Determinants of Customer Acceptance of E-wallet Financial Transaction Technology

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ABSTRACT

E-wallets and mobile payment systems provide fast, secure, and convenient payment in transactions services while minimizing the need for human interaction. However, the adoption of the technology has had varying levels of success. Using a sample of 300 respondents, the study randomly assigned participants into three conditions and provided different information on how they would be reimbursed by their bank in case of fraud. In the three conditions, this study analyzed how prior consumer knowledge about e-wallet technology along with perceived usefulness, perceived ease of use, and trust may be related to the attitudes on the use of e-wallet which subsequently relates to the intentions to use this technology. The findings suggest that consumer knowledge about e-wallet technology, relates to perceived usefulness, perceived ease of use and trust which are known to influence attitude and behavioral intention to adopt and use new technologies such as the e-wallet. In addition, the results displayed that those respondents who were assured of immediate reimbursement in case of fraud may have higher intention to adopt e-wallet when compared to those who were informed of delayed reimbursement or those given no information. While, the ANOVA results provided tentative support the hypothesis that assurance of reimbursement will improve the intention to use e-wallet, the ANCOVA findings demonstrate that when prior consumer knowledge is taken into consideration and groups are compared with this factor in the equation, the group differences disappear.

Keywords: Technology Acceptance Model, E-wallet, Mobile Payment, Consumer Knowledge, Trust

ÖZ

Elektronik cüzdan sistemi temas gerektirmeyen hızlı, güvenilir ve kullanışı kolay ödeme hizmeti sunmaktadır. Ancak, bu sistemin yaygınlaşması çeşitli seviyelerde başarılı olmuştur. 300 kişilik bir örnekleme topluluğu baz alınarak bunlar üç ayrı gruba bölünmüş ve her bir gruba dolandırıcılık olması halinde bankadan farklı bir süre içerisinde geri ödeme yapılacağı bilgisi verilmiştir. Her üç grup için de elektronik cüzdanla ilgili müşteri ön bilgilendirmesinin algılanan kullanışlılık, algılanan kullanım kolaylığı ve güvenlik üzerindeki etkileri ile bunların davranış ve kullanım niyeti üzerindeki etkileri incelenmiştir. Sonuçlar müşteri ön bilgilendirmesinin algılanan kullanışlılık, algılanan kullanım kolaylığı ve güvenlikle ilişkili olduğunu ve bunların da davranış ve kullanım niyetini etkilediğini önermektedir. Buna ek olarak, sonuçlar dolandırıcılık halinde hemen geri ödeme alınacağı sözü verilen müşterilerin belirli bir süre sonra ödeme yapılacağı sözü verilen veya hiç bir bilgi verilmeyen müşterilere kıyasla daha yüksek elektronik cüzdan kullanım niyeti olduğu göstermektedir. ANOVA sonuçları geri ödeme garantisinin elektronik cüzdan kullanım niyetini artırdığını izah etmektedir. ANCOVA sonuçları ise müşteri ön bilgilendirme dikkate alındığında gruplar arası farklılıkların ortadan kalktığını göstermektedir.

Anahtar Kelimeler: Teknoloji Kabul Modeli, Elektronik Cüzdan, Mobil Ödeme, Müşteri Bilgilendirmesi, Güvenlik

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LIST OF ABBREVIATIONS

ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
ATM	Automatic Teller Machine
ATT	Attitude
AVE	Average Variance Extracted
B2B	Business to Business
B2C	Business to Consumer
BI	Behavioral Intention to Use
CAT	Cognitive Absorption Theory
CK	Consumer Knowledge
COVID-19	Coronavirus Disease 2019
CR	Composite Reliability
DIT	Diffusion of Technology Theory
ECM	Enterprise Content Management
EPS	Electronic Payment Systems
EV	External Variable
fsQCA	Fuzzy Set Quality Comparative Analysis
GMS	Group Special Mobile
GNP	Gross National Product
HTMT	Heterotrait-Monotrait Criterion
IDT	Innovation Diffusion Theory
IRT	Innovation Resistance Theory
ISI	Institute for Scientific Information

ISSM	Information Systems Success Model
M	Mean
MTAM	Mobile Technology Acceptance Model
NFC	Near Field Communication
P2P	Peer to Peer
PEOU	Perceived Ease of Use
PLS-SEM	Partial Least Squares Structural Equation Model
POS	Point of Sale
PU	Perceived Usefulness
Q2	Cross Validated Redundancy Measure
QR code	Quick Response Code
R2	Coefficient of Determination
SOR	Stimuli-Organism-Response
SPO	State Planning Organization
SWIFT	Society of Worldwide Interbank Financial Telecommunication
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
TRU	Trust
TTF	Task Fit Technology
UAUT	Unified Theory of Acceptance and Use of Technology
UN	United Nations
US	United States
USD	United States Dollar
VIF	Variance Inflation Factor

Chapter 1

INTRODUCTION

The world has been going through digitalization of services in the recent years. Digitalization of finance has influenced the procedures of banks, firm to firm relations and customer shopping habits. After the surge of credit card use the world is now faced with "cashless" transaction models where payments are made with use of internet.

Mobile banking has led its place to mobile payment systems with or without banks where transactions are carried out via mobile phones. Consumers are using their internet or mobile phones to make payments from their accounts in a fast and secure environment. However, the efficiency that can be achieved through the use of e-wallet systems is not realized because some consumers are not willing to accept the new technology or they do not have adequate information about the benefits and ease of the new system. Therefore, it is eminent to investigate factors that contribute to technology acceptance and evaluate reasons that hinder its use.

Small enterprises and millions of companies are using digital networks with an estimated number of 1.9 billion purchasing goods and services on internet according to 2020 report of UN's Task Force for Digital Financing. Both ordinary citizens as well as business owners are depending heavily on online transactions with the development of e-commerce and growing use of internet. Public administrations are also using digital finance leading to faster, accountable and more transparent financial data preservation (Task Force on Digital Financing 2020). Digitalization is also

expected to ease the way for more sustainable development goals. Growing digitalization can direct domestic savings into more profitable investments, can lead public administrations for more accountable management and can reshape financial environment accordingly. Digitalization is also seen as a path to enable citizens to have better control on their finances.

It is stated that USD 130 billion is spent daily by consumers' worldwide and governments' use 85 billion US Dollars globally each day (Task Force on Digital Financing 2020). Such spending requires decisions of how and what to consume that shapes world's future resources and development. Therefore, digitalization is regarded as an opportunity to direct limited resources for more sustainable development goals. For example, digitalization can lead to more transparent public expenditure with tax payers having more information on the destination of public funds. Public administrations might be compelled to implement more environmentally friendly projects with better preserved digital data information. However, barriers also exist in the era of digitalization. 750 million people are excluded from online service and 3.3 billion people are deprived of necessary possessions to reach digital financial systems in the world (Task Force on Digital Financing 2020). Lack of resources of developing countries, reluctance of accountability and distorted market mechanisms all contribute to difficulties of reaching digital finance systems. However, with crises such as COVID 19 pandemic and citizens' desire to have a faster and safer ways of living is expected to continue the quest in digitalization.

The banking sector have used the developments in digitalization and combined it with their services by providing transaction venues online together with mobile applications. Mobile banking reduced cost of transactions, offered banking services regardless of distances and increased speed of services available for customers. Recent

technological changes and the introduction of online banking applications compelled banks to explore, develop and invest more in digital platform. Online banking altered the nature of business of producing banking services from payments to distribution and marketing. This new venue also developed new "bank customer values" (Llevwellyn, 1997; Methlie and Nysveen 1999) which compelled banks to dwell on for increased trust and loyalty (Shergill, & Li, 2005). Growth of electronic commercial activities led banks to dwell more in technological products that can be used with ease and safely online. Recent increase in use of mobile phones made introduction of new applications such as mobile payments possible.

Mobile payment services are becoming more and more popular throughout the world as technology provides faster and cashless applications to make payments. People's use of mobile phones to send funds from their accounts to others for payment transactions has become a widely used technological discovery substituting the use of credit cards (Pew Charitable Trust, 2020). According to the statistics of Merchant Savvy, a United Kingdom based consulting firm of financial services, as of January 2022 the worldwide e-commerce retail sales of 2021 has reached up to USD 4.92 trillion and estimated annual growth rate of mobile payment market for 2021-26 forecast will be 23.8%. 44.5 % of e- commerce transactions are carried out by digital mobile payments in 2021 (Merchant Savvy, 2022).

Digital finance including mobile payments will continue to transform mobile phones into financial instruments for billions of people around the globe giving them more control. The rapid increase in the use of mobile phones and our growing use of internet-connected technologies in our daily life have had an impact on consumer financial transactions and have led to the development of cashless electronic payment systems. Research conducted by Pew, a US-based think tank exploring social issues

and public opinion, reports that there is an increasing trend in the use of e-wallet technology in United States. The money spent on technology in the financial sector has grown from 2 billion US Dollars to over 100 billion US Dollars between 2010 and 2018 (Pew Charitable Trust, 2020).

The research report also argues that there are some hurdles that limit the consumer adoption of mobile payments compared to the adoption of credit and debit cards (Pew Charitable Trusts, 2020). The Pew Report states that 30 percent of consumers in the US reported their concerns of possible loss of funds and feared "poor protection" compared to credit and debit cards and 15 percent reported actual issues they experienced with the use of mobile payments (Pew Charitable Trusts, 2020). Thus, despite the increasing trend in adoption worldwide and the introduction of mobile payment systems such as e-wallets in many countries, the acceptance of this new technology is still far from reaching its potential levels (De Kerviler, Demoulin, & Zidda, 2016).

Policy makers and regulators continue to develop new systems in an effort to control the security issues related with e-wallet payment systems. Present old regulatory infrastructure is under continuous reconstruction to enable transaction of funds with more speed in a regulated manner in most markets. For example, in United States payment market the policymakers are working on timely transaction of funds and developing "sandboxes" programs that will require decreased amount of licensing and supervision processes in an effort to provide a better innovative environment for new technological ideas (Pew Charitable Trust, 2020).

E-wallet and the associated mobile payment systems are important innovations enabling fast and secure payment in transactions while minimizing the need for human interaction. Especially during the COVID pandemic, contactless payment methods

gained more attention. Consequently, a number of studies have been carried out in an effort to explain antecedents of consumer adoption of e-wallet technology. For example, Undale, Kulkarni, and Patil, (2020) studied the "security concern" and "comfort ability" of using e-wallet during the COVID- 19 pandemic environment. However, despite the increased use of mobile payment applications during COVID-19 the acceptance and use the new technology still has not reached to its potential level. Pew Charitable Trust's research states that mobile payment use among lower income population as well as among older generation continues to remain at low levels. In addition, income levels of millions have declined as a result of pandemic conditions and thus lowered e-wallet usage even further (Pew Charitable Trust, 2020). Therefore, studies on the acceptance of this new technology continue to explore factors influencing the use of e-wallet applications by employing various models.

Technology acceptance is studied in the past by models such as Theory of Reasoned Action and later by Technology Acceptance Model. In Theory of Reasoned Action the people's behaviors are believed to be shaped by their beliefs, intentions and attitudes. In Theory of Planned Behavior individuals' beliefs and subjective norms shape their attitudes and their beliefs that they can perform a specific behavior (Marangunic & Granic, 2015).

Technology Acceptance Models (TAM) claimed that an individual's perceived ease of use and perceived usefulness shaped by external conditions influence his/her attitude and behavioral intention. Triverdi (2016) investigated elements which influence the acceptance of e-wallet among active mobile internet users between the ages of 18 and 35 who are referred as Gen Y in India by using the Technology Acceptance Model. The study used Technology Acceptance Model in exploring effects of perceived trust, subjective forms and self-efficacy together with perceived

usefulness and perceived ease of use on behavioral intention to use e-wallet. Liébana-Cabanillas et al. (2014) employed Technology Acceptance Model and investigated the moderating effect of age and the influence of ease of use, attitude, usefulness, risk and trust on e-wallet adoption.

Recently, Venkatesh et al. (2003) proposed a different extension model called the Unified Theory of Acceptance and Technology (UTAUT) combining previous models on consumer acceptance of technology. In this model performance expectance, effort expectance, social influence and facilitating conditions influence the diffusion of technology (Al-Somali, Gholami, & Clegg, 2009).

Technology Acceptance Model is still the most popular model used for determining factors influencing new technology use. While, most studies investigated the effects of perceived usefulness and ease of use which are the two of the main constructs of TAM, few have questioned the influence of knowledge about e-wallet technology and the possible role that assurances from financial institutions could play as additional factors influencing adoption of this technology.

Consumers' perceptions of anything new are influenced by the amount of information they have on the new subject or product. Knowledge may come from advertisements, campaigns, written material or sometimes by word of mouth. However, the effect of having adequate knowledge is expected to shape one's perception as to whether the new product will benefit one's self or not. Hearing or learning the ease of use, the safety precautions and usefulness is assumed to direct consumers' attitudes towards using the new product in question.

In addition, consumers want to have some guarantees on the safety of financial applications while making online transactions. Financial incentive offers and cash

back campaigns are used in order to increase e-wallet adoption. However, consumers might need more assurances about their funds in case of fraud or misuse.

This study aims to consider the influence of consumer knowledge and assurances in addition to the perceived usefulness, ease of use and trust on the attitudes and intentions to use the e-wallets in everyday life.

The study carried out a survey where respondents were randomly assigned to three groups. A control group was formed which was not offered any assurances from their financial institution for reimbursement in the case of problems with their payment. In the other two groups, one group was assured that their financial institution will immediately cover any damages they might incur due to any unauthorized use of their e-wallet and the other group was informed that their financial institution will cover any damages after reviewing the case within five working days.

The proposed research questions are:

(1) What are the factors influencing the customer intentions to adopt the e-wallet in general?

(2) How does the knowledge that there will be guaranteed reimbursement in case of fraud/unauthorized influence consumer adoption intentions?

(3) How does the time frame of the guaranteed reimbursement in case of unauthorized use influence consumer adoption intentions?

The rest of the study includes a review of literature on e-wallet, prior studies on e-wallet and use of technology in banking together with literature on TAM. Hypotheses are developed based on the literature review and gathered data and existing theories. Methodology section includes information on sampling methods, context of the study and sampling characteristics. Measures used to analyze items of each construct are also identified in this section. Results of the study are presented in the

fifth section followed by the discussion section. The discussion section includes ideas on the meanings of findings and their theoretical and practical implications. The seventh chapter is on a case study of e-wallet application system implementation of Cyprus Turkish Cooperative Bank where the experience of e-wallet introduction to the North Cyprus market is evaluated. The conclusion section contains views on the limitations of the study together with recommendations on future possible research.

Chapter 2

LITERATURE REVIEW

2.1 E-wallet

Banking system and financial services in general depend heavily on trust. Secure financial clearing and fund transfer payment systems adopted by banks and other financial institutions form the main infrastructure of business transactions and thus economic growth. A productive and well qualified clearing system is necessary for the success of banking services. In recent years, technological breakthroughs in information and communication technology have altered the nature and speed of the financial system and the transactions (Kalyani, 2016).

E-wallet is mainly a fintech application where "fintech" is described as the merger of "financial" and "technology" changing business procedures and models via the use of Information Technology (Venkatraman, 1994, 2000; Alam et al., 2021). Business models have been changed at five levels where technology was instrumental. Fintech began in the 18th century with financial globalization, continued with use of ATMs in banking, and followed by fintech startups and innovations (Arner et al., 2015; Salampasis & Mention, 2018; Alam et al., 2021).

The first stage of Fintech 1.0 started with global connections between banks and financial institutions during the period of 1866-1967. Infrastructures such as bridges and railroads enabled faster transportation leading a way to more efficient global trade (Arner et al., 2015; Boamah & Murshid, 2019; Alam et al., 2021). The second stage of Fintech 2.0 covering the period of 1967-2008 began with the

instillation of first Automatic Teller Machine in 1967 and introduction of digital finance. Stock exchange trading activities began in 1971 and traditional banking systems became more digital where payment systems such as SWIFT and automated clearing house services were introduced. Online banking, mobile payment systems and e-commerce with the introduction of internet became a part of societies and businesses' lives requiring regulations (Arner et al., 2015; Boamah & Murshid, 2019; Alam et al., 2021).

The third stage of Fintech 3.0 began in 2008 with the global financial crisis and is continuing at present. In this period developed countries began to construct more secure and better models of business after the financial crisis. Transparency became the first requirement in finance industry and consumers required more information from banks and similar financial establishments. Bitcoin was introduced in 2009 and digital payment systems were launched such as Google wallet and Apple Pay leading to a competition between banks and fintech companies (Palmie et al., 2020; Alam et al., 2021). The last level Fintech 3.5 focused on younger generations with mobile phones. Convenience and fast way of life together with trust in technology enabled fintech innovations to gain acceptance. Many businesses made use of this new venue for better profits and larger growth. Legislations and regulations are changed according to requirements of these new business and transaction models (Salampasis & Mention, 2018; Schindler, 2017; Kerenyi & Molnar, 2017; Alam et al., 2021).

Thus, since the beginning of 1990s the way of conducting business and shopping changed venue into a new path known as electronic commerce. This new way of completing business has two main venues, business-to consumer (B2C) and business-to-business (B2B) e-commerce. In business-to-consumer buyers have greater role in shaping products, delivery procedures and designs through their preferences.

E-commerce enables buyers to have choices among convenient prices, sales venues for desired products and services, financial products and self-management in their accounts. Businesses have thus evolved and adapt their procedures accordingly (Vulkan, 2003; Kalyani, 2016). In order to provide a safe exchange environment for e-commerce electronic payment systems new venues came into play. Electronic payment systems (EPSs) were developed to provide a secure and efficient way to complete a financial exchange to take place in an online environment and deliver buyers' payments to businesses in an efficient way (Kalakota & Whinston, 1997; Kalyani, 2016).

Electronic payment systems not only provided reduced operational and payment processing costs but also suited to the new mode of increasing online sales and decreasing costs of technology (Kalakota & Whinston, 1997). Having and using credit cards is more expensive when compared with online payments (Laudon & Traver, 2002). In addition, consumers prefer a fast and fruitful transaction system (Nizam et al., 2019; Alam et al., 2021). Mobile payment system is a breakthrough from paper based to electronic based systems decreasing both time and expenses involving transactions. Thus, reduced payment costs are one of the main advantages of using electronic payment systems for both customers and business owners relative to others. On top of reduced costs, consumers have the advantage of using a more secure transaction method since GMS, Sim cards and other protection technologies provide better encryption of transaction data (Liébana-Cabanillas, Sánchez-Fernández, Munoz-Leiva, 2014). Naturally, some scholars also claim that there exist disadvantages of using e-wallet services. For example, increase in number of users may create network influences (Hagiu & Rothman, 2016; Alam et al., 2021). In

addition, there always exists a possibility of fraud risk like in every financial transaction (Niranjanamurthy et al., 2013; Alam et al., 2021).

Over the recent years, businesses and financial institutions have also begun to invest in electronic commerce and payment systems. Research was diverted to factors influencing buyers to accept IT based payment systems. One of these new channels that financial institutions invested in information technology is electronic wallet (Lim, Ahmad, & Talib, 2019). With electronic commerce mobile phones have turned into credit cards, point of sales and automated teller machines where one can reach his/her accounts instantly and complete remote payments. Thus, financial institutions such as banks began to invest more funds and attention to electronic banking and recently to e-wallet since preferences and life styles of consumers became heavily dependent on mobile phones and electronic commerce (Lim, Ahmad, & Talib, 2019).

Online banking altered the nature of business of producing banking services from payments to distribution and marketing. Especially in newly developing regions of the world where individuals have limited access to financial services, electronic payment systems reached via smart phones have increased the rate of transactions on these platforms (Taufan & Yuwono, 2019). Mobile phones began to be used as internet banking terminals, point of sales and a way to provide instant access to bank accounts. In addition, changes in technology and banking traditions enabled people to adapt their lifestyles accordingly and to use a new technology such as e-wallet in present circumstances (Lim, Ahmad, & Talib, 2019).

Electronic wallet (e-wallet) is one of the technological advances which developed as a safe and efficient electronic payment system in e-commerce. Electronic wallet provides simple, safe and protected transfer of money through electronic devices. Money in the sense we know is converted into electronic money

and sent from one electronic device to another (Uddin & Akhi, 2014; Siddiquie, 2014; Amin et al., 2015).

E-wallet enables individuals to execute transactions with mobile applications instead of physical transactions. In e-wallet technology a mobile application is used to complete a financial payment transaction to convey funds from one party to another (Teng, & Khong, 2021). With the increased use of mobile phones and applications, banks and sellers faced new and more easy access opportunities to markets where they can market brands and increase revenues at a larger scale with faster transactions and lower costs (Liébana-Cabanillas, Sánchez-Fernández, Munoz-Leiva, 2014; Teng & Khong, 2021). In addition, consumers have safer transactions with the help of encrypted mobile phone applications with increased protection and reduced application time (Liébana-Cabanillas, Sánchez-Fernández, Munoz-Leiva, 2014).

Developments in network technologies and increased use of smart phones thus led to the evolution of new forms of electronic commerce such as e-wallet (Slade et al., 2013; Teng, & Khong, 2021). At first electronic wallet payment systems were grouped as "remote" and "proximity" classes according to technologies required (Ondrus & Pigneur, 2007; Slade et al., 2013; Teng, & Khong, 2021). Remote mobile payment systems were used for digital content services and web sales with mobile phones (Khalilzadeh, Ozturk, & Bilgihan, 2017; Slade et al., 2013 Teng, & Khong, 2021). Consumers can pay for digital or online purchases with use of short message service or mobile internet connection as they do in e-commerce (De Kerviler, Demoulin & Zidda, 2016). Proximity mobile payment systems are usually employed for ticketing, vending, and point of sale item purchases. Buyers use a QR code with use of their mobile payment application and hold up their phones for reading by the seller's Near Field Communication (NFC) terminal or Bluetooth device (De Kerviler,

Demoulin & Zidda, 2016). Businesses use electronic wallets as point of sale (POS) terminals once credit cards of customers are connected to their smart phones. Customers can use e-wallets as payment platforms through the mobile applications downloaded (Wang et al., 2016; Teng, & Khong, 2021). Here, bank's mobile applications or private financial institutions' applications act as intermediate providers of connection services in transactions between the buyer and the seller.

