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英文论文题目：**AN EMPIRICAL STUDY OF INTENTION FACTORS OF MOBILE PAYMENT USAGE IN NON-BANKING SECTOR : A RESEARCH FROM ISTANBUL**

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AN EMPIRICAL STUDY OF INTENTION FACTORS OF MOBILE PAYMENT USAGE IN NON-BANKING SECTOR : A RESEARCH FROM ISTANBUL)

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Author

Muhammed Guven

Date: 16 June 2020

摘要

随着技术的变革，消费者的习惯发生了明显的变化。 这种转变提高了人们对数位化的期望以及对数位服务的需求。 通过满足未来需求，可以数位化的行业已逐渐变得更具竞争力。 在空间依赖性逐渐降低的世界中，行动服务变得极为宝贵。 随着数位化的普及，支付系统发生了快速变化。支付系统的变化对消费者的支付偏好产生了影响。另类支付工具的多样化已减少了现金使用量。 因此，行动支付系统的开发和使用已变得越来越广泛。非银行实业鉴于这些发展，本研究使用 TAM 模型检测伊斯坦布尔的个人特征，衡量人们对移动支付接受程度。TAM 已被定义为各种变量，这些变量根据技术相关场景，已能提供研究者使用移动支付和电子商务的消费者行为一个定位。因此，TAM 在本研究中被认为是最合适的模型。这项研究试图找到以下问题的答案；人们对伊斯坦布尔的行动支付使用情况有什么看法，根据以前的研究，伊斯坦布尔几乎代表了土耳其的平均水平；在伊斯坦布尔案例中，TAM 模型的变量之间是否有联系？ 此外，伊斯坦布尔社会的个人特征是否会影响使用行动支付的意图？

在先前应用 TAM 模型的研究中，研究覆盖了特定的团体或地区。 但是，尚未有研究以伊斯坦布尔及其社会作为对象。该模型新增了可能影响行动支付使用意图的不同因素。同时，删除一些不被认为具有决定性的因素，简化了模型。TAM 模型中增加了文献综述中发现的社会影响力，知识，安全性，创新性，成本和兼容性。 外部变量，使用态度和实际系统使用已从原始模型中删除。 在修改了模型的最终版本之后，提出了假设以检验使用移动支付的意图与修改后的 TAM 模型中的其他因素之间的关系。

问卷调查表已按滚雪球采样法分发给伊斯坦布尔的所有地区。 使用结构方程模型分析了有效的 397 个样本，并具有最大似然性。本研究使用 SPSS 和 LISREL 检测样品的可靠性并分析描述性统计量、t 值和路径系数。并计算 T 值以测量因素之间的关系。

研究的结果令人鼓舞。本研究考察了人们对移动支付系统的看法以及伊斯坦布尔案例中扩展的 TAM 模型之间的关系。 易用性因素对使用行动支付的意图产生负面影响，表明其易用性对居住在伊斯坦布尔的人们没有重大影响，甚至没有负面影响。分析结果表明，创新性与所有变量都高度正相关，这意味着更创新的应用程序而非易用性是首选。安全感对易用性有负面影响，因为人们认为如果申请程序很简单，安全性将很弱。确定兼容性，创新性和社会影响力会对使用行动支付的意图产生重大影响。成本、安全性和易用性的影响是负面的，而知识和实用性的影响对使用行动支付意图则呈低度正相关。

在本研究中，使用修订后的 TAM 模型，将重点放在伊斯坦布尔市场上。尽管结果表明伊斯坦布尔人的看法，但这些结果也可以最小程度地代表土耳其社会的平均水平。基于 TAM 的因素分析个人行为使这项研究对于电子商务公司而言是相当可行的。同样，它为广告行业开辟了重要领域，旨在向正确的人发送正确的信息。 建议进一步的研究可以集中于行高因素的综合性，并增加更多可能影响使用移动支付意图的因素。

关键词：伊斯坦布尔行动支付使用意图；TAM 应用于非银行部门； TAM 之个人特质

Abstract

Perceivable changes have occurred in consumer habits with the transformation of technology. This transformation increased people's expectations of digitalization and the need for digital service. Sectors that can now be digitalized have gradually become more competitive by meeting the needs of the future. Mobile services have become extremely valuable in the world, where space dependency has gradually decreased. There has been a rapid change in payment systems with the mobility supported by digitalization. The change in the payments system was effective in consumers' payment preferences. The diversification of alternative payment instrument has reduced the usage of cash in the world. Therefore, the development and usage of mobile payment systems have become widespread In light of these developments, it seems to be a good area to examine the factors that will measure mobile payment acceptance among people Trying to conclude by measuring the personal characteristics of the Istanbul community with technology acceptance model (TAM) is an excellent opportunity for the intention to use mobile payment in non-banking sector. TAM have defined as various variables, which have been able to give researchers a position of consumer behavior in the mobile payment usage and e-commerce based on technology related scenario. Therefore, TAM is preferred in this research as most appropriate model. This study attempted to find answers to the following questions; What is the perception of people about mobile payment usage in Istanbul, which represents to almost average of Turkey according to previous studies? Is there relation among TAM model's variables on Istanbul case? Furthermore, Are Personal characteristics of Istanbul's society affecting to intention to use mobile payment?

In previous studies that applied the TAM model, studies were covering a specific group or region. However, no research has yet been conducted to examine Istanbul and the personal characteristics of its society. The model was enriched by adding different factors affecting the intention to use mobile payment. At the same time, simplification was made to the model by removing some factors that were not considered decisive While the social influence,

knowledge, security, innovativeness, cost and compatibility that found with literature review were added to the TAM model, the external variable, attitude toward using and actual system use were removed from the original model. After the final version of the model was revised, hypotheses were formulated to examine the relationship between intention to use mobile payment and other factors in revised TAM model

The questionnaire of the survey was distributed to all the districts in Istanbul toward the snowball sampling method. The valid 397 responses were analyzed using the structural equation model with robust maximum likelihood. The Descriptive statistic, t-values and path coefficients were measured. T-values were calculated to measure the relationship between the factors. SPSS and LISREL were used for sample reliability and analysis.

The results of the research were encouraging the perception of people towards mobile payment systems and relation between expanded TAM model on Istanbul case examined with this study. Ease of use factor has a negative impact on intention to use mobile payment shows that its ease of use does not have a significant impact on people who live in Istanbul or even it has a negative effect. Analysis results show that innovativeness has a profoundly positive relationship with all variables, which meant that more innovative applications rather than easy are preferred. Security has a negative effect on ease of use regarding the perception that If the application is easy, security would be weak. Determining that compatibility, innovativeness and social influence have a significant effect on the intention to use mobile payment is an indication that the characteristic of the society is measured on the model. While the effect of cost, security and ease of use is negative, the effect of knowledge and usefulness realized low positive on intention use mobile payment.

In this research, focused on the Istanbul market with the measuring of the revised TAM model's variables. Even though the results figured individual perception of people from Istanbul, these results can minimally represent the average of Turkey's society. Analyzing personal behaviors based on the TAM's factors made this study quite feasible for e-commerce companies. Likewise, it has opened essential areas for the advertising industry, which aims to send the right message to the right person. Further studies can focus on increasing of

comprehensiveness of factors and add more factors that may affect the intention to use mobile payment.

Keywords: Intention of Mobile Payment Usage in Istanbul; Expanded TAM in Non-Banking Sector; Personal Characteristics on TAM

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List of abbreviations, symbols, and terminology

1. Mobile Payment - (MP) / (M-payment)
2. Mobile Payment Forum - (MPF)
3. Mobile Money - (M-money)
4. Short Message Service - (SMS)
5. European Commission - (EC)
6. Wireless Application Protocol - (WAP)
7. Near Field Communication - (NFC)
8. Point of Sales Terminal - (POS)
9. Automatic Teller Machine - (ATM)
10. Radio Frequency Identification - (RFI)
11. QR Code - (Quick Response Code)
12. Direct Carrier Billing - (DCB)
13. Diffusion of Innovations Theory - (DIT)
14. Technology Acceptance Model - (TAM)
15. Theory of Planned Behavior - (TPB)
16. Theory of Reasoned Action - (TRA)
17. Theory of Acceptance Use of Technology Model - (UTAUT)
18. Smart Phone Credit Card - (SCC)
19. Analysis of Variance – (ANOVA)
20. Statistical Package for the Social Sciences – (SPSS)
21. Linear Structural Relations – (LISREL)
22. Confirmatory Factor Analysis - (CFA)
23. Definition of Structural Equation Model - (SEM)
24. Explanatory Factor Analysis - (EFA)
25. Maximum Likelihood - (ML)

26. Generalized Least Squares - (GLS)
27. Weightless or Ordinary Least Squares - (Unweighted ULS)
28. Scale Independent Least Squares - (SILS)
29. Small Squares - (WLSM)
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31. Robust Maximum Likelihood - (ML)
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36. Comparative Fit Index - (CFI)
37. Increased Fit Index - (IFI)
38. Relative Fit Index - (RFI)
39. Combined Reliability - (CR)
40. Average Variance Extracted – (AVE)
41. Scale Composite Reliability – (SCR)
42. Person to Person Payment - (P2P)

1 INTRODUCTION

The world economy is becoming more and more integrated in parallel with the development of information and communication technologies. As a result of this development, the demand expectations and needs of consumers have increased and differentiated so far. Thus, modern commercial systems that will enable consumption to take place at the desired time and place have been developed and expanded. The emergence of mobile commerce has also been a tool for the use of different technologies to meet the needs. Traditional payment methods applied in the purchase of products and services began to vary over time. Initially, purchases made with physical money started to be made with bank / credit cards that allow electronic use of money, and recently, digital payment methods have been added to these payment methods. Today, consumers can benefit from mobile payment systems that can be used in many different sectors with various mobile devices with different features.

Even though mobile payment has been initially perceived with certain security concerns when making online transaction, people around world slowly embarked on it as favorable. Especially, mobile payment which is used by mobile devices created opportunities to make easier payment. Mobile payment has become adopted payment method in some countries, especially in China, whereas many countries, specifically Turkey could not go forward as expected. Despite Turkey met with internet later compared to world, Internet users as a percentage of total population in 2019 is reported as 72% with 59.3 million people. In addition, 77% of total population own smart while mobile internet users as a percentage of total population is accounting for 68% with 56 million users (WeAreSocial, 2019). When all these numbers are considered, there is structurally no impediment to be developed of m-payment in Turkey. There are also a lot of mobile payment applications as well as many tech companies that are keen to emerge in mobile payment sector of Turkey. Despite banking sector is quite matured in Turkey, it is an area that is not flexible due to the regulations that has to be complied with (Tangı, 2014). Fintech companies, which have more flexibility than banking sector, are

well ahead of the banking sector in terms of payment services. Thus, the non-banking payment service area has expanded considerably with contribution of fintech. Companies in world such as Alipay and WeChat pay, especially in China, take the lead in non-banking field (Liu, 2015). In the non-banking sector in Turkey it is more advanced in the field of mobile payments. Since it would not be very meaningful to examine the use of the same bank's mobile payment service by a person who already trust to the banking sector, it would be more meaningful for me to focus on the non-banking sector. Because of all these reasons I will examine mobile payments as non-banking activities in Turkey. Narrowing the field of my research will give an advantage in utilizing secondary data.

There are many studies in the literature on the adoption of new technologies. Consumers' adaptation to technology and their use of technology to reflect their consumption behavior are frequently found in behavioral science research. The change in the payment habits of the consumer with the development of technology. It will assist in reaching data that will guide the understanding of the development of mobile payment systems and the future of these systems in sectoral research and in understanding and interpreting consumer behavior. The emergence of mobile payment systems in non-banking sector in Turkey, will be discussed trends that related to the use of these systems in the future in this study.

In the first part of the study, purpose of study and objectives have been taken place. Mobile payment types and the conceptual framework for mobile payment is emphasized in literature while the emergence of historical development of mobile payment are also given information about Turkey and the world. Then, research methodology, application, results and discussion and conclusion part will have been given in last part.

1.1 The scope of the study

Studying of intention to use mobile payment in Turkey is quite interesting and differentiated topic in diverse research about mobile payment, especially from non-banking sector’s perspective, which will help to make scope of research to narrow. Also, focusing on non-banking sector provided to security as variable on consumers mind. If someone has already

used banking system for any purpose before, then they will not have lack of trust about the system to have used. So, it is going to need measuring of security that added on TAM, which used to identify relation of each factor in Istanbul case. TAM have defined as various variables, which have been able to give researchers a position of consumer behavior in the mobile payment usage and e-commerce based on technology related scenario. Therefore, TAM is preferred in this research as most appropriate model. Moreover, applied to benefit from other study area to expand model such as social characteristic studies. In this particular study, we will narrow geographical location and demonstrate only Turkish perspective on this issue. Since there is no limitation internal migration in Turkey, Istanbul has taken migration from every city of country so far. So, it makes Istanbul as well distributed city in terms of Istanbul perspective. Therefore, choosing of Istanbul as research sample is significant to identify overall perspective of Turkey. It will be measured with sample of Istanbul, which is representor of whole Turkey as population distribution. Thus, we are going to include success instances around world so that research might be more comprehensive. Moreover, chosen respondents for survey will be selected among people who have used m-payment and have never used before. This way we could observe both sides of coin examine specifically factor for both adopted and potential adopted person.

1.2 Objectives of the study

When it comes to more specific objectives of the study would be focused on:

1. To examine perception of people towards payment systems in terms of non-banking sector in Istanbul, Turkey
2. To identify factors which affect to intention of mobile payment usage in Istanbul.
3. To figure out the relation among Technology Acceptance Model's variables and understand whether it is relevant to Turkish consumers
4. To investigate the effects of personal characteristics about the on the intention of mobile payment in Istanbul

1.3 Research purpose

Main idea of this study is to examine perception of mobile payment for intention to use mobile payment usage and understand to factors that affect people attitude to intention to use mobile payment in Turkey. Relation among Technology Acceptance Model (TAM)' variables and understand whether is relevant with consumers from Istanbul approach or not. Moreover, will be tried to see which variables effects for mobile payment usage in non-banking sector have more or less and will be investigated personal characteristics impact on adoption of mobile payment. Why is being focusing on the non-banking sector is that make direction of study to narrower and measure security concerns for intention to use mobile payment. Because, if someone has already used banking system for any purpose before, then they will not have lack of trust about the system to have used. More precisely, while results of research will be figuring out how users' approach towards to mobile payment and which factors might change or effect to user's mind, will have been investigated effects of mobile payment and understand relation among variables of TAM to understand whether it is relevant or not in Istanbul case.

1.4 Outline of Study

Chapter 1: Introduction: Includes the brief introduction of the research topic. The scope of study also taken place in this part. Objective of study and its purpose was explained.

Chapter 2: Literature Review: This chapter includes the literature review, which relevant to the topic of study. The previous studies, types of mobile payment, and theories looked into to structure base of the study. Models and theories are utilized later in Application part to analyze.

Chapter 3: Research Methodology: This chapter includes how research has been carried out. The preparation of data, data collection process, designing of models to get best results and overall method processed once they are obtained.

Chapter 4: Application: it is major part of study for analyzing all data and proper findings

are measured. Hypotheses are set and checked to analyze their implications. It is one of the most significant chapter in study.

Chapter 5: Results and Discussions: All results were analyzed and taken place in this chapter. Relevant relations are gained and identified in results and discussions, which help to understand major findings and idea. It is basically summarized results and discusses regarding to scope of literature review.

Chapter 6: Conclusion: This part includes main findings of study and core approach in order to come up with statements that can implied from results of this study. The limitations and future direction explained briefly as well.

2 LITERATURE REVIEW

2.1 Mobile Payment Systems

The European Central Bank is defined as a form of payment used to initiate a payment order for goods or services and to change the financial value in transactions performed on a mobile device (mobile phone, personal digital assistant. (European Central Bank, 2010).The European Commission (EC) defines mobile payment as payment order and payment data, accepted, transmitted or approved via mobile phone or device and that the concept covers purchase of online or offline services or physical goods. (European Commision, 2012).Mobile Payment Forum (MPF) (2002), mobile payment; It is defined as the transaction of exchange of financial value by using a mobile device in exchange for the purchase of goods or services by both parties.

There are various definitions regarding mobile payment in the literature. Some of these are mentioned below. Mobile payment; It is expressed as a form of payment used to initiate, authorize and approve a financial value change in exchange for goods or services in transactions carried out through a mobile device. (Karnouskos, 2004). Ondrus and Pigneur (2005) define m-payments as wireless monetary transactions connected via mobile devices. Kim, Mirusmonov and Lee (2010) stated that mobile payment is an improved version of electronic payments and mobile payments are basically payments made on a mobile device. (Kim, Mirusmonov, & Lee, 2010). Niina Mallat (2007): Mobile payments are a form of payment that has been created as an alternative to cash use in sales transactions by facilitating payments in electronic and mobile commerce. (Mallat, 2007). Shin (2010) mobile payment system; It has been defined as system using mobile devices to pay bills and make bank transactions. (Shin, 2010).

Yang, Lu, Gupta, Cao and Zhang mobile payments; They define payment for goods, services and invoices using mobile devices using wireless and other communication technologies. (Yang, Lu, Gupta, Cao, & Zhang, 2012). Mobile payment systems, as mentioned

above, allow financial exchange between the buyer (consumers) and the seller (goods or service providers) through physical devices in exchange for physical or digital goods and services.

2.2 Mobile Payment Historical Context

The first alternative to cash and check payments was the card payment systems that appeared in the United States along with the technical developments in the 1950s. while debit cards started to spread all over the world in the 1970s, the acceptance of digital payment began to be easier with the production of the first the point of sale (POS) machines (Kayalıderen & Çetiner, 2018). With the discovery of e-commerce, which was considered one of the most important concepts for digital payments in 1979, by an Englishman named Michael Aldrich, online commerce began between consumers and manufacturers. With this invention, online trade between consumers and businesses has become possible (Tabitha & King, 2015).

In the 1980s, besides the development of digital payment technologies, there were developments related to security systems. In order to prevent fraud on credit cards, hologram technology has been used. The 1980s were the first years of e-commerce (Behrang, Azamat, Shahriar, Rashad, & Meera, 2011). In addition, ATMs started to spread all over the world in that period. credit card expenditures were paid to the bank at the end of the month in this period. it was possible to spread the payments over time with the business model developed by American Express in 1987, thereby paving the way for consumers to use their cards as credit cards in today's meaning. In the late 1980s, the foundations of the online banking system were started to be laid. (Kutsal, 2018).

Electronic commerce has now been moved to mobile environments after the computer environments with the wireless application protocol (WAP) technology, as the wireless internet became available for mobile as well as computers.

Mobile payment, which radically changed the payment habits with the development of mobile devices and the use of smartphones, was introduced for the first time in 1997. (Wushishi &

Ogundiya, 2014). Mobile payment application was realized for the first time in Finland in 1997. Passengers at Helsinki Airport paid for the drinks they bought from a Coca-Cola vending machine via a message they sent on their mobile phones (Zhong, 2009). The mobile banking service was also launched for the first time in a text message by Finnish origin Merita Bank. (Kutsal, 2018). In 1998, Kevin Duffrey and Andrew Tobin developed the m-commerce server and won the Financial Times 1998 Global's "most innovative mobile product" award in the field of Telecommunications (PR Newswire). In the same year, Radiolinja started to offer downloadable ringtones for mobile phones under the mobile commercial service. In 1999, the first smart Money was introduced in the Philippines and i-mode technology in Japan (Roebuck, 2012).