As mobile phones became more suited for personal specifications, Near Field Communication (NFC) technology made contactless payments possible. Near Field Communication (NFC) technology sends data within a 10 to 20 cm scale by bringing or showing the mobile phone close to terminal (Becker, 2007; Chen, 2008; Zhao, Anong and Zhang, 2019).

NFC payments are faster than using credit cards and are more secure and convenient in exchanging transfer information. Some studies indicate that NFC mobile payment can be 15 to 30 seconds faster than completing procedure at a POS (Hayashi, 2012). Banks can authorize a payment to a retailer and then the retailer can send the phone a receipt and any kind of promotion via an NFC-ready mobile phone (Hamblen, 2012; Zhao, Anong, Zhang, 2019).

Near Field Communication (NFC) chips in mobile phones enabled smart phones to be used as contactless credit or debit cards in electronic mobile payment. In order to use an electronic wallet (e-wallet), one needs a proximity mobile payment application downloaded and installed to a mobile phone. Such an installation modifies the mobile phone into an e-wallet. Then, just as using a credit or debit card one can hold his/her mobile phone to an NFC enabled POS terminal and make payment (Wang et al., 2016; Teng, & Khong, 2021). World known examples of NFC technology are Apple Pay and Samsung Pay but there are other mobile payment systems which do not

use NFC and rather employ Quick Response code instead while making real time payments (Teng, & Khong, 2021).

The payment is made by QR (Quick Response) code scanning or in-application payment. E-wallet also can transfer funds between persons who are referred to as “peer to peer (P2P)” transaction (Ariffin, Abd Rahman, Muhammad and Zhang, 2021). Quick Response codes make use of a two-dimensional barcode and require lower technological infrastructure rather than POS terminals and are widely used in retail, restaurant and financial sectors (Liebana-Cabanillas, Luna, & Montoro-Ríos, 2015; Teng, & Khong, 2021).

Thus, mobile payments can be classified into two as proximity and remote payments with other sub divisions according to the technology used in making transactions as shown in Figure 1.

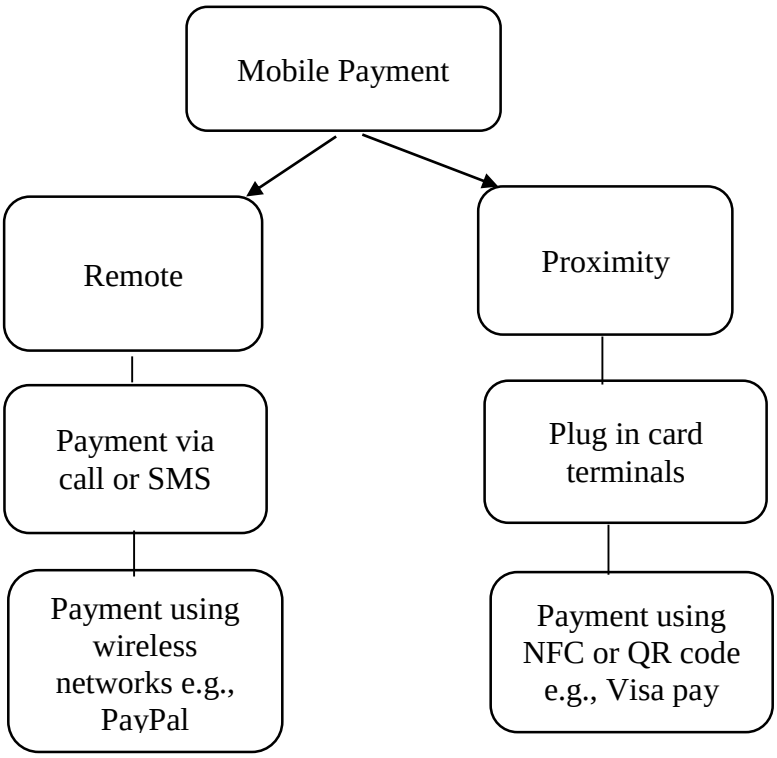

Figure 1: Mobile payment classification. Adopted from (Slade et al., 2013 and Teng, & Khong, 2021)

Other studies classified mobile payment systems into four different categories. According to Gobry (2012), there exist four different types of mobile payment services such as “carrier billing, Near Field Communication (NFC), and apps and card readers” (Moghavvemi, Phoong & Phoong, 2021). In carrier billing the transaction amount is put directly to the consumer’s phone bill. This type of mobile payment systems are used in economies where there exists obstacles to reach credit card services. It is also used in electronic device commerce (Heggestuen, 2014; Moghavvemi, Phoong & Phoong, 2021). NFC as explained previously is based on proximity payment which is easily carried out by smart phones equipped with NFC technology. The third type is the “app” which is used commonly by banks and sellers. The fourth category is payment with a card reader suitable to read credit cards and contactless payments Moghavvemi, Phoong & Phoong, 2021).

2.2 Previous Studies on E-wallet Acceptance

Venkatesh, et al. (2003) studied factors that influence consumer acceptance of new information technology systems. They employed their newly developed model called Unified Theory of Acceptance and Use of Technology (UTAUT) and claimed that individual responses to using information technology directly influence behavioral intentions to use and actual adoption of new technology (Venkatesh, et al., 2003).

Shin (2009) used Unified Theory of Acceptance and Use of Technology (UTAUT) to determine factors influential in the adoption of mobile payment applications. The study used variables such as security, trust, social influence and self-efficacy together with known constructs of Technology Acceptance Model such as perceived ease of use and perceived usefulness. The findings confirmed the effect of perceived ease of use and perceived usefulness on attitude. In addition, perceived security and trust were determined as influential factors affecting intention.

Demographic specifications were also highlighted as influential as moderating agents on the relationships between constructs (Shin, 2009).

In another study the variables influencing the intention to use mobile payment technology were analyzed by Kim, Mirusmonov and Lee (2009). They reviewed the existing literature and studied various "user-centric" elements of various users which they believed to affect mobile payment use. They proposed a mobile payment research method with two user-centric variables such as personal innovativeness and mobile payment knowledge. The mobile payment properties were classified as "mobility, reachability, compatibility and convenience." They also categorized users as "early" and "late" users. The findings of the study indicated that perceived usefulness and perceived ease of use has the strongest influence on intention to use mobile payment services. Compatibility was not influential in mobile payment adoption and early users (adopters) are affected by perceived ease of use. Late users, on the other hand, are influenced by perceived usefulness, reachability and convenience (Kim, Mirusmonov and Lee, 2009).

In 2013 Zhou (2013) studied the continued intention to use mobile payment systems claiming that keeping users and enabling them to use the service for a long period is essential for system providers. The author employed The Flow Theory and analyzed the success of information systems in an effort to determine variables that influence continuous use of mobile payments. De Leon and Mclean's (1992) Information Model Success Model proposes that system quality and information quality influence the user satisfaction. They later included the service quality into the model and argued that these success levels influence user and institutional behavioral changes. The results of the study indicated that service quality influences trust and system quality affects satisfaction. In addition, information quality and service quality

influence the flow and trust, flow and satisfaction all together bring about the continuous intention to use mobile payment systems (Zhou, 2013).

In a study done by Shaw (2014) the influence of trust in mobile payment adoption with use of Technology Acceptance Model incorporating constructs such as perceived usefulness was researched. Shaw emphasized the low rates of mobile wallet acceptance in North America by consumers and retailers who are slow in adapting the new technology. According to the study, consumers usually learn about the new technology through informal channels and are concerned with security. The research which is based on a sample of Canadian consumers revealed that perceived usefulness is the main "influencing" construct and informal learning is mediated by trust in e-wallet adoption (Shaw, 2014).

In a similar project on mobile payment systems, De Reuver et al. (2015) analyzed collective action for mobile payment platforms and claimed that banks and telecom operators still try to form platforms for better functioning mobile systems in the Western countries. The authors analyzed three Dutch Banks and three Dutch telecom operators who jointly formed a service manager for mobile payment services. The study employed The Collective Action Theory of Olson (1965) which suggests that rational people evaluate the actions of others before deciding to cooperate and Platform Theory of Gawer (2009) which states that platforms have modular architectures where independent modules can be used in multiple products to investigate the issues related with cooperation of banks and telecom operators. The findings revealed that different objectives, lack of common interests and dependencies and governance issues lead to problems in formation of service platforms (De Reuver et al., 2015).

Although scholars such as Dahlberg et al. (2015) stated that mobile payment should be studied in three venues such as strategy, ecosystems technology and technological environment, it has taken more attention from the marketing research (Flavian & Guinaliu, 2020). Marketing scholars heavily researched mobile payment systems firstly because its suitable nature reaches to a wide range of consumers and thus provides a large potential (Liebana-Cabanillas, Luna, & Montoro-Ríos, 2015; Flavian & Guinaliu, 2020). Secondly, despite other technology acceptance researches in marketing, e-wallet and mobile payment in general presents an untapped area of study. Lastly, in order for consumers and sellers to gain from this new technological transaction venue, consumer preferences and reasons of use should be thoroughly analyzed (Dahlberg et al., 2015; Flavian & Guinaliu, 2020).

In 2015 Dahlberg et al. (2015) carried out a literature review on articles completed between 1999 and 2006 related with e-wallet research. They concluded that most of the published articles included topics of consumer adoption and technology aspects of mobile payment services. They claimed that mobile technology is a complex and continually changing topic. Therefore, studies done on mobile payment systems may have inadequate provision for the field. In addition, especially at times when mobile payment systems were new the quality of data suffered since both consumers and institutions were unfamiliar with the concept. The theoretical models were also not fully developed during the concerned period. The absence of theory development and a sound framework inhibited the research done in this period. Moreover, studying different aspects of mobile payments such as technology, ecosystem or adoption may lead to a partial understanding of the concept. Lastly, according to the authors, since mobile payment systems are used in different parts of

the world with various socio economic and cultural levels, it is dangerous to generalize the findings of research done in the concerned period (Dahlberg et al., 2015).

Studies after 2015 include a degree of diversification towards fields of adoption, technology and ecosystem. Adoption research includes studies of factors influencing acceptance of technology. Technology research examines formation and analysis of mobile payment technologies. Ecosystem research studies investigate mobile payment ecosystem and business models (Teng, & Khong, 2021).

When research done in different cultures are examined, a study by Keramati et al. (2012) on adoption of mobile payment systems in Iran combined behavioral factors with technological factors of technology acceptance. A survey of 623 questionnaires among Iranian customers was completed. The findings revealed that "ease of use, usefulness, trust, compatibility, cost, norm, payment, habit, availability of mobile phone skills and convenience" influence e-wallet adoption significantly (Keramati et al., 2012).

In 2016 De Kerviler et al. (2016) analyzed consumers' acceptance of proximity mobile payment technology with use of smart phones. They employed a perceived value perspective. Perceived value perspective is defined as the perspective of a user towards a product of service based on the rate that good or service satisfies the expectations and requirements of the user (De Kerviler et al., 2016). The scholars claimed that perceived benefits ("hedonic, utilitarian, social benefits") and financial and privacy risks influence e-wallet acceptance.

Another study done on e-wallet in India provided information on factors influential in using mobile services. Yadav (2017) studied elements that affect consumer intention to use e-wallet in India. Yadav (2017) claimed that mobile wallet enhances the chances of getting involved in finance by public who were used to

traditional banking practices in the past. In addition, the researcher points out that establishments and finance institutions can use mobile wallets to provide a wide range of services to more people at a low cost regardless of their social or positional situation. The study was based on a sample of 350 respondents from all areas of India with use of a structured questionnaire. The findings revealed that only perceived usefulness actively influences consumer intention and adoption of e-wallet.

In another study related with e-wallet was carried out in Thailand. Direkwuttanakunchai and Yousapronpaiboon (2017) studied mobile payment acceptance in Thailand based on intention to use Samsung Pay. Multiple regression analysis of 400 credit card users (mostly female between ages of 28 and 50 years old private sector employees) was employed. The findings demonstrated that perceived usefulness has the highest influence on technology adoption. Perceived usefulness was followed by perceived ease of use. Trust was another construct analyzed with benevolence, orientation to resolve, credibility and integrity. The study resulted by indicating that perceived usefulness and trust with sub categories of credibility, integrity and benevolence affect attitude to adopt Samsung Pay in a positive direction (Direkwuttanakunchai and Yousapronpaiboon , 2017).

Riskinanto, Kelana, and Hilmawan (2017) studied the acceptance of e wallet system in Indonesia with special attention given to the effect of age. The scholars claimed that different age groups in population decide to use technology in various ways different from each other. Thus, the study analyzed whether the use of e wallet differs according to different age segments of the population. Technology Acceptance Model moderated by age was employed while analyzing a sample of 523 online questionnaires. The results demonstrated that only perceived ease of use has a positive

influence on perceived usefulness which was moderated by age in adoption of e wallet system.

Another study was carried out among Go-Pay users in Indonesia on factors influencing the intention to adopt e-wallet through an online survey (Taufan & Yuwono, 2019). The data was analyzed based on Technology Acceptance Model. According to researchers, in Indonesia the majority of the population has limited connection with financial services due to poor infrastructure, location and high prices. In addition, the adoption rate of mobile payment systems is much lower than the rate in other neighboring countries. The results demonstrated that the intention to use Go-Pay is significantly influenced by perceived value, perceived usefulness and perceived ease of use (Taufan & Yuwono, 2019).

Studies on e-wallet were carried out for a variety of payment systems with different models. Kalinic et al. (2019) studied the consumers' intention to use peer to peer mobile payment systems with a proposal of a behavioral model. They used a sample of 701 online questionnaires in order to determine factors influencing peer to peer mobile payment adoption. They also employed a "neural network" model (multilayer perceptron model where two groups with different variables are formed and studied) to list the effects of significant variables obtained from the research. Their findings indicated that perceived usefulness has the strongest influence on the actual use of peer to peer mobile payment system. In addition, social norms and perceived trust also affect adoption of peer to peer mobile technology (Kalinic et al., 2019).

In a similar study Flavian and Guinaliu (2020) explored main factors determining e-wallet and mobile payment adoption including the construct of mindfulness. According to researchers, mobile payments have the advantage of being "convenient" when compared to existing system of payments such as credit cards,

since mobile payments are not hindered by time or place (Shao et al., 2019; Flavian and Guinaliu, 2020). However, although mobile payment systems have higher users in Asia and Far East countries, the rate of adoption in western world is lower than expected (Liébana-Cabanillas et al., 2018a, b; Flavian and Guinaliu, 2020). This position has been reviewed by numerous studies using various models of acceptance and theories.

The authors believe that psychological factors of users should also be included in the research. "Mindfulness" is defined as a state of being aware of the present situation, concentrating on a specific thing at a point in time. This concept is similar to "perceived behavioral control" in Theory of Planned Behavior in marketing since they both change from person to person and are both related with a person's understanding. Flavian and Guinaliu (2020)'s study used Sun et al. (2016) 's four factors of mindfulness and employed them for the analysis of mobile payment adoption systems. Sun et al. (2016) proposed that "a mindful person" will show better attention to the functions of a new technology and their attitudes will be influenced accordingly. The four dimensions of mindfulness which affect attitude are listed as "engagement with the technology, technological novelty seeking, awareness of local contexts and cognizance of alternative technologies" (Sun et al., 2016; Flavian and Guinaliu, 2020). The study concluded that mindfulness, perceived usefulness, perceived ease of use and attitude are the major drivers of behavioral use intention.

At the 4th International Conference on Computer Science and Computational Intelligence 2019 on 12–13 September 2019 Karsen et al. (2019) presented a study on technological factors of mobile payment systems. The study was carried out with a qualitative literature review and highlighted 17 factors essential for mobile payment acceptance. According to the study, these factors can be classified into 3 categories as

technological factors, personal factors and ecological factors. Technological factors include "safety, expected performance, facilitating conditions, absorbency, availability, consistency and product involvement" (Karsen et al., 2019). Personal factors contain "compatibility, value, services, accessibility, system quality, agreement and usability." The study also proposes that in addition to technological, personal ecological factors "structural certainty, acceptance of acceptance and awareness" should also be considered while launching a mobile payment application (Karsen et al., 2019).

Another theory used for e-wallet studies is Innovation Resistance Theory. Kaur et al. (2020) studied e-wallet adoption claiming that the market for mobile payments is still not fully developed due to consumers' rejection of mobile payment use. The authors studied mobile payment system usage by employing Innovation Resistance Theory. Innovation Resistance Theory proposes that there exist active and passive resistance which are behavior of people affected by consumers' existing state and belief systems. Active resistance is related with the properties of the innovation and can be explained by functional barriers. Passive resistance is influenced by the existing belief systems and can be related with psychological barriers. The sample included 1256 mobile wallet users. The results of the study demonstrated that usage, risk and value barriers influence the intention to use mobile payment in a negative way. Tradition and image barriers have no relation with intention to use mobile payments. In addition, usage and value barriers also have a negative relation to intention to use mobile payment systems (Kaur et al., 2020).

In a recent research Liebana- Cabanillas et al. (2020) studied the mobile payment service adoption in an "emerging market" namely India. According to the study, although the government of India is employing policies favoring digital and

mobile payment use, the economy is still mainly cash based system. The study proposed that "innovation, stress and perceived ease of use" affect the "perceived usefulness" of mobile payment and that "perceived usefulness, satisfaction, risk and trust" of the system affect intention to adopt mobile payment systems. The findings revealed that the propositions of the study are confirmed.

Mobile payment adoption is also studied in the Jordanian context by Al-Okaily et al. (2020) for the case of Jordan Mobile Payment system. The Unified Theory of Acceptance and Use of Technology (UTAUT2) was employed by extending the theory with addition of four new external factors such as awareness, security, privacy and culture for the Jordanian population. The study also explored whether the connection between social influence and intention to use e wallet is moderated by culture. The sample consisted of 270 people. The findings revealed that the intention to use mobile payment systems is influenced positively by "performance expectancy, social influence, price value, security and privacy." However, the study also showed that culture does not moderate the connection between social relations and intention (Al-Okaily et al., 2020).

Another study on preferences of users of mobile payment services was carried out in South Korea by Choi et al. (2020). The authors claimed that many studies of mobile payment adoption investigated general reasons influencing acceptance of technology. They stated that few studies evaluated the specific factors influencing the adoption process. The study analyzed specific antecedents of mobile payment adoption with use of 373 respondents of an online survey. Five service characteristics were investigated namely "mobile payment, platform assurance policy, mileage program authentication method, and affiliated stores." The findings revealed that assurance policy is the category that has the highest influence on users' preferences.

The study also divided the respondents into two groups as "safety seekers and platform adheres" according to their choices and evaluated the study accordingly (Choi et al., 2020).

Generation specific preferences were researched in other studies. For example, technology acceptance of millennial in India was studied by Sarmah & Kanojia (2021) with the use of extended Technology Acceptance Model. The sample consisted of 438 graduate students from private universities in northern India since younger generations are the most common users of the new technology. The findings revealed that there exists a significant and positive connection between perceived ease of use and perceived usefulness. In addition, perceived ease of use positively affects behavioral intention. Another result of the study demonstrates that the trust construct positively influences the actual use (Sarmah & Karojia, 2021).

United Arab Emirates context was used in another study on e-wallet adoption with modified Technology Acceptance Model among university students. The aim was to determine determinants of consumer adoption of mobile payment services with moderating effect of gender. The study was conducted among 850 respondents and the findings revealed that when gender is used as a moderator the power among constructs resulted in an increased level. The results also demonstrated that "perceived security, trust and perceived privacy affect both perceived usefulness and perceived ease of use" (Alshurideh et al., 2021).

A recent research study done in three Asian countries namely China, India and Bangladesh concentrated on the effect of several factors on the adoption of mobile payment services by using the Technology Acceptance Model (Jawad & Parvin, 2022). "Perceived trust, perceived risk, social influence, perceived ease of use and perceived usefulness" were used as determining constructs in the study. The sample consisted of

1,289 respondents from the selected countries who used mobile payment applications. The findings revealed that while perceived ease of use, perceived usefulness, perceived trust and social influence has positive effect on intention, perceived risk has a negative influence as expected.

Another study was carried out in Turkey which is a developing country where Quick Response mobile payment is a new technology. The research analyzed the relationship among determinants that influence the acceptance of the mobile payment systems (Türker, Altay & Okumuş, 2022). An online survey was carried out among 485 QR code mobile payment service users and Technology Acceptance Model was employed for evaluation. The findings of the study showed that perceived trust is the strongest construct which influences the intention to use mobile payment system. Perceived compatibility and perceived usefulness are other constructs that have a positive effect on mobile payment adoption (Türker, Altay & Okumuş, 2022).

Moghavvemi, Phoong & Phoong (2021) analyzed the motivations and obstacles related with e-wallet systems from the merchants' perspective of the new technology in Malaysia. According to the study, although the new technology exists for almost 20 years, the adoption rates by customers and sellers are still relatively low (Park et al., 2019; Moghavvemi, Phoong & Phoong, 2021). The authors claimed that most of the research in this area is related with consumer acceptance and the merchants' perspective is usually neglected. However, according to the researchers, the acceptance of technology by merchants is one of the pre-requests for the system to work successfully. Previous studies done from the merchants' point of view indicated that abilities of firms and present factors in different economies influence adoption of e-wallet systems in different countries. For example, perceived customer value addition and perceived usefulness of the technology affect merchants' adoption of

mobile payment systems. (Singh and Sinha, 2020; Verkijika, 2020; Moghavvemi, Phoong & Phoong, 2021).