The emergence of PayPal had been a revolutionary development for mobile payment systems. PayPal; It is an innovative technological product that includes Elon Musk among its founders, developed as a wireless payment system for use in palm computers, and enables secure shopping over the Internet. Innovative solutions emerging in this system; Innovations such as making payments by e-mail, increasing digital payment security, creating HTML payment buttons. Alipay and WeChat Pay from China have been leading to mobile payment sector inspired from PayPal’s revolutionary development and one of the world's first common digital payment systems. China’s mobile payment volume passed 41.51 trillion dollars in 2018 while more than 90% of market under controlled by Alipay and WeChat Pay. PayPal's annual payment volume in 2017 was $ 451.27 billion (TEB, 2018). The size of the mobile payment market, which was $ 1139.43 billion in 2019, is estimated to reach $ 4690.95 billion in 2025. Mobile payment applications such as PayPal, Samsung Pay, Apple Pay, AliPay, and WeChat Pay are also rapidly adopted by stores and service providers around the world. (Mordor Intelligence, 2019).

In the 2000s, the number of m-commerce related services increased and the Google Wallet Mobile Application T-Mobile, m-commerce joint venture emerged in 2011. With the development of mobile commerce, mobile payment systems that enter the lives of consumers

are faster than consumers' mobile devices with different methods. and make it easier to pay. (Demirel, 2011)Today, consumers are able to access products or services from their mobile devices differently from traditional retail stores thanks to the developing technology, increasing internet speed, the inability to tolerate inefficiencies such as crowded and long pay lines in these stores, and the changes in lifestyle are widespread shopping on mobile devices. (TUSIAD, 2019).

2.3 Mobile Payment Types

While mobile payments offer various services, they use different technologies. The world of mobile payments, which includes various financial stakeholders, mobile network operators and regulators, continues to evolve with each stakeholder's own motivations, expectations and abilities. (Dennehy & Sammon, 2015).Mobile payments; It is classified into two main categories according to the features of the device used, the structure of the platform to be shopping, the environment and the amount of payment (Slade, Dwivedi, Williams, & Piercy, 2014):

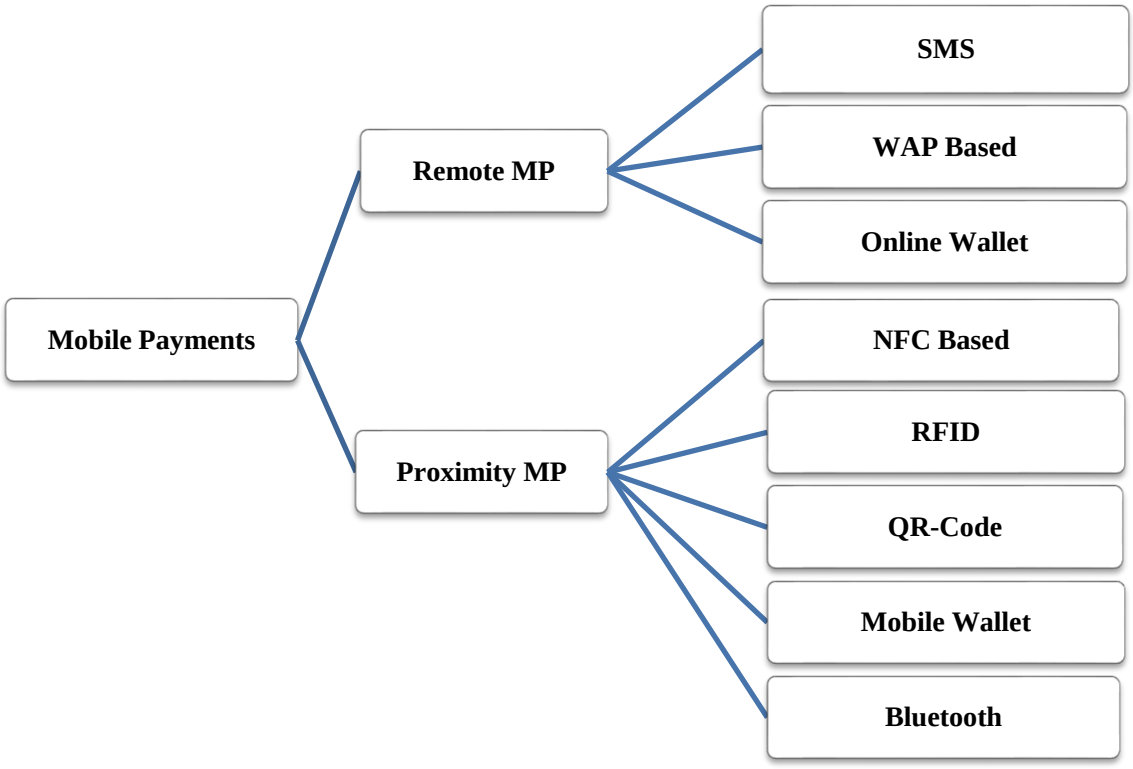

Figure 2. 1: Mobile payment types

2.3.1 Remote Mobile Payments

It is the technology used in cases where the consumer and the mobile device that he pays are not located at the same time as the point where the payment is made physically (ITU, 2013). In this type of payment, every step of the transaction (initiation, communication and completion) is made through an intermediate network instead of direct contact with the vendor or POS systems (Valcourt , Robert, & Beaulieu, 2005). In the mobile remote payment method, where user information is requested to be saved in the application in advance, online data transfer is carried out without re-requesting information in the transactions to be carried out by storing the recorded data. This method requires little interaction with staff, vendors and other intermediaries, often not at all and is almost completely completed independently (Mallat, 2007).

- **Short Message Service (SMS):** It is one of the most common types of remote mobile payment method. In this method, the consumer uses a mobile phone to send text messages to pay for goods and services, and the amount of the payment is usually reflected on the subscriber's phone bill or deducted from the balance (ICEMD, 2016). It is an application that can be accessed on all mobile devices regardless of whether the mobile device has internet connectivity and advanced technological features (Karnouskos, 2004). In the mobile remote payment method, where user information is requested to be saved in the application in advance, online data transfer is carried out without re-requesting information in the transactions to be carried out by storing the recorded data. This method requires little interaction with staff, vendors and other intermediaries, often not at all and is almost completely completed independently. (Sorensen, 2018).

- **Wireless Application Protocol (WAP):** It is a system that provides wireless internet access service to mobile users (Hu, Li, & Qing, 2008). Consumers can pay using

mobile phones or applications installed on mobile devices via mobile phones. In this way, money transfers between customers, businesses and individuals are possible quickly and easily. (BTK, 2015).

- **Online Wallets:** Online wallets that one of the payment methods using WAP technology; the user chooses the mobile wallet when shopping from a website or web stores (Google Play Store, Apple Store, etc.) (Octavian, 2012). The user is asked to enter a PIN, or another security measure is used. This makes the application safe to use. Worldwide; Companies such as Alipay, WeChat Wallet, Apple Pay, Google Wallet, Amazon Payments and PayPal are examples of providers of this technology (US Paymentreport, 2018).

2.3.2 Proximity Mobile Payments

The mobile payment application that takes place directly at the point of sale requires specially equipped devices according to the remote payment system (SmartCardAlliance, 2007). Near field communication, radio frequency recognition, some barcode payments, Bluetooth, infrared and contactless chips are protocols used for close payment and enabling short distance data exchange (Karnouskos, 2004).

- **Near Field Communication (NFC):** Near Field Communication is the leading technology in the mobile payment system, enables the wireless transfer of data from one device to another within a short distance of 10 cm. This technology is used in payments where the mobile phone is physically in the same environment as a POS device or NFC enabled card machine. (Hussein & Rababah, 2012). This method, which enables its users to have contactless payment experience, is also called Touch and Get. NFC technology, which requires shorter distances compared to Bluetooth payment technology, is a safer payment method (Blue Pay, 2020). In addition, unlike chip and PIN technology, which takes longer to process, it enables encrypted data to be

transferred directly and instantly to point-of-sale devices. While NFC is accepted as a payment tool in bus and metro stations in London and all public transportation vehicles in China, it is used to provide identity card information in Japan (Sorensen, 2018).

- **Radio Frequency Identification (RFID):** RFID technology, which is expressed as a technology that automatically identifies objects and objects, transfers data using radio waves through an electronic label. RFID tags that can be read a few meters away define the message by receiving a coded radio signal emitted by the RFID reader to read the tag. (BTK, 2015). Just as there are mobile devices that have Radio frequency identification tag feature in their system, this feature can be added to mobile devices later. (Park, Kwak, Kim, Won, & Kim, 2006). RFID technology on mobile devices provides personal and secure services such as purchasing products, verifying their information and making payments via wireless internet network (Han, et al., 2010).
- **QR Code (Quick Response Code):** The square code, which is a two-dimensional matrix barcode, can be read by this specific QR barcode reader and smartphones. Information decoded in text, URLs or other forms enables fast data access (BTK, 2015). The use of the QR code in mobile payments takes place in the following ways. (Işler & Gülaç, 2017):
    - Reading the QR code produced by the workplace by the customer's mobile phone and transmitting the payment information to the customer's mobile phone
    - After a QR code is read to the mobile phone by the customer and the phone is directed to a web page, the customer makes purchases and pays
    - Reading the QR code containing the customer's payment information (such as credit card, loyalty card) by the QR code scanner on the business side.

Alipay and WeChat, which are widely used in China, accept payments with QR code

on both the merchant and the user side. These applications have positively impacted their customers with their promotions and innovative technologies that provide trust. They have been the most successful examples of mobile payments made using QR code (Zhang, 2018). In addition, Starbucks and Target companies are among the most successful examples using this application in prepaid customer accounts. (BTK, 2015).

- **Mobile Wallet / Digital Wallet (Mobile Wallets):** In mobile wallets; more than one credit or debit card can be kept together. Besides, besides credit and debit cards for mobile wallets; it is also possible to add loyalty cards, boarding passes, tickets and other important documents (SquireGuide, 2019).. This reduces the need for users to carry cards or wallets, and the user can pay by mobile phone. In the application, where the payments are mostly made through NFC, in some cases, a PIN or fingerprint authorization can be requested, and authentication can be requested. Apple Wallet, Google Pay, PayPal, Samsung Pay, Alipay and Android Pay are some of the popular providers of mobile wallets worldwide (Lu, 2018).
- **Bluetooth:** This technology, which works like the NFC payment method, provides a longer distance (up to 50 meters) for payment processing (Vikethozo & Gypsy, 2014). While NFC is limited to one-to-one interaction on a mobile device and a payment reader, Bluetooth speeds up the payment process by performing multiple transactions simultaneously from a single payment terminal. Moreover, thanks to the sensors that recognize BLE technology in the mobile device, it is not even necessary to remove the phone when you want to pay in a store with a smartphone (PowerPay, 2019).. Although the major providers in the market support Apple, Google and Microsoft Bluetooth, they focused more on NFC in the payment world as they launched their mobile wallets (Apple Pay, Samsung Pay etc.) (BusinessInsider, 2020).

According to Gobry'ye (2012); mobile payment is divided into four classes:

1. **Direct Carrier Billing (DCB):** It is any transaction where all costs are directly reflected on the phone bill of the user. It is one of the most user-friendly and the most common type of mobile payment systems, since payment is made directly and facilitates overcoming bureaucratic obstacles. It is preferred by smartphone users such as Apple and Android for all age groups and devices of all brands, since registration requires very little effort. (Shen & Yazdanifard , 2015). Due to the implicit universality of operator billing, it is immediately understood and used by young users or users from countries with limited resources where consumers are required to use direct forms of payment that do not need to have any debit or credit card for digital content, such as downloading songs from iTunes. Although the billing seems to be losing blood, the emergence of smartphones has led carrier billing services to come to the fore and until this year, only $ 3 billion in revenue was generated in the USA. (Heggestuen , 2014).
2. **Near Field Communication (NFC):** NFC is a technology that includes mobile contactless payment that enables using existing POS terminals and services (Dejan & Izabela, 2011). This is achieved by establishing a two-way, short-distance communication that provides information transfer between the mobile device and the terminal. It can also be used between two activation devices that are close to each other and impossible to achieve in a wider network. (Ondrus & Pigneur, 2007). NFC technology is used by users only accessing the required application, accessing only the required application, and entering the security code provided, confirming their operation. In this system, users have their own purchase profiles and personalized offers. (Kemp, 2013). This feature has been used relatively recently. Since Android version 4.4 and iOS 8, most of the obstacles that are incompatible with the main user base have been overcome. Global businesses can make their own personal changes in NFC by adapting them to their own applications. For example, companies like Starbucks allow consumers to scan the barcodes of their receipts to allow customers to add the cost of their products to their employee accounts and collect Starbucks cards in accordance with their well-established policies. (Smart Card Alliance, 2011).

3. **Bank-Specific Smartphone Applications/Mobile applications:** It is a specially created application for banking or other money transfer services and provides the provision of electronic or other banking services without the need for the participation / use of staff or ATM (Fenu & Pau, 2015). It is used daily and widely by banking groups such as Groupon as well as transactions such as transferring money to individuals, paying bills and paying taxes.

4. **Special Protocols, Each with Its Own Special Card Readers, Transaction Tools and Individually Strengths and Weaknesses**: Card readers are not only limited with software but also chooses consumers by bypassing the need to find terminals to send their money directly to the seller. it is a special credit card reader that interfaces with the credit card and the customer's smartphone. This technology is currently implemented by major mobile payment companies such as PayPal, Intuit and Verifone, and by PayAnywhere, the leader of card reading technology, and other credit providers working with it. Since this is a newly developing technology, these applications are used in developing countries limitedly (Heggestuen , 2014).

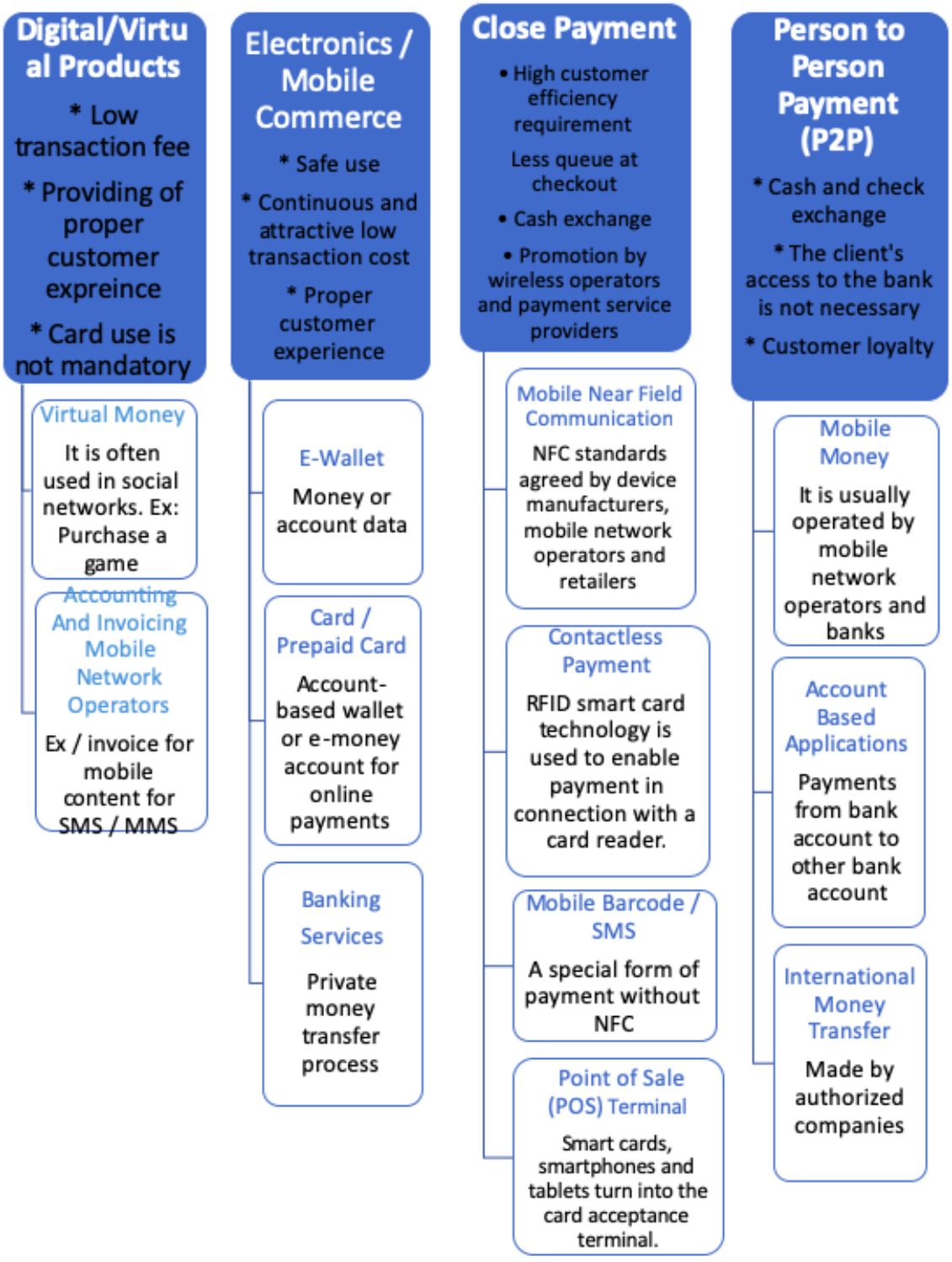

Figure 2. 2: 4 Basic mobile payment segments

2.4 Advantages and Disadvantages of Mobile Payment

The advantages and disadvantages of M-payment can be listed as follows (Liébana-Cabanillas, Muñoz-Leiva , & Sánchez-Fernández, 2015):

2.4.1 Advantages

- Operating systems that allow easier access and easier development via an application via an already popular platform (smartphones) (Lerner, 2013).
- Faster implementation thanks to automatic software updates.
- Testing through user feedback thanks to the applied market.
- Easier sales and after sales support services for highly customized products and services according to the needs of each user.
- Higher and more detailed security measures.
- Increased confidence in general thanks to the direct nature of m-payments.

2.4.2 Disadvantages

- Relatively high cost for new practitioners or developers on the platform.
- There are several interconnected reference points across many different payment systems.
- Complexity resulting from the use of more difficult tools to ensure safety increases application difficulty due to scalability.
- It is impossible to establish homogeneity due to high complexity and competition among developers.
- Lack of trust arising from the lack of common awareness among users.
- Technology not being adopted much by older / less tech-savvy users.
- Lack of access to users of third world countries.

2.5 Development of Mobile Payment

The needs of individuals, the way they meet these needs, and the ways to access the products, services, and information have changed with the developments in information

technologies and digital transformation. The proliferation of mobile technologies has reached a structure that allows easy access to products, services, and information with the development of information technologies. However, mobile commerce systems, which enable consumers to access goods and services offered anywhere, anytime and without going to physical stores, led to the emergence of new electronic payment systems as an alternative to traditional payment systems (Rajiv & Ishan, 2015).

Electronic commerce, which is generally defined as the purchase, sale, and order of goods and services electronically over a network; It refers to the exchange in which payment transactions are made using computer technology, electronic communication channels and related technologies (smart card, EFT, POS terminals, fax, etc.) (OECD, 2012).

One of the electronic payment systems is mobile payment as well. Today, mobile devices, which have used as a means of payment as well as communication services, have reached a critical dimension all over the world since the late 1990s and have become an indispensable element of daily life by consumers (Zlatko, 2016).

2.5.1 Developing of Mobile Payment in Turkey

Using of cell phone first in Turkey started to operate with two mobile phone operators in 1994, in fact that the number of subscribers has increased exponentially over the last time the mobile phone in Turkey (Nurdilek & Can, 2012).