The study informed that in Malaysia the government and the Central Bank are promoting the use of cashless payment systems. Samsung cooperates with commercial banks to motivate use of mobile payment systems and technologies with providing training to merchants. However, according to Moghavvemi, Phoong & Phoong (2021), Malaysia still remains as cash based economy with 80% of transactions depending on cash and credit cards. Thus, their research was in search of determinants of motivations and obstacles of 16 companies in acceptance of mobile payment technology in the Malaysian context. Open ended interviews were conducted and coded. The findings of the study demonstrated that motivating factors of mobile payment adoption for sellers include reduced payment processing time, where reduced payment time in turn increases customer satisfaction and loyalty. The study showed that another advantage for sellers is the attraction of new customers with the availability of mobile payment services especially tourists from countries like China. According to the study, an additional advantage is the removal of payment process with cash and the convenience mobile payment brings both to customers and sellers. The research demonstrated that another motivating factor is the presence of reward systems and promotion campaigns in mobile payment technologies which attract new and usually younger customers. In addition, lower processing cost attracts merchants to this new transaction system since they expect the processing costs of mobile payments to be lower than the conventional payment methods of credit cards. According to the research, the last motivating factor for mobile payment adoption of companies in Malaysia is the improvement of security (Moghavvemi, Phoong & Phoong, 2021).

The same study reveals that one of the obstacles preventing the adoption of mobile payment systems by merchants is the lack of service providers and facilities providing adequate information and marketing approaches by service providers to companies. Another obstacle is "technical incompatibility" (Moghavvemi, Phoong & Phoong, 2021). According to the article, companies want to accept mobile payment from all of their customers with a standard system regardless of the phone type or credit card. Lack of adequate knowledge and training is another obstacle for sellers. Companies require support and training from service providers while including mobile payment into their existing transaction procedures. In addition, cost of investment (such as cost of NFC POS devices and/or cost of software for accounting purposes) is another barrier for sellers to accept mobile payment systems. Authors point out that obstacles of mobile payment adoption of sellers include lack of security and trust, infrastructure and technological issues where there is a risk of technology going offline, lack of adequate customer demand and customer preferences depending on the culture of shopping. In addition, according to the research companies state that the firms and the economy as a whole is not ready for the application and wide use of the new technology since both customers and sellers can make use of other types of payment methods (Moghavvemi, Phoong & Phoong, 2021).

Another study done in Malaysian context by Karim et al., (2020) analyzed major elements affecting youth of Malaysia to adopt e-wallet as a payment method by using Technology Acceptance Model. According to authors, young generations in Malaysia, especially the Millennial (who are born between 1981 and 1997) and Generation Z (who are born from 1997 and onwards) are young adults who are using new technological devices intensively. However, there can be problems faced due to safety and security in addition to users' specific choices which can hinder or promote

adoption. In the study PLS-SEM was employed for the evaluation of a sample of 330 questionnaires. Findings indicated that perceived usefulness, perceived ease of use, privacy and security have positive influence on intention to use e-wallet (Karim et al., 2020).

In a different research related with the same country (Malaysia) Leong et al. (2020) analyzed the determining factors of mobile payment adoption in Sarawak, Malaysia. The sample consisted of 194 online consumers. Perceived compatibility, perceived security, perceived innovativeness and user mobility were included into the model as additional constructs together with perceived usefulness and perceived ease of use. Perceived compatibility is explained as the scale of new technology that is in accordance with present worth, knowledge from past and requirements of the consumers (Ozturk et al., 2016; Leong et al., 2020). The findings of the research indicated that the relationship between perceived compatibility and intention is mediated by perceived usefulness and perceived ease of use and that perceived compatibility is an influential construct related with technology acceptance (Leong et al., 2020).

Lew et al. (2020) researched the mobile payment technology acceptance in the hospitality industry in Malaysia. Self-efficacy Theory, Critical Mass Theory and Flow Theory were used together with Mobile Technology Acceptance Model in an effort to determine factors influencing mobile payment adoption in hospitality sector, namely in restaurants and cafes. Self-efficacy Theory of Bandura (1977) proposes that people with low self-efficacy avoid trying new tasks when compared with those who have a high self-efficacy with the belief that they can accomplish it. Thus, knowing whether one has self-efficacy or not is a good indicator of one's behavior when faced with different occasions (Lew et al., 2020). The study accepted self-efficacy as a person's

opinion about his/her capacity to begin, insist and complete a behavior. The Critical Mass Theory of Oliver et al. (1985), explains the effectiveness of group action for the good of the public. In technology acceptance the critical mass theory is employed to explain the influence of groups favorable to new technology on persons' technology use in different institutions. The Flow Theory explained by Getzels and Csikszentmihalyi (1975), on the other hand, encompasses a "pleasant and concentrated" performance where a person shuts down all other thoughts and concentrates on the task at hand. The Mobile Technology Acceptance Model of Ooi and Tan (2016) includes constructs such as mobile usefulness and mobile ease of use developed from previous studies of technology acceptance models in order to better explain mobile technology adoption. Findings of the study revealed that "mobile usefulness, mobile ease of use, mobile self-efficacy, and perceived enjoyment" influence intention to use mobile payment systems positively in hospitality sector (Lew et al., 2020).

Apart from the geographical and cultural differences, age and gender specifications are also of factors of interest in e-wallet research. Chawla & Joshi (2020) researched constructs that affect attitude and behavioral intention in e-wallet adoption and the moderating influence of age and gender. The study was carried out as discussion in two focus groups of 744 users formed by executives and students. The sample included students and professionals from large cities in India and this may hinder the generalization of the results. The authors emphasize that other demographic factors such as education, income or occupation can also be analyzed. With use of partial least square –structural equation modeling, the study showed that ease of use, usefulness, trust, security and facilitating conditions affect attitude and intention. The study also demonstrated that age and gender moderate the relationship between the

above mentioned constructs together with attitude and intention especially in males and young customers.

While most studies are concentrated on the factors positively influencing the adoption of new technologies, there also exist reasons and barriers that hinder the acceptance. Leong et al. (2020) studied these barriers in another research project which was carried out with the use of Innovation Resistance Theory (IRT). Innovation resistance is described as the resistance of consumers to new products which might be seen as a change from their satisfactory present situation or which might be against their existing beliefs (Leong et al., 2020). Innovation Resistance Theory is proposed by El Mhamdi et al. (2011) who suggested that innovation resistance of consumers result from psychological and functional barriers. It is assumed that functional barriers begin when consumers realize that innovation is a changing factor and psychological barriers come into play when the new discovery or product is against their existing knowledge and norms (Ma & Lee, 2019; Leong et al., 2020). Risk, usage and value barriers are classified as functional barriers while image and tradition barriers are called psychological barriers (El Mhamdi et al., 2011; Leong et al., 2020).

The results of the study indicated that age is not related with mobile payment resistance while education is a determining factor. Higher levels of education result in decreased levels of innovation resistance. When constructs of the innovation resistance theory is analyzed the usage barrier resulted to have the highest influence on e-wallet resistance. According to the study, when consumers believe that it is difficult to use e-wallet technology, they resist adopting it. The tradition barrier is also influential on mobile wallet resistance since people resist changing their habits and traditional payment procedures. The risk barrier comes into play when consumers are

concerned with network instability, privacy issues and fraud and they refrain from using the new technology (Leong et al., 2020).

In another research especially done on mobile payment services using Quick Response (QR) technology in retail industry Yan et al. (2021) analyzed the critical factors that influence mobile payment adoption intention. The scholars used MTAM Mobile Technology Acceptance Model of Ooi and Tan (2016) in the study claiming that TAM is a model suitable for organizational context while mobile payment adoption for ordinary users might require a different model of analysis. The findings of the study showed that usage of mobile wallets with Quick Response (QR) technology is beneficial for consumers due to the convenience it possesses because of reduced payment time (Yan et al., 2021).

In some studies mobile payment applications are referred as "disruptive technologies" in a sense that they are better than the old existing technologies, products or habits with better functions. In a study on the low rates of mobile application adoption especially in Europe, Schmidthuber, Maresch & Ginner (2020) questioned the reasons of reluctance to accept this new system of transaction. According to Schmidthuber, Maresch & Ginner (2020), mobile payment adoption is at better levels in Asia than Europe. Although European investors have contributed to the infrastructure for mobile payment systems and the new technology exist in place, the adoption rates still remain at low levels. The study refers this situation as "puzzle of abundance" meaning that although the new technology is available for masses, the opportunity and benefits are not used adequately by population. The Technology Acceptance Model is employed in research and the results showed that "perceived usefulness, perceived compatibility, perceived personal innovativeness and perceived social influence" positively influence the intention to use mobile payment. On the

other hand, the study shows that perceived risk negatively influences the intention to adopt mobile payments.

In spite of the usefulness NFC mobile payment systems/ e-wallets encompass, their adoption rate remains low (Khalilzadeh et al., 2017; Ariffin, Abd Rahman, Muhammad and Zhang, 2021). According to the Apple Pay review by the end of 2017 only 16 percent of Apple Pay owners have used Apple Pay (Munster, 2018). Credit card companies and/or banks have used variety of incentives such as cash back and discounts or granting points for future sales (Arango et al., 2015; Zhao, Anong, Zhang, 2019). Thus, such marketing promotions and incentives are expected to show similar gains in NFC e-wallet adoption.

COVID-19 pandemic period increased the usage of electronic payment systems and banking in order to minimize personal contact. Consumers preferred mobile payment methods such as e-wallets (Daragmeh et al., 2021; Ariffin, Abd Rahman, Muhammad and Zhang, 2021). This period has raised hopes of integrating digital systems into our daily lives. However, researchers state that the progression of e-wallet usage is still at unsatisfactory levels (Ismail, 2021). It is apparent that consumers are still not ready to accept e-wallet usage for reasons that yet to be studied further (Yong et al., 2018; Ariffin, Abd Rahman, Muhammad and Zhang, 2021).

Aji, Berekon and Md Husin (2020) carried out a study of multi group analysis between Indonesia and Malaysia related with COVID-19 and e-wallet adoption. As a precaution to prevent COVID-19 spread governments in most countries encouraged the use of contactless payment mechanisms. The authors researched the effects of government policies (such as strengthening network infrastructure, increasing internet speed and designing more favorable policy packages or security precautions) in this direction together with the influence of other antecedents of e-wallet use in a study of

multi group analysis between Indonesia and Malaysia which are located in the region of outbreak. The study concentrated on the effects of perceived risk, government support and perceived usefulness variables on the intention to use e-wallet during COVID-19 outbreak. Questionnaires were obtained from 259 respondents from Indonesia and 207 respondents from Malaysia. The findings indicated that different countries have differing effects related with government support. For example, the government support effect was significant in Malaysia and not in Indonesia. In addition, perceived usefulness mediated the government support and intention relationship and mediated to some extend the relationship between perceived risk and intention (Aji, Berekon and Md Husin, 2020).

Upadhyay et al. (2021) also studied factors affecting consumer's behavioral intention and use behavior towards e-wallet during COVID-19. The study used meta-Unified Theory of Acceptance and Use of Technology (meta-UTAUT) model to analyze the effect of constructs such as perceived severity and self-efficacy on behavioral intention. A meta-analysis was based on modified unified theory of acceptance and use of technology (meta-UTAUT). The findings indicated that attitude is influenced by performance expectancy, effort expectancy and perceived severity while effort expectancy is influenced by self-efficacy. The results showed that social influence has insignificant effect on attitude, intention and actual use (Upadhyay et al., 2021).

Undale, Kulkarni, & Patil, (2020) studied the "security concern" and "comfort ability" of using e-wallet during the COVID 19 pandemic environment. In addition, they analyzed the influence of demographics such as age and gender on "security concern" and "comfort ability" in using e-wallet. Their results demonstrated that consumers from middle-income group are more worried about the security of mobile

payments than people from the lower-income group. In addition, the findings indicated that female consumers are more anxious about e-wallet security than the male users (Undale, Kulkarni, & Patil, 2020).

In a research related with COVID-19 outbreak period Revathy & Balaji (2020) studied the factors that determine the e-wallet adoption during COVID-19 outbreak in India where social distancing protocols were employed with lock down policies. Online survey method was used to gather data. The findings indicated that "social influence, perceived security and performance expectancy" influenced adoption of e-wallet systems. Effort expectancy had no effect on e-wallet adoption contrary to expectations (Revathy & Balaji, 2020).

Al-Sharafi et al. (2021) analyzed the importance and role of security issues and trust on mobile payment during and after COVID-19. The authors also aimed to study factors affecting the sustainable use of contactless payment methods during and after the outbreak. The study combined The Expectation-Confirmation Model with Protection Motivation Theory to investigate the continuation of mobile payment usage over time. The Expectation-Confirmation Theory of Oliver (1977) is used to analyze the continuous use of information technology breakthroughs with use of satisfaction and expectation confirmation. According to this theory, a person re-evaluates the decision to use a new technology after adoption and trial and then makes a final "confirmation" decision for continuous use (Rogers, 2003). In Protection Motivation Theory "expectancy" and "value" variables are used to measure a person's intention to take protective actions (Zhang et al., 2020). The results of the study demonstrated that perceived trust has the greatest influence on mobile payment use followed by self-efficacy, normalized importance, perceived vulnerability and usefulness (Al-Sharafi et al., 2021).

Daragmeh, Lentner and Sagi (2021) studied elements which are effective in the adoption of mobile payments among "generation X" in Hungary during COVID-19 outbreak. The study was conducted with a sample of 1120 generation X respondents with use of an online survey. Technology Acceptance Model was used for evaluation. The findings of the study revealed that "perceived COVID-19 risk, perceived usefulness and subjective norms" affect the intention to adopt mobile payment services among the generation X of Hungarian people. In addition, perceived usefulness is a mediator for the relationship between perceived ease of use and intention to use mobile payments (Daragmeh, Lentner and Sagi, 2021).

COVID-19 outbreak influenced the payment mechanisms used in most sectors including the hospitality sector. Khanra et al. (2021) studied the delay in users' acceptance of mobile payment services in the hospitality sector during COVID-19 outbreak. The authors claimed that most consumers are half-hearted in adopting mobile payment services waiting for better technologies to develop. The study employed the Innovation Resistance Theory with use of privacy concern and visibility constructs. Respondents were selected among those who have used mobile services for transportation and accommodation purposes. The findings of the study indicated that "usage barrier, image barrier, privacy concerns and visibility" were factors influential in delay of mobile payment adoption. In addition, security concerns moderated the relationship between image barrier and delay in mobile payment adoption in the hospitality sector (Khanra et al., 2021).

Another study done by Cham et al. (2021) on e-wallet usage during COVID-19 researched the effect of functional, psychological and risk barriers which ended up in elderlies' rejection towards mobile payment systems. The researched was based on an online survey among 400 consumers at age of 60 and above and investigated

influential factors effecting non-adoption of e-wallet. Findings indicated that, functional barriers such as “perceived complexity, perceived incompatibility and perceived costs”, psychological obstacles such as “lack of trust, inertia and technological anxiety”, and risk perception affect elderlies’ attitude and intention to use mobile payments services (Cham et al., 2021).

According to a study done by Goel et al. (2021), apart from the role of consumers’ age, consumer concerns of health during periods such as COVID-19 outbreak also influence e-wallet adoption. Researchers studied the role of health-related concerns and trust on mobile payment loyalty with use of new constructs such as perceived severity, perceived susceptibility and intimacy (Goel et al., 2021). The study combined Technology Acceptance Model of Davis (1989) with Stimulus Organism Response Theory (SOR). According to the SOR theory, certain occurrences lead to different reactions in consumers’ minds which in turn direct consumers to behave in different ways (Loureiro et al., 2019). These influential stimuli can be external or internal. The study introduced “perceived severity” and “perceived susceptibility” as health belief factors together with trust which stimulate loyalty to mobile payment. The findings of the study revealed that perceived severity and trust influence mobile payment loyalty. In addition, trust affects loyalty both directly and also indirectly through intimacy. Furthermore, the research demonstrated that there exist no relationship between perceived usefulness and loyalty (Goel et al., 2021).

Findings of Okonkwo et al. (2022), on the other hand, demonstrated that although the rate of mobile payment application adoption and usage increased during COVID 19 pandemic, the results are much different in “cash-based economies.” This research was carried in Cameroon among 621 mobile phone users. The Diffusion of Innovation Theory (DIT), Technology Acceptance Model (TAM) and Information

Systems Success Model (ISSM) were used for evaluation. The Diffusion of Innovation Theory explains how people perceive, process and make decisions when faced with new technology and information. Information Systems Success Model suggests a model for information systems where six factors of information system relationships are described and analyzed (Okonkwo et al., 2022). The findings of the study demonstrated that widely used strategies do not usually work in all areas of the world since in Cameroon the consumers were not influenced by perceived ease of use and compatibility and that this new technology is not accepted by the existing life styles of Cameroon people. Therefore, the study reveals that whether there are COVID 19 conditions or not in low income cash based economies mobile payment application use might not always increase to expected levels (Okonkwo et al., 2022).

Belanche, Guinaliu and Alb´as (2022) studied the increased use of peer to peer (P2P) usage of mobile payment transactions which became more prominent during the COVID-19 pandemic period. Bizum is a peer to peer mobile payment system used in Spain and the authors investigated the factors influential in adopting Bizum by collecting data from users and employing structural equation modeling. The findings demonstrated that the use of the mobile system increased due to users' attitude and perception of control over the application together with word of mouth intentions. In addition, it has been confirmed that social approval does not influence the use of peer to peer system of transactions. Moreover, perceived risk has no direct effect on intention and that perceived risk is moderated by perceived security. Another finding was that the demographic specifications such as age and gender do not affect the use of peer to peer payment systems (Belanche, Guinaliu and Alb´as, 2022).

Sustainability of continuous mobile payment use is one of the areas researchers dwell upon. Yuan, Liu & Zhang (2020) analyzed which variables influence the loyalty

to mobile payment systems since preserving existing users and ensuring continuous use is a significant issue. They employed Information System Success Model and the Stimuli-Organism-Response model during investigation. Mobile commerce loyalty is explained as behaviors influenced by perceptions, judgments and reasoning. The Stimuli-Organism-Response framework proposes that environmental stimuli influence the internal affection of a person which in turn results in certain types of behaviors (Mehrabian and Russell, 1974). The findings of the study with use of this model indicated that satisfaction and intimacy have a direct influence on mobile payment loyalty. Intimacy in turn is affected by trust and satisfaction and trust is influenced by overall quality. Thus, the study suggested that technology should be of high quality and should target consumers' feelings for higher mobile payment loyalty (Yuan, Liu & Zhang, 2020).

Wang et al. (2019) explored the factors affecting the switching behaviors of mobile payment applications. The scholars used "the push-pull-mooring framework" which is a part of migration literature to analyze the switching behavior from one mobile payment application to another. According to push-pull-mooring framework push factors direct people away from existing services whereas pull factors are attracting attributes that make alternatives seem better. Mooring factors, on the other hand, are complementary elements that facilitate or hinder certain behaviors. For example, the privacy risk can be categorized as a push factor whereas monetary rewards of alternatives can be seen as pull factors. "Inertia" which is a person's conscious insistence of remaining with the existing conditions rather than changing for better ones can be accepted as a mooring condition. The study was carried out among Alipay users with a sample of 3785 respondents. The findings demonstrated that

inertia was influential on the relationship between alternative rewards and switching behavior (Wang et al., 2019).

Various aspects of consumer characteristics are examined in an effort to determine factors influential on e-wallet adoption. Karimi and Liu (2020) studied the effect of "mood" on users' acceptance of mobile payment applications. The Mood Behavior Model and the Affect Infusion Model were employed. "Moods" are positive or negative "affective" states which are not caused by a specific occasion. The Mood Behavior model suggests that the mood influences behavior by forming different motivations. These mood influences can be informational or directive. Informational mood influences or impacts lead to changes in judgments. The directive mood impacts, on the other hand, lead to changes in choices. In Affect Infusion Model it is suggested that two different mood mechanisms influence judgments and decisions of people. Affect as priming mechanisms of mood influence "attention, retrieval and associative processes." Affect as information mechanisms of mood affect decisions (Karimi and Liu, 2020). The study suggested with the use of these models that mood changes influence consumers' decisions according to their decision making style and need for satisfaction. For example, the results indicated that when a consumer has a positive mood, "satisfier" consumers with higher need for gratification tend to adopt mobile payment services. Thus, the study demonstrated that different consumers with different characters will be affected in changing ways by their respective moods in mobile payment adoption (Karimi and Liu, 2020).

Boden, Mair and Wilken (2020) studied the effect of convenience construct on "the willingness to pay" in mobile payment transactions. According to the study, consumers are willing to pay more when they use credit cards compared to payments with cash. They based this perception on Zellermayer's (1996) concept of "pain of

paying" which defines the emotions of people while making payments and suggesting that "pain of paying" is negatively related to willingness to pay. The authors also suggested that when a payment method is more "convenient" the willingness to pay is expected to increase. The results of the study demonstrated that convenience acts as a mediator between mobile payment adoption and willingness to pay (Boden, Mair and Wilken, 2020).

Verkijika and Neneh (2021) stated that although there exists a large potential for the use of mobile payment services, actual adoption of this transaction system has not reached up to expected levels. The authors claimed that apart from the studies done previously new ways of motivation for the use of technology should be investigated. They emphasized the importance of recommendation for adoption pointing out that positive recommendations have a great effect on consumers and negative recommendations can lead to increased reluctance to try the new technology. In the study a "qualitative text-mining approach" was employed by investigating specific themes from experiences of users of mobile payment systems. 16 applications on Google Play store were used and 5955 experience texts were analyzed in an effort to determine the reasons for positive or negative statements. 13 themes namely "ease of use, usefulness, convenience, security, reliability, satisfaction, transaction speed, time-saving, customer support, output quality, perceived cost, usability and trust" were extracted. According to the study, these themes played an influential role in motivating consumers to adopt of reject the use of mobile application systems (Verkijika and Neneh, 2021).

In a different study related with e-wallets, Abbassi et al. (2022) investigated the effect of quality and confirmation variables on individuals' continuous intention to use e-wallet systems. They employed the fuzzy set Quality Comparative Analysis

(fsQCA) method for evaluation. The results of the study demonstrated that service quality has the strongest effect on the continuous intention to use e-wallet applications. The results of the fcQCA, on the other hand, indicated that service quality is not a required variable. “Information quality, system quality, usefulness confirmation, ease of use confirmation, and security confirmation” combined all together influence continuous use (Abbassi et al., 2022).

In other studies researchers analyzed the improvement of e-wallet adoption rate by studying the effect of financial incentives for consumers as in the case of credit card usage. It is expected that cash back and discounts will lead to a positive increase on e-wallet use. A study done by Zhao, Anong, & Zhang (2019) investigated how financial incentives influence consumers’ intention to adopt e-wallet and whether differences in incentive types lead to different intentions. An online experiment was conducted comparing two different types of incentives, namely cash back and discounts, with two different amounts and two different promotion periods. The results of study revealed that presence of financial incentives positively influenced adoption intention and it also had an indirect positive effect on intention through perceived risk. The experiment also showed that people in the high-risk group were positively affected by the extent of the promotion period (Zhao, Anong, & Zhang, 2019).

In a study on sustainable e-wallet adoption in Malaysia it is declared that adoption rates in Malaysia depend heavily on incentives and financial promotions such as pay backs or coupons, leading consumers to acquire the application without continuous usage (Che Nawi et al., 2022). The research analyzed the influence of perceived usefulness, perceived ease of use, social influence, facilitating conditions, trust and compatibility on intention to adopt e-wallet among Malaysian working adults. The results indicated that the above mentioned constructs significantly affect the

intention to adopt e-wallet. In addition, findings demonstrated that the level of financial earnings moderated the relationship between compatibility and intention (Che Nawi et al., 2022).

Lim et al. (2022) investigated the effects of offering money gift on the intention to use e-wallet. PLS-SEM was employed in order to analyze 350 questionnaires collected from Malaysian population. Cognitive Absorption Theory (CAT) was used which suggests that experiences of users of technology affect users' faith in the system and their persistent use (Agarwal and Karahanna, 2000; Guo and Ro, 2008; Lim et al., 2022). Using this theory the study was based on the perspective that users who have a high "cognitive absorption" while using a money gift specification will have a positive attitude and perception towards e-wallet system as a whole. This in turn is expected to result in higher levels of intention to adopt e wallet and continued use of technology. The results of the study indicated that people with high cognitive absorption from using money gift function and who appreciate the new technology have less problems of using the application. Perceived usefulness and perceived ease of use influences the intention to adopt and continuity of using the application (Lim et al., 2022).

Such studies clearly demonstrate the requirement for influence of different marketing promotion activities to increase e-wallet adoption intention. Most studies are done with the assumption that consumers already know the properties and advantages of e-wallet technology. However, most people are unaware of this new technology and financial institutions need to convey more information. This study aims to fill this literature gap and to determine which factors determine adoption of e-wallet technology. Factors such as consumer knowledge, perceived usefulness, and perceived ease of use, trust, attitude and behavioral intention are analyzed in order to

measure their effect on adoption. In addition, a survey experiment is employed to evaluate how consumer knowledge on reimbursement period in case of fraud influences e-wallet intention.

2.3 Technology Acceptance Model

Developments in technology and its usage in our everyday lives stimulated the quest for determining reasons for acceptance or refusal of technology. Technology Acceptance Model (TAM) is regarded as an important theory helping us to understand the factors that influence how consumers adopt information systems (Lee, Kozar & Larsen, 2003). TAM proposes that perceived ease of use and perceived usefulness are the main factors determining the intention to use technology (Charness and Boot, 2016). Perceived usefulness is explained as an individual's acknowledgement that use of specific technology will make his or her activities better (Davis, 1989). Perceived ease of use is how much less effort a consumer thinks is required while using a new technology (Davis, 1989).

TAM has been developed on the basis of Fishbein and Ajzen's Theory of Reasoned Action (1975) and Ajzen's Theory of Planned Behavior. These two theories are based in the field of psychology explaining behavior and decisions of people based on certain constructs and assumptions. According to Theory of Reasoned Action (TRA), people are "rational" in general and take decisions with use of available information (Marangunic & Granic, 2015). The objectives, intentions and attitudes of people shape their behaviors. This theory explains that behavior is affected by beliefs, attitude and intention. The individual's existing beliefs and intention influences his/her attitude regarding behavior (Marangunic & Granic, 2015). That is, intention is influenced by "the normative influence of third parties" (Liébana-Cabanillas, Sánchez-Fernández, Muñoz-Leiva, 2014). However, the Theory of Reasoned Action (TRA)

became inadequate in predicting behavior since some people are believed to have limited control on their behaviors and attitudes. Thus, another construct was included into the model by Ajzen as a complementary factor known as “perceived behavioral control” leading to the development of a new theory called Theory of Planned Behavior (TPB) (Marangunic & Granic, 2015).

The Theory of Planned Behavior of Ajzen (TPB) proposes that specific beliefs shape perceptions and behavior. An individual’s intent is shaped by his/hers subjective norms towards a specific behavior, attitude and the belief as to whether he/she will be able to perform that behavior (Marangunic & Granic, 2015). These beliefs are behavioral beliefs which influence attitudes, normative beliefs that affect subjective norms and control beliefs which condition behavioral control (Liébana-Cabanillas, Sánchez-Fernández, Muñoz-Leiva, 2014). According to the Theory of Planned Behavior there exists a direct relationship between “perceived behavioral control” and “behavioral achievement”. However, the Theory of Planned Behavior too had certain shortcomings since its main assumption was grounded on the “rationality” of people with disregard to unconscious behavior. In addition, demographic and personality differences of people were not taken into account (Marangunic & Granic, 2015).

Inspired by Fishbein and Ajzen’s Theory of Reasoned Action and Ajzen’s Theory of Planned Behavior, Davis (1989) stated that perceived usefulness and perceived ease of use influence individuals’ attitude and intention towards using technological services. Davis’s Technology Acceptance Model did not include “subjective norm” into the model and proposed that attitude is influenced by perceived ease of use and perceived usefulness (Marangunic & Granic, 2015).

As stated before, Technology Acceptance Model (TAM) is based on Theory of Reasoned Action (TRA) and they include similarities rather than differences.

However, according to Theory of Reasoned Action (TRA) beliefs cannot be generalized to all systems since beliefs are dedicated to the specific technology or system in question. Technology Acceptance Model (TAM), on the other hand, claims that perceived ease of use and perceived usefulness influence technology acceptance for all systems. In addition, in Theory of Reasoned Action (TRA) beliefs are employed as a single element where as in Technology Acceptance Model (TAM) beliefs are regarded as different factors (Davis et al., 1989; Pikkarainen et al., 2004).

After initial implementation of TAM Davis extended his model by proposing that the use of technology is a result of "user motivation" which is affected by an "external stimulus" originating from the system's characteristics. According to Davis, this "user's motivation" in return is influenced by perceived ease of use, perceived usefulness and attitude (Marangunic & Granic, 2015).

In 1989 Davis used Technology Acceptance Model in a study among 104 MBA students on a computer word processing application (Davis et al., 2009; Sharp, 2006). The results indicated that perceived usefulness has a significant and strong effect on intention whereas perceived ease of use has less influence although its effect continued to be significant (Sharp, 2006). In the light of this study attitude was removed from the model since findings showed that attitude did not "fully mediate" the perceived usefulness and perceived ease of use and included behavioral intention as a new construct. This "modified version" of TAM evolved into a more "parsimonious" and popular model used by many studies in explaining technological system acceptance. In addition, the inclusion of "external variables" (such as "system characteristics, user training, user participation design and implementation process") brought upon the investigation of other elements that may affect individuals' behaviors (Marangunic & Granic, 2015).

A theoretical extension of Technology Acceptance Model (TAM) was introduced in 2000 by Venkatesh and Davis by including social influence and cognitive instrumental processes into the framework (Venkatesh &Davis, 2000). The extension of the model was called TAM2 and was tested in four different organizations where two organizations voluntarily implemented the new technology and the other two used the new system mandatorily. Results revealed that both social influence processes that is "subjective norm, voluntariness, and image" and cognitive instrumental processes that is "job relevance, output quality, result demonstrability, and perceived ease of use" affected acceptance significantly (Venkatesh & Davis, 2000).

Recent studies of Venkatesh et.al. (2003) evolved into a different extension model called the Unified Theory of Acceptance and Use of Technology (UTAUT) combining previous models on consumer acceptance of technology. Some of these prior models and theories are social psychology, Innovation Diffusion Theory (IDT), Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), the Social Cognitive Theory, the Motivation Theory and Technology Acceptance Model (TAM) (Yi et al., 2006; Venkatesh et al., 2012; Yousafzai, 2012; Tarhini et. al., 2016). According to UTAUT model, performance expectance, effort expectance, social influence and facilitating conditions influence the diffusion of technology (Al-Somali, Gholami, & Clegg, 2009). According to UTAUT, behavioral intention to adopt a certain technology is influenced by performance expectancy (PE) and voluntariness (Al-Qeisi, 2009; Tarhini et. al., 2016).

In 2007 Lin et al. (2007) suggested integration of technology readiness and Technology Acceptance Model and called it TRAM. In 2008 Chang (2008) provided

a model which integrated model of Task- Technology Fit and Technology Acceptance Model (Chen, Li & Li, 2011).

In 2008 Venkatesh and Bala (2008) claimed that previous research concentrated on the factors influencing new technology adoption in information technology for the workplace. They suggested that managers' perspective and their informed decisions to change or implement policies are also as significant as the user acceptance of information technologies. They claimed that the way various managerial interventions influence the existing determinants of technology adoption should be studied further. For this purpose they provided a new integrated version of Technology Acceptance Model (TAM3) with new determinants of information technology use and tested the model. In this new model called TAM3 Venkatesh and Bala (2008) combined TAM2 of Venkatesh and Davis (2000) with determinants of perceived ease of use. They claimed that TAM3 presents a complete framework of determinants of a person's information technology acceptance. In TAM 3 there exist new relationships such as moderation effect of experience between perceived ease of use and perceived usefulness, between computer anxiety and perceived ease of use and the moderating effect of experience between perceived ease of use and behavioral intention. According to TAM 3, experience moderates the effect of perceived ease of use on perceived usefulness. The model also assumes that the determinants of perceived ease of use (which are computer self-efficacy, perceptions of external control, computer anxiety, computer playfulness, perceived enjoyment, and objective usability) do not have any effect on perceived usefulness (Venkatesh and Bala, 2008).

The Technology Acceptance Model has been used in a large number of studies to understand the adoption of a variety of technological information systems. Technology Acceptance Model's explanatory power and effectiveness in

generalizability to different settings in technology adoption has made it a preferred theoretical framework to use in research (Nysveen et al., 2005; Luarn and Lin, 2005; Pikkarainen et al., 2004; Kleijnen et al., 2004). With regard to commercial mobile technologies TAM stands as the most widely employed model in prior literature (Wei, Xinyan, & Yue, 2011; Liébana-Cabanillas, Sánchez-Fernández, Muñoz-Leiva, 2014).

Lee et.al. (2003) evaluated the implementation and future progress of TAM in 1986-2003 period in their study on Technology Acceptance Model's history, application and future (Marangunic &Granic, 2015). They examined one hundred Information Systems (IS) publications and carried out a survey with IS researchers to analyze the Technology Acceptance Model. Their evaluation pointed out to a need for including additional constructs into the model. Limitations of the model are also emphasized. According to Lee et.al (2003), "self-reported usage" is the main method used in many studies related with TAM and is inherently open to common method bias which may deform the relationship among constructs. Generalization problem is another limitation in many of TAM studies since most research is carried out with "homogenous groups" such as students at a specific point in time related with a specific task (Lee et al., 2003). One of the major limitations of the model is explained as the low variance rates and is assumed to be related with low inclusion of external variables into the model together with short exposure to technology before testing.

Legris et al. (2003) analyzed the progress of Technology Acceptance Model and concluded that although the model is a useful one it has to be developed with inclusion of additional significant constructs. New variables should encompass "human and social change process" and the model should be broader and consistent (Legris et al., 2003). King and He (2006), on the other hand, implemented a meta-analysis of Technology Acceptance Model used in different fields and concluded that

the model is an applicable and strong model. The study emphasized the use of students instead of professionals in some TAM studies is valuable and that the model can be applied to technology acceptance cases at a wider extent.

Sharp (2006) examined the development, extension and application of Technology Acceptance Model and concluded that there exist three specific future research areas related with the model. The first area for future research is the problem of mixed results of whether the perceived usefulness or perceived ease of use has stronger influence on intention. According to Sharp (2006), while ten studies indicate that perceived usefulness is a strong determinant of intention, six studies reveal that perceived ease of use is a stronger determinant. Thus, future research might be done to categorize these constructs' influence based on different types of technology in question. The second area of future research is the case between voluntary and compulsory environment of research implementation. According to Sharp (2006), it is argued that implementing technology acceptance model in a compulsory environment might lead to different results when compared with those studies done in a voluntary environment. The third area for future research is the effect of attitude in technology acceptance (Sharp, 2006).

Chuttur (2009) criticized the Technology Acceptance Model in his study done on origins, developments and future progress of the model. After an extensive analysis of the history, extension and limitations of the model Chuttur (2009) concluded that researchers have opposing views on the grounds of theory and real life influence of the model. In addition, according to Chuttur (2009), studies done on Technology Acceptance Model are short of adequate strictness and relation that would benefit information systems research (Chuttur, 2009).

Turner et.al. (2010), on the other hand, analyzed the estimation strength of TAM in technology use. A systematic literature review was carried out with meta-analysis and 79 empirical studies were analyzed. The findings indicated that perceived ease of use and perceived usefulness have lower relationship with actual usage than does behavioral intention. Turner et.al. (2010) concluded that the model should be used within its validation context.

Hsio and Yang (2011) analyzed Technology Acceptance Model and tried to determine the subfields of the model with use of "co-citation analysis". The period of analysis extended from 1989 to 2006 by examining articles in the ISI Web of Knowledge data base. They determined three main implementations of TAM with use of factor analysis, multidimensional scaling and cluster analysis. The main TAM application clusters were determined as task related systems, e-commerce systems and hedonic systems (Hsio and Yang, 2011).

In 2016, Ooi & Tan (2016) proposed a similar model to Technology Acceptance Model (TAM) and named it as Mobile Technology Acceptance Model (MTAM). They claimed that previous research was based on work conditions and organizational environments. In addition, the antecedents used in previous studies and models were established using electronic commerce literatures contrary to real life mobile contexts. Thus, the authors suggested that the new model should contain mobile usefulness and mobile ease of use as constructs for smartphone credit card application adoption studies. "Mobile perceived security risk, mobile perceived trust, mobile perceived compatibility and mobile perceived financial resources" were the other additional constructs used in the model. The new model was applied to 459 users and the results demonstrated that mobile usefulness has a confirmed effect on intention

while the role of mobile ease of use needs additional study of practical cases (Ooi & Tan, 2016).

Although there have been other models that have added more predictors to the original TAM such as the TAM2, UTAUT, TAM3, application of the Theory of Planned Behavior to TAM (TBP-TAM) or models that have taken different perspectives on use of new technology such as Diffusion of Innovation Theory (DOI), Task Force Fit Technology (TTF) and Enterprise Content Management (ECM), the current study takes the basic two predictor variables of PU and PEOU from TAM and extends it by merely adding trust and customer knowledge. This keeps the constructs measured and included as predictors in the model at the lowest possible level thus providing a more parsimonious model. In model choice, the parsimony principle states that simpler models with fewer parameters should be preferred over more complex models. A parsimonious model is less likely to over fit the dataset.

In addition to parsimony, the extended core model is preferred contrary to other theories and models because of the context of the current study and some of the criticisms of the other models. For example, Theory of Planned Behavior (TPB) has been applied in a very wide variety of settings, however, the TBP assumes that behavior is based on a cognitive evaluation of the benefits and costs. Thus, it belongs to the group of rational choice models (Sana'a, 2016). However, the current study considered trust to be an important factor. The Diffusion of Innovation (DOI) Theory was not preferred. DOI argues that there is a progressive and gradual diffusion process within communities and systems of users for new technologies. The communication channels and knowledge influence this process. The DOI theory is more suitable for firm or community level rather than the individual level analysis as it takes complex societal factors into consideration (Sana'a, 2016). TAM2, TAM3 and UTAUT, on the

other hand, base their assumptions on the voluntary use environment believing that individuals have an option in deciding to use the new technology. However, in certain cases the use of the new technology is mandatory or inevitable (Sana'a, 2016). In addition, UTAUT and UTAUT2 have been criticized for result bias across cultures (El- Masri, 2017) and do not have individual factors that may help understand individual system acceptance (Sana'a, 2016). The current study is based on the North Cyprus context with a specific traditional culture where information and trust are significant. Thus, the core TAM model with extensions of consumer knowledge and trust was used instead of UTAUT.

In Task-Force Fit Technology (TTF) theory different settings lead to different specific task characteristics and technology characteristics (Khalilzadeh, Öztürk and Bilgihan, 2017). The current study used TAM as a more widespread model suitable for general environments instead of TTF. Enterprise Content Management (ECM) concept lacks a well-defined framework and when implemented produce varying results in terms of objectives, processes and technologies (Jaakonmaki et al., 2018). Thus, the extended Technology Acceptance Model with two new constructs is selected as a well-defined model instead of ECM concept as the main model for this study.

Technology Acceptance Model (TAM) includes perceived ease of use, perceived usefulness, attitude, behavioral intention to use technology and actual use as constructs. According to TAM, "external variables" influence the acceptance and use of technology through people's confidence (Perceived ease of use and perceived usefulness) and views (attitudes). In this model external variables affect people's perceived ease of use and perceived usefulness in such a way that using technology is expected to produce better outcomes with little effort (Davis, 1989). In other words,

an individual's recognition of the usefulness, ease of use and attitude related with the use of new technology influences its actual use (Davis, 1989).

In various studies a lot of researchers integrated new constructs to Technology Acceptance Model. For example, Agarwal and Prasad (1998a, 1998b) included the variable of "compatibility" referring to the compliance of the new technology in question. Dishaw and Strong (1999) added Task- Technology Fit to the model. "Cognitive absorption" (which is the state of user's involvement and engagement while using a new technology), "playfulness" and "self-efficacy" (which is the belief of one's ability to accomplish the intended outcomes) are new variables integrated by Agarwal and Karahanna (2000). Vankatesh and Davis (2000) included "subjective norms" (which is an individual's perception about the particular behavior, that is influenced by the judgment of significant others) as a new construct. Chau and Hu (2002) added "peer influence" and Chiu et al. (2005) integrated "personal innovativeness" into TAM constructs (Chenn, Li & Li, 2011).

In 2003 and 2005 "trust" was included to Technology Acceptance model by Gefen et al. (2003) and Wu and Chen (2005). Later on, Walczuch et al. (2007) and Lin et al. (2007) used a new variable in their studies namely "technology readiness" within the Technology Acceptance Model. In 2009 Chen et al. (2009) combined this new variable "technology readiness with Technology acceptance Model and Theory of Planned Behavior formulating a new model to analyze individuals' ongoing engagement with self-service technological applications. At the same time Lee (2009) integrated Technology Acceptance Model with Theory of Planned Behavior, "perceived benefit" and with "perceived risk" in the context of online banking usage (Chenn, Li & Li, 2011).

In the current study, consumer knowledge on e-wallet (CK) is considered as an external variable (EV) which has an effect on the perceived benefits and trust towards the new technology and ultimate intention to use the application. Consumer knowledge is the amount and context of information a consumer achieves prior usage. It involves knowledge on the risks, benefits and possible outcomes of the technology in question. For example, according to a study done on adaptation of new technologies, consumer knowledge management plays a significant role in consumers' intention to adopt Electronic Vehicles (Huang et al., 2021).

In TAM perceived usefulness (PU) is explained as one's understanding that use of specific technology will make his or her activities better (Davis, 1989). In the current study, the PU is characterized as a person's understanding of advantage acquired from adopting e-wallet.

Perceived ease of use (PEOU), on the other hand, is the level of physical or mental activity needed to use the new technology in question. Davis (1989) argues an "easy to use" application will usually be selected over others. Especially in online commerce and banking the idea that a consumer regards online transaction as free of effort determines a person's perceived ease of use (Vijayasarathy, 2004; Liebana-Cabanillas, Sanchez-Fernandez, & Munoz-Leiva, 2014). External variables are claimed to impose their effect on attitude and intention through perceived usefulness and perceived ease of use (Bashir and Madhavaiah, 2014).

In technological acceptance models, attitude (ATT) is regarded as essential in developing a certain behavior (Ajzen & Fishbein, 1980; Pee, Woon, & Kankanhalli, 2008). Formed by both emotional and behavioral aspects attitude is shaped by a person's experience, belief or knowledge about a certain product together with one's feelings and evaluation of that product or service (Fishbein and Ajzen, 1975). Thus,

attitude determines and shapes an individual's intention to perform a certain behavior that is a consumer's intention to use the new technology (Liebana-Cabanillas, Sanchez-Fernandez, & Munoz-Leiva, 2014). Behavioral intention (BIU) is the measure of the likelihood of a person employing the application. It is the dependent variable of Technology Acceptance Model.