Table 2. 1 : Basic electronic communications sector

	2013	**2014**	**2015**	**2016**	**2017**	**2018**
Population	76.667.864	77.695.904	78.741.053	79.814.871	80.810.525	82.003.882
Number of Fixed Telephony Access Lines	13.551.705	12.528.865	11.493.057	11.077.559	11.039.650	11.362.046
Santral Capacity for Fixed Telephony	25.038.005	24.492.204	23.273.061	21.408.987	20.545.118	18.441.347
Number of Payphones	87.227	83.209	81.249	75.714	66.894	63.693
Number of Mobile Telephony Subscriptions - Total	69.661.108	71.888.416	73.639.261	75.061.699	77.903.347	80.117.999
Number of Mobile Telephony Subscriptions - 2G	20.394.945	13.558.922	9.382.950	4.481.147	3.095.349	2.127.675
Number of Mobile Telephony Subscriptions 3G+4.5G[1]	49.266.163	58.329.494	64.256.311	70.580.552	74.807.998	77.990.324
Number of Broadband Subscriptions - Total	32.566.534	41.227.022	48.572.148	62.236.606	68.869.578	74.500.089
Number of Fixed Broadband Subscriptions - Total	8.393.391	8.866.361	9.504.594	10.499.692	11.924.905	13.407.226

[1] While 3G mobile telephone service has been providing since 2009, 4.5G mobile telephone service has began to service since 2016

Fiber	1.193.704	1.457.397	1.672.628	1.926.080	2.336.687	2.800.557
xDSL	6.644.543	6.799.100	7.157.200	7.764.204	8.656.181	9.491.634
Cable	486.497	558.456	629.064	736.916	826.734	932.121
Other	68.647	51.408	45.702	72.492	105.303	182.914
Number of Mobile Broadband Subscriptions - Total	24.173.143	32.360.661	39.067.554	51.736.914	56.944.673	61.092.863
Mobile Broadband Dedicated	1.701.014	1.354.746	1.597.606	1.237.749	828.369	655.999
Standard Mobile Broadband	22.472.129	31.005.915	37.469.948	50.499.165	56.116.304	60.436.864
Number of Cable TV Subscriptions	1.181.907	1.176.126	1.160.985	1.187.934	1.214.524	1.248.240
The Length of Fiber-km	227.413	244.847	268.119	290.974	324.667	355.028

Table 2. 2 (continued) : Basic electronic communications sector

Source: (BTK, 2019)

When the data related to the electronic communication sector in Table 2.1 are examined; Turkey's total population of 82 million in 2018, while the number of mobile phone subscribers to 80.117.999, the number of mobile broadband subscribers to 61.92.863. With the rapid spread of 4.5G technology between 2013 and 2018, the number of broadband subscribers increased significantly. However, fixed-line subscriber ownership has decreased by about 15% over the past 6 years.

Turkey began to be used in the credit card for the first time in 1968 (BIS, 2017). The number of people using the card called Diner’s Club, which could only be used in contracted institutions as a travel and leisure card at that time, was only a few thousand people. According to the study conducted by Provision with Interbank Card Center of Turkey called as BKM

data; In 2018, the total amount of 7 billion transactions made with credit and debit cards reached 1 billion 579 million TL. There are 66 million credit cards in Turkey. While the number of transactions made with credit cards abroad was approximately 95 million in 2018, the number of transactions made with debit cards was approximately 27 million. While contactless mobile payment transactions were 45 million in 2016.this number increased 96% in 2017 and rose to 88 million units. As of the end of 2018, this number increased approximately 2.5 times and reached 213 million (Kutsal, 2018)

Turkey Online Payments Report, which published in 2016 by Interbank Card Center, indicated that online retail payments rose 20% to 30% in 2016. (BKMexpress, 2016). 70% of digital banking transactions are made with mobile payment systems in Turkey. According to ING International Research's Mobile Banking and Payment Trends report, which includes 13 European countries, America and Australia; To check the accounts of 3 out of every 4 people who prefer digital banking transactions via their mobile devices while in Turkey, from 3 to 5 people each pay the bills from mobile devices (ING, 2018).

In the Interbank Card Center Card Monitor 2017 Card Usage Habits Survey, "Which tool would you like to pay in the future?" While the proportion of those who answered the question, Mobile phone was 42% in 2015, this rate reached 67% in 2017 (BKM, 2017).

"The New Growth Engine of The Digital World: E-Commerce" that published in 2017 by TUSIAD, despite the smart phone penetration is rapidly increasing, world average remained at 19% in terms of the share of mobile electronic commerce to 44% (TUSIAD, 2017). Indeed, in Turkey, cash, credit / debit cards and the use of mobile payment instruments beside the checks is increasing day by day.

Turkey, high credit card penetration, and mobile payment infrastructure is an important dynamic of electronic commerce and Internet banking usage (EdgarDunn, 2015).

According to TUSIAD 2019 Development of E-Commerce, Crossing Borders and New Norms report, approximately 98% of adult individuals have mobile phones and 77% of these

individuals use smartphones. According to the information received from the most frequently traded e-commerce platforms and marketplaces, purchases made on mobile devices in the clothing and consumer electronics categories exceeded 50%. One out of three people who shop online prefers to pay mobile. (TUSIAD, 2019). It has a consumer profile that adopts innovative technology and services early with the advantage of its young and dynamic population and rapidly increasing mobile broadband penetration. In this case, it is considered to be an advantage for the spread of mobile payments in Turkey. (BTK, 2015).

2.5.1.1 Mobile Payment Companies which are operating in Turkey

The new generation of payment systems in Turkey continues to be widespread, as indicated previously.

Debit and credit cards in Turkey in 2018 with 213 million TL in excess of $ 1.5 trillion total trade volume, including contactless payment, 7 billion units was done. There are 148 million debit and 66 million credit card that is using in Turkey (DailySabah, 2019).While the use of physical cards is rapidly converting to digital, the contactless mobile payment technology developed enabled the identification of credit cards to mobile phones. Thus, allowing the mobile phone to be brought closer to the POS device take in less than a second to complete the payment.

The spread of mobile phones that support NFC technology is rapidly increasing contactless mobile payment methods (Dejan & Izabela, 2011). According to Statista data; The transaction volume of mobile payment methods has grown nearly four times in the past three years, with the rate of use reaching 50% in Asia Pacific countries. The sophistication of the banking sector in Turkey is also developing rapidly to the fore particularly contactless payment infrastructure. Mobile contactless payment increased to 5 cards between 2017 and 2019, and the transaction limit on contactless cards was 90 Turkish liras.

This contactless payment technology, which was previously used by ING Bank and Deniz Bank, was finally offered by Vakıf Bank to approximately 15 million retail customers. This product developed by Provision is also used by many domestic and foreign banks through

Mastercard Payment Transaction Services (MPTS).

A new step was taken in technology solutions for the development of innovative payment methods with a protocol between Provision and MasterCard Global in early 2019. In this context, SoftPOS application, which turns Android-based mobile devices into POS terminals, has been implemented. In addition, debit and credit cards are defined on all mobile phones compatible with NFC technology and converted into electronic wallets. With the contactless mobile payment, the risks of theft or loss of the credit card are eliminated (Teknotalk.com, 2019).

In the online retail area, over 70% of consumer visits of many brands take place on mobile devices, while over 60% of turnover comes through mobile (TUSIAD, 2019). On the other hand, Using the Survey of TUIK's Initiative in Information Technology initiatives in Turkey in 2017, according to data it is only made sales of over 10% from the Internet or mobile applications lagged behind those of most European countries this ratio. Ireland is the country with the highest rate in Europe and 25% of businesses sell online (Iyzico, 2019).
international brands such as PayPal operates in Turkey through mobile shopping areas in both Turkish companies.

2.5.1.2 Digital Wallets in Turkey

- **Beemo:** It is a mobile payment technology that establishes a mobile payment infrastructure for businesses and runs digital slips and automatic loyalty programs together with the QR code channel (Bayim, 2018).

- **GPay:** It is a mobile payment technology that is defined and subscribed to the system in order to make payment with via e-pin and QR channel (Göregen, 2018).

- **Alneo:** It is a digital payment application that offers installments to all banks and credit cards without the POS device. Financial monitoring and banking transactions are also considered as a separate feature in this mobile technology (Digitalage, 2019).

- **Param:** An electronic money account valid in e-commerce and stores where you or someone else can load money into your digital wallet (Turkpara, 2019).

- **Mobilexpress**: It is a mobile payment technology that monitors multiple credit and debit cards and collects the Regular payments instantly according to your payment schedule (Mobilexpress, 2019).

- **PepPara:** It allows users to deposit and withdraw money over the internet. they can add money to your PePara account via EFT / Money Order. The most important feature of it is that it is very important to analyze PepPara transactions in detail before becoming a member of any betting site in order to get a smooth service. One of the features that distinguish PepPara in others is that it is used in the purchase of fuel (Kurgucu, 2019).

- **Papara**: It is an online wallet that provides a secure payment for online shopping. It allows users to withdraw money from ATM with your telephone number. It developed by Master Card feature Papara not only in Turkey, providing also use the Master Card agreements with overseas companies. It makes it possible to make transactions with lower commission rates when shopping abroad (Shiftdelete, 2017).

- **BKM Express**: It is very easy to create a digital wallet by saving the credit and debit cards you have with BKM Express. In this way, you can perform the transactions you will make over the internet in a very short time. You can also take advantage of extra discounts and campaigns if you shop on certain e-commerce sites. In addition, you have a chance to earn points, bonuses, chip money in your spending. BKM Express, which is a payment tool that is also socially aware, contains UNICEF, WWF etc.

Users can donate to many foundations and associations by BKM Express (Serkan, 2019).

- **FastPay**: It is a Denizbank service that provides money transfer from pocket to pocket (Guner, 2019).

- **Paycell:** It is a wallet application where subscribers can load TL on their mobile phones and purchase packages. It also uses QR channel to complete payments (Finanspara, 2019).

- **Vodafone Pocket Wallet:** You can use any credit card you have by adding it to Vodafone Pocket Wallet independently from the bank. Pocket wallet allows you to pay in a practical way with QR code and contactless payment option. Vodafone Pocket Wallet, which provides users with ease of access without entering a password, has solved the security problem with the Eye Verify system. To make your daily life easier, you can also pay your bill and HGS that is paid for toll highways with a pocket wallet (ERDAL, 2016).

QR data matrix method using mobile devices in Turkey. Considering the transactions with the lowest amount for operations in more consumers while they use this payment method. They have not yet adopted a common structure in banks operating with their own data matrix systems (TUSIAD, 2019). The Hopi application, launched by Boyner Group in 2015, is an example of QR code payment method. With the application, points are accumulated both in the stores of member brands and in e-commerce sites, and discounts and campaign coupons can be used. (Hopi, 2020).

2.5.2 Mobile Payments in the World

The number of Internet users is growing rapidly all over the world. It was stated by ITU

that there will be over four billion internet users at the end of 2019, and the penetration rate will exceed 53% (ITU, 2019).

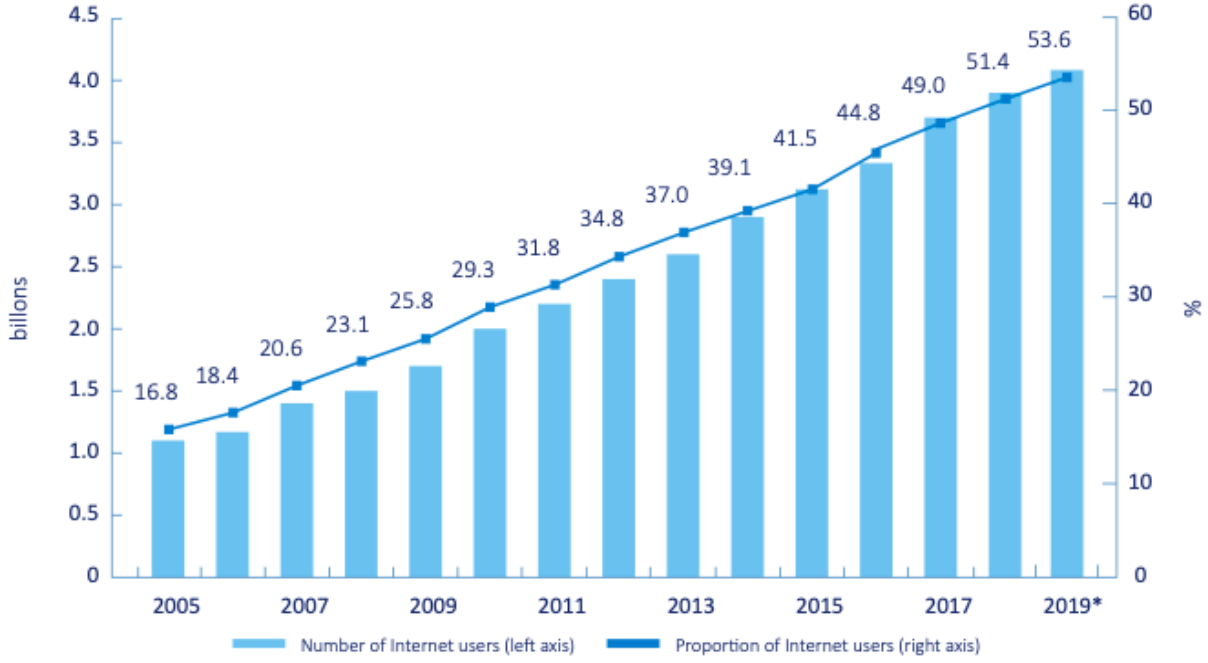

Figure 2. 3: Individuals using the internet, 2005-2019 using the Internet, 2005-2019

[Number of Internet users (left axis)/Proportion of Internet users (right axis)]

Increasing the adoption of mobile payment solutions worldwide, rapidly increasing mobile consumer and P2P payments; accelerates the global growth of mobile international payment services (ITU, 2019).. Mobile money services; It has accelerated the global growth of mobile consumer payment services by rapidly expanding in insufficient financial markets in Africa, Asia and Latin America, enabling hundreds of millions of people to participate in electronic transactions for the first time. (Statista, 2019).

In 2000s, the foundations of digital payment systems were laid in today's sense. First of all, chip-and-pin cards appeared in England. Using the password loaded on the microchips, it is possible to make transactions. Today, it is considered as one of the most important developments to ensure credit card security.

The cryptocurrency bitcoin, whose name has been frequently heard in recent years, also appeared in the late 2000s. In 2008, a person nicknamed Satoshi Nakamoto sent a paper titled Bitcoin; Peer-to-Peer Electronic Cash System to a cryptography-related e-mail group. In 2009,

the first open source bitcoin client was released with the bitcoin network and the first bitcoin generation was realized. The first purchase with Bitcoin was two pizzas delivered by Pope Johns on bitcoin forums. In 2015, more than 160 thousand businesses were reported to accept bitcoin payments.

In 2000s, brands started to provide customized digital payment services. For example, in 2010, Starbucks has become one of the most successful practitioners of this service by offering mobile payments to customers who do not want to carry cash at all branches around the world. Contactless mobile payment systems also emerged in these years. The limit of this form of payment continues to increase today, and therefore, the cashier lines are moving faster.

The most current products in the digital payments system; Apple Pay, which was launched just before the end of the PayPal protocol with eBay (2014), are digital wallets and mobile payment systems such as Google Wallet (Android Pay), MasterPass, Visa Checkout, BKM Express. Alternatives such as Amazon Go, the marketplace that offers a safe service as it receives payments on mobile devices, are among the latest developments in the field of mobile payments. Beyond the Pacific, Alipay, the mobile payment solution of China's giant electronic commerce brand, Alibaba, has reached a larger volume than PayPal. Ant Financial, the roofing company of Alipay, has announced that it has invested 14 billion dollars with its statement on June 8, 2018. With this investment, Alipay has become the biggest fintech initiative in the world.

Bitcoin, which reached very high values in a short time, attracted worldwide attention, but it has lost its former popularity. However, the value of blockchain, which forms the functioning logic of crypto money, is getting more and more understood day by day. The budget for blockchain, which is a distributed database and provides encrypted transaction tracking, is increasing worldwide. The global finance sector increased its budget allocated to develop blockchain technologies in 2017 by 67% in 2017. According to research conducted by the US-based market research company Greenwich Associates; 10% of the banking institutions participating in the research stated that they have allocated 10 million dollars or more to research on blockchain technologies and develop products suitable for this technology. 14%

of the financial institutions participating in Greenwich Associates' research stated that they already produce blockchain solutions (Kemp, 2013).

The number of mobile transactions in the world is grouped into 8 different regions. As of 2018, the highest usage rates of mobile payment service worldwide occurred in the Asia Pacific region, especially Thailand and China. (Statista, 2019) In the developing e-commerce market, M-PESA in Kenya, a sub-Saharan African country, reached a critical audience as the actual payment mechanism in China, while Alipay and WeChat Pay in China reached a critical mass, and a sharp decline in mobile wallet applications in India. (MPW, 2018).

A growing number of merchants worldwide support a variety of mobile payment options. The most common of these are special mobile payment options such as mobile applications for online shopping, mobile payments at POS and mobile wallets.

As of 2018, PayPal, Apple Pay and Visa Checkout are the most popular mobile wallets accepted by online sellers (Statista, 2019) Alipay and WeChat Pay in China; Paytm in India; Mobile Pay, Vipps and Swish are the dominant leaders in the Scandinavian countries. Mercado Pago is adopted in underdeveloped markets in Latin America. (Enberg, 2019).

It is estimated that the number of 950 million mobile payment transaction users worldwide will increase globally in 2023 and reach 1.31 billion in 2019. (Statista, 2019).

According to Transparency Market Research, China has the most mobile adoption of mobile wallet with a rate of 47% and Alibaba and Tencent's payment solutions. WeChat payment and Alipay are the two most popular payment platforms in the China. Norway is the second country where its citizens use mobile wallets with 42%. Britain comes third with 24% followed by Japan and Australia with 20% and 19%. In terms of global mobile expenditures, money transfers constituted most of the expenditures with 68.9% in 2017, followed by goods purchases and invoice payments with rates of 23.3% and 5.1% respectively. In terms of the use of different digital wallets in the world, WeChat pay became the application with the

highest number of users with a total of 1.13 monthly active billion user in second quarter of 2019, followed by Alipay, which has 1 billion active user (Kwan, 2018).

While the volume of transactions made on mobile devices in the world is approximately 700 billion dollars in 2017, this figure is expected to reach 4.5 trillion dollars in 2026. The interest in mobile payment in China and the rate of card use in this country is lower than in the rest of the world, the banking system in Africa has not a widespread organization; reveals that the use of mobile payment systems occurs rapidly in these regions. (MOKA, 2018).

According to the "Digital Payments 2020" report prepared by Boston Consulting Group and Google in 2016; It is estimated that the internet services on mobile platforms will reach 3 billion users by 2020. This number corresponds to approximately 65% of the adult population in the world. Until 2020, the methods used to access the internet will be mobile devices with 80% and 58% of the users of these mobile devices will access the internet from their smart phones. (BCG, 2016).

2.6. Major Technology Adoption Studies

In this section, technology adoption models in the literature are mentioned so far. These models have been applied in academic studies for technology adoption as well.

2.6.1 Diffusion of Innovation Theory

Diffusion of Innovations Theory (DIT) is proposed by Rogers at 1995. DIT was proposed to concentrate to consumer whereas TAM was developed for end-users. DIT is made different from previous models. Firstly, Rogers uses diffusion throughout culture and considers to perceived attributes or norms as variable. Moreover, Rogers postulated that adaptation has been affected by innovation. Rogers explains adopters in five categories in order to distribute people in social system. Categories is defined as innovators, early adopters, early majority, late majority and laggards (Rogers E. M., 1995).

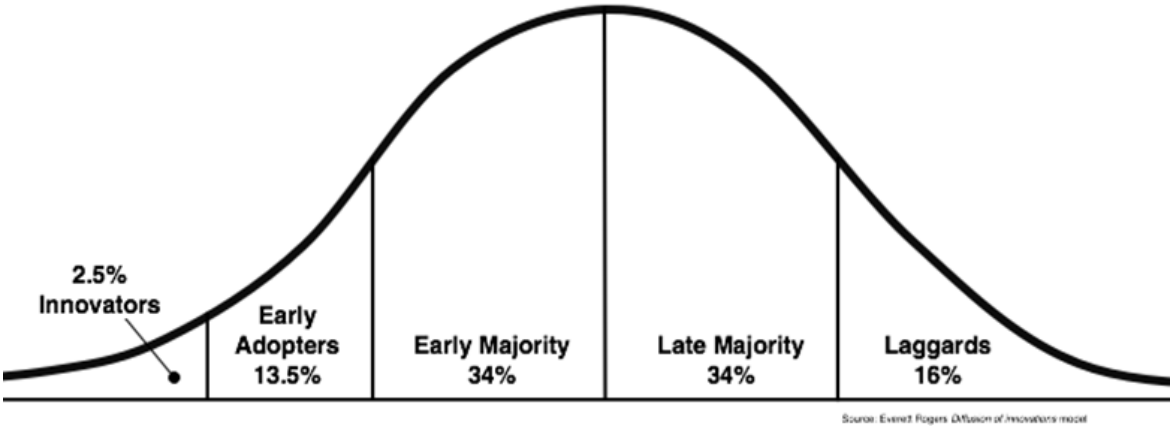

Figure 2. 4: Diffusion of innovation theory I

Innovators who have high social status and ability to reach financial assets are likely willing to take risk. Even if they failed, it can be covered with financial assets.

Early adopters can be defined as high social status, well-educated and opinion leaders. They are more likely to make decision slowly and accurately than innovators.

Early majorities have a bit higher status than average level. Their adoption takes longer time than innovators and early adopters.

Late majority is people who are less willing to take risks due to that their social status and financial elasticity is less than average.

Laggards basically live within tradition. They have lowest level social status and financial liquidity. Therefore, their adoption time is longest.

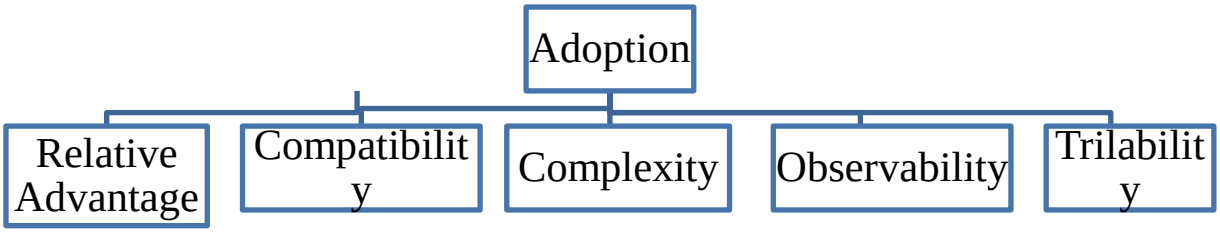

Figure 2. 5: Diffusion of innovation theory II

The constructs which used in Diffusion of Innovation Theory are relative advantage, compatibility, complexity, observability, trialability.

Relative advantage is defined as "*the degree to which an innovation is perceived as being better than its precursor"*. Attractiveness of something on individual's mind is over existing things

Compatibility is defined as "*the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters"*. An innovation is used easily with past experience without problem and conflict

Complexity is defined as "the *degree to which an innovation is perceived as being difficult to use"*. An innovation to use is being thought as complicated by person who wants to use it

Observability is "*the degree to which the results of an innovation are observable to others"*. It is measure that is able to be observed and noticed regarding results of innovation.

Trialability is "*the degree to which an innovation may be experimented with before adoption"*. It can be said that an innovation can be considered and evaluated in its own conditions.

2.6.2 Theory of Reasoned Action (TRA)

Theory of Reasoned Action shows that how behavior and attitude affect each other so that

relationship between them can be examined. The theory suggests that intention to do something depends on individual's behavior. In order to make most accurate prediction of behavior, intention factors should be comprehended. Theory of Reasoned Action have three general constructs that are behavior intention, attitude toward behavior and subjective norm. Behavior intention is main part of theory that is affected by attitude toward act or behavior and subjective norm.

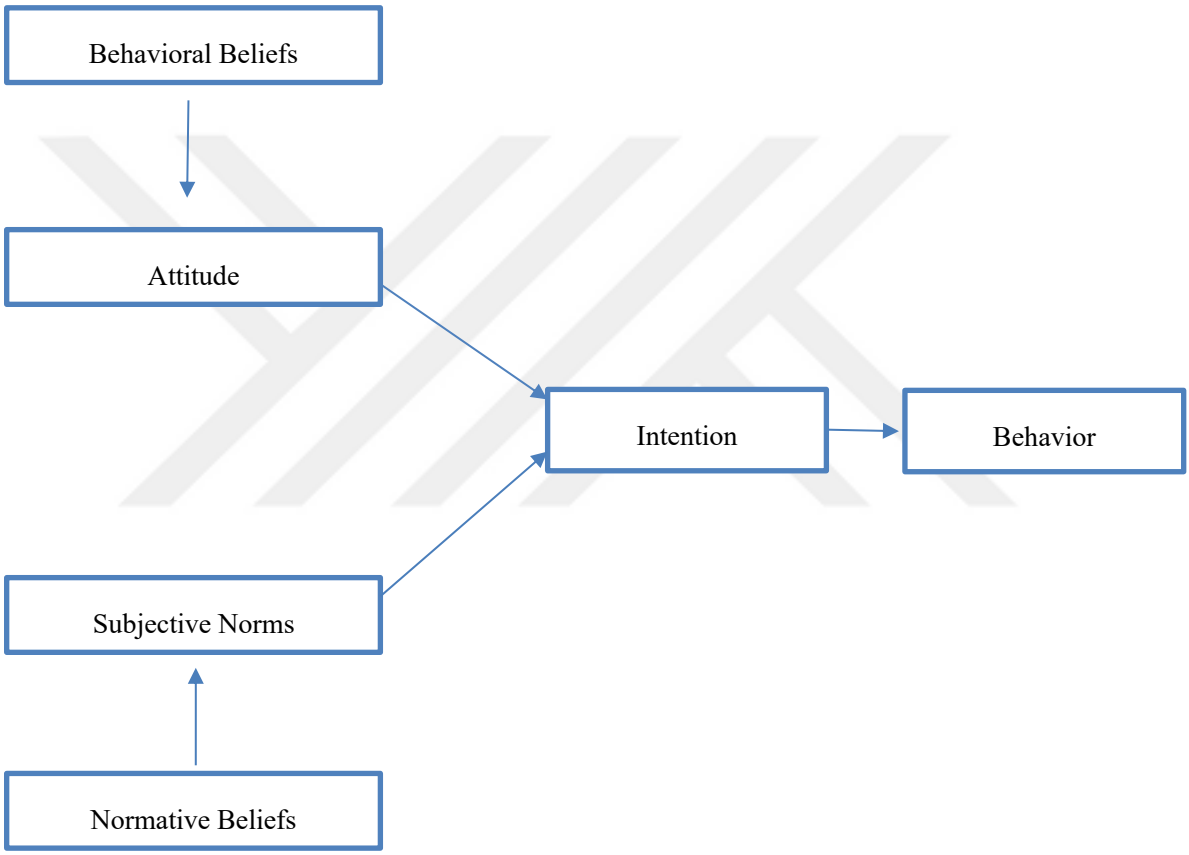

Figure 2. 6: Theory of reasoned action

Theory of Reasoned Action are conducted a meta-analysis to clarify by Sheppard, Hartwick and Warshaw (Fishbein & Ajzen, 1975). As it is explained in meta -analysis, Theory Reasoned Action is only generated for single behavior. Results of person's behavior and involuntary behaviors do not reckon within model (Sheppard, Hartwick, & Warshaw, 1988).

2.6.3 Theory of Planned Behavior (TPB)

The Theory of Planned Behavior is model that Theory of Reasoned Action is extended. (Fishbein). To correct TRA in terms of voluntary, "Perceived behavioral control" is added as variable that might influence intention. The model is given in Figure 2.7 (Ajzen I. , 1991)

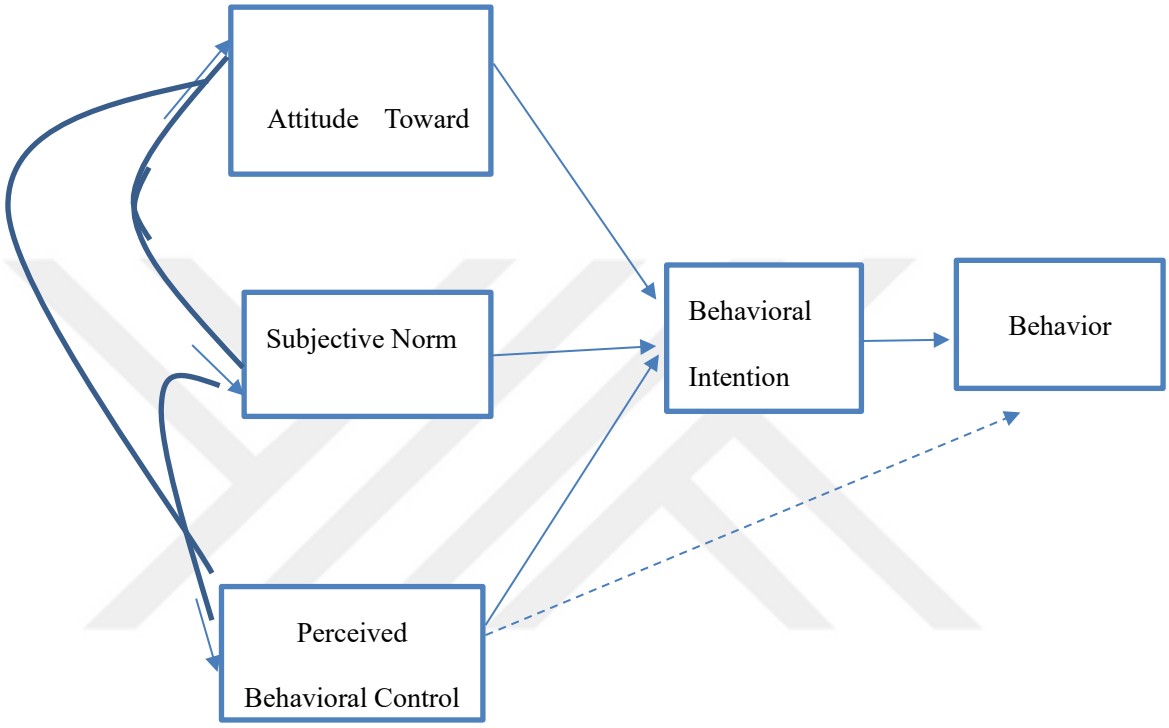

Figure 2. 7: Theory of planned behavior

The model proposes that behavioral intention has been affected positively by perceived behavioral control. Intention is defined different that existed in TRA due to that considered voluntary in TPB (Ajzen I. , 1991). As Theory of Planned Behavior's figure showed, attitude towards act, subjective norm and perceived behavioral control or behavior has direct impact on behavioral intention.

2.6.4 Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM) that is still seen as most convenient model to examine user's adoption is came up by Davis (1986) in order to explain and predict user's adoption in his doctoral dissertation. Theory of Reasoned (TRA) that proposed by Fishbein

and Ajzen is basis of Technology Acceptance Model (TAM). Nonetheless, Davis (1986) focuses on computer usage behavior in TAM even though Fishbein and Ajzen aimed to understand human behavior in TRA. Moreover, Technology Acceptance Model does not mention to social influence's effect while social influence's effect can be considered as subjective norm in Theory of Reasoned Action (TRA).Technology Acceptance Model has been proposed with five constructs that are perceived ease of use, perceived usefulness, attitude toward using, behavioral intention to use and actual system use. According to TAM, there are factors that might not only influence person's decision to use system and individual's decisions can be measured. TAM postulates that actual system usage depends on behavioral intention to use (BI) that is influenced by attitude toward using (ATT) and perceived usefulness which is affected by perceived ease of use and external variables. Perceived usefulness and attitude to toward directly affects behavioral intention. Perceived ease of use (PEOU) indirectly affects to attitude toward using which is predicted from perceived ease of use and perceived usefulness.

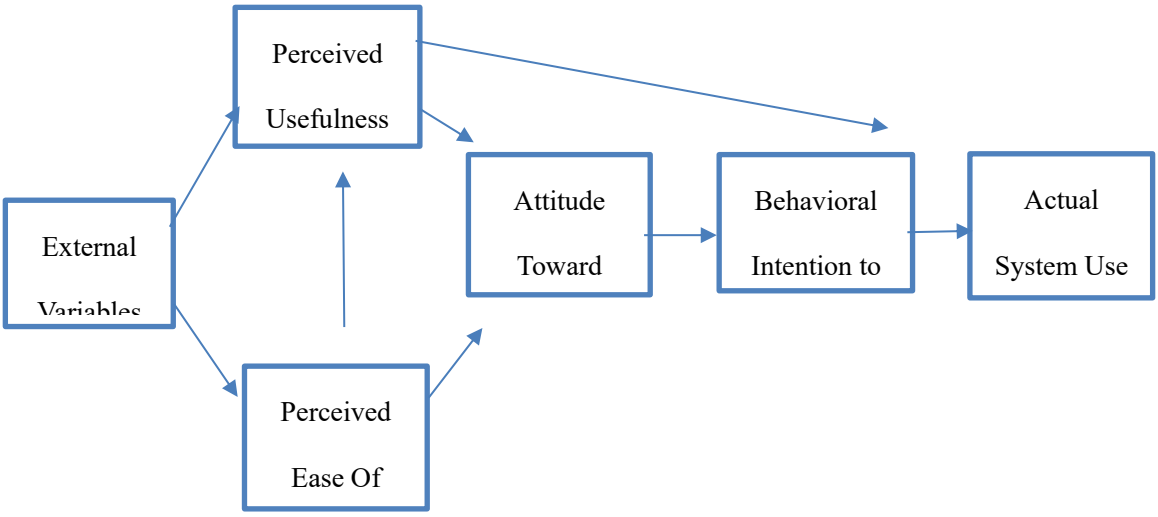

Figure 2. 8: Technology acceptance model

Perceived usefulness was defined as *"the degree to which an individual believes that using a particular system would enhance his or her job performance"*. Hence, it can be explained,

consumers will prefer to that application if they believe that application will make their job to more effective.

Perceived ease of usefulness was defined as "*the degree to which an individual believes that using a particular system would free of physical and mental effort".* Therefore, it can be explained more precisely, if consumer thinks that use of application is easy, they will prefer to have it. More precisely, if they perceived application as user friendly, they will most likely choose it to use (Davis F. A., 1989).

2.6.5 Technology Acceptance Model 2 (TAM 2)

TAM 2 that is extended version from Technology Acceptance Model is developed by Venkatesh and Davis. It is extended with adding social influence and cognitive instrumental processes. Subjective norm which is basically defined as person's perception, image and voluntariness are social variable whereas output quality, result demonstrability, job relevance and perceived ease of use are cognitive. Moreover, as proven in previous studies, attitude towards using technology has a positive impact on intention to use. So, attitude toward usage neglected from this model. Extended model is given below as figure 2.9

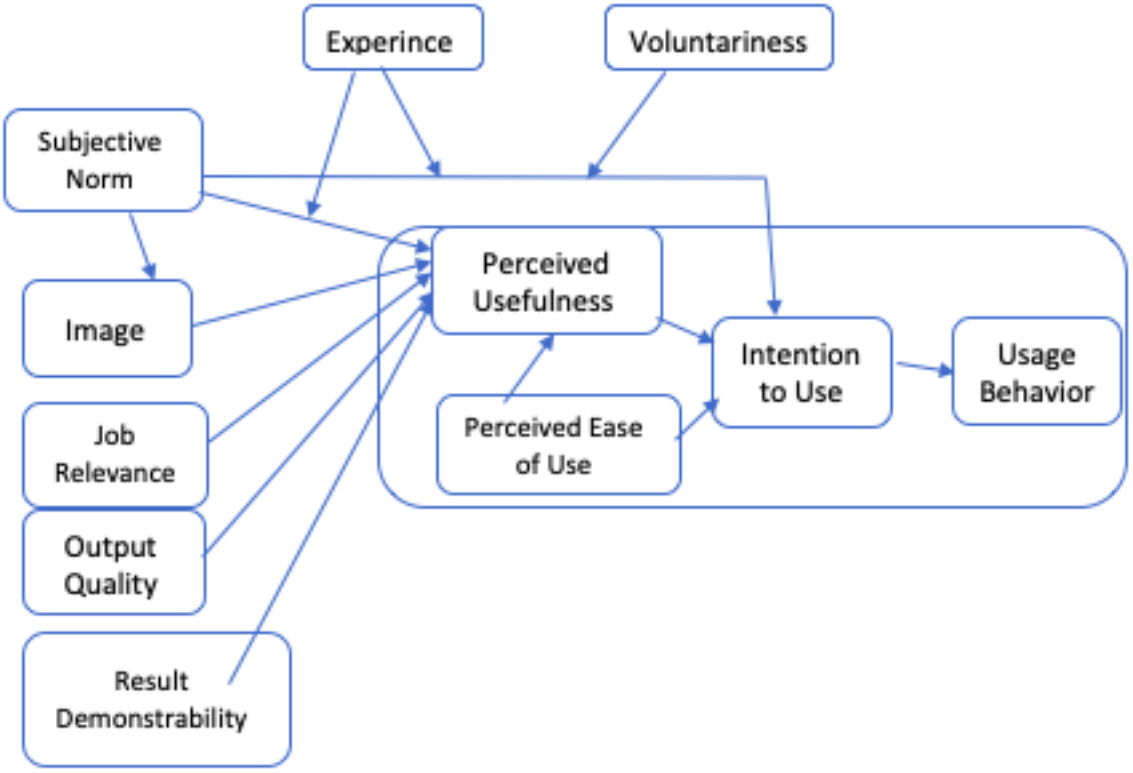

Figure 2. 9: Technology acceptance model I

Subjective norm, voluntariness and image are counted as main factors which cause whether persons will accept or not. Perceived ease of use, perceived usefulness and intention to use are positively and directly affected by subjective norm (Venkatesh & Davis, 2000).

2.6.6 Unified Theory of Acceptance Use of Technology Model (UTAUT)

Unified Theory of Acceptance of Technology Model was developed in 2003 by Venkatesh, Morris and Davis. It has been integrated with eight model to analyze the new technologies.

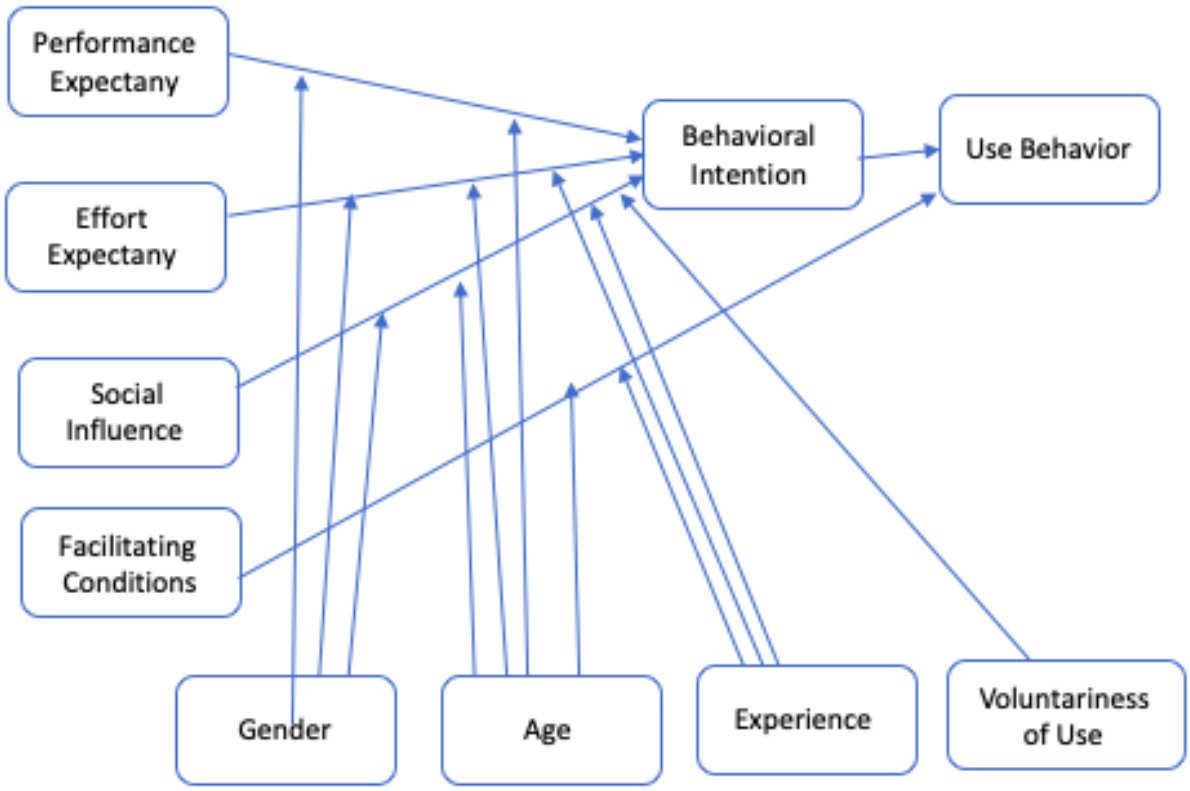

Figure 2. 10: Unified theory of acceptance use of technology model

Performance expectancy, effort expectancy, social influence and facilitating conditions are main variable in UTAUT. These four main variables have directly impact on user acceptance and usage behavior (Venkatesh V. , Morris, Davis, & Davis, 2003).