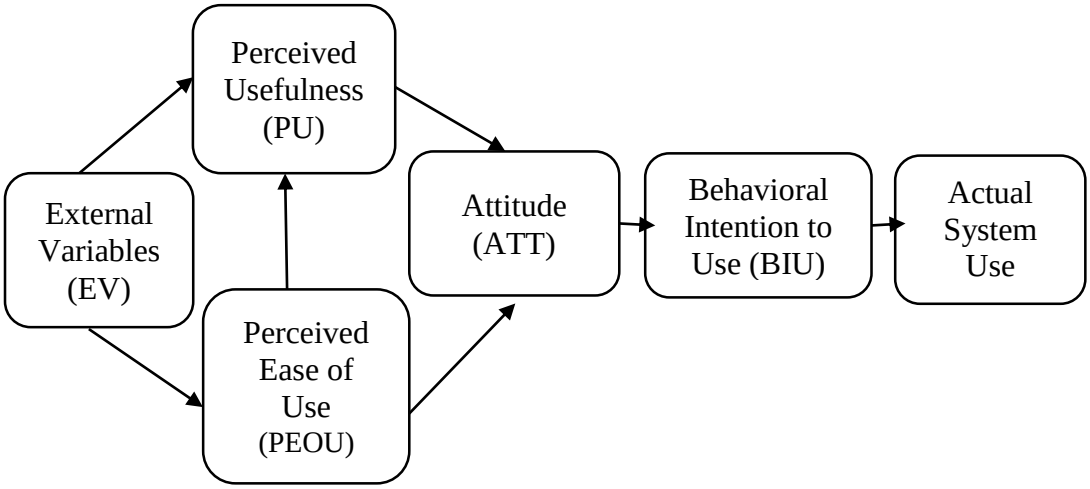

Figure 2: Technology Acceptance Model (TAM)

Numerous previous studies used additional social constructs and personal factors into the Technology Acceptance Model (Bashir and Madhavaiah, 2014). These additional factors include trust, perceived risk, perceived security, perceived enjoyment, and self-efficacy, social influence and others. For example, Kumra and Mittal (2004) stressed the significance of trust in online banking which is affected by opportunistic behavior and communication. In another instance, Khare et al. (2010) analyzed the effect of personality and its influence on acceptance of internet banking (Bashir and Madhavaiah, 2014). Other studies included social image and subjective norms in Technology Acceptance Model (Fishbein & Ajzen, 1975; Moore & Benbasat, 1991; Venkatesh & Bala, 2008).

Fast development of internet and e-commerce in recent years has led to the inclusion of new constructs in TAM. Constructs such as perceived playfulness, perceived enjoyment and flow experience were included as key constructs of behavioral intention in addition to perceived usefulness and perceived ease of use. According to Van der Heijden, (2004) and Teo et al., (1999), perceived enjoyment affects actual usage of internet and e-learning (Lee, Lee, & Kwon, 2005). According to Moon & Kim (2001), perceived playfulness in internet and according to Hsu & Lu (2004), flow experience in online games influence behavioral intention (Gu, Lee, & Suh, 2009). Trust, on the other hand, is a key construct of behavior in e-commerce since transactions are carried out on internet (Gefen et al., 2003a; Grazioli & Jarvenpaa, 2000; Luhmann, 1979; Gu, Lee, & Suh, 2009).

In the present study trust is another antecedent used in adoption of technology especially in financial transactions. Literature states that trust is more significant in online banking, financial transactions and acceptance of new technologies in business than in traditional ones. The main question of accessibility to private information through internet poses as a great concern for customers in shaping their trust to banks and to financial transactions (Al–Somali, Gholami, Cleggi 2009). Trust develops as transaction parties mutually agree of each other's reliability (Aldás-Manzano, 2009). In online banking and/or mobile transactions, where perceived risks are more prominent, trust plays a significant role in continuation of relationships with customers and adaptation of the new technology.

Prior literature states that both perceived risk and trust should be analyzed with regards to acceptance of mobile payment systems and/or e-wallets. Fear of financial loss inhibits the acceptance of e-wallet (Shin, 2009). Thus, significance of trust becomes more intensified in order to diminish such concerns.

Chapter 3

HYPOTHESIS DEVELOPMENT

3.1 Consumer Knowledge on E-wallet (CK)

An individual's behavior is influenced by his/her knowledge especially when customers make decisions (Liu et al., 2018; Huang et al., 2021). Information about a new product can depend on objective or subjective knowledge. While objective knowledge depends on accurate information, subjective knowledge includes an individual's rate of comprehension of the product (Park et al., 1994; Huang et al., 2021). Studies have displayed that customer knowledge has positive influence on the intention to use electronic vehicles (Degirmenci and Breitner, 2017). For example, positive ideas of consumers on the environmentally friendly aspects of electronic vehicles have been shown as a positive construct in their willingness to adopt this new auto technology (Huang et al., 2021).

Similarly, the behavioral intent to adopt and use e-wallet is expected to be affected by customer's knowledge on advantages of carrying out their financial transactions with e-wallet. Having adequate knowledge on e-wallet is expected to influence perceived usefulness, perceived ease of use and trust positively towards e-wallet technology. For example, consumers provided with a guarantee that their transaction will be reimbursed in case of fraud and/or that their personal information are encrypted and won't be lost are expected to have more trust on the application. Thus, in this study the degree of customers' subjective knowledge of e-wallet and its

effect on the intention of using e-wallet will be analyzed with the belief that consumer knowledge on e-wallet influences intention to adopt this new technology.

H1: Consumer knowledge on e-wallet positively affects perceived usefulness

H2: Consumer knowledge on e-wallet positively affects perceived ease of use

H3: Consumer knowledge on e-wallet positively affects trust

3.2 Perceived Usefulness (PU)

Perceived Usefulness is explained as one's understanding that use of specific technology will make his or her activities better (Davis, 1989). In this study, the PU is characterized as a person's understanding of advantage acquired from adopting new payment technologies. TAM suggests that PU is an influential factor effecting acceptance of technology, leading people to believe that usage of technology will better productivity (Davis, 1989). Perceived usefulness can be explained as the conviction that using the new technology would increase a person's performance. This performance could be in terms of goods produced or services provided in a more efficient manner in less time (Chawla & Joshi, 2019).

Several studies proposed that perceived usefulness directly and positively affects attitude and behavioral intention to use new technology (Davis, 1993; Liebana-Cabanillas et al., 2017; Hsu and Chiu, 2004; Flavián, Guinaliu, & Lu,2020). A study done on e-wallet stated that perceived usefulness has a positive influence on attitude and intention on e-wallet users (Chawla and Joshi, 2019; Sarmah, Dhiman & Kanojia, 2021) and when new technological products are in question, individual's attitude influences their acceptance of the new technology (Liu et al., 2018; Huang et al., 2021). Therefore, perceived usefulness of e-wallet is expected to positively influence the attitude towards e-wallet.

H4: Perceived usefulness positively affects attitude towards e-wallet.

3.3 Perceived Ease of Use (PEOU)

Perceived Ease of Use is how much less effort a consumer thinks is required while using a new technology (Davis, 1989). In other words, when an individual thinks that using a new system does not require much effort, he/she is considered more likely to adopt that technology. Davis (1989) argues that an "easy to use" application will usually be selected over others. TAM places PEOU as a construct that enables usage of new technological systems. Dahlberg et al. (2015) claims that PEOU is the most important and extensively employed antecedent in the assessment of the adoption of mobile payments.

Prior researches have analyzed the positive influence of perceived ease of use in mobile payment adoption (e.g., Matemba and Li, 2018; Johnson et al., 2018; Liebana-Cabanillas et al., 2018a, b; Williams, 2018; Ooi and Tan, 2016; Pham and Ho, 2015; Flavián, Guinaliu, & Lu,2020). In addition, several studies have displayed the influence of perceived ease of use on the user's attitude toward mobile payment especially in the context of China's mobile payment adoption where e-wallet is extensively used (Ooi and Tan, 2016; Pham and Ho, 2015; Flavián, Guinaliu, & Lu, 2020) Thus, we expect PEOU to positively influence the attitude to use e-wallet:

H5: Perceived Ease of use has a positive effect on attitude towards e-wallet.

However, according to a study on consumer acceptance of online banking by Pikkarainen et al. (2004), although PEOU also has a positive impact on intention to use technology, it has less influence than PU and that PEOU affects intention to use technology through perceived usefulness. Barry and Jan (2018) concluded that PEOU has a significant and positive effect of on PU and perceived usefulness on BI to use a particular system. Al-Maroof and Al-Emran (2018) stated that since Web service technology requires less effort to use it has positive effect on PU and BI (Sarmah,

Dhiman & Kanojia, 2021). Therefore, we expect PEUO to also have an indirect effect on attitude and behavioral intention;

H6: Perceived Ease of Use has an indirect positive effect on Attitude and Behavioral Intention to use E-wallet through Perceived Usefulness.

3.4 Trust (TRU)

Trust is a significant factor in customer relationship with banking industry. Especially after financial crisis of 2008, trust acts as a catalysis agent in establishing relationship with consumers who need to believe that their transactions and savings are invulnerable in their respected institutions. (Van Esterik-Plasmeijer & Van Raaij, 2017). Trust develops as transaction parties mutually agree of each other's reliability (Aldás-Manzano et al., 2009). In a study done on acceptance of online banking in Saudi Arabia, Al-Somali et.al, (2009) showed that trust, PU, PEOU, and other variables explain %85 of variance in attitude towards online banking. In prior studies Trust is also shown as a construct that affects attitude in online transactions (Flavian et al. 2005; Gefen 2002; Lii, 2009). In adaptation of electronic payment systems such as e-wallet, where perceived risks are more prominent, trust plays a significant role in continuation of relationships with customers. According to Shin (2009), trust is an important element in e-wallet acceptance where consumers are concerned with the possibility of fraud (Chawla and Joshi, 2019). Therefore, trust is expected to positively influence attitude to use e-wallet and also behavioral intention to use e-wallet through attitude.

H7: Trust has a positive effect on Attitude to use E-wallet

3.5 Attitude to Use E-wallet (ATT)

Attitude towards using new technology depends on whether the user perceives usage as positive or not (Leonard et al., 2004). Davis (1989) proposed in TAM that behavioral intention is determined by attitude toward a new technology (Chawla and Joshi, 2019). Like Technology Acceptance Model of Davis (1989) Ajzen (1991)'s Theory of Planned Behavior consider attitude as a significant element which affects consumers' intention to use a certain system (Flavián, Guinaliu, & Lu,2020).

Prior research on technology adoption established that attitude is an important antecedent influencing the intention to continuous use (De Luna et al., 2019; Yang et al., 2017; Apanasevic et al., 2016; Ariffin et.al, 2021). Other studies also consider attitude as a prevalent construct determining mobile payment adoption (De Luna et al., 2018; Liebana-Cabanillas et al., 2014a, b; Flavián, Guinaliu, & Lu,2020). In addition, Schierz et al. (2010) and Wulandari (2017) also backed up the hypothesis that attitude affects behavioral intentions in the mobile payment systems context (Upadhyay et al., 2022). Similarly, a study done by Upadhyay et al. (2022) on meta-UTAUT technology adoption model revealed that attitude has emerged as the most powerful construct affecting intentions of consumers to use mobile payment services. Therefore, considering prior research we will propose that;

H8: Attitude has a positive effect on behavioral intention to use e-wallet

3.6 Behavioral Intention to Use E-wallet (BI)

Behavioral intention to use E-wallet is an individual's decision to try to use the new technology and is the dependent variable in the conceptual model presented in Figure 2.

3.7 Immediate Reimbursement (Experiment)

Although e-wallet is an advantageous way of completing transactions, the adoption rate is contrary to expectations (Khalilzadeh et al., 2017; Zhao, Anong, & Zhang, 2019). In order to motivate consumers, discounts, rewards and cash back incentives are provided as marketing strategies. Reimbursement assurances are also influential in reassuring consumer trust while deciding whether to adopt mobile payment systems or not. In order to measure whether consumers are more interested in using e-wallet in case of immediate or later reimbursement, a survey experiment is conducted by providing different periods of reimbursement to separate three subject groups. Here, the expectation is that the consumers in Group 1 with immediate reimbursement knowledge in case of fraud will be more willing to adopt e-wallet than the subjects who are provided with delayed reimbursement.

H9: Guaranteed immediate reimbursement improves intention to use e-wallet (experiment)

H10: Guaranteed immediate reimbursement affects attitude to use e-wallet through trust.

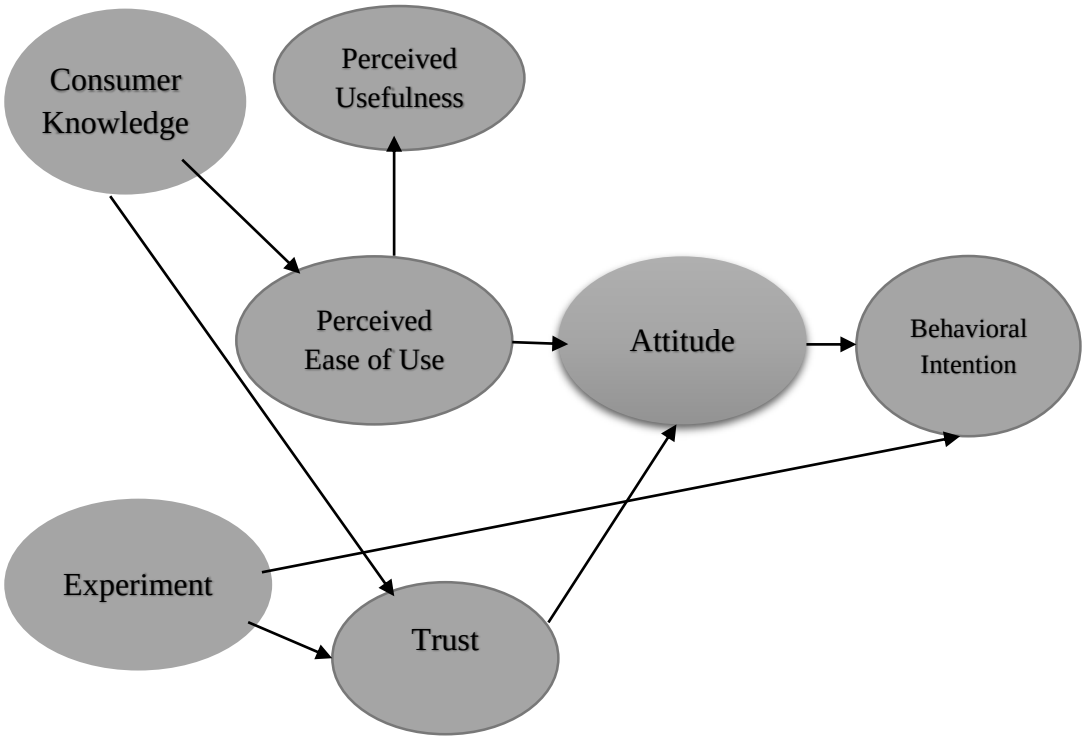

Figure 3: The Conceptual Model

Chapter 4

METHODS

4.1 Sample

The present study is carried out in the context of North Cyprus. North Cyprus is an island in the Mediterranean with small and highly educated population. The main economic sectors are tourism, education and public services. According to the population census of 2019 total number of population of North Cyprus is 291,376. According to the State Planning Organization's report of 2019 on Macroeconomic Indicators, the Gross National Product (GNP) of the country is 3,823 million US Dollars. The economy has grown by 3.6% in 2016 and by 5.5% in 2017. The currency devaluation of 2018 has led to a smaller growth rate of 1.3 % in 2018 and %0.2 in 2019 (www.devplan.org).

North Cyprus is primarily earning its foreign revenue through tourism and education. Although the growth rate of tourism and trade declined in 2019 by 2.7% its share in total GNP is still 22.2%. There exist 23 universities providing higher education for local and foreign students on the island. Total number of students studying in the higher education sector present in North Cyprus was 111,188 in 2019. 13,343 of these students were local Cypriots, 51,738 were from Turkey and 41,842 came from other countries (www.devplan.org).

Banking sector is composed of 2 state controlled, 14 private and 5 Turkish branch banks plus 1 development bank. The consolidated accounts of the sector in 2019 had increased by 23.73% and reached up to 7,159 million US Dollars. Total

deposits were 5,761 million US Dollars and total credits resulted in 3,960 million US Dollars by the end of 2019 (www.devplan.org).

For this study quota sampling method is used and residents over the age of 18 living in North Cyprus were targeted in online and offline questionnaires. The sample preserves the ratios of age and gender distribution in the population data from the TRNC Statistical Institute Statistical Yearbook 2019.

Table 1: Comparison of population age group distribution vs. data collected

Population census 2019 (SPO)			**Data collected**	
Age group	**Total**	**Percentage**	**Total**	**Percentage**
20-75+	**291,367**		**300**	
20-40	153,348	57.3	122	40.7
40-60	88,361	30.3	133	44.3
60-75	50,658	17,4	45	15,0

Table 2: Gender /Age Distribution of Data Collected

Age Group	**Male**	**Female**	**Total**
20-40	70	55	125
40-60	58	75	133
60-75+	19	23	42
Total	**147**	**153**	**300**

Although e-wallet use is a new way of effortless and secure transaction, it has not yet acquired the intended usage rates around the world. According to Khalilzadeh, Ozturk & Bilgihan [31], regardless of the convenience e-wallet payment systems provide, the adoption rate is not as high as expected. Therefore, it is apparent that factors stimulating consumers to prefer e-wallet usage should be examined more

thoroughly. For this purpose, an online survey is used to gather data from a representative sample of North Cyprus adults over the age of 18. Three groups were formed where respondents in Group 1 (n=110) are informed that any loss they may incur due to misuse in the system will be reimbursed immediately. Participants (n=102) in Group 2 are informed that their loss will be reimbursed in a period of 5 days in case of misuse. Participants in Group 3 (n=88) served as the control group where subjects were provided no information on reimbursement. Total number of respondents is 300.

Data were collected from adults residing all over North Cyprus. The majority of the respondents were young and middle aged professionals working in government or private institutions. The questionnaires were formed by modifying the existing questionnaires used in prior studies. The language of the questionnaires was translated into Turkish. The questionnaires included a total of 29 questions. Seven of these questions were presented to obtain descriptive information and knowledge on respondents' previous online activities. The indicator questions used in questionnaires are presented in Table 4 and their sources are presented in detail in Table 11. A pilot study was performed in order to obtain feedback from respondents. Initial pilot group consisted of 16 adults whose ages ranging from 18 to 54. The sample included 6 males and 10 females with education levels secondary, bachelors and graduate. The pilot study provided feedback about the questions' clarity and measures reliability. The questionnaires were corrected accordingly. The questionnaire constructs were measured by 5-point Likert's scale, ranging from "Strongly Disagree (1)" to "Strongly Agree (5)".

The data was analyzed by using SPSS and Smart –PLS software programs and with partial least squares structural equation modelling (PLS_SEM). PLS-SEM uses

ordinary least squares regressions together with principal components analysis. This method is called a "variance-based" method since it explains total variance and employs this to predict parameters (El-Masri and Tarhini, 2017; Ariffin et al., 2021). PLS-SEM is preferred when established theories with new extensions are analyzed in exploratory based-research (El-Masri and Tarhini, 2017; De Kerviller, Demoulin and Zidda, 2016). In addition, PLS-SEM is widely employed for small samples for models with a large number of constructs (El-Masri and Tarhini, 2017). Uphadyay, et al. (2022) employed PLS-SEM conducted with SmartPLS3.3.2 software in a similar study on mobile payment system use during COVID-19 pandemic period. The authors stated that PLS-SEM method enabled the analysis of a complicated model regardless of the sample size. Similarly, Shin (2009) employed the same PLS-SEM method to explore factors affecting user acceptance for NFC mobile wallets in the United States and Korea. The researchers suggested that PLS-SEM provides answers to related questions and enables researchers to work with small samples on "advanced" model elements. Since this study is exploring the effect of a new construct on TAM with a small sample, PLS-SEM is selected as a method of analysis.

Table 3: Experiment Groups

Survey	Experimental group	n
First group	1: Immediate reimbursement in case of fraud	110
Second group	2: Reimbursement in 5 days in case of fraud.	102
Third group	3: Control group with no knowledge on reimb. period	88
		300

4.1.1 Questionnaire Questions and Variable

Questionnaire questions and variables were formed by reviewing previous literature and measures.