Performance expectancy can be defined as *"the degree to which an individual believes that using the system will help him or her to attain gains in job performance"*. It also explained like that performance expectancy is similar with perceived usefulness that is used in TAM. Effort expectancy can be defined as "*the degree of ease associated with the use of the system"*.

2.7 Previous Studies

Türker and Okumuş (2019) surveyed 485 people using the variables of intention to use, perceived benefit, perceived ease of use, perceived trust, social impact, perceived compatibility and perceived security; Independent sample T Test and ANOVA result showed

that the intention to use, perceived benefit, perceived ease of use, perceived trust, perceived compatibility and perceived safety variables showed statistically significant differences according to socio-demographic characteristics (Turker & Okumuş, 2019). It has been seen that whether the participants used or did not use mobile payments before caused differences regarding their intention to use and their perceptions about mobile payment.

Örs (2018) surveyed 378 people using the variables of intention to use, usefulness, ease of use, safety, cost, compatibility, knowledge, innovation, new technology unrest, social impact and entertainment; As a result of the partial least squares-structural equation model, it was observed that the most usefulness and compatibility factors were effective in the adoption of mobile payment systems (Ors, 2018).

Hossain (2018) conducted a survey of 328 people using the variables of usefulness, ease of use, reliability, mobility, risk, satisfaction and intention to use in his study; as a result of the confirmatory factor analysis and the structural equation model, consumer satisfaction affects the intent to use (continuous); it was seen that perceived usefulness and ease of use positively affect the intention and satisfaction of continuous use (Hossain & Nusrat, 2018).

Kim (2009) conducted a survey of 269 people using the variables of intention to use, innovation, mobile payment information, portability, accessibility, compatibility, convenience, perceived usefulness and perceived ease of use in their study; As a result of the structural equation model, it was observed that the intention of using the mobile payment system was strongly influenced by the variables of ease of use and perceived usefulness.

Humbani and Wiese (2017), in his study; conducted surveys to 416 people using optimism, innovativeness, suitability, compliance, discomfort, insecurity, perceived cost, perceived risk and adoption variables (Humbani & Wiese, 2017). As a result of the analysis made with the regression analysis method, it was determined that the levels of optimism and innovation of the consumers were not significant. The disturbance variable was determined to be a preventive of consumers' readiness to accept. Perceived convenience and compatibility are important factors in the adoption process; Insecurity, perceived cost, and perceived risk have

been shown to significantly impede acceptance of mobile payment

Johnson et al. (2017) surveyed 270 people using personal privacy risk, ubiquity, testability, ease of use, relative benefit, visibility, perceived security and intent to use; As a result of the analysis made with the method of partial least squares, ease of use, relative advantage, visibility and perceived security positively affect the individual's intention to use mobile payment services; In addition, it was observed that the variables of ubiquity and testability positively affect the individual's perception of security, and concerns about privacy risks negatively affect their perceptions of security (Johnson, Kiser, Washington, & Torres, 2017).

In study of Matemba and Li (2018), surveyed 212 people using the variables of safety, confidence, ease of use, privacy, concerns, relative benefit, behavioral intent; As a result of the analysis made with the structural equation model method, trust was seen as one of the critical factors that pushed people to adopt ease of use for the WeChat Mobile Wallet payment type. It has also been found that trust has the greatest impact on relative benefit, relative benefit (or perceived benefit) has an important relationship with people's intention to adopt (Matemba & Li, 2018).

Shankar and Datta (2018) conducted a survey of 381 people using the variables of trust, self-efficacy, innovativeness, subjective norm, perceived ease of use, and mobile payment adoption in their study (Shankar & Datta, 2018).Considering the technology adoption model, as a result of the analysis made with the structural equation model method, it was seen that the perceived ease of use, perceived benefit, trust and self-efficacy have an important and positive effect in the acceptance of mobile payments. However, it has been stated that subjective norms and personal innovation do not have a significant impact on the intention to adopt mobile payment, and perceived ease of use is the most effective determinant of the intention to adopt mobile payment in India.

Khalilzadeh (2017) conducted a survey of 412 people using behavioral intent, hedonic performance expectation, utilitarian performance expectation, social impact, effort expectation, self-efficacy and facilitating conditions in his study; As a result of the analysis made with the structural equation model method, it was seen that the security variable had both direct and

indirect effects on the basic structures of the model. Safety positively affects the intention to use both directly and indirectly (Khalizadeh, Ozturk, & Bilgihan, 2017). The impact of social impact on the intention to use NFC-based mobile payments was found to be stronger than the effects of both utilitarian and hedonic performance expectations. In addition, both hedonic and utilitarian performances were found to be positively affected by the expectation structure, and it was stated that social impact is an important determinant of behavioral intentions.

Cabanillas (2017) conducted a survey of 584 and 287 people using subjective norm, perceived ease of use, perceived benefit, attitude, perceived safety and intention to use in his study; As a result of the analysis made by using the structural equation model method, the most important variables in the usage purpose are "attitude, perceived benefit, subjective norms and perceived security" regarding the adoption of the mobile payment system for SMS by SMS (Cabanillas, Iviane, & Francisco, 2017). On the other hand, with regard to the adoption of the NFC mobile payment system, the most important variables in the order of their importance are stated as "attitude, subjective norms, perceived benefit and perceived security". In both payment systems, it is stated that the variable which has the biggest effect on the intention to use is "attitude".

Hampshire (2017) conducted a survey on 111 people using perceived trust, perceived risk, perceived benefit, personal characteristics, perceived ease of use, attitude towards use, and system usage; As a result of the application of the content analysis method, perceived trust has been shown to affect perceived benefit positively and reduce perceived risk, and perceived risk negatively affects perceived benefit. In addition, perceived benefit significantly and positively affects the attitude of consumers in the UK (Hampshire, 2017).

Baganzi and Lau (2017) conducted a survey of 384 people using variables such as performance expectancy, self-efficacy, trust, perceived risk, structural assurance and behavioral intent (Baganzi & Lau, 2017). As a result of the analysis made with the structural equation model method, it was concluded that the risk perceived as the most important factor in mobile money acceptance by Mobile money users for the Mobile Money (m-Money) payment type is negatively related to performance. It was observed that the intention to accept

mobile money is positively correlated with trust belief, performance expectation, and perceived risk is an important determining factor in adopting mobile money.

Bailey, Mishra and Ben (2017) conducted a survey on 240 people using new technology anxiety, self-efficacy, privacy, perceived ease of use, perceived benefit, attitude and intent in his study; As a result of the analysis made with the structural equation model method, click-to-pay, retail applications, mobile payment self-efficacy, perceived ease of use and perceived usefulness significantly affect the payment type (Bailey, Mishra, & Ben, 2017). Privacy concerns affect the attitude towards mobile payments and the attitude towards mobile payment usage intent. While new technology anxiety affects perceived ease of use, it does not affect perceived benefit.

Aslam,Imtiaz and Ham.(2017) surveyed 335 people using variables such as perceived safety, perceived compatibility, perceived benefit, perceived ease of use, subjective norm, attitude towards use and intention to use; As a result of the analysis made with the structural equation model method, it was shown that perceived compatibility, perceived usefulness and subjective norm are an important indicator of consumer attitude towards the use of mobile payment services, and the effect of perceived security and perceived convenience on the attitude is insignificant (Aslam, Imtiaz, & Ham, 2017).

Wu and Lin (2017), using the variables of positive emotions, perceived risk, perceived benefit, spreading stages and intention to accept. applied a questionnaire to the person; As a result of its analysis with the structural equation model and multi-group analysis methods, WeChat Mobile Wallet showed that the users' intention to accept for payment type is related to relatively perceived risk, perceived benefit and positive emotion. It is stated that positive emotion has a strong negative effect on perceived risk and a positive effect on perceived benefit, and perceived benefit greatly reduces the perceptions of users of risk (Wu & Lin, 2017).

Ozturk, Bilgihan, Saba and Hua (2017) conducted a survey of 412 people using the variables of compatibility, affinity, perceived risk, privacy concerns, suitability, utilitarian value and intent to use in his study; As a result of confirmatory factor analysis and analysis with structural equation model, it has been shown that privacy concern, benefit value and

suitability for NFC payment type significantly affect individuals' acceptance of NFC-based mobile payment technology. It was stated that there was no significant relationship between the perceived risk and the users' intention to use NFC-based mobile payment technology, and the privacy anxiety was significantly related to the behavioral intentions of the users (Ozturk, Bilgihan, Saba, & Hua, 2017).

Seetharaman, Karippur, Palaniappan and Golo. (2017) surveyed 227 people using the variables of availability of alternatives, behavioral intent, transaction cost, threshold mass, flexibility, innovation, perceived ease of use, personal privacy, perceived benefit, transaction speed, trust and transaction security (Seetharaman, Karippur, Palaniappan, & Golo, 2017). As a result of the analysis made with the confirmatory factor analysis method, it was seen that the perceived ease of use, transaction cost and transaction speed had a very strong effect on the perceived usefulness. While transaction security, nominal transaction cost and transaction speed have a very strong effect on perceived ease of use, privacy has no effect on perceived ease of use. Trust, privacy, and transaction cost have a very strong impact on transaction security.

Mun, Khalid and Nadarajah (2017) conducted a survey of 300 people using perceived benefit, perceived ease of use, perceived credibility and intent to use social impact; As a result of the analysis made with the multiple regression method, it was seen that all the proposed factors had an important effect on affecting consumers' intention to use mobile payment services and perceived usefulness was the strongest determinant of behavioral intent (Mun, Khalid, & Nadarajah, 2017).

Singh, Srivasta, and Sinha (2017) surveyed 204 people using the variables of ease of use, benefit, self-efficacy, trust, social norms, hedonism, attitude, safety, satisfaction use, option and age; It was found that all eight variables for variance analysis, t-test, Chi-square test and regression analysis and mobile wallet payment type had a significant positive correlation between preference and satisfaction (Singh, Srivastava, & Sinha, 2017). Ease of use, trust, social norms, attitude and security are the most effective variables for determining the level of preference. For North Indian consumers, the usage rates have been confirmed to increase, as

the application is very efficient and useful. The new variable hedonism has been found to have a significant impact on the satisfaction of consumers and mobile wallet usage in North India.

Hunafa, Hidayanto, and Sandhyaduhitta (2017) conducted a survey of 1,684 people using the variables of innovation, intrinsic motivation, social impact, facilitating conditions, perceived benefit, perceived ease of use, intention to use and habit in his study; As a result of the analysis made with the structural equation model method, it was concluded that it has a positive effect on the internal motivation and facilitating the situation, the perceived benefit of the consumer and the perceived ease of use (Hunafa, Hidayanto, & Sandhyaduhita, 2017). While personal innovation only has a significant impact on perceived ease of use, social impact has been shown to have a significant effect only on perceived usefulness. It has been determined that both perceived benefit and perceived ease of use have a significant impact on consumers' intention to use mobile payments, thus concluding the applicability of the Technology Acceptance Model in the context of mobile payment acceptance.

Martens, Roll, and Elliot (2017) surveyed 444 people using optimism, innovation, discomfort, insecurity, perceived benefit, perceived ease of use and intention to use; As a result of the analysis made with the structural equation model method, some of the Technology Preparation Index 2.0 variables show a significant effect on the dimensions of the Technology Acceptance Model. The Perceived Benefit was found to be the strongest explaining variable of intent to use mobile payments, and the "Country" factor was not an intermediary in structural relations (Martens, Roll, & Elliott, 2017).

Oliveira, Thomas, Baptista, and Campos (2016) surveyed 301 people using the variables of performance expectation, effort expectation, social impact, facilitating conditions, hedonic motivation, price value, behavioral intent, compliance, perceived safety and intention to recommend; As a result of the analysis made with the structural equation model method (Oliveira, Thomas, Baptista, & Campos, 2016). it was observed that the compatibility, perceived technology security, performance expectations, innovation and social impact for the NFC payment type have direct and indirect effects on the adoption of mobile payment and the intention to propose this technology. Performance expectancy is important for the behavioral

intention of adopting mobile payments; It was stated that performance expectation was significant in the expectation of mobile payment, but it was not significant in explaining the behavioral intention of adopting mobile payment.

Ooi and Tan (2016) surveyed 459 people using perceived security risk, perceived trust, behavioral intent, benefit, ease of use, perceived compatibility, perceived mobile and financial resources. As a result of the analysis made with the structural equation model method, it was seen that there is a significant relationship between compatibility and benefit for SCC (Smart Phone Credit Card) - NFC payment type. Compatibility explains its intention to use. Financial resources are related to perceived usefulness, but do not create a meaningful relationship with intention to use. While perceived ease of use does not establish a significant relationship with intention to use, there is a significant relationship between perceived usefulness and intention to use. The strongest variable that explains its intention to use turned out to be trust (Ooi & Wei, 2016).

Qasim and AbuShanab (2016) surveyed 253 people using the variables of effort expectation, performance expectation, social influence, trust, network externality and behavioral intentions; As a result of multiple regression analysis and confirmatory factor analysis, it has been shown that network externalities are the most effective determinant of mobile payment acceptance, although traditional acceptance determinants affect customers' willingness to accept mobile payments. Given the huge impact of network externalities on mobile payment acceptance, it was found to be the highest among all predictive factors. The model explains 58% of the behavioral intent variance (Qasim & Abu-Shanab, 2016).

Luna, Fransisco and Cabanillas (2016) surveyed 191 people using the perceived benefit, perceived ease of use, innovation, individual mobility, perceived compatibility, attitude towards NFC use, subjective norm and perceived security variables; As a result of the analysis made using the structural equation model method, attitude, subjective norms and innovation for the NFC payment type are determinants of the intention to use this technology in the future. The most effective variable on the intended use of the proposed payment system is perceived compatibility. It can be said that the effect level of this variable on perceived benefit and

attitude towards the use of payment system is significantly high. Subjective norms are important in terms of valuing the views of those who are really important to them in the perspective of individuals (Luna, Fransisco, & Cabanillas, 2015).

Hankun, Yafang, Xuemei and Jing (2016) surveyed 382 people using privacy anxiety, perceived risk, perceived security, trust, perceived ease of use, perceived usefulness and attitude. As a result of the analysis made with the structural equation model method, the effect of perceived risk, perceived security, trust, ease of use, perceived benefit ratio on users' attitudes towards online payment was similar in the two countries (USA and China). In the U.S., privacy concerns have significantly impacted users' attitudes towards online payment; however, it has been concluded that only privacy concerns in China have no positive effect on users' attitudes towards online payment (Hankun, Yafang, Xuemei, & Jing, 2016).

Pietro et al. (2015) surveyed 439 people using attitude, compatibility, utility, ease of use, safety, intention to use and user behavior; As a result of the analysis made with the structural equation model method (Pietro, Guglielmetti, Mattia, Renzi, & Toni, 2015).it was seen that the intention to use a technology, usefulness, ease of use and security of this technology were affected for the type of mobile ticket payment. In addition, usability is simultaneously affected by ease of use, compatibility with users' values and needs, and their attitude towards mobile services. In addition, the model confirms the direct relationship between intention to use technology and real use.

Chauhan (2015) conducted a survey of 225 people using the variables of trust, perceived benefit, perceived ease of use, attitude towards use and intention to use; As a result of the analysis made with the partial least squares method, for the mobile money payment type; The trust and core structures of the technology acceptance model, such as perceived benefit, trust and attitude towards use, have been shown to contribute to influencing the intention to accept mobile money. It is stated that perceived ease of use does not affect perceived benefit and attitude towards usage (Chauhan, 2015).

3 RESEARCH METHODOLOGY

In this section, the first proposed model is introduced, the model components are defined and the relevant hypotheses are given. In addition, information regarding the measurement Method is included. This section ended with data analysis.