Table 4: Variables, Description and Response Type in Questionnaires

Variable	Description	Response Type
code	this is a unique identifier	a number is assigned in order
Type	shows which of the 3 groups the respondent is in	1= immediate reimbursement, 2=5day reimbursement, 3= no offer
Q3	Age	An integer is entered
Q4	Gender	1= male 2= female
Q5	Education	1=Primary School 2= Secondary School 3=Associate Degree 4=Bachelor's Degree 5=Master's Degree /Doctorate
Q6	How often do you use your internet bank account?	1=I don't have an internet bank account 2=Less than once a week 3=Once a week 4=Every day 5=Several times a day
Q7	Do you shop online?	1=Never 2=Occasionally 3=Sometimes 4=Often 5=Very often
Q8	Do you make payments online?	1=Never 2=Rarely 3=Sometimes 4=Often 5=Regularly
Q9	Do you have an e-wallet? If so, how often do you use it?	1=Never 2=Rarely 3=Sometimes 4=Often 5=Regularly
CK1	I know that to use e-wallet is a good way to complete transactions	1 str disagree- 5 str agree
CK2	I know how to use e-wallet applications	1 str disagree- 5 str agree

CK3	I know that using e-wallet is a faster route to complete transactions	1 str disagree- 5 str agree
PU4	I believe that using E Wallet services will save my time	1 str disagree- 5 str agree
PU5	I think that E Wallet will improve quality of my job performance	1 str disagree- 5 str agree
PU6	E Wallet will help me buy easily	1 str disagree- 5 str agree
PU7	E Wallet services will improve my productivity	1 str disagree- 5 str agree
PU8	E Wallet services will increase my effectiveness	1 str disagree- 5 str agree
PEOU9	Interaction with e-wallet will be clear and understandable	1 str disagree- 5 str agree
PEOU10	Interaction with e-wallet will not require mental effort.	1 str disagree- 5 str agree
PEOU11	I think it will be easy to get e-wallet to do what I want to do	1 str disagree- 5 str agree
PEOU12	In general, I believe that e-wallet will be easy to use	1 str disagree- 5 str agree
TRU13	The probability of misuse of transaction information in e-wallet is very low	1 str disagree- 5 str agree
TRU14	The probability of misuse of personal information in e-wallet is very low	1 str disagree- 5 str agree
TRU15	I am worried about connecting my bank/credit card to e-wallet application	1 str disagree- 5 str agree
TRU16	I will feel safe while using e-wallet	1 str disagree- 5 str agree
ATT1	I would like to use E-wallet	1 str disagree- 5 str agree
ATT2	I think using e-wallet will be interesting	1 str disagree- 5 str agree
ATT3	It is desirable for me to learn to use E Wallet	1 str disagree- 5 str agree
BI4	I am willing to keep using e-wallet in the future.	1 str disagree- 5 str agree
BI5	I intend to use an e-wallet on a daily basis	1 str disagree- 5 str agree
BI6	I plan to keep using e-wallet regularly	1 str disagree- 5 str agree

4.1.2 Sample Descriptive Information

The sample consisted of 300 questionnaires distributed randomly with special effort to represent 2019 census distribution. As provided in Table 2, 147 of respondents were constituted of males and 153 were of females. Table 5 shows age frequencies and percentages of total respondents.

Table 5: Age Frequencies and Percentages of Respondents

Age Group	Frequency	Percentage
20-40	83	27.7
40-60	190	63.3
60-75+	27	10
Total	**300**	**100**

Table 5 shows that out of 300 respondents 83 are between the ages of 20 and 40 representing younger generation. 190 of 300 respondents are between the ages of 40 and 60 revealing expectations of a more mature part of generation using finances in working life. 27 of respondents are between ages of 60 and 75 and above ages. These respondents' views demonstrate views of a more elderly segment of population.

The questionnaires also included questions about the education levels of respondents. Information about education levels demonstrated respondents' level of understanding the specifications of the application and information given prior to filling out the questionnaires. The details about the education positions of respondents are presented in Table 6.

Table 6: Education Levels of Respondents

Education Level	Frequency	Percentage
Primary	3	1
Secondary	43	14.3
Associate	24	8
Bachelors	118	39.4
Masters	112	37.3
Doctorate	-	-

3 of respondents have primary level of education and 43 out of 300 respondents have completed secondary level of education. Table 6 shows that 118 of 300 respondents have bachelor's degree and 112 have completed their masters. Thus 76.7 percent of the respondent of the sample have completed bachelors and higher education.

The questionnaires included questions about the internet use and online banking experiences of respondents. Table 7 displays the detailed information on the internet banking of respondents by showing how often they use online banking services.

Table 7: Frequency of Respondents Internet Banking Usage

Use of Internet Banking	Frequency	Percentage
Don't have internet Banking	52	17.3
Less than once a week	35	11.6
Once a week	46	15.4
Every day	123	41
Several times a day	44	14.7
Total	**300**	**100**

Frequency of internet usage by respondents reveals that 17.3 percent of 300 respondents do not have internet banking services. However, 248 respondents use mobile banking services. 41 percent of respondents use internet banking every day and 14.7 percent use internet for banking purposes several times a day.

The respondents were also asked about whether they shop online. Usually the younger generations prefer shopping online with faster services without losing time and having to pay for cost of transportation. Table 8 shows the details on how often respondents shop online.

Table 8: How Often Respondents Shop Online

How Often Shop Online	**Frequency**	**Percentage**
Never	23	7.6
Occasionally	51	17
Sometimes	102	34
Often	89	30
Very often	35	11.4
Total	**300**	**100**

Table 8 displays that 23 respondents out of 300 never shop online. However, 11.4 percent of respondents very often shop online and 89 out of 300 respondents often shop online. Descriptive information reveals that out of 300 respondents at least 277 of people who have filled out the questionnaires have an online shopping experience.

The survey also included questions on online payment experience of respondents. Table 9 displays the detailed information on the frequency of online payment experiences examined in the study.

Table 9: How Often Respondents Make Payments Online

How Often Make Payments Online	***Frequency***	***Percentage***
Never	24	8
Occasionally	40	13.3
Sometimes	68	22.7
Often	64	21.3
Very often	104	34.7
Total	**300**	**100**

104 respondents answered that they make payments online very often. This constitutes 34.7 percent of the sample. 21.3 percent of respondents make payments online often and 22.7 percent of respondents use online payment applications sometimes. Only 8 percent of respondents never make online payment transactions.

Table 10 reveals information about the e-wallet experience of respondents. The question is asked as to whether respondents have an e-wallet and if so, how often they use it. E-wallet applications in North Cyprus are recent products of banks and expectations on e-wallet usage were not very high. However, the results indicated that almost half of respondents have some kind of experience with e-wallet applications.

Table 10: How Often Do Respondents Use E-Wallet?

How Often Use E-Wallet	**Frequency**	**Percentage**
Never	166	55
Occasionally	32	10.8
Sometimes	41	13.8
Often	36	12
Very often	25	8.4
Total	**300**	**100**

Table 10 indicates that 45 percent of respondents use e-wallet and have information on e-wallet. 61 persons out of 300 respondents use e-wallet often and very often and 13.8 percent of respondents make use of e-wallet sometimes. 166 of

respondents have never used e-wallet but provided with detailed information about the application and how it was used.

4.2 Measures

This study included six constructs, namely, consumer knowledge on e-wallet, perceived usefulness, and perceived ease of use, trust, attitude and behavioral intention to use e-wallet. In total, 22 specific items were included in the six constructs which were adopted from existing literature as shown in Table 11.

The three item consumer knowledge (CK) scale was adopted from Huang, et al.(2021), the five item perceived usefulness (PU) scale from Davis (1989) and Triverdi (2016), the four item perceived ease of use (PEOU) scale from Davis (1989) and Venkatesh & Bala (2008), the four item trust (TRU) scale from Lauran and Lin (2005) and Parasuraman, Zeithaml & Malhotra (2005), the three item attitude (ATT) scale from Shih and Fang (2004), and the three item behavioral intention (BI) scale from Taylor and Todd (1995), Lin, Shih & Sher (2007), and Nor and Pearson (2008). All constructs were measured on 5-point Likert scales, with response options ranging from “Strongly Disagree (1)” to “Strongly Agree (5)”.

Table 11: Items used in Conceptual Model

Constructs	Adopted Items	References
Consumer Knowledge on E-wallet	I know that to use e-wallet is a good way to complete transactions	Huang, X., Lin, Y., Lim, M. K., Tseng, M. L., & Zhou, F. (2021).
	I know how to use e-wallet applications	
	I know that using e-wallet is a faster route to complete transactions	
Perceived Usefulness	Using E Wallet services saves my time	Davis (1989), Triverdi (2016)
	E Wallet has improved quality of my job performance	
	Using E Wallet helps me buy easily	
	E Wallet services have improved my productivity	
	E Wallet services increase my effectiveness	
Perceived Ease of Use	Interaction with e-wallet is clear and understandable	Davis (1989), Vankatesh and Bala (2008)
	Interaction with e-wallet does not require mental effort.	Vankatesh and Bala (2008)
	I think it is easy to get e-wallet to do what I want to do	
	In general, e-wallet is easy to use	
Trust	The probability of misuse of transaction information in e-wallet is very low	Lauran and Lin (2005), Parasuraman et al. (2005)
	The probability of misuse of personal information in e-wallet is very low	
	I am worried about connecting my bank/credit card to e-wallet application	
	I feel safe while using e-wallet	
Attitude	I like to use E-wallet	Shih and Fang (2004)
	I think using e-wallet is interesting	
	It is desirable for me to learn to use E Wallet	
Behavioral Intention	I am willing to keep using the digital wallet in the future.	Taylor and Todd (1995), Lin et al (2007), Nor and Pearson (2008)
	I intend to use a digital wallet on a daily basis.	
	I plan to keep using the digital wallet regularly.	

Chapter 5

RESULTS

5.1 Measurement Model

Hair et al. (2019) states that measurement models are first evaluated by looking at the loadings of indicators. Loadings above 0.708 are accepted. An indicator loading above 0.708 shows that the construct in question displays more than 50 per cent of the item's variance and is considered as a reliable item.

Composite reliability is another area where researchers examine in order to evaluate internal consistency (Jöreskog, 1971; Hair et al., 2019). Higher values show more reliability at differing levels. In other words, reliability values between 0.6 and 0.7 are contemplated as "acceptable in exploratory research" and values between 0.7 and 0.90 are thought as "satisfactory to good." On the other hand, values of composite reliability higher than 0.95 indicate that there might be undesired excess of relationships among the indicator's error terms (Hair et al., 2019).

Item loadings of latent variables were examined in the measurement model together with reliability. Indicator loadings of each item display how much change is provided by the related construct. As mentioned above, prior research indicates that the acceptable loading level is 0.708 for convergent validity of each construct (Hair et al., 2019). Table 12 shows the item loadings of each item in the study together with the values of composite reliability (CR). The acceptable level for composite reliabilities is 0.70 (Gefen et al., 2000). All our items have the necessary level and as shown in Table 12.

Table 12: Item Loadings, Composite Reliability values

Constructs	Indicators	Loadings	CR
Consumer Knowledge	CK1: I know that to use e-wallet is a good way to complete transactions	0.875	0.867
	CK2: I know how to use e-wallet applications	0.796	
	CK3: I know that using e-wallet is a faster route to complete transactions	0.812	
Perceived Usefulness	PU1: I believe that using E Wallet services will save my time	0.779	0.915
	PU2: I think that E Wallet will improve quality of my job performance	0.833	
	PU3: E Wallet will help me buy easily	0.843	
	PU4: E Wallet services will improve my productivity	0.820	
	PU5: E Wallet services will increase my effectiveness	0.853	
Perceived Ease of Use	PEOU1: Interaction with e-wallet will be clear and understandable	0.819	0.904
	PEOU2: Interaction with e-wallet will not require mental effort.	0.869	
	PEOU3: I think it will be easy to get e-wallet to do what I want to do	0.832	
	PEOU4: In general, I believe that e-wallet will be easy to use	0.831	
Trust	TRU1: The probability of misuse of transaction information in e-wallet is very low	0.858	0.921
	TRU2: The probability of misuse of personal information in e-wallet is very low	0.902	
	TRU3: I am worried about connecting my bank/credit card to e-wallet application	0.820	
	TRU4: I will feel safe while using e-wallet	0.873	
Attitude	ATT1: I would like to use E-wallet	0.881	0.908
	ATT2: I think using e-wallet will be interesting	0.924	
	ATT3: It is desirable for me to learn to use E Wallet	0.818	
Behavioral Intention	BI1: I am willing to keep using e-wallet in the future.	0.921	0.951
	BI2: I intend to use an e-wallet on a daily basis.	0.920	
	BI3: I plan to keep using e-wallet regularly.	0.951	

Note: CR stands for composite reliability.

Table 13: Cronbach's Alpha values

Constructs	Indicators	Cronbach's Alpha
Consumer Knowledge	CK1: I know that to use e-wallet is a good way to complete transactions CK2: I know how to use e-wallet applications CK3: I know that using e-wallet is a faster route to complete transactions	0.770
Perceived Usefulness	PU1: I believe that using E Wallet services will save my time PU2: I think that E Wallet will improve quality of my job performance PU3: E Wallet will help me buy easily PU4: E Wallet services will improve my productivity PU5: E Wallet services will increase my effectiveness	0.884
Perceived Ease of Use	PEOU1: Interaction with e-wallet will be clear and understandable PEOU2: Interaction with e-wallet will not require mental effort. PEOU3: I think it will be easy to get e-wallet to do what I want to do PEOU4: In general, I believe that e-wallet will be easy to use	0.859
Trust	TRU1: The probability of misuse of transaction information in e-wallet is very low TRU2: The probability of misuse of personal information in e-wallet is very low TRU3: I am worried about connecting my bank/credit card to e-wallet application TRU4: I will feel safe while using e-wallet	0.886
Attitude	ATT1: I would like to use E-wallet ATT2: I think using e-wallet will be interesting ATT3: It is desirable for me to learn to use E Wallet	0.848
Behavioral Intention	BI1: I am willing to keep using e-wallet in the future. BI2: I intend to use an e-wallet on a daily basis. BI3: I plan to keep using e-wallet regularly.	0.923

Reliability is also measured by Cronbach's alpha with lower acceptable rates. Hair et al. (2019) defines Cronbach's alpha as a "less precise" estimate of reliability since in this procedure un-weighted items are employed. Where as in composite reliability loadings of items are used to weighting resulting in higher results (Hair et al., 2019). Table 13 presents the Cronbach's Alpha values.

According to Hair et al. (2017a), measurement models are analyzed based on indicator collinearity, convergent validity, and significance and indicator weights. Convergent validity is measured and evaluated by looking at the relationship between constructs and substitute measure of the same concept (Hair et al., 2019). Chin (1998) named this course of action as “redundancy analysis” (Chin, 1998; Hair et al., 2019). For this purpose, resembling indicators of the same concept should be included in questionnaires at the beginning of questionnaire preparation phase. Hair et.al, (2017a) proposes that the association of a formatively measured construct with a construct within the same concept should be 0.7 or higher (Hair et al., 2019).

Convergent validity is measured by Average Variance Extracted for each item in every construct. Average Variance Constructed is found by squaring the loading of each item in a construct and calculating the mean value. In another words, the Average Variance Extracted (AVE) is the rate of variance constructs acquire from their indicators compared to the variance due to measurement error. The recommended minimum level is 0.50 (Fornell and Larcker, 1981) and is met by all.

The collinearity issue was tested by examining the Variance Inflation Factor (VIF) values which have the threshold value that should be close to 3 or lower. VIF values are analyzed to compute whether or at what extend the formative indicators lie in the same straight line or their collinearity (Hair et al. 2019). Table 14 displays the VIF values for items. VIF values above 5 indicate a collinearity problem (Hair et.al.2019). Items related with trust and behavioral intention have VIF values above 3 but not larger than 5. Table 14 displays Average Value Extracted and VIF values for each construct.

Table 14: Average Variance Extracted and Variance Inflation values.

Constructs	Indicators	AVE	VIF
Consumer Knowledge		0.686	
	CK1: I know that to use e-wallet is a good way to complete transactions		1.835
	CK2: I know how to use e-wallet applications		1.512
	CK3: I know that using e-wallet is a faster route to complete transactions		1.547
Perceived Usefulness		0.682	
	PU1: I believe that using E Wallet services will save my time		2.623
	PU2: I think that E Wallet will improve quality of my job performance		2.338
	PU3: E Wallet will help me buy easily		2.848
	PU4: E Wallet services will improve my productivity		2.429
	PU5: E Wallet services will increase my effectiveness		
Perceived Ease of Use		0.702	
	PEOU1: Interaction with e-wallet will be clear and understandable		1.946
	PEOU2: Interaction with e-wallet will not require mental effort.		1.919
	PEOU3: I think it will be easy to get e-wallet to do what I want to do		2.273
	PEOU4: In general, I believe that e-wallet will be easy to use		1.902
Trust		0.745	
	TRU1: The probability of misuse of transaction information in e-wallet is very low		3.201
	TRU2: The probability of misuse of personal information in e-wallet is very low		3.924
	TRU3: I am worried about connecting my bank/credit card to e-wallet application		1.917
	TRU4: I will feel safe while using e-wallet		2.279
Attitude		0.766	
	ATT1: I would like to use E-wallet		2.154
	ATT2: I think using e-wallet will be interesting		2.865
	ATT3: It is desirable for me to learn to use E Wallet		1.880
Behavioral Intention		0.866	
	BI1: I am willing to keep using e-wallet in the future.		3.102
	BI2: I intend to use an e-wallet on a daily basis.		3.503
	BI3: I plan to keep using e-wallet regularly.		4.699

Note: 1.AVE stands for Average Value Extracted 2. VIF stands for Variance Inflation values.

Table 15 displays the results of the model according to Fornell and Larcker criterion. In addition, Table 16 provides findings according to the Heterotrait-Monotrait (HTMT) criterion which are all below 0.90 except behavioral intention.

Table 15: Fornell and Larcker Criterion

		1	2	3	4	5	6
1	Attitude	**0.875**					
2	Behavioral Intention	0.831	**0.931**				
3	Consumer Knowledge	0.650	0.649	**0.828**			
4	Perceived Ease of Use	0.646	0.693	0.686	**0.838**		
5	Perceived Usefulness	0.666	0.682	0.704	0.722	**0.826**	
6	Trust	0.614	0.680	0.589	0.634	0.566	**0.864**

Note: The square root of AVE is presented in the diagonal and correlation values are below the diagonal.

Fornel and Lacker test is performed to measure discriminant validity. According to Fornell-Lacker (1981), the square root of average variance extracted shows discriminant validity when the end value is greater than correlation values among the latent variables. In Table 15 the average value extracted results are on the diagonal and correlations among latent variables are below the diagonal. All AVE values are larger than the correlation values in their respective rows. Thus, Fornell and Larcker test results show that discriminant validity is established.

Table 16: Heterotrait-Monotrait Ratio (HTMT)

		1	2	3	4	5	6
1	Attitude						
2	Behavioral Intention	0.934					
3	Consumer Knowledge	0.792	0.767				
4	Perceived Ease of Use	0.745	0.778	0.843			
5	Perceived Usefulness	0.758	0.751	0.842	0.819		
6	Trust	0.686	0.746	0.709	0.720	0.635	

Heterotrait-Monotrait Ratio (HTMT) shows the mean value of item correlations relative to geometric mean of that average correlation measuring the same construct (Hair et al., 2019). The threshold value for HTMT Ratio is 0.9. Table 16 shows that the ratio of behavioral intention and attitude is 0.934 indicating that there exists no discriminant validity between these two constructs.

5.2 Structural Model

The structural model is analyzed with PLS-SEM after testing convergent and discriminant validity of the measurement. In structural model evaluation the coefficient of determination (R^2) and cross validated redundancy measure (Q^2) and statistical significance and path coefficients are examined (Hair et al., 2019).

As referred in previous studies R^2 represents "in-sample predictive power" (Rigdon, 2012; Hair et al., 2019). In other words, R^2 shows the variance in each construct and indicates how much an explanatory power a model has (Shmueli and Koppius, 2011; Hair et al., 2019). R^2 is a calculation of "predictor" constructs and should be considered in relation to studies with similar complexity.

In order to assess the model's exploratory power R^2 is tested. R^2 which ranges from 0 to 1 is accepted to have higher explanatory power as the value increases. According to Hair et.al, (2019), 0.75 R2 value indicates a substantial, 0.5 values moderate and 0.25 value a weak explanatory power. Table 16 displays R square values of the model which range from 0.49 to 0.69 indicating moderate power.

Table 17: R-Square values

	R Square
ATT	0.545
BI	0.691
PEOU	0.584
PU	0.496
TRU	0.347

The effect size (f^2) is employed for determining how exemption of certain constructs influence that internal construct's explanatory power R2. The effect size (f^2) is usually close to the scale of path coefficients and thus are not usually reported. It is usually stated when rank order of the constructs' relevance in explaining a

dependent construct differs from path coefficients indicating existence of meditation (Nitzl et al., 2016; Hair et.al., 2019).

When the effect size f^2 is examined, it is apparent that all of the constructs have values within the accepted ranges which are 0.02 as small, 0.15 medium and 0.35 large (Cohen, 1988; Hair et.al., 2019). Table 18 displays the results of the effect size.

Table 18: The Effect Size f^2

Hypotheses relationships	Effect size (f2)
CK→PU	0.985
CK→PEOU	0.151
CK→TRU	0.530
PU→ATT	0.126
PEOU→PU	0.271
PEOU→ATT	0.041
TRU→ATT	0.097
ATT→BI	2.233

5.2.1 The Summary of the Relationships

PLS analysis is performed with bootstrapping, in order to test hypotheses. The summary of the relationships is presented in Fig. 4 and Table 19

Table 19: The summary of the relationships

Hypotheses relationships	Beta	Significance	Effect size (f2)	Decision
CK→PU	0.393	0.000	0.985	Accepted
CK→PEOU	0.687	0.000	0.151	Accepted
CK→TRU	0.589	0.000	0.530	Accepted
PU→ATT	0.354	0.000	0.126	Accepted
PEOU→PU	0.452	0.000	0.271	Accepted
PEOU→ATT	0.216	0.001	0.041	Accepted
TRU→ATT	0.277	0.000	0.097	Accepted
ATT→BI	0.831	0.000	2.233	Accepted

Hypothesis 1 proposes that consumer knowledge on e-wallet positively affects perceived usefulness. The results indicate that Consumer Knowledge (CK) predicts Perceived Usefulness (PU) in a significant and positive way since the path coefficient $\beta = 0.393$ and $p<0.001$. Hypothesis 2 states that Consumer Knowledge on e-wallet positively affects Perceived Ease of Use. Results show that Consumer Knowledge on e-wallet predicts Perceived Ease of Use (PEOU) positively and significantly ($\beta = 0.687$ and $p<0.001$).

Hypothesis 3 proposes that Consumer Knowledge on e-wallet positively affects Trust. The analysis indicates that Consumer Knowledge positively and significantly affects Trust since $\beta = 0.589$ and $p<0.001$. Hypothesis 4 proposes that Perceived Usefulness positively affects Attitude towards e-wallet. The fourth hypothesis is also confirmed by the study where the path coefficient results as $\beta = 0.354$ and the p value is significant ($p<0.001$). Results also indicate that Perceived Ease of Use has a positive effect on Attitude ($\beta = 0.215$). This positive effect is also significant ($p<0.01$) indicating that Perceived Ease of Use predicts attitude parallel to what is proposed in Hypothesis 5.

It is also apparent from results that Hypothesis 6 is also confirmed since Perceived Ease of Use has a direct positive effect on Perceived Usefulness ($\beta = 0.452$, $p<0.001$) and an indirect effect on Attitude and Behavioral Intention. When indirect effects are analyzed, results show that Perceived Ease of Use has a special indirect effect on Attitude and Behavioral Intention through Perceived Usefulness (PEOU -> PU -> ATT -> BI = 0.133). Hypothesis 7 proposes that Trust has a positive effect on Attitude to use e-wallet which is confirmed by a positive path coefficient of $\beta = 0.277$ with significance $p<0.001$.

Results also suggest that Attitude has a positive effect on Behavioral Intention to use e-wallet as stated in Hypothesis 8 since the coefficient is β =0.831 and significance is p<0.001. Figure 5 displays the results of the proposed model.

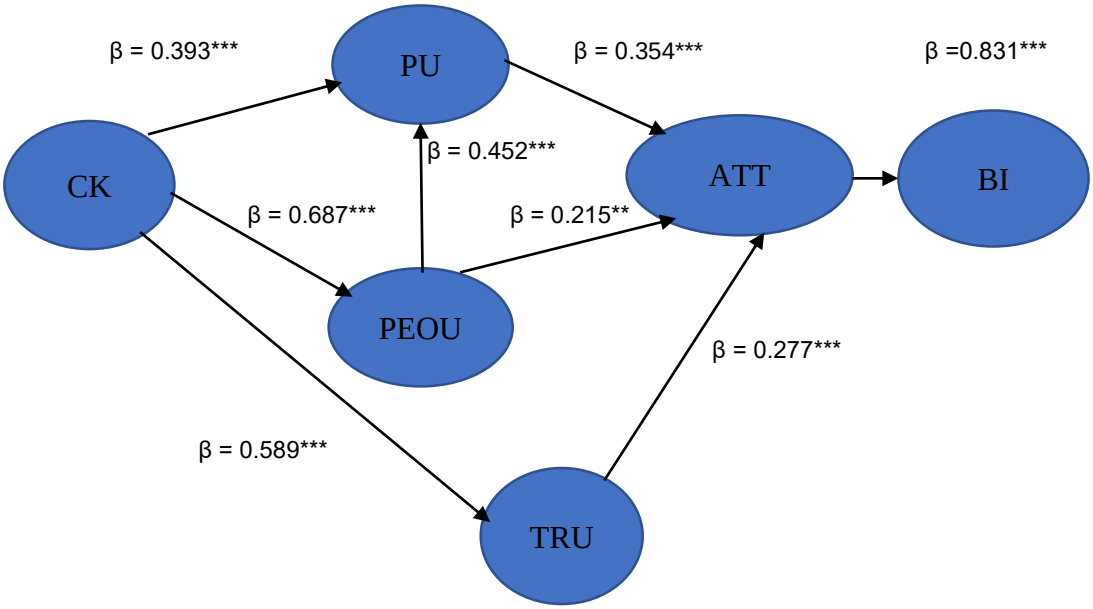

Figure 4: Results of the Proposed Model
Notes: *p<0.05, **p<0.01, *** p<0.001; ns=non-significant

5.3 Results of the Survey Experiment

A survey experiment analyzing preferences of e-wallet usage is employed in an effort to measure how different information provided to users on e-wallet properties influence the intention to use this new payment system. For this purpose, three groups are formed while gathering data. Participants in Group 1 were provided with the information that their probable losses in case of a fraud will be reimbursed immediately. Respondents in Group 2 were told that their losses will be reimbursed in 5 working days in case of a fraud. Participants in Group 3 which is the control group were provided with no such information.

In a total of 300 questionnaires, information of different groups was distributed randomly with the use of online data gathering system. 110 respondents answered to questionnaires of Group 1, 102 participants took place in Group 2 and 88 respondents were in Group 3.

Table 20 displays the means of six latent variables by three groups with different knowledge on reimbursement periods.

Table 20: Means for dependent variables for three different groups

Type	Reimburs. period	CK	PU	PEOU	TRU	ATT	BI
Group 1	immediate	4.1182	3.9636	3.9977	3.6841	4.1455	4.0303
Group 2	5 days	3.9020	3.7608	3.9044	3.4436	3.9444	3.7451
Group 3	No knowledge	3.9729	3.8943	3.9375	3.5313	4.0341	3.8333

Respondents in Group 1 who were given the information that their losses will be reimbursed immediately in case of a fraud, have the highest mean in all variables. In other words, people in Group 1 have the highest intention, attitude and trust to use e-wallet. Respondents in Group 2 who had the information that their losses will be covered in five days have the lowest intention while the control group participants' (Group 3) intentions resulted higher than Group 2 respondents.

One way analysis of variance ANOVA test was employed to measure whether respondents who were offered information on immediate reimbursement in case of a fraud and those who were given no information have a significant difference in intention to adopt e-wallet. The result of ANOVA showed that there was a significant effect of immediate reimbursement information on the intention to adopt e-wallet $F(1,300) = 3.474$, $p<0.001$. Respondents who were provided with immediate reimbursement information had significantly higher intention to adopt e-wallet

(M=4.0303, SD=0.73578) than those who were not offered any information (M=3.8333, SD=0.82428) or than those who were offered information of reimbursement in five days (M=3.7451, SD=0.86387). The results of ANOVA confirmed the proposition of Hypothesis 9 which claimed that guaranteed immediate reimbursement improves intention to use e-wallet. However, Hypothesis 10 which proposed that guaranteed immediate reimbursement affects attitude to use e-wallet through trust is rejected since the ANOVA results of trust was insignificant $F(1,300) = 2.334$ $p>0.05$.

Analysis of Covariance (ANCOVA test) was also conducted in order to explore how consumer knowledge (covariate) affects different groups and lead to different reactions on intention. Table 21 summarizes mean scores and standard deviations for behavioral intention in each of the three experimental conditions, and Table 22 reports the ANCOVA results. The results of ANCOVA test indicate that consumer knowledge and behavioral intention were significantly related with each other. In other words, prior consumer knowledge significantly influences intention to adopt e-wallet [$F=202.984$, $p<0.001$]. Thus, Hypothesis 1 which states that consumer knowledge positively and significantly influences behavioral intention is supported. However, when consumer knowledge is included, the effect of group difference diminishes since group type is insignificant [$F=1.435$, $p>0.001$].

Table 21: Descriptive Statistics

Group Type	Mean	St. Deviation	N
1	4.0303	0.73578	110
2	3.7451	0.86387	102
3	3.8333	0.82428	88
Total	3.8756	0.81380	300

Dependent variable: Behavioral Intention

Table 22: ANCOVA Results

Target Variable	SS	df	MS	F	Sig
Behavioral Intention					
Dependent variable (type)	1.045	2	0.523	1.345	0.262
Covariate (CK)	78.915	1	78.915	202.984	0.000

Structural model was examined in order to explore the effect of different reimbursement period information provided to respondents. Multi group analysis with bootstrapping results for survey groups are presented in Table 23. The results indicated that consumer knowledge is positively significantly related with perceived usefulness in all groups ($\beta1 = 0.311$, $p<0.05$; $\beta2 = 0.389$, $p<0.05$; $\beta3 = 0.504$, $p<0.05$). Similarly, consumer knowledge is positively related with perceived ease of use and trust in all groups. While perceived usefulness positively relates to attitude in Group 1 ($\beta1 = 0.412$, $p<0.05$), this hypothesis is not supported for Group 2 ($\beta2=0.243$ $p>0.05$) and supported in Group 3 ($\beta3=0.403$ $p<0.001$). These findings indicate that for Groups 1 and 3 to whom reimbursement guarantee is provided and no information was given (the control group), perceived usefulness influences attitude towards e-wallet. For Group 2 to whom information of 5 day reimbursement was provided perceived usefulness has no effect. This may mean that respondents have no perception of usefulness when reimbursement is delayed.

Although the effect of perceived ease of use on attitude is supported in Group 1 ($\beta1 = 0.037$ $p<0.05$), it is rejected according to the results of Group 2 ($\beta2 = 0.100$ $p>0.05$) and Group 3 ($\beta3=0.160$ $p>0.05$). These findings indicate that respondents who have been provided with guaranteed immediate reimbursement in case of fraud have perceived ease of use affecting attitude. On the other hand, the respondents with no

guarantee of immediate reimbursement tend to have perceived ease of use with no significant effect on attitude.

Lastly, the trust indicator for Group 1($\beta1=0.113$ $p>0.05$) does not influence attitude contrary to expectations. Respondents with guaranteed reimbursement assurance were expected to have higher levels of trust and more influence of trust on attitude. This result may indicate that prior knowledge on guaranteed reimbursement may not have a direct effect on trust. The trust indicator for Group 2 and 3 were significant and the effect of trust on attitude is supported for these groups again contrary to expectations. All other hypotheses are supported.

Table 23: Hypothesis Testing of Groups

		Gr. 1			Gr. 2			Gr. 3	
	Beta	Sig.	Decision	Beta	Sig.	Decision	Beta	Sig.	Decision
CK-PU	0.311	0.000	Accepted	0.389	0.000	Accepted	0.504	0.000	Accepted
CK-PEOU	0.658	0.000	Accepted	0.759	0.000	Accepted	0.627	0.000	Accepted
CK-TRU	0.586	0.000	Accepted	0.630	0.000	Accepted	0.546	0.000	Accepted
PU-ATT	0.412	0.000	Accepted	0.243	0.099	Rejected	0.403	0.000	Accepted
PEOU-PU	0.565	0.000	Accepted	0.472	0.000	Accepted	0.303	0.007	Accepted
PEOU-ATT	0.250	0.037	Accepted	0.239	0.100	Rejected	0.160	0.131	Rejected
TRU-ATT	0.113	0.281	Rejected	0.381	0.004	Accepted	0.333	0.000	Accepted
ATT-BI	0.766	0.000	Accepted	0.879	0.000	Accepted	0.840	0.000	Accepted

In addition, path coefficient comparison was employed in order to determine whether path coefficients differ significantly across groups of data (Hair et.al. 2014). Table 24 shows comparison of path coefficients on each hypothesis across groups 1, 2 and 3.

Table 24: Path Coefficient Comparison

	Group 1 vs 2		Group 2 vs 3		Group 1 vs 2	
	Beta Diff.	Signif.	Beta Diff.	Signif.	Beta Diff.	Signif.
CK→PU	-0.078	0.437	-0.115	0.378	-0.193	0.167
CK→PEOU	-0.101	0.142	0.132	0.119	0.031	0.784
CK→TRU	-0.043	0.598	0.084	0.369	0.041	0.668
PU→ATT	0.169	0.370	-0.160	0.361	0.009	0.943
PEOU→PU	0.093	0.366	0.168	0.190	0.261	0.060
PEOU→ATT	0.011	0.946	0.078	0.618	0.090	0.574
TRU→ATT	-0.268	0.126	0.048	0.739	-0.220	0.120
ATT→BI	-0.113	0.025	0.039	0.386	-0.074	0.217

Chapter 6

DISCUSSION

The present study investigated the determinants of e-wallet mobile system adoption with the use of extended TAM variables in North Cyprus. In addition, an online survey experiment is used to determine the influence of reimbursement periods on adoption intentions. The proposed research questions were: (1) What are the factors influencing the customer intentions to adopt the e-wallet in general? (2) How does the knowledge that there will be guaranteed reimbursement in case of fraud/unauthorized influence consumer adoption intentions? (3) How does the time frame of the guaranteed reimbursement in case of unauthorized use influence consumer adoption intentions?

For research question one, the results of the study confirmed that consumer knowledge, perceived usefulness, perceived ease of use, trust and attitude have a significant and positive effect on behavioral intention to use e-wallet. Provision of information to consumers on advantages and procedures of using e-wallet clearly influences attitude and intention to adopt this new transaction technology. The results indicate that consumer knowledge predicts perceived usefulness in a significant and positive way since the path coefficient $\beta = 0.393$ and $p<0.001$. Results of the study also show that consumer knowledge on e-wallet predicts perceived ease of use positively and significantly ($\beta = 0.687$ and $p<0.001$). In addition, the analysis indicates that consumer knowledge positively and significantly affects trust since $\beta = 0.589$ and $p<0.001$. This is parallel to the findings of Huang, et al. (2021) where it was confirmed

that consumer knowledge management about the security and effectiveness of the technology used plays a significant role in consumers' intention to adopt Electronic Vehicles (Huang, et al., 2021). The findings of this study fill a gap in previous research on mobile payment systems by analyzing the impact of providing knowledge to consumers.

As stated in technology adoption model, perceived usefulness and perceived ease of use of adapting e-wallet are essential constructs affecting attitude and intention in a positive direction. The findings of the study show that perceived usefulness positively affects attitude towards e-wallet. The path coefficient resulted as $\beta = 0.354$ and the p value is significant ($p<0.001$). Results also indicate that perceived ease of use has a positive effect on attitude ($\beta = 0.215$). This positive effect is also significant ($p<0.01$) indicating that perceived ease of use predicts attitude. These findings are similar to the findings of Liebana-Cabanillas et al. (2017); Hsu and Chiu (2004); Ooi and Tan (2016); Pham and Ho (2015) and Flavián, Guinaliu, & Lu (2020) who all proposed that there exists a positive relationship between perceived usefulness and attitude and a positive relationship between perceived ease of use and attitude.

In addition, the results indicate that perceived ease of use has an indirect positive effect on attitude through perceived usefulness. Perceived ease of use has a direct positive effect on perceived usefulness ($\beta = 0.452$, $p<0.001$) and an indirect effect on attitude and behavioral intention. When indirect effects are analyzed, results show that perceived ease of use has a special indirect effect on attitude and behavioral intention through perceived usefulness (PEOU -> PU -> ATT -> BI = 0.133). These results are similar to the findings of prior studies. For example, Pikkarainen et al. (2004) stated that although perceived ease of use also has a positive impact on intention to use technology, it has less influence than perceived usefulness and that perceived

ease of use affects intention to use technology through perceived usefulness. Barry and Jan (2018) concluded that perceived ease of use has a significant and positive effect of on perceived usefulness and perceived usefulness on behavioral intention to use a particular system.

Trust is another prominent antecedent influenced by consumer knowledge which has a positive effect on attitude and intention to use e-wallet. The findings of the study demonstrate that trust has a positive effect on attitude to use e-wallet which is confirmed by a positive path coefficient of $\beta = 0.277$ with significance $p<0.001$. This finding confirms the results of previous studies. For example, Al-Sharafi, et al. (2021) analyzed the importance and role of security issues and trust on mobile payment. The results demonstrated that trust has the greatest influence on mobile payment.

Attitude is influenced by the above discussed constructs (perceived usefulness, perceived ease of use and trust) and affects intention to use e-wallet in payment transactions. These results are similar to prior studies of mobile payment adoption. For example, Yadav (2017) studied elements that affect consumer intention to use e-wallet in India. The findings revealed that perceived usefulness actively influences consumer intention and adoption of e-wallet. This is parallel to the findings of previous studies. Flavian and Guinaliu (2020) explored main factors determining e-wallet and mobile payment adoption and concluded that mindfulness, perceived usefulness, perceived ease of use and attitude are the major drivers of behavioral use intention.

Research question two analyzed how the knowledge that there will be guaranteed reimbursement in case of fraud/unauthorized use influences consumer adoption intentions. This question is answered with ANOVA results indicating that when consumers are informed that their losses will be reimbursed immediately as was

the case in Group 1, such knowledge leads to a significant effect on behavioral intention to use e-wallet. Respondents who were provided with immediate reimbursement information had significantly higher intention to adopt e-wallet (M=4.0303, SD=0.73578) than those who were not offered any information (M=3.8333, SD=0.82428) or than those who were offered information of reimbursement in five days (M=3.7451, SD=0.86387).

The research question three explored in what way the time frame of the guaranteed reimbursement in case of unauthorized use influences consumer adoption intentions. The results indicate that the time frame of guaranteed reimbursement influences respondents' behavior since respondents who were provided with immediate reimbursement information had significantly higher intention to adopt e-wallet (M=4.0303, SD=0.73578). Consumers who were not offered any information (M=3.888, SD=0.82428) or respondents who were offered information of reimbursement in five days (M=3.7451, SD=0.86387) have lower intention to adopt e-wallet. However, results of ANCOVA indicate that when prior consumer knowledge is included into the equation the effect group differences on behavioral intention diminishes. That is when consumer knowledge is taken into consideration, having different kinds of reimbursement assurances becomes insignificant.

The current study provides valuable information to literature since it highlights the significance of consumer knowledge on e-wallet while deciding to use the new technology. Availability of detailed information clearly increases adoption attitude and intention. In addition, provision of incentives such as immediate reimbursement encourages consumers in trying the new technology in case of probable fraud. Therefore, our study proposes a different kind of incentive than financial cash back

policies or discounts and introduces a new marketing mechanism based on guaranteed and fast reimbursement.

From a managerial point of view, this study highlights the importance of explaining the new technology to prospective customers. Managers of banks or technology firms should consider providing detailed information on the new technology and assurances regarding probable risks while promoting the new product. The study reveals that both consumer knowledge and trust lead to a significant influence on attitude and behavioral intention to use e-wallet. Therefore, the practitioners in the sector should design their implementation policies with caution to increase information and trust.

Chapter 7

CASE STUDY

E-wallet applications began to be used in North Cyprus in 2018 with the introduction of the system by a private commercial bank called Credit West Bank Ltd. The e-wallet payment system was named as “Local Pay” and has been a new venue of payment in the market.

The Cyprus Turkish Cooperative Bank Ltd. introduced another mobile payment system product in February 2021 and entered the market as the second service provider. The e-wallet payment system was named as “HEPI” and the Bank launched a big campaign with bonus point allocation property to attract users. This chapter analyzes the case of e-wallet system application implementation of Cyprus Turkish Cooperative Bank Ltd. in North Cyprus. The Bank’s Deputy General Manager responsible from Information Technology was interviewed about the design and implementation of the project. Additional information was gathered from the interview done with the Bank’s General Manager. In addition to the research done with the Bank as the service provider, interviews were carried out with a businesses using the application and also with a consumer as the end user.

Cyprus Turkish Cooperative Bank Ltd. was established on 9.9.1959. The members of the Bank were the cooperative societies who were obliged to deposit their funds to the Bank according to the Cooperative Law called Chapter 114. According to this system, every cooperative society was a member of the Bank who acted as an upper financial body (www.koopbank.com).

The Bank operated under the Cooperative Law and Banking Law until 2001. The new Banking Law of 2001 introduced a new organization where the Cyprus Turkish Cooperative Bank retrieved from production and retail of goods and services and began to operate only in the financial sector. The production and retail of goods and services in other sectors were grouped in two subsidiary firms whose sole owner remained as the Bank with 100 percent of equity (www.koopbank.com).

The Cyprus Turkish Cooperative Bank today is the largest financial organization in North Cyprus with a market share of 23 percent in the banking sector in terms of total assets and deposits (www.koopbank.com). According to the financial data of the year 2021 published by the Central Bank, the Cyprus Turkish Cooperative Bank had total assets of USD 1.117 million. The total amount of deposits of the Bank was USD 1,018 million and the total amount of credits was USD 582 million at the date of December 31st, 2021. The Bank's total equity was USD 41 million and the profit of the year 2021 amounted up to USD 18.5 million (www.kktcmerkezbankasi.org).

The Cyprus Turkish Cooperative Bank is an issuer and operator of credit card named "Optimum" in the financial market. The technological changes in the financial world and the resulting changes in consumers' lifestyles has led banks to constantly introduce new financial products to their consumers. Introduction of the e-wallet payment application system "HEPI" resulted from such a requirement.

In the interview with the Cyprus Turkish Cooperative Bank about the new e-wallet payment application system, questions were asked to understand their objectives, preparations, targets and experiences related with the investment. The management presented their valuable and sincere views about the project formation and implementation process together with their views on future expectations.

When asked about what perspective they had while deciding to invest in e-wallet application system as a product, the management replied that they followed the payment system practices in the world and in Turkey. Their analysis demonstrated that many financial firms as well as banks in the world and in Turkish financial sector were introducing e-wallet as a new technological product. These developments prompted the management to invest in e-wallet application systems as a new technological product.

Every project and investment requires a certain preparation period where data are gathered and experiences of similar investments are researched. The Bank management was asked about what kind of research procedure they employed at the initial phase and what kind of data on local businesses and consumer preferences they had. The Bank management stated that they analyzed the electronic payment system called "Venmo" in the United States as an example. The "Venmo" application includes a new approach to person to person transaction which was studied in depth and used as an example while designing "HEPI." In addition, the Bank studied experiences related with "Local Pay" mobile application already present in the market. The disadvantages of using "Local Pay" was inspected with an aim to introduce a better product with higher technological aspects and ease of use. The Bank already had the experience of issuing and marketing credit cards for the last 20 year. According to the management, this experience and existing data helped easing the way to introduce new product along with and as an alternative to credit cards. The management admitted that at the beginning of the project the institution lacked adequate information about e-wallet consumer and business preferences since mobile payment was a very recent technology in North Cyprus. The main objective of the Bank was to continue their mission of being a "technologically superior Bank who follows the developments

in the world and provides the newest technology to North Cyprus." The management believed that consumers and businesses would adopt the new technology once it is available in the market. However, they stated that initial results and experience demonstrated that the realization of the targeted adoption rates will require some more time.