3.1 First Adoption Model

As a result of examining the studies in the literature, the most used components were obtained, and the model was established. The first model established in this context.
When the studies in the literature are examined, the model created according to the variables thought to affect the hidden variable is given in Figure 3.1

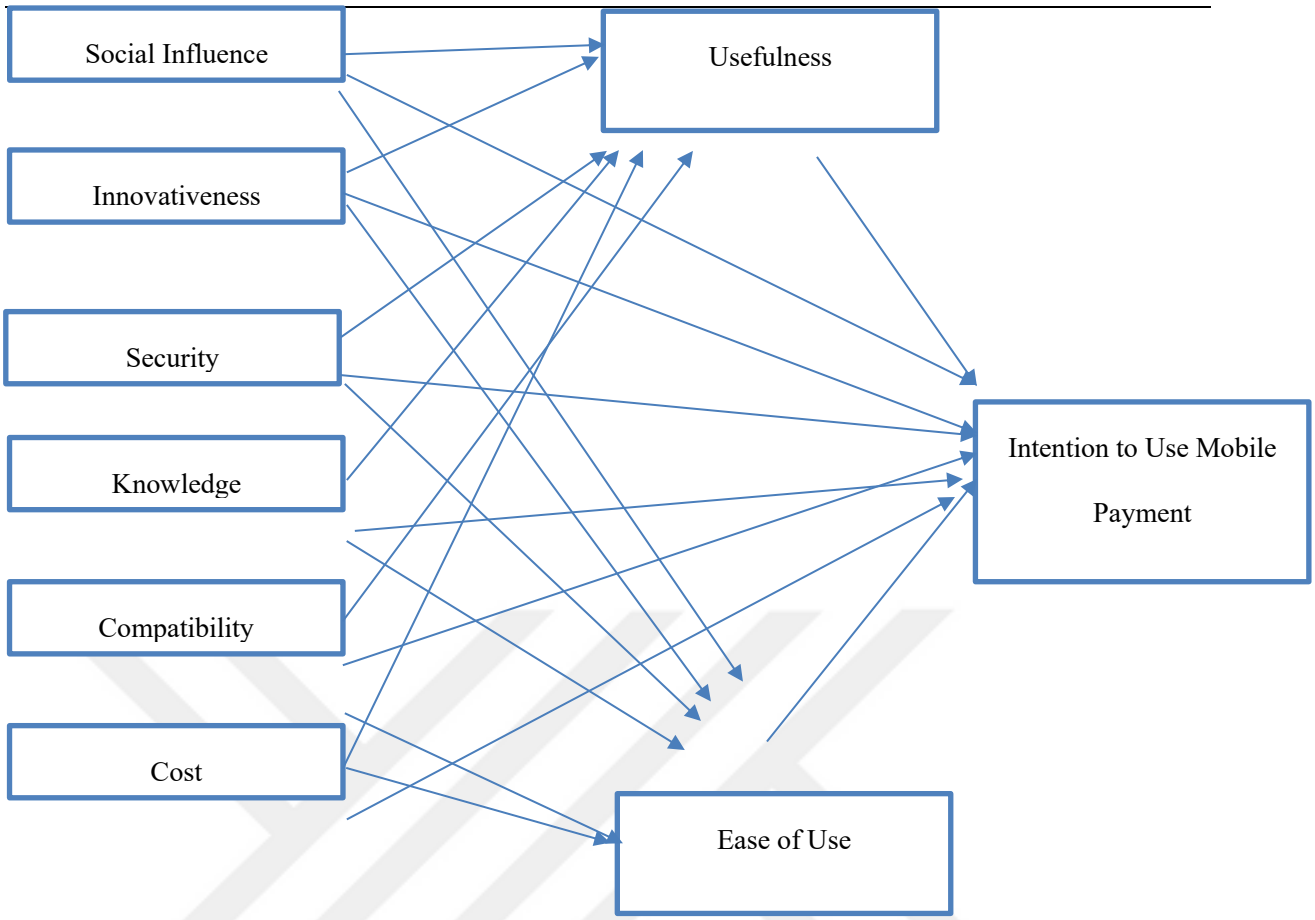

Figure 3. 1: Model established as a result of the literature study

The model in figure 3.1 was created as a result of the literature study. The components in the above model are used quite frequently in the literature. Therefore, the starting model proposed in figure 3.1

3.1.1 Ease of Use

Ease of use refers to person believes that using a particular system will be easy, simple and effortless to use (Davis F. , 1989). Davis also explains ease of use as “freedom from difficulty”. Therefore, it is considered as one of significant factor that affect decision to adopt and accept new innovations. According to Technology Acceptance Model, if new technology is perceived as easy to handle, using of that can be seen more favorable. Therefore, perceived

ease of use has an impact on usefulness and intention to use new technology (Venkatesh & Davis, 2000)

3.1.2 Usefulness

Intention to use an information system can be measured with usefulness of that system (Davis F. D., 1989). Previous studies have proved that usefulness has a positive effect to predict technology adoption. it is also confirmed that perceived usefulness can be seen as variable that have an impact on mobile payment acceptance (Francisco, Iviane Ramos de, & Ríos, 2017). Mobile technology user will have intention to use mobile payment when they hold positive beliefs about system to be favorable for their transactions and financial issues. Therefore, perceived usefulness is being known as positively affect to intention to use new technology

3.1.3 Intention to Use Mobile Payment

Intention can be defined as understanding of how actual behavior affects to attitude and unfavorable intention can be occurred by negative attitude (Wang, Sun, Lei, & Toncar, 2009). According to previous studies, there are empirical evidences about positive intention of mobile technology users towards mobile payment when they have a positive tendency on m-payment (Au & Kauffman, 2008). Intention to use mobile payment have provided that the possibility of using and acceptance a new technology (Schierz, Schilke, & Wirtz, 2010). Past studies have also confirmed that behavioral intention to use encourage later usage and consumer's inclination to accept new system.

3.1.4 Innovativeness

Innovativeness is accepted as individual's tendency to experience new information systems (Chang, Cheung, & Lai, 2005). Past studies have shown that personal innovativeness has positively affected to acceptance of new technology and adoption of innovations Previous

studies has also provided that innovativeness play significant role for intention of new mobile systems (Blake, Neuendorf, & Valdiserri, 2003). Therefore, it is appropriate to be applied as variable to understand of how influence on mobile payment acceptance (Yi, Fiedler, & Park, 2006)

3.1.5 Security

Security can be defined as security concern that negatively affects individual's perception to use new system. Since online transactions have contained such as privacy, data theft, frauds hacker attacks, perceived security and risk have decreased for users (Yao Chuan & Jong, 2010). Online transactions contain several security risks that decrease consumer's perceived security and perceived trust (Chellappa & Pavlou, 2002). In case that person have not previously experienced m-payment, it causes to weak user's perceived security (David, Elena, & Straub, 2003).

3.1.6 Cost

Cost can be defined as that have to spend money in order to use mobile payment systems and other things that related mobile payment technologies.

3.1.7 Social Influence

Social influence could be defining as degree that user of mobile payment gives importance to other's thoughts. So, it can be perceived factor that measure external influence (Venkatesh V. , Morris, Davis, & Davis, 2003).

3.1.8 Knowledge

Knowledge can be defined as factor explain information level or experience or awareness that is already gained for mobile payment technologies.

3.1.9 Compatibility

Compatibility could be defined as “the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experience of users of mobile payment systems “ (Rogers E. M., 1996).

3.3 Definition of Structural Equation Model (SEM)

Structural equation modeling (SEM) is a multivariate statistical method based on the definition of observable and unobservable variables based on a particular theory, but in a causal and relational model, which is generally applied in social sciences (Carvalho & Chima, 2014).

SEM tests the theoretical model by providing the same basic purpose by the researchers by using the relationship models between the observed variables in different ways. For example; It can be tested with hypotheses such as whether the home life of the student affects school success in educational researches, whether consumer confidence in trade in market research affects the increase in sales in production, whether a good diet in health research reduces the risk of heart attack with regular exercises (Schumaker & Lomax, 2004).

SEM differs from classical multivariate statistical methods due to its features. First of all, SEM takes a confirmatory approach rather than an exploratory or explanatory approach. Therefore, while many statistical methods other than SEM try to explain the relationships on the dataset, SEM confirms the compatibility of the established relationships with the data. As such, SEM's hypothesis testing is more successful than other methods. While classical multivariate methods do not have any ability to calculate or correct measurement error; SEM shows very clear results in error calculations. Accordingly, while measurement errors are handled separately in traditional methods, SEM clearly considers measurement errors in all analysis. While processing the variables that can be observed in these methods, in SEM, both the observable and unobservable, that is, latent variables can be processed, and hypotheses can be tested accordingly (Kline, 2005).

3.4 Basic Concepts of Structural Equation Modeling

In the use of statistical methods, analyzes are mostly done through individual observations and related models are established. For example, in methods such as multiple regression analysis and variance analysis (ANOVA), the difference between the observed value and the estimated value is minimized, whereas the difference between the sample covariance matrix and the estimated covariance matrix in SEM is minimized (Malkanthies, 2015).

Another feature that distinguishes SEM from other multivariate methods is that it is used in testing the causal relationship between observed variables and latent variable. The latent variables are one of the most important concepts of SEM. The variables that the researcher is really interested in are variables for measuring abstract concepts such as intelligence, motivation, emotion, and attitude. Abstract concepts in many areas such as psychology, sociology, education, economics and marketing are often not directly measurable. In psychology, abstract concepts such as self-view and motivation, sociology, despair and restlessness, education, verbal ability and educator's expectation, economics, customer satisfaction, perception of quality can be given as examples to the latent variable. It is not possible to measure the abstract concepts mentioned directly. For this reason, the researcher can scale the latent variables by associating them with the observed variables. Using independent variables observed in SEM, hidden independent variables are created, and hidden dependent variables are created using observed dependent variables. At this stage, latent dependent variables and latent independent variables are obtained by CFA method.

SEM basically consists of models that show the causal relationship between observed or latent variables and these. Unlike classical statistical methods, dependent and independent variables are called internal and external variables in SEM. The main reason for this; In SEM models, one variable can be dependent for some variable or variables, while it can be an independent variable for other variables. For this reason, it will not be correct to use these terms in the definitions of dependent and independent variables used in SEM models.

Factors obtained by using externally observed variables are called external latent variables, and factors obtained with internally observed variables are called internal latent variables.

3.5 Path Analysis

The concept of Path Analysis has been replaced by SEM in recent years. In order to better understand the path analysis that forms the basis of SEM, SEM is generally started by explaining the concept of path analysis. Path analysis is confirmed by confirmatory factor analysis and some pictorial representations in SEM, called path diagrams that stimulate causal or non-causal relationships between variables (Frances & Nora, 2004).

The path diagrams used in the representation of models with path analysis are very common and useful in practice. The standard conformity of the observed and hidden variables in the path diagram are expressed by path diagrams, and how the models change in detail is shown in the diagram. Path diagrams are very useful to show all information about the model and can be very helpful in changing the model in SEM implementation (Hoyle, 1995).

3.6 Confirmatory Factor Analysis (CFA)

Explanatory Factor Analysis (EFA) is a technique used to determine how many subtitles variables in a measurement tool can be summed and how they relate. With CFA, variables included in the data set are expected to be collected in a certain factor or subgroup. Thus, the number of variables in the data set is reduced and it is possible to compare the structure obtained theoretically. CFA is based on testing a model or structure previously determined by EFA in the scale development and adaptation process or examining the validity of the model (Goldberg & Velicer, 2006).

In CFA, first of all, the hypothesis testing of the relationships between the variables is made and it is aimed to verify these relationships. At this stage, the relationships between the factors and the factors in the direction of the hypotheses established in the analysis are examined. Therefore, the researcher must have information about the structure of the variables defined in the model before the analysis. Thus, the model has a foundation based on a strong

theoretical or experimental structure (Bilman, 2012).

CFA mediates the testing and validation of theoretical knowledge. Variables observed in CFA are pre-assigned or fixed to certain factors. Before the analysis, the researcher can predict that there is a relationship between the factors defined by the theory or some factors are unrelated. (Puteh & Ong, 2017)

In this sense, arrows that are observed in CFA or used among hidden variables are shown with path charts. These show the structural coefficient between the observed variables and the latent variable and can be considered as the factor load in EFA It can be said that these coefficients are helpful in measuring and interpreting the effect of change in observed variables on latent variables.

3.7 Measurement Model and Structural Model

It consists of two stages: SEM measurement model and structural model. The first one is the "measurement model" applied by connecting the observed variables with CFA, and the second is the "structural model" applied by connecting the latent variables with the equality system simultaneously (Puteh & Ong, 2017).

3.7.1 Measurement Model

The measurement model in SEM analysis, that is, the relationship structure between observed variables and latent variables, is generally based on modeling in CFA. Based on the preliminary knowledge of the researcher with this modeling, it is known which observed variables will be linked to which latent variable or observed variables that will be linked to the latent variable by applying EFA before modeling. Since SEM is a method that is mostly applied in social sciences, measurement model is a modeling model that is widely used in measuring the abstract concepts desired by social scientists or in developing scale.

The path diagram of external observed and hidden variables in the measurement model is given in the Figure 3.2 below.

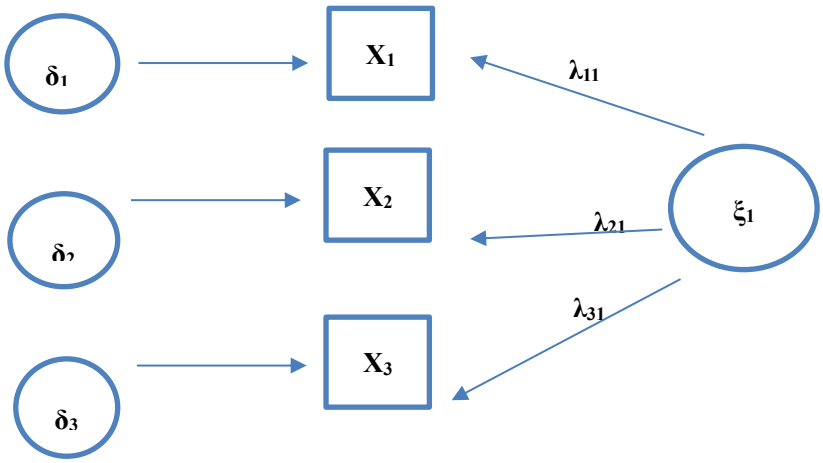

Figure 3. 2: Measurement model of external variables

The matrix representation of the measurement model for the external observed variable (X) and the external latent variable (ξ) is given in Equality (1.1) and its general form in Equality (1.2). In this equation δ , the measurement error; λ structural coefficient for the link between the latent variable and the observed variable; Θ_δThe variance covariance matrix of measurement errors.

3.7.2 Structural Model

The structural model can be considered as the regression model between the measurement model and the latent variables determined. They are models established to see the relationship between latent independent variables and latent dependent variables. The figure below shows the road diagram for the structural model.(Hox & Bechger, 2010).

3.8 Steps of Structural Equation Models

SEM analysis consists of 5 steps and completing these steps completely plays an important role in increasing the reliability of the research. These steps are; It is given below in detail as to determine, define, estimate, test and modify the model.

3.8.1 Determining the Model

While determining a model in SEM; The purpose of the research, the experience and

expectation of the researcher and previous studies on this subject are very important. Before starting the analysis, a model is determined based on basic information such as which latent variable to be loaded in each observed variable, which latent variables will be associated with which latent variables. It is the most basic stage of SEM. Because SEM is not a method of creating a model, it is a method to test the model, and wrong determination of the model may cause the analysis to be carried out from the beginning and even to re-collect the data.

3.8.2 Defining the Model

A defined model is a model with a single solution for each of the parameters to be estimated. If all parameters in the unknown parameter vector are defined, the model is defined, it can be said. The parameters in the parameter vector, which play an important role in model identifiability, can be free, fixed or constrained parameters in accordance with the preliminary knowledge of the researcher. It is the parameter to be estimated without any constraints on the free parameter. A fixed parameter is a parameter that is equal to a value (usually 0 or 1 values). The restricted parameter is the parameter that is synchronized with other parameters or parameters. Model identifiability depends on determining free, fixed and restricted parameters. The model determined in the first step of SEM may be fully defined, over-defined or under-defined. In a fully defined model, unknown parameters are equal to only one value, an over defined model can have more than one value for unknown parameters, and in an underdefined model, estimates cannot be made for unknown parameters. In order for the model to be defined, it must be fully or over-defined. In this regard, the degree of freedom of the model is a basic structure in defining the model.

defined, the degree of freedom is 0 or negative.

Rules for model identifiability are given below.

t rules: $t < \frac{1}{2}(p+q)(p+q+1)$ Here t is the number of unknown parameters; (p + q) is the number of variables observed. The most preferred identifiability rule in SEM is the t rule. This condition is necessary, but not sufficient.

Two step rules: In this rule, firstly it is checked whether the measurement model is defined or

not. If undefined, the model is undefined. If the measurement model is defined, it is passed to the structural model and it is checked whether this model is defined or not. If this model is defined, it can be said that the model is defined. This condition is sufficient but not necessary

3.8.2.1 Multiple Indicators-Multiple Causes

A special type of latent variable analysis that consists of one or more latent variables in MIMIC models. In this model, both multiple dependent variable indicators and multiple independent causal variables are defined simultaneously. Provided $p \geq 2$, $q \geq 1$ This rule is sufficient but not necessary. In addition to these applications, definition rules such as Wald Order Rule and Information Matrix Rule are included in model definition. These rules are both necessary and sufficient (Lee, Cadogan, & Chamberlain, 2012).

3.8.3 Predictive of the Model

After determining that the model is defined in SEM, the parameter estimates phase is started. In this calculation process, iteration methods are applied similar to factor analysis. At this stage, the difference between the data and the model in SEM was named as error or leftover (Weston, 2006).

$$Data = Model + Error \quad (1.7)$$

In the estimation process, it is aimed to use the harmony function that minimizes the difference between the sample covariance matrix (S) and the population and covariance matrix (∑)) (Varol, 2014). The general hypothesis for SEM is given in Equality (1.8).

$$H_0: \sum = \sum(\theta) \quad (1.8)$$

.

The harmony function that minimizes the difference between $\sum$ and $\sum(\theta$ in the estimation process is aimed. These adaptation functions or estimation processes are determined according to the scales of the variables in the model or different estimation

methods taking into account the distribution properties. The most commonly used estimation methods are Maximum Likelihood (ML), Generalized Least Squares (GLS), Weightless or Ordinary Least Squares (Unweighted ULS), Scale Independent Least Squares (SILS), asymptotically distributed, also named Small Squares (WLSM), Diagonal Weighted Least Squares (DWLS) and Robust (Robust) Maximum Likelihood (ML) methods can be used.

3.8.4 Test of the Model

After the prediction of model parameters in SEM, many goodness-of-fit criteria have been developed to determine the best model among alternative models. Although there is no definite criterion that gives the best results, different criteria are preferred to be used in different strategies. The application criteria in the application part of the thesis are briefly introduced below.

3.8.4.1 Chi-Square Test Statistics: Chi-Square test statistics is one of the statistics used in the estimation results of the models. However, chi-square test statistics can give inconsistent results depending on the width of the sample. Although chi-square is widely used in SEM, it is rarely used when there is a single criterion of model fit in applied research. In many cases, alternative fit criteria are used because the sample size causes significant variations in the χ^2 table value.

3.8.4.2 Root Mean Square Error of Approximation (RMSEA): RMSEA is a measure of the approximate fit in the mainstream. If the RMSEA value is less than 0.05 or equal to 0.05, it is a good fit, a value between 0.05 and 0.08 is an acceptable fit, and a finding between 0.08 and 0.10 is acceptable. If the value is greater than 0.10, it is understood that the model cannot be accepted.

3.8.4.3 Square Root of the Average of Standardized Error Squares (SRMR): The SRMR value, as generally accepted, indicates a good fit if it is less than 0.05, and an acceptable fit if it is less than 0.10. SRMR is just a descriptive fit index in the same way as RMR.

3.8.4.4 Normalized Fit Index (NFI): NFI values are in the range of 0 to 1, and higher values close to 1 are indicative of better fit. The method generally used for this index is that values greater than 0.90 are indicators of acceptable fit, and values of 0.95 and above are indicative of good fit. The defect of NFI is that it is affected by the sample size. NNFI has been developed to solve this problem.

3.8.4.5 Unnormalized Fit Index (NNFI): NNFI, like NFI, generally varies between 0 and 1. However, since this index is not normalized, values other than these values can be encountered. If the NNFI value is greater than 0.95, there is an acceptable fit, the value must be 0.97 and above for a better fit.

3.8.4.6 Comparative Fit Index (CFI): CFI is based on decentralized chi-square distribution. CFI takes values between 0 and 1, high values indicate good fit. According to this; Values between 0.95 and 0.97 indicate that compliance is acceptable, values above 0.97 and indicate good fit. Compared to NNFI, CFI is less affected by the sample size.

3.8.4.7 Increased Fit Index (IFI): IFI takes values between 0 and 1, but in some cases the value of this index may exceed 1. As the IFI value approaches 1, the fit of the model increases. Acceptable fit between 0.90 and 0.95 corresponds to good fit.

3.8.4.8 Relative Fit Index (RFI): Values between 0.90 and 0.95 give acceptable fit values, while values higher than these indicate good fit. In cases where the sample volume is relatively small, it is stated that CFI provides a more appropriate comparison compared to RFI.

3.8.5 Model Modification

In addition to the fit indices in SEM, there are modification indices that lead to a number of changes to better adapt the model. These indexes include new connections between observed variables and latent variables, variables that need to be removed from the model, and many parameters, including error covariances, which are considered appropriate to be added

between variables. The use of these indices tests the data compatibility of the model formed with the specific theoretical basis of SEM. For this reason, the modifications should be based on a theoretical structure and should not go beyond the purpose of SEM (Bayram, 2013).

If the model fit criterion is found to be less satisfactory in testing hypotheses, the researcher will conduct a determination study to find a better fit model to the sample covariance matrix. For this, the researcher removes or adds a parameter that is not significantly different from 0 to the model. The most common procedures for making parameters are; is to compare t statistics values for each parameter with t table values and use Wald statistics. The most common techniques used to add parameters are; Selecting the largest modification index, choosing the largest expected parameter change statistics and using the Langrange product statistics (Akıncı, 2007).

4 APPLICATION

This chapter included to analysis of respondent's answers, which were collected through online survey. This section is divided into several parts of respondent's profile. Under respondents' profile, demographic data like age, gender, educational background and income level classification along with other necessary information that related to their familiarity with mobile payment systems. Descriptive analysis was investigated along with collected responses through the survey. This provided to get an overall appearance of respondent's preference and experience with variables used in this research. To analysis of respondent's profile, the characteristics of respondents were given as descriptive statistics. 397 respondents participated to survey through online survey, which was distributed using the snowball method.