Promoting a new technological product and attracting customer awareness requires a well-designed marketing campaign. When asked about whether the Bank received any professional aid while launching their marketing campaign of e-wallet, the management stated that they carry out marketing campaigns by their own Marketing and Consumer Relations and Advertisement divisions. The management informed that marketing campaigns were created by analyzing similar existing campaigns in the world and by using some of their aspects suitable to North Cyprus life style characteristics. Their primary consumer target type was selected as students and younger generations. Additional marketing activities towards students in North Cyprus were also implemented within the framework of an agreement with the Ministry of Education.

When the primary marketing aspects of "HEPI" were questioned to gather more detailed information on the Bank's marketing strategy, the management provided information about their loyalty programs as main campaigning promotions. According to the Bank's management, the application has two loyalty characteristics called "Little HEPI everywhere" and "Little HEPI just for you." These two loyalty characteristics were promoted as incentives for adoption. Especially the "Little HEPI just for you" characteristic enables consumers to earn higher bonus points which can be used in the same business and in turn motivates business owners to promote the application.

The venues of information used to reach the market players and the aspects of the application the Bank promoted by providing information with detailed examples (such as security, ease of use, the time of problem solving etc.) were also asked in the interview. The management stated that social media was used to convey information to their target population (younger population). Announcements of different campaigns and advertisements were placed on social media. "No contact" characteristic and "security" aspect of the e-wallet application were highlighted while providing information to customers. The management informed that in "HEPI" e-wallet application a "dynamic" QR code is produced for each transaction on POS devices. According to the management "dynamic QR code" production is a new implementation in the market. In addition, the Bank adopted the policy of not charging any fees for transfer of funds from accounts or cards to the application. According to the management this policy placed them ahead of their competitor in the market.

When questioned about whether the management of the Bank believe that providing prior knowledge to consumers and businesses leads to an increase in the intention to use e-wallet, the management stated that they definitely agree. However, they emphasized that the information should be simple and easily understandable. According to the management, although the product in question inherits a new technology, information on the product should include clear and simple messages.

As the service provider the Bank interacts with customers but mainly with business owners. The Bank management was asked about the problems they encountered while marketing the application to businesses. The management pointed out the problems of use related with POS devices in businesses. According to the information acquired from the Bank's management, there exist more than one payment methods on point of sale (POS) devices (method for Coop cards, method for other

cards and the latest payment method with QR code). The Bank faced some problems with businesses while training them to implement methods for payments with QR code. Additional stickers on POS devices were placed to remind business owners or employees to press “ENTER” three times for payments with QR code. The Bank management stated that the problem is partially solved.

When questioned about the Bank’s opinion on who should be the primary target in marketing e-wallet applications, consumers or businesses, the management’s answer was a definite one in favor of consumers. According to the management of the Bank, it is easier to integrate businesses into the system once the consumers adopt and ask for electronic payment.

The Bank was also asked to compare credit card use and e-wallet use as payment systems in the light of the Bank’s data base. The management stated that credit card use still has a very high user rate in the market. They pointed out that credit card payment applications are also evolving along with the developments in alternative payment systems such as electronic wallets. According to the Bank management, it is apparent that more time is required for electronic wallets to replace credit cards as agents for payment. 99 percent of payment transactions are still carried out with credit cards. The management emphasized that mobile payment systems are still at the beginning level. In their view, banks regard such systems as technological advantage and competence. The management stated that the return on the capital and efforts invested in electronic payment applications has not yet been realized. However, they also added their prediction that electronic payments with mobile phones will inevitably replace payments with credit cards in the future.

The Bank’s total customer target number for e-wallet use was stated as 10 thousand users for the first two years. The number of users at the present (December,

2022) is 7,540. HEPI was launched in February 2021 and the target success rate is 75 percent. In the interview, the management was asked to evaluate the level of use "HEPI" electronic payment application has attained. The management stated that as an institution they did not have big expectations about mobile payment application system use in North Cyprus while investing in this project. They added that a similar experience was apparent in the Turkish financial system and that they were aware of the time required for a technological system to be accepted by consumers. According to the management, Banks develop these kinds of applications in order to demonstrate their competence in the sector and not to fall behind the prevalent trends in the global financial developments and competition. The General Manager of the Bank explained the process of investing in a new technological product by comparing the experience to "a journey to the moon." According to the General Manager, investing in new technology and acquiring tangible results require time. Decision of investment exhibits an institution's superiority and leadership to the public (both to consumers and enterprises) believing that such a small step may lead to a bigger achievement in the future. Afterwards you may realize that your journey to the moon becomes "a journey to Mars."

Apart from the interview done with the management of Cyprus Turkish Cooperative Bank as the service provider, more interviews were carried out with a customer and a business owner. The interview with business owner using "HEPI" e-wallet payment systems in his establishment included questions to measure his views on the relations with the service provider (Bank) and the reactions of his customers. Questions were also asked about his marketing strategies for e-wallet use and the specific aspects of e-wallet that he utilized to direct consumers to make payments with

their mobile devices. Similarly a customer using e-wallet was asked about how he has become aware of the new system and the reasons to adopt this new transaction venue.

The business owner who was asked what prompted him to implement e-wallet in his business stated that a customer asked for e-wallet payment and he contacted and received information from the service provider. He added that they did not face with any difficulties in implementing the new system. A similar question asked to a consumer was replied by stating that she was informed by friends and by the advertisement campaign of the Bank which had influenced her intention to adopt the new system.

While the business owner believed that providing prior consumer/business knowledge before implementing the application will increase the intention to use e-wallet, the customer approved this view by stating that she received prior information from friends and the application itself which helped to ease her adoption process.

The business owner was asked about the establishment's relationship with the service provider in order to evaluate the feedback of the intermediary player in e-wallet application adoption. When asked about whether the service provider supplied businesses with adequate knowledge and education at the system implementation phase and contact afterwards, the business owner stated that the service provider provided the necessary information. He also explained that the representatives of the service provider visit his business periodically to inquire about any problems related with the e-wallet use after the implementation process. This statement shows that prior knowledge provided to intermediary businesses at implementation and following feedback visits are beneficial in establishing a sound relationship with the players in the market. Consumers, on the other hand, demand information from the service provider as well as continued incentive campaigns related with e-wallet use. This is

apparent from the reply of the customer when asked about whether she received adequate information from the Bank (as service provider) and what should be done to increase e-wallet use. The customer replied by saying that she received information from the Bank and that made her feel secure while using the application. The consumer also suggested that gifts/bonus points and discounts should be provided to e-wallet users and these campaigns should be advertised through social media like Twitter, Facebook and Instagram.

The marketing of e-wallet payment applications depends not only on provision of incentives but also on the specific aspects of the system itself. For example, the security, ease of use, speed or convenience of the technology may influence the intention to adopt and use the system. When the customer was asked about which properties of the e-wallet system pleases her, the reply consisted of speed, ease of use and earning bonus points. The incentive of earning bonus points that can be spent later on after every transaction above certain amounts was also mentioned by the business owner as a way of alluring customers to use e-wallet. In addition to having bonus point incentive, the business owner emphasized the ease of use aspect of e-wallet when he described e-wallet as "easy and practical."

The customer interviewed about her perception of security related with e-wallet stated that e-wallet system is "definitely secure." However, the business owner stated that generally "none" of his customers ask about e-wallet when questioned about what percentage of customers want/ask to make payments with e-wallets. This is parallel to the answer he presented to the question of what percentage of payment transactions are made by e-wallet versus credit cards. The business owner stated that 99 percent of the payment transactions are still carried out by credit cards. This observation confirms the information on credit card use provided by the Bank. Consumers still use

credit cards for payments at a rate much higher than they use e-wallet. The use of e-wallet is perceived as "easy and practical" for those who are aware of the availability of this alternative payment system. For example, when asked about which payment type is easier when credit card payments and e-wallet payments are compared, the customer stated that although contactless credit cards provide an easy way to make payments, using QR code with mobile phones to make payments seems more practical.

Overall the interviews done with a customer and a business owner implicated the need for more awareness about the e-wallet payment system in the market. Both parties highlighted the importance of having incentives such as bonus points as an encouraging factor in e-wallet adoption. The ease of use, speed and being a practical way of completing transactions are the main aspects of e-wallet the respondents agreed on. The interviews indicate that the service provider's relationship with the intermediary businesses is adequate however, the marketing of the product can be enhanced with new incentives other than bonus points. In addition, both the customer and the business owner agree that providing prior knowledge and information about e-wallet system ease the way of adopting the application and increases the intention of use.

However, the interview with the business owner indicates that more effort should be spent for increasing the rate of e-wallet use by the general public. The customers should be informed and encouraged by marketing campaigns to ask for e-wallet payment while shopping. Otherwise the current situation may continue in the favor of credit card payment use for payment purposes.

Chapter 8

CONCLUSION

E-wallet payment applications have entered into publics' everyday life as a safe and fast way of completing financial transactions. Banks and other intermediary institutions are investing in digital platforms to provide mobile payment services. Especially during the COVID-19 pandemic outbreak the use of e-wallet applications increased due to requirements of social distancing and lock down policies. However, the rate of e-wallet use is still not at expected levels.

Studies have been carried out by using various technology acceptance models and theories in an effort to determine factors which influence behavioral intention to use e-wallet systems. In the current research we carried out a study by using the Technology Acceptance Model to determine the effect of consumer knowledge construct on behavioral intention to use e-wallet. Besides consumer knowledge, perceived ease of use perceived usefulness trust and attitude are other constructs in the model used to examine factors of influence on intention.

In addition, we employed a survey experiment by dividing the sample into three groups where one group is provided with prior knowledge about immediate reimbursement guarantee in case of fraud or misuse. One of the other groups was given knowledge that they will be compensated in five days in case of fraud. The third group acted as a control group with no knowledge provided about reimbursement.

Main research questions of the study were: (1) What are the factors influencing the customer intentions to adopt the e-wallet in general? (2) How does the knowledge that there will be guaranteed reimbursement in case of fraud/unauthorized influence consumer adoption intentions? (3) How does the time frame of the guaranteed reimbursement in case of unauthorized use influence consumer adoption intentions?

The results of the study confirmed that consumer knowledge as an external variable influence perceived ease of use, perceived usefulness and trust constructs positively. Perceived ease of use also influences perceived usefulness directly and attitude indirectly through perceived usefulness. These constructs in turn positively and significantly affect attitude and attitude influences the behavioral intention to use e-wallet.

The survey experiment employed to measure reactions of respondents when they were presented with additional information on reimbursement resulted in the expected way. The group with information of immediate reimbursement in case of fraud or misuse had higher levels of intention to use e-wallet than others. The group who had information that they will be reimbursed in five days and the group with no information had lower levels of intention.

The study was carried out with a sample of at least 300 respondents representing the population characteristics of North Cyprus. The context of the study is North Cyprus which is a small island in the Mediterranean. Like every study, this project has its limitations. Data is gathered from the traditional small community of North Cyprus with people having high education levels but also a conservative way of life. Financial issues are still conservatively treated and transactions are either cash based or are done with credit cards. Therefore, the new technology might take time to diffuse into everyday life of islanders. Like adoption of credit card usage, it is clear

that creative and assuring marketing efforts are required for consumers to adopt this new technology of mobile payment system.

Time limitation and the difficulty in reaching people who agree to participate in the survey have resulted in a sample of 300 respondents. The respondents were mainly public and private sector employees and professionals. The college student representation was limited due to the timing of questionnaire distribution phase of the thesis work, namely the summer period. There were limited opportunities to include more elderly generation of the public. Attempts to include more elderly as respondents were rejected since most of them were reluctant to talk about financial transactions or banking issues.

The study could have been done with a larger sample of at least 500 respondents with more representation from the rural areas of North Cyprus. The questionnaires were distributed in large cities. Thus rural representation was limited and the diffusion of technology into the rural segments was not analyzed. In addition, although the questionnaires were distributed evenly among different sexes, the study could have included a section dedicated to gender differences in e-wallet adoption. The distribution of questionnaires could have been done during winter when college students would be available to respond. This would enhance the sample's representation and would include the younger generation's perspective into the responses.

A similar study may lead to different results if it is carried out in a country with multicultural and larger population where consumers are less conservative in adoption of new technologies and more open to complete their transactions in a more convenient way. The sample could have included younger generations who are more familiar with new technologies. In addition, future research may include other kinds of incentives

that may positively affect adoption of e-wallet. Future research may also encompass other constructs such as social influence and familiarity through intensive marketing promotions and their effects on mobile technology adoption.

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APPENDICES

Appendix A: Interview with C. T. Cooperative Central Bank Ltd

1. What perspective and aim prompted your management to invest and provide e-wallet payment application system as a product by your Bank?

When payment system practices and trends in the world and in Turkey were analyzed, it was apparent that many firms as well as Banks invested in electronic wallet and electronic payment applications. In light of these new developments and technology our Bank decided to invest an electronic wallet application system.

2. What kind of research procedure did you employ at the initial phase? What kind of data on local business and consumers did you have?

The main research was carried out about the electronic payment system called "Venmo" which is used in the United States. Although "Venmo" application has differences when compared to "HEPI" application, this application includes a novel approach to especially the person to person payment transactions. "Venmo"s person to person money transfer characteristics were used as an example. In addition, "Local Pay" mobile payment application of Creditwest Bank which was already in use in the market was analyzed. The disadvantages of using "Local Pay" was analyzed with an objective to introduce a better product with higher technological aspects and ease of use.

Our Bank had the experience of issuing and marketing credit cards for the last 20 years. This experience and already available data were employed while introducing a new technological product to the market along with and as an alternative to credit cards.

However, our institution lacked adequate information about consumer preferences and business approaches specifically towards electronic payments since this application is a very recent technology when North Cyprus market is considered. The main objective was to continue our mission as the technologically superior Bank who follows the developments in the world and provides the newest technology to North Cyprus. The consumers and businesses were expected to adopt the new technological product once it was available in the market. However, our preliminary experience indicates that the realization of expected adoption rates will require some more time.

3. Did you receive any professional aid while launching your marketing campaign?

Marketing campaigns were carried out by our Bank's Marketing and Consumer Relations and Advertisement divisions. The campaigns were created by analyzing similar existing campaigns in the world and using some of their aspects suitable to North Cyprus life style characteristics.

4. Which part of the population did you target? (Age, gender, profession etc.)

Our primary consumer target were students and younger generations. A project was carried out within the framework of an agreement with the Ministry of Education which included additional marketing activities towards all students studying in North Cyprus.

5. Which aspects of the electronic wallet application were promoted in your marketing campaign?

The application has two loyalty characteristics called “Little HEPI everywhere” and “Little HEPI just for you.” These two loyalty characteristics were promoted as incentives for adoption. Especially the “Little HEPI just for you” characteristic enables consumers to earn higher bonus points which can be used in the same business and in turn motivates business owners to promote the application.

6. How did you provide information to consumers about the electronic wallet application? Which aspects of the application did you promote by providing knowledge with detailed examples? (Security, ease of use, the time of problem solution when needed, etc)

The social media is used to convey information to consumer population since younger generations were targeted. The younger generation was informed through announcements about different campaigns and advertisements on social media.

We have promoted the “no contact”, “security” aspects of electronic wallet application while informing our customers. In HEPI application a “dynamic” QR code is produced for each transaction on POS devices. This is a new implementation in the market. In addition, we refrained from charging any fees for transfer of funds from accounts or cards to the application. This policy placed us ahead of our competitor in the market.

7. Do you believe that providing prior knowledge to consumers and businesses leads to an increase in the intention to use electronic wallet?

Definitely yes. However, knowledge should be simple and easily understandable. The application may inherit a new technology, but the information about how it works should be transferred to people as simple as possible.

8. What was your total consumer target?

10 thousand users for the first two years.

9. What is the amount of time period since implementation of the application and what percentage of the targeted consumer number has been realized?

HEPI was launched in February 2021, the target success rate is 75%.

10. What kind of problems did you encounter while marketing the application to businesses?

There exist more than one payment methods on point of sale (POS) devices (method for Coop cards, method for other cards and the latest payment method with QR code). We have encountered some problems with businesses while training them to implement methods for payments with QR code. We had to put additional stickers on POS devices to remind them to press “ENTER” three times for payments with QR code. The problem is partially solved.

11. In your opinion, who should be the primary target in marketing e-wallet applications? Consumers or businesses?

Definitely consumers. It is easier to integrate businesses into the system once the consumers adopt and ask for electronic payment.

12. When credit card use and electronic wallet use are compared which one is higher according to your Bank’s data? Can you provide an approximate percentage?

Credit card use still has a very high user rate in the market. Credit card payment applications are also evolving along with the developments in alternative payment

systems such as electronic wallets. It is apparent that more time is required for electronic wallets to replace credit cards as agents for payment. 99 percent of payment transactions are still carried out with credit cards.

Mobile payment systems are still at the beginning level. Banks regard such systems as technological advantage and competence. We believe that the return on the capital and efforts invested in electronic payment applications has not yet been realized. However, we also foresee that electronic payments with mobile phones will inevitably replace payments with credit cards in the future.

13. Are you satisfied with the level of use your electronic payment application has attained? If not, in your opinion, what are the main reasons of the current position?

We did not have big expectations about mobile payment application system use in North Cyprus while investing in this project. We were aware that technological systems require a certain amount of time for consumers' adoption. A similar experience is apparent in the Turkish financial system. Banks develop these kinds of applications in order to demonstrate their competence in the sector and not to fall behind the prevalent trends in the global financial developments and competition. However, we all know that: investing in new technology is like "travelling to the moon." Acquiring tangible returns takes time. You exhibit your superiority and leadership to the public (both to consumers and enterprises) believing that such a small step may lead to a bigger achievement in the future. Then you realize that "you are travelling to Mars."

Appendix B: Interview with Business Using E-Wallet

1. How did you decide to implement e-wallet use in your business?

A customers asked for it. We did not face any problems.

2. Did you contact the service provider (the Bank) to adopt e-wallet yourself?

Yes, I contacted the Bank to acquire the system for my business when I heard about the application.

3. Did your service provider (the Bank) supply your business with adequate information and education at the process of implementation?

Yes, they provided training on how to use the point of sale devices with QR code. They explained how the system worked and benefits of the new payment procedure.

4. What kind of campaign did you implement to inform your customers to let them know that e-wallet can be used for payment in your establishment?

We informed all our customers while they were getting ready to pay.

5. What percentage of your customers want/ask to make payments with e-wallets?

Generally none of our customers want to make payments with e-wallet. They usually prefer to make payments either in cash or with credit cards.

5. Do your customers find e-wallet use for payment as a convenient and easy procedure?

Customers who use e-wallet do not face any problems while using e-wallet for payments.

6. How do you classify e-wallet payment application system yourself? (Easy, complicated etc.)

I believe that e-wallet payment system is easy and practical.

7. How did you inform your customers about e-wallet? Which properties of e-wallet did you highlight while informing your customers? (such as security, ease of use etc.)

We have informed our customers that they can earn bonus points if they pay with e-wallet which in turn can be used in other transactions either in our business or elsewhere.

8. Do you believe that providing prior consumer/business knowledge before implementing the application increases the intention to use e-wallet? Please explain.

Yes, providing knowledge before implementation of the application reduces the questions we have and makes us feel more confident in using the application.

9. Did your service provider visit your business to inquire about any problems related with e-wallet usage after implementing the application?

Yes they came and solved the minor problems we had.

10. Does your service provider contact with your business periodically about the application?

Yes they do.

11. Is credit card use or e-wallet use higher when your business is considered? Can you provide an approximate percentage for both?

Credit card use is still higher 99 %. E-wallet use is approximately 1%.

12. Are you satisfied with the rate of e-wallet use in your business? Do you believe that e-wallet payment is better than credit card or cash payment? If yes, can you provide your reasons?

No, I believe that e-wallet payments should be higher since everyone uses mobile phones and making e-wallet payments is easier and more practical compared to credit card payments.

Appendix C: Interview with a Customer

1. How did you decide to use e-wallet for making payments?

I decided to use e-wallet since e-wallet use is more practical and you can earn bonus points when you pay with e-wallet.

2. From where did you learn/hear about e-wallet payment systems? Did your friends suggested its use or did advertisements catch your attention?

I was informed both by my friends and advertisements about e-wallet payment applications.

3. Did you receive adequate information about e-wallet application before or at the first attempt to use e-wallet? If yes, from who or from where did you get the information?

Yes, I received information from my friend and from the application itself.

4. Do you prefer to shop from businesses who use e-wallet payment systems? If yes, can you provide your reasons?

Yes, I prefer to shop from businesses who have e-wallet since paying with e-wallet is easier and faster.

5. Which properties of e-wallet application pleases you? (Speed, security, ease of use etc.)

Speed, ease of use and earning bonus points.

6. Do you prefer to pay with e-wallet in every shopping transaction?

Yes, I do.

7. Which payment type is easier to use credit card or e-wallet according to your opinion?

Contactless credit cards provide an easy way to make payments. However, using QR code with mobile phones to make payments is more practical.

8. Do you believe that making payments with e-wallet is a secure?

Yes, I believe that e-wallet payments are definitely secure.

9. Did you Bank/service provider provide adequate information about e-wallet use?

Yes, it did. That’s why I feel secure while using e-wallet.

10. In your opinion, what should be done to increase e-wallet use?

Providing gifts, bonuses and discounts for payments done with e-wallet will increase e-wallet use. In addition, these campaigns should be advertised in social media like Facebook, Instagram and Twitter.