4.1 Statistical Evaluation of Data

While evaluating the findings of the study, SPSS 22.0 and LISREL 8.7 Statistical package programs were used for statistical analysis. The characteristics of the respondents were given as descriptive statistics. Since mass list that have participants is not haven, the data was collected as online with non-probable sampling methods according to the snowball sampling method. The validity and reliability analysis of the answers given by the participants to the scale questions in the questionnaire was made. After ensuring the validity and reliability of the scales, the hypotheses of our model determined by the structural equation model were tested. Results were evaluated at 95% confidence interval and $p < 0.05$ ($t = 1.96$) significance level. Our data consists of 5-point Likert scales and it is determined that it is not suitable for normal distribution according to multiple normality test. In this case, Robust Maximum Likelihood method, which is a prediction method without normal distribution assumption, was used in our study.

Table 4. 1 **:** Five-point Likert scale

Strongly Disagree **1**	**Disagree** **2**	**Neither Agree nor Disagree** **3**	**Agree** **4**	**Strongly Disagree** **5**

4.2 Sample Size of the Study:

Simple random sampling method was used in sample selection. In simple random sampling method, independent selection is made by considering the possibility of being equal and independent in the sampling selection of each unit in the universe (Bhattacherjee, 2012). Our research universe has been determined as the province of Istanbul, and because we do not have information about the number of universes of the research and it is homogeneous, sampling calculation has been made with the rate estimation method. The formulation for this method is given below.

$$n = \frac{p*q*Z_{\alpha/2}}{d^2} = \frac{0{,}5*0{,}5*(1{,}96)^2}{(0{,}05)^2} = \frac{0{,}9604}{0{,}0025} \cong 384$$

According to the sample calculation above, at least 384 samples are required for the reliability and validity of the research. In this context, our data was obtained by obtaining information from 397 participants in Istanbul for online research using the online survey technique. As a result of the data obtained, empty observations were obtained by regression estimation method and analyzes were performed.

4.3 Hypothesis

With the context of mobile payment researches, usefulness can be defined as “the degree to which a mobile payment user believes that using a mobile payment system would enhance his or her performance” (Davis F. , 1989). According to Davis and literature review, usefulness has an impact on intention to use of mobile payment usage. Therefore, the variables that is known to have impact on usefulness is significant to analyze. Compatibility could be defined

as “the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experience of users of mobile payment systems “ (Rogers E. M., 1996). As a result, it is worth to analyze effect of compatibility on usefulness in order to determine intention use mobile payment. Same circumstance is for knowledge and innovativeness due to fact that they have significant relation with compatibility and usefulness in literature. Since security is known as reason for new technology usage in terms of privacy, security is made hypothesis in this research in order to analyze. Moreover, social influence is showed in literature as variable that have relation with intention to use new technologies and usefulness that came from social circle. For cost, some of studies proofed that cost of using new technology is determinant to use for consumer. Especially development countries like Turkey, cost is significant variable to make hypothesis. As a result, H_1, H_2, H_3, H_4, H_5, H_6 is given below is formed.

H_1: Compatibility has an impact on Usefulness

H_2: Knowledge has an impact on Usefulness

H_3: Security has an impact on Usefulness

H_4: Cost has an impact on Usefulness

H_5: Innovativeness has an effect on Usefulness.

H_6: Social influence has an impact on usefulness.

Ease of use refers to person believes that using a particular system will be easy, simple and effortless to use (Davis F. , 1989). For this reason, it is considered as one of significant factor that affect decision to adopt and accept new innovations. According to Technology Acceptance Model, if new technology is perceived as easy to handle, using of that can be seen more favorable. Therefore, perceived ease of use has an impact on usefulness and intention to use new technology (Venkatesh & Davis, 2000). Therefore, the compatibility that is showed in literature as meaningful in terms of experience of new technology usage is significant to make hypothesis in this study. Since knowledge and innovativeness are also related to how to use new technology, they are affecting perception of user about ease of use. For security, it is

related to procedures of security barrier. Precisely, if something is made safer, it is needed to put more security barrier. So, it is mean that security may have impact on ease of use. For social influence on ease of use, it is showed in literature as variable that has impact on user perception for whether new technology is found as easy or not. For cost effect on ease of use, there is some research about cost effect on ease use, which is showed to relation between them. As a result, H_7, H_8, H_9, H_{10}, H_{11},H_{12} is given below is formed.

H_7: Compatibility has an impact on Ease of Use.

H_8: Knowledge has an impact on Ease of Use.

H_9: Security has an impact on Ease of Use.

H_{10}: Cost has an impact on Ease of Use

H_{11}: Innovativeness has an effect on Ease of Use.

H_{12}: Social influence has an effect on Ease of Use.

Intention can be defined as understanding of how actual behavior affects to attitude and unfavorable intention can be occurred by negative attitude (Wang, Sun, Lei, & Toncar, 2009). According to previous studies, there are empirical evidences about positive intention of mobile technology users towards mobile payment when they have a positive tendency on m-payment (Au & Kauffman, 2008). Intention to use mobile payment have provided that the possibility of using and acceptance a new technology (Schierz, Schilke, & Wirtz, 2010). Past studies have also confirmed that behavioral intention to use encourage later usage and consumer's inclination to accept new system. According to previous studies, the variables that may affect to usefulness and ease of use may have relation with intention to use mobile payment. Since compatibility is the "degree to which is perceived as being consistent with the existing values, needs, and past experience of users of mobile payment systems"(Rogers E. M., 1996), it may have relation with intention to use mobile payment. Knowledge and innovativeness are also related with user perception about ability and personal characteristic that inspire to use new technology. So, they might have related with intention to use new technology. For security, according to literature review, it might have impact on intention to use mobile payment due to that security concern is determined as reason for preferring new technology. Since social

influence has impact on personal perception of users, it is needed to make hypothesis for intention use mobile payment. For cost, since it is studied in many researches as reason to intention to use new technology, it has taken place in this research to analyze. As result, H_{13}, H_{14}, H_{15}, H_{16}, H_{17}, H_{18} is given below is formed.

H_{13}: Compatibility has an impact on intention to use mobile payment.

H_{14}: Knowledge has an impact on intention to use mobile payment.

H_{15}: Security has an impact on intention to use mobile payment.

H_{16}: Cost has an impact intention to use mobile payment.

H_{17}: Innovativeness has an impact on intention to use mobile payment.

H_{18}: Social influence has an impact on intention to use mobile payment

Within the related context of mobile payment studies, usefulness can be defined as "the degree to which a mobile payment user believes that using a mobile payment system would enhance his or her performance" (Davis F. , 1989). According to Davis and literature review, usefulness has an impact on intention to use of mobile payment usage. Therefore, H_{19} given below is formed.

H_{19}: Usefulness has an impact on intention to use mobile payment.

In setting of mobile payments studies review, ease of use can be defined as "the degree to which a mobile payment user believes that using a mobile payment system would enhance his or her performance" (Davis F. , 1989). So, H_{20} given below is formed.

H_{20}: Ease of use has an impact on intention to use mobile payment.

Table 4. 2 **:** Hypothesis

H_1: Compatibility has an impact on Usefulness
H_2: Knowledge has an impact on Usefulness
H_3: Security has an impact on Usefulness
H_4: Cost has an impact on Usefulness
H_5: Innovativeness has an effect on Usefulness.
H_6: Social influence has an impact on usefulness.
H_7: Compatibility has an impact on Ease of Use.
H_8: Knowledge has an impact on Ease of Use.
H_9: Security has an impact on Ease of Use.
H_{10}: Cost has an impact on Ease of Use
H_{11}: Innovativeness has an effect on Ease of Use.
H_{12}: Social influence has an effect on Ease of Use.
H_{13}: Compatibility has an impact on intention to use mobile payment.
H_{14}: Knowledge has an impact on intention to use mobile payment.
H_{15}: Security has an impact on intention to use mobile payment.
H_{16}: Cost has an impact intention to use mobile payment.
H_{17}: Innovativeness has an impact on intention to use mobile payment.

H_{18}: Social influence has an impact on intention to use mobile payment
H_{19}: Usefulness has an impact on intention to use mobile payment.
H_{20}: Ease of use has an impact on intention to use mobile payment.

Table 4. 3(continued): Hypothesis

As it figured out in below, hypothesizes prepared for each factor that was modelled in expanded TAM. Twenty hypotheses made for all factors. They will be analyzed and check in this research.

Table 4. 4 : Descriptive statistics about the participants

How old are you?	**Frequency**	**Percent**
0-18	31	7,8
19-30	175	44,1
31-40	75	18,9
41-50	53	13,4
51-60	29	7,3
61 and above	34	8,6
Total	**397**	**100,0**

What is your education level?	**Frequency**	**Percent**
Primary school	32	8,1
Middle School	31	7,8
High school	106	26,7
University	174	43,8
Master and other	54	13,6
Total	**397**	**100,0**
How long have you been using a smartphone?	**Frequency**	**Percent**
I've never used it before.	8	2,0
1-3	46	11,6
3-5	85	21,4
5-10	190	47,9
10 years and more than	68	17,1
Total	**397**	**100,0**
How long have you been using any mobile payment system?	**Frequency**	**Percent**
I've never used it before.	94	23,7
1-3	140	35,3
3-5	81	20,4
5-10	64	16,1
10 years and more than	18	4,5
Total	**397**	**100,0**

Table 4. 5(continued): Descriptive statistics about the participants

When the descriptive statistics obtained within the scope of the research are examined in Table 1; age status, 7.8% 0-18 years, 44.1% 19-30 years, 18.9% 31-40 years, 13.4% 41-50 years, 7.3% 51-60 years and 8, 4% 61 years old and over.

Education level; It has been determined as 8.1% primary school, 7.8% secondary school, 26.7%

high school, 43.8% undergraduate and 13.6% graduate and others.

Smartphone usage time; I have not used 2% before, 11,6% 1-3 years, 21,4% 3-5 years, 47,9% 5-10 years, 17,1% 10 years or more.

Mobile payment system usage period; 23.7% I have not used before, 35.3% 1-3 years, 20.4% 3-5 years, 16.1% 5-10 years and 4.5% 10 years and above.

When the descriptive statistics obtained within the scope of the research are examined in Table 1; age status, 7.8% 0-18 years, 44.1% 19-30 years, 18.9% 31-40 years, 13.4% 41-50 years, 7.3% 51-60 years and 8, 4% 61 years old and over.

Education level; It has been determined as 8.1% primary school, 7.8% secondary school, 26.7% high school, 43.8% undergraduate and 13.6% graduate and others.

Smartphone usage time; I have not used 2% before, 11,6% 1-3 years, 21,4% 3-5 years, 47,9% 5-10 years, 17,1% 10 years or more.

Mobile payment system usage period; 23.7% I have not used before, 35.3% 1-3 years, 20.4% 3-5 years, 16.1% 5-10 years and 4.5% 10 years and above.

4.4 Validity and Reliability of Scales

The validity of the scales was provided with confirmatory factor analysis and similarity validity, and Cronbach’s alpha and combined reliability analysis were performed for reliability analysis.

Reliability refers to the stability of the values obtained in measurements that are renewed under the same conditions of a measuring instrument. An unreliable scale is useless and is evaluated by the Alpha Coefficient Method developed by Cronbach (1951). Cronbach Alpha is an estimation method that measures internal consistency, when items whose values cannot be scored as true-false are scored as 1-3, 1-4, 1-5 (Taherdoat, 2016).

If the correlation between the questions is negative, the alpha coefficient calculated by the alpha method is also negative. If this coefficient is negative, the reliability model will be disrupted. In other words, it expresses that the scale's aggregate property of the scale used is

impaired (Landau & Everitt, 2004).

Depending on the alpha coefficients, the reliability of the scale is interpreted as follows.

Table 4. 6 : Cronbach's Alpha

Cronbach's Alpha	**Scale**
• $0.00 \leq \alpha < 0.40$	The scale is not reliable.
• $0.40 \leq \alpha < 0.60$	The reliability of the scale is low.
• $0.60 \leq \alpha < 0.80$	The scale is very reliable.
• $0.80 \leq \alpha < 1.00$	The scale is a highly reliable scale.

If the answers to the scale items are three or more, the Cronbach's alpha coefficient is used to measure the internal consistency. While this coefficient is generally recommended to be preferred over 0.70, it may be possible to tolerate up to 0.60 in exploratory research (Hair, Babin, & Anderson, 2009).

Combined reliability (CR) values are calculated from factor loads calculated from CFA. When CR≥.70, it can be said that the unified reliability condition is met (Raykov, 1997).

The indicator of affinity validity is the average variance (AVE) value described. In order to confirm the affinity validity, the mean variance explained (AVE≥.0.50) must be present. However, if the AVE value is lower than expected in a single dimension, other validity and reliability results are examined, and the decision is made based on the CR value higher than the AVE value and the separation validity (Hair, Babin, & Anderson, 2009)..

For the validity of decomposition; The square root of the AVE values should be larger than

the correlation value with the other dimensions. In this case, it can be stated that the separation validity is provided for each dimension in the data collection tools used (Fornell & Larcker, 1981).

Table 4. 7**:** Confirmatory factor analysis and reliability results of the scales

Scales	**Factors**	**B**	**Standardize B**	**t**	**AVE**	**CR**	**Cronbach's Alpha**
Usefulness	USEF1	2,14	0,73	35,78*	0,570	0,886	0,927
	USEF2	2,26	0,84	56,43*			
	USEF3	1,9	0,86	77,89*			
	USEF4	1,92	0,83	64,59*			
	USEF5	1,14	0,54	22,44*			
	USEF6	1,44	0,68	27,86*			
Easy of Use	EOU1	2,1	0,96	73,45*	0,813	0,963	0,949
	EOU2	1,86	0,95	55,40*			
	EOU3	1,56	0,81	27,11*			
	EOU4	2,2	0,9	47,73*			
	EOU5	2,6	0,95	64,54*			
	EOU6	1,94	0,83	32,82*			
Compatibility	COMP1	1,99	0,89	41,46*	0,837	0,953	0,944
	COMP2	2,17	0,92	85,19*			
	COMP3	2,05	0,94	57,37*			
	COMP4	2,2	0,91	51,58*			
Knowledge	KNOW1	1,65	0,76	22,06*	0,797	0,940	0,914
	KNOW2	1,65	0,91	52*			
	KNOW3	1,86	0,94	65,93*			
	KNOW4	1,75	0,95	69,49*			
Security	SEC1	1,38	0,91	44,49*	0,797	0,940	0,923

	SEC2	1,87	0,94	48,61*			
	SEC3	1,58	0,88	32,83*			
	SEC4	1,77	0,84	29,78*			
Cost	COST2	0,23	0,14	1,99*	0,818	0,957	0,686
	COST3	-140	-0,82	-28,31*			
	COST4	-116	-0,79	-22,99*			
	COST5	-1,64	-0,84	-31,01*			
	COST6	-1,3	-0,84	-27,41*			
Innovationness	INN1	1,14	0,79	20,72*	0,701	0,875	0,841
	INN2	1,25	0,88	32,19*			
	INN3	1,61	0,84	23,99*			
Social Influence	SI1	1,13	0,69	19,09*	0,651	0,928	0,903
	SI2	2,41	0,9	30,52*			
	SI3	1,79	0,79	25,26*			
	SI4	1,26	0,67	17,22*			
	SI5	1,5	0,75	23,48*			
	SI6	1,44	0,92	36,72*			
	SI7	1,72	0,89	31,34*			
Intention of Payment	INT1	2,51	0,89	42,93*	0,894	0,971	0,953
	INT2	2,62	0,96	74,33*			
	INT3	2,15	0,98	122,37*			
	INT4	1,9	0,95	67,38*			
All factor loads are statistically significant at the level of * p <0.05 (t> 1.96; t <-1.96). SCR; Scale Composite Reliability, AVE; Average Variance Extracted							

Table 4. 8(continued): Confirmatory factor analysis and reliability results of the scales

When the values in Table 4.5 are examined; Confirmatory factor analysis, differential validity

analysis, Cronbach's alpha and combined reliability analysis values were shown for each scale.

4.4.1 Usefulness Scale Test Values

Values are found to be x^2 with p <0.05 in CFA (277.39). The fit index values of the model are within the acceptable limits of RMSEA (0.010), NFI (0.97), NNFI (0.96) CFI (0.98), IFI (098), RFI (0.95) SRMR (0.046). It seems that CFA is valid. It can be said that the model provides sufficient affinity validity due to AVE (0.570) ≥ 0.50. According to the reliability results, it can be said that it is highly reliable because it is CR (0,886) ≥ 0,70 and Cronbach's Apha (0,927) ≥ 0,80. Factor weight values (0.54-0.86) are included in the CFA.

It is seen that the scale-induced CFA is significant when the Easy of Use scale test values x^2 (90.39) with p <0.05 in CFA. Acceptable limits of the model's fit index values RMSEA (0.076), NFI (0.99), NNFI (0.99) CFI (1.00), IFI (1.00), RFI (0.99) SRMR (0.017) It is understood that CFA is valid because it is included in. It can be said that the model provides sufficient affinity validity due to AVE (0.813) ≥ 0.50. According to the reliability results, it can be said that it is highly reliable because it is CR (0,963) ≥ 0,70 and Cronbach's Apha (0,949) ≥ 0,80. Factor weight values (0.81-0.96) are among the values in CFA.

It is seen that the CFA of the scale originates from the scale where the compatibility values are found to be x^2 (21.21) with p <0.05 in the CFA test values. The fit index values of the model are accepted as RMSEA (0,08), NFI (1,00), NNFI (0,99) CFI (1,00), IFI (1,00), RFI (0,99) SRMR (0,011) values. It is understood that CFA is valid because it is within the limits of feasible. It can be said that the model provides sufficient affinity validity due to AVE (0.837) ≥ 0.50. According to the reliability results, it can be said that it is highly reliable because it is CR (0,953) ≥ 0,70 and Cronbach's Apha (0,944) ≥ 0,80. Factor weight values (0.89-0.94) are among the values in CFA.

It is seen that the scale-based CFA is meaningful with the presence of x^2 (19.89) with p <0.05 in the DFA of the test scale. Acceptable limits of the model's fit index values RMSEA (0.074), NFI (1.00), NNFI (0.99) CFI (1.00), IFI (1.00), RFI (0.99) SRMR (0.016) It is

understood that CFA is valid because it is included in. It can be said that the model provides sufficient affinity validity due to AVE (0.797) ≥ 0.50. According to the reliability results, it can be said that it is highly reliable because it is CR (0.940) ≥ 0.70 and Cronbach's Apha (0.914) ≥ 0.80. Factor weight values (0.76-0.95) are included in CFA.

It is seen that the CFA of the scale is meaningful when the security scale test values are x^2 (25.81) with p <0.05 in CFA. The fit index values of the model are accepted as RMSEA (0,07), NFI (1,00), NNFI (0,99) CFI (1,00), IFI (1,00), RFI (0,99) SRMR (0,018) values. It is understood that CFA is valid because it is within the limits of feasible. It can be said that the model provides sufficient affinity validity because it is AVE (0.797) ≥ 0.50. According to the reliability results, it can be said that it is highly reliable because it is CR (0.940) ≥ 0.70 and Cronbach's Apha (0.923) ≥ 0.80. Factor weight values (0.84-0.91) are among the values in CFA. Sec 5 item was removed from the model because it did not separate well.

It is seen that the scale-induced CFA is meaningful when x^2 (29.49) is found to be p <0.05 with CFA test values. Acceptable limits of the model's fit index values RMSEA (0.079), NFI (1.00), NNFI (0.98) CFI (0.98), IFI (0.99), RFI (0.99) SRMR (0.030) It is understood that CFA is valid because it is included in. It can be said that the model provides sufficient affinity validity due to AVE (0.817) ≥ 0.50. According to the reliability results, it can be said that it is highly reliable due to the fact that CR (0,957) is ,0,70 and Cronbach's Apha (0,689) ≥ 0,60. Factor weight values (-0.84-0.14) are among the values in CFA. Cost 1 item was removed from the model because it did not separate well.

4.4.2 Innovativeness Scale Test Values

The fit index values of the model are accepted as RMSEA (0,000), NFI (1,00), NNFI (1,00) CFI (1,00), IFI (1,00), RFI (1,00) SRMR (0,00) It is understood that CFA is valid because it is within the limits of feasible. It can be said that the model provides sufficient affinity validity due to AVE (0,701) ≥ 0,50. According to the reliability results, it can be said that it is highly reliable because it is CR (0.875) ≥ 0.70 and Cronbach's Apha (0.841) ≥ 0.80. Factor weight

values (0.79-0.84) are included in CFA.

4.4.3 Social Influence Scale Test Values

Values are found to be x^2 (25,47) with p <0.05 in CFA. Acceptable limits of the model's fit index values RMSEA (0.034), NFI (1.00), NNFI (1.00) CFI (1.00), IFI (1.00), RFI (0.99) SRMR (0.026) It is understood that CFA is valid because it is included in. It can be said that the model provides sufficient affinity validity due to AVE (0,651) ≥ 0,50. According to the reliability results, it can be said that it is highly reliable because it is CR (0,928) ≥ 0,70 and Cronbach's Apha (0,903) ≥ 0,80. Factor weight values (0.69-0.72) are among the values in CFA.

It is seen that CFA is significant due to the presence of x^2 (31.53) with p <0.05 in Intention of Payment CFA. The fit index values of the model are accepted as RMSEA (0,007), NFI (1,00), NNFI (1,00) CFI (1,00), IFI (1,00), RFI (0,99) SRMR (0,0093). It is understood that CFA is valid because it is within the limits of feasible. It can be said that the model provides sufficient affinity validity due to AVE (0,894) ≥ 0,50. According to the reliability results, it can be said that it is highly reliable because it is CR (0.971) ≥ 0.70 and Cronbach's Apha (0.953) ≥ 0.80. Factor weight values (0.89-0.98) are included in the CFA.

4.4.4 Path Analysis and Evaluation of Research Model with SEM

LISREL 8.7 package program was used to investigate the cause-effect relationship and non-relational relationships between the hypotheses of the research and the variables, and the theoretical estimation of the parameters was made using the Robust Maximum Likelihood method. The diagram of the standardized coefficients is given in figure 4.1

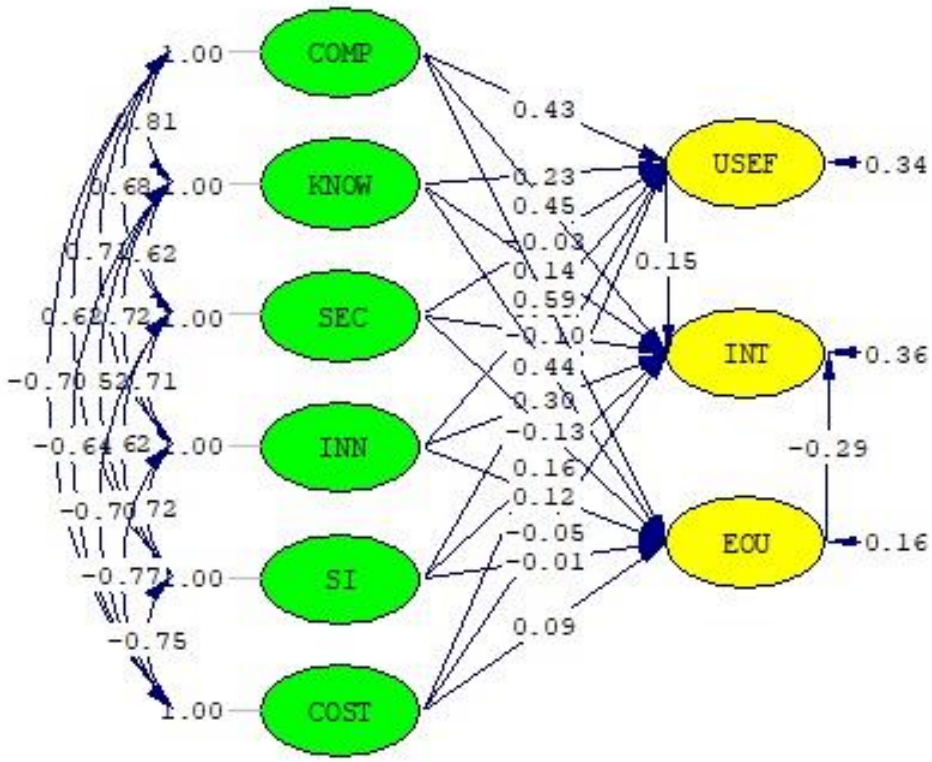

Figure 4. 1: Structural equation model for research

The coefficients and t statistical values for the model are examined in detail in Table 4.6

Table 4. 9: Coefficients and test results related to the research model

Independent Variable	**B**	**Std B**	**t**	**Dependent variable**
COMP	0,43	0,43	4,81*	USEF
KNOW	0,23	0,23	2,30*	USEF
SEC	-0,034	-0,03	-0,57	USEF
COST	-0,097	-0,10	-1,06	USEF

INN	0,093	0,09	0,97	USEF
SI	0,086	0,09	1,17	USEF
R^2= 0,66				
Independent Variable	**B**	**Std B**	**T**	**Dependent variable**
COMP	0,59	0,59	7,43*	EOU
KNOW	0,44	0,44	5,37*	EOU
SEC	-0,13	-0,13	-2,59*	EOU
COST	0,09	0,09	1,38	EOU
INN	0,12	0,12	1,81	EOU
SI	-0,0077	-0,01	-0,15	EOU
R^2= 0,84				
Independent Variable	**B**	**Std B**	**t**	**Dependent variable**
COMP	0,45	0,35	3,61*	INT
KNOW	0,14	0,05	1,01	INT
SEC	-0,099	-0,07	-1,35	INT
COST	-0,055	-0,09	-0,64	INT
INN	0,30	0,28	3,12*	INT
SI	0,16	0,18	2,22*	INT
USEF	0,15	0,15	1,82	INT
EOU	-0,29	-0,29	-2,13*	INT
R^2= 0,64				
All relationships are statistically significant at level of p<0.05(t:>1.96, t<-1.96				

Table 4. 10(continued): Coefficients and test results related to the research model

The equations for the coefficients in Table 4.6 are given below.

USEF = 0.43 * COMP + 0.23 * KNOW - 0.034 * SEC - 0.097 * COST + 0.093 * INN + 0.086 * SI (1)

When the coefficients related to Equation (1) are tested with the t statistic values in table 4.6; It was determined that the effect of security, cost, innovativeness and social influence on usefullness was not statistically significant (p> 0.05; t <1.96, t> -1.96). It has been determined that the effect of compatibility and information on usefulness is statistically significant (p <0.05; t> 1.96). Compatibility in utility variable leads to an increase of 43% and knowledge an increase of 23%. Also, since R^2=0,66; It can be said that the perceptions of compatibility and knowledge contain the usefulness by 66%.

EOU = 0,59*COMP + 0,44* KNOW – 0,13*SEC + 0,09*COST+ 0,12*INN +0,007*SI (2)

When the coefficients related to Equation (2) are tested with the t statistic values. It was determined that the effect of cost, innovativeness and social influence on ease of use was not statistically significant (p> 0.05; t <1.96, t> -1.96). The effect of compliance, information and safety on ease of use was determined to be statistically significant (p <0.05; t> 1.96, t <-1.96), while compatibility in the ease of use variable caused an increase of 59% and information increased by 44%. Security causes a decrease of 13%. Also, since R^2=0,84; It can be said that compatibility, knowledge and security perceptions explain the ease of use by 84%.

INT = 0,45*COMP + 0,14* KNOW – 0,099*SEC – 0,055*COST+ 0,30*INN +0,16*SI +0,15*USEF-0,29*EOU (3)

When the coefficients related to Equation (3) are tested with the t statistic values in table 4.6; The impact of knowledge, security, cost and usefulness was not statistically significant (p> 0.05; t <1.96, t> -1.96). The effect of compatibility, innovativeness, social influence and ease of use on mobile payment usage was determined to be statistically significant (p <0.05; t> 1.96; t <-1.96), compatibility in mobile payment usage variable was 45%, innovativeness causes an increase of 30% and social effects increase by 16%, while ease of use causes a decrease of

29%. Also, R^2=0,64; It can be said that the perceptions of compatibility, openness to new technology and social impact explain the use of mobile payments by 64%.

Table 4. 11 : Model evaluation and evaluation of cohesion

Cohesion Criteria	**Good cohesion**	**Acceptable Cohesion**	**Model**
Chi-square goodness of fit test	Being Significant	-	Significant
RMSEA	0≤RMSEA≤0,05	0,05≤RMSEA≤0,10	0,051**
NFI	0,95≤NFI≤1	0,90≤NFI≤0,95	0,98*
NNFI	0,97≤NNFI≤1	0,95≤NNFI≤0,97	0,99*
CFI	0,97≤CFI≤1	0,95≤CFI≤0,97	0,99*
IFI	0,95≤IFI≤1	0,90≤IFI≤0,95	0,99*
RFI	0,95≤RFI≤1	0,90≤RFI≤0,95	0,98*
SRMR	0≤SRMR≤0,05	0,05≤SRMR≤0,10	0,063**

When the cohesion criteria in table 4.7 are examined; As a result of the test of Structural Equation Model related to the research; The presence of x^2 (4989.93) with p <0.05 indicates that the model is significant. Acceptable limits of the model's fit index values RMSEA (0.051), NFI (0.98), NNFI (0.99) CFI (0.99), IFI (0.99), RFI (0.98) SRMR (0.063) It can be said that the model determined because it is included is meaningful and compatible.

Table 4. 12: Hypothesis test results related to the research model

HYPOTHESİS	**ACCEPTED**	**REJECTED**
H_1: Compatibility has an impact on Usefulness.	✓	
H_2: Knowledge has an impact on Usefulness.	✓	
H_3: Security has an impact on Usefulness.		✓
H_4: Cost has an impact on Usefulness.		✓
H_5: Innovativeness has an effect on Usefulness.		✓
H_6: Social influence has an impact on Usefulness.		✓
H_7: Compatibility has an impact on Ease of Use.	✓	
H_8: Knowledge has an impact on Ease of Use.	✓	
H_9: Security has an impact on Ease of Use.	✓	
H_{10}: Cost has an impact on Ease of Use		✓
H_{11}: Innovativeness has an effect on Ease of Use.		✓
H_{12}: Social influence has an effect on Ease of Use.		✓
H_{13}: Compatibility has an impact on Intention to use mobile payment.	✓	
H_{14}: Knowledge has an impact on Intention to use mobile payment.		✓
H_{15}: Security has an impact on Intention to use mobile payment.		✓
H_{16}: Cost has an impact on Intention to use mobile payment.		✓

H_{17}: Innovativeness has an impact on Intention to use mobile payment.	✓	
H_{18}: Social influence has an impact on Intention to use mobile payment.		✓
H_{19}: Usefulness has an impact on Intention to use mobile payment.		✓
H_{20}: Ease of use has an impact on Intention to use mobile payment.	✓	

*Table 4. 13(continued)**:** Hypothesis test results related to the research model*

Table 4.8 shows the results of the hypothesis testing related to the research model. According to these results; It can be said that the **H_1**, **H_2**, **H_7**, **H_8**, **H_9**, **H_{13}**, **H_{17}** and **H_{20}** Hypotheses are confirmed, rest of them were rejected.it was determined as a result of the research that other hypotheses were not confirmed.

5 RESULTS AND DISCUSSION

Various answers tried to explain for research direction that was made in previous parts. Do personal characteristics influence to intention of mobile payment usage in Istanbul? Which variable can affect more and less to people's intention to use mobile payment in Istanbul? These were main questions fact that wanted to consciously research in this study. The research objectives set were;

1. To examine perception of people about mobile payment systems in non-banking sector in Istanbul, Turkey
2. To identify factors which affect to intention of mobile payment usage in Istanbul.
3. To figure out the relation among Technology Acceptance Model's variables and understand whether it is relevant to Turkish consumers
4. To investigate the effects of personal characteristics on the intention of mobile payment in Istanbul

To analyze the responses of the survey and perceptions of people on mobile payment systems from 397 respondents, the various analysis was validated using Indicator Reliability test. For the primary analysis and hypothesis testing, structural equation modeling with robust maximum likelihood estimation was conducted. The main output, frequencies, and relations are written below.

5.1 Research objective findings

The first objective was to examine the perception of people about payment systems in the non-banking sector in Istanbul among the four research objectives that were modeled for this research. To analyze for this objective, 397 respondents were surveyed, and responses were analyzed for this study. According to data that is shown on results, 86.3% of respondents had used mobile payment before, so the majority of the respondent has experienced mobile payment systems in Istanbul. However, 23.7% of them have never used mobile payment in Istanbul.

There must be several reasons behind it, and various variable which can prevent. One of the main parts of this research is to identify those variables. It can be said that the majority are aware of that and agreed on needing mobile payment systems. As shown in the survey, most people have a positive tendency in mobile payment services.

The second objective was to identify the factors which affect the intention of mobile payment usage in Istanbul. Based on the literature review on TAM and related studies, a factor that affects the intention of mobile payment usage are; compatibility, innovativeness, security, knowledge, cost, social influence, ease of use, usefulness, and intention to use mobile payment.

The third objective was to figure out relation among Technology Acceptance Model's variables and understand whether is relevant with Turkish consumers. It is directed towards factors in case of Istanbul. The factors were measured by using LISREL 8.7 and results are showed in the table 4.6 of Application chapter. As presented in table 4.6, it can be said that there is significance relation between factors for intention to mobile payment systems. However, there was no direct relation between perceived ease of use and intention to mobile payment. This was the most important difference from previous studies.

Also, it is presented that there was relation intention to mobile payment and compatibility(t=3.61, B:0.45), knowledge*(t:1.01 B:0.14*), security(t:-1.35, B:-0.099), cost(t:-0.64, B:-0.55), innovativeness(t:3.12, B:0.30, social influence(t:2.22, B:0.16), usefulness(t:1.82, B:0.15), ease of use(t:-2.13, B:-0.29).

The fourth objective was to investigate the effects of national characteristics about the perception of security on the intention of mobile payment in Turkey. Security has only an impact to ease of use on the model. Since ease of use has no significant effect on intention use mobile payment, there is no meaningful relationship between security and intention to use mobile payment as, unlike previous studies.

5.2 Main Findings

With the introduction of mobile phones into our lives, the level of mobile services in the world has increased rapidly. While this situation increased the need for mobile payments, some

countries lagged behind this improvement. Obviously, while mobile payment usage has increased worldwide, some states could not adapt to this development for specific reasons. Where mobile payments have shaped the financial structure around the world, it has become an excellent handicap for some countries that lagged to adapt to this adaptation. In the case of Istanbul, although mobile payment systems in Turkey have developed according to some countries, they are far behind countries such as China. In this research, it has been determined the structural reasons for the development process to be slow or behind compared to other countries by identifying with the expanded TAM model.

To understand factors that affect the intention to use mobile payment, Technology acceptance model was used. There are nine factors in the model that are compatibility, knowledge, innovativeness, security, social influence, cost, ease of use, usefulness, and intention to use mobile payment. While Cost, security, and ease of use has no positive effect on the intention to use mobile payment, usefulness, innovativeness, compatibility, social influence, and knowledge has a positive impact on that. Therefore, for people using mobile payments in Istanbul, cost, security, and ease of use have no significance in affecting the intention to use mobile payment. Contrary to previous studies, People from Istanbul, who love more innovative services, have a low perception of security's sensitivity. Cost is an ineffective factor for people who live in Istanbul. While compatibility, social influence, and innovativeness have a high positive impact on the intention to use mobile payment, knowledge has had a relatively lower positive effect. In this study, the TAM model has been expanded with some variables that were found by searching previous studies and has become a source for reviews in many different sectors. The demonstration of the factors with the significance level on the model has become a relevant result for many industries. The results that reveal the relationships between the factors from this study will also contribute to the improvement of the mobile payment services ecosystem and the growth of the mobile payment market in Istanbul.

5.3 Research Implication and Suggestion

Although the Technology Acceptance Model is a useful model for measuring the use of information systems, some points have to be expanded to be explained more. Since the social and structural conditions of each country and every society are not the same, it is known that there are differences in their approach. Accordingly, social cost and benefit factors that will increase the accuracy of the model are not explained in this model. This deficiency led to the need to make additions from other side branches of the model. The use of social exchange theory and social capital theory in expanding the model in the study of Kankanhalli, Tan, and Wei is one of the steps taken in this direction (Kankanhalli, Tan, & Wei, 2005)).

Ooi and Tan (2016), in their study to identify usage of smartphone credit card that modeled with perceived security, perceived trust, behavioral intent, usefulness, ease of use, perceived compatibility, perceived mobile, and financial resources. As a result of the analysis made with the structural equation model method, it was seen that there is a significant relationship between compatibility and usefulness for SCC (Smart Phone Credit Card) - NFC payment type. Compatibility explains its intention to use. Financial resources are related to perceived usefulness, but do not create a meaningful relationship with the intention to use. While perceived ease of use does not establish a significant relationship with the intention to use, there is a significant relationship between perceived usefulness and intention to use. The most influential variable that explains its intention to use turned out to be trusted (Ooi & Wei, Mobile technology acceptance model: An investigation using mobile users to explore smartphone credit card", Expert Systems with Applications, 2016).

A significant relation between Perceived usefulness and compatibility found in his research revealed the need to measure the compatibility variable in my model. While the relation between usefulness and compatibility calculated quite high, compatibility’s relation with each factor on model had measured relevantly significant Besides, according to Chew's research (2007), it was emphasized that perceived security and compatibility variables should also be added to the model. However, the researches on the acceptance and adaptation of TAM to

information systems make meaningful results (Chew, 2007). The relationship between these factors is not at the same level since the characteristic socio structure of each society is not the same. While compatibility has a high impact on intention to use mobile payment *(t = 3.61, B: 0.45*), security has a negative impact on intention to use mobile payment *(t: -1.35, B-0.099*). While security was one of the most critical variables in the researches carried out in the world, it was the opposite in Istanbul. At the same time, similar to previous studies, security has been negatively associated with ease of use in Istanbul (*t: -2.59, B: -0.13*). As the security threshold is increased, the service quality and benefits are reduced, so it is more important to be easy than it is safe for people who live in Istanbul. Although the negative effect of Ease of use on the intention to use mobile payment (*t: -2.13, B: -0.29*) is surprising for this research, it can be interpreted as an indication that people from Istanbul do not find what is easy. As a result of this situation, the strength of innovativeness's relationship with the intention to use mobile payment can be considered *(t: 3.12, B: 0.30*).

According to Yakup and Durmaz's research, social influence is a factor that affects and directs people in many areas of their life (Yakup & Durmaz, 2014).. This factor, which has an impact on people, is the determining factor for accepting and adapting new systems such as mobile payment systems. Studies on understanding human behavior are thought to help in adapting to new systems. In this study, while the relationship of social influence with ease of use is negative (*t: -0.15, B: -0.0077*), its relationship with usefulness is low and positive (*t: 1.17, B: 0.086*). However, the relationship between social influence and intention to use mobile payment is quite high (*t: 2.22, B: 0.16*). As can be seen in the literature chapter, Knowledge has a high impact on the intention to use mobile payment in previous studies in the world. The impact of Knowledge on intention use mobile payment in Istanbul is relatively low (*t: 1.01, B: 0.14*). However, the relationship between Knowledge and ease of use is significantly high. The statistical values of this relationship are *t: 5.37, B: 0.44*. Innovativeness was one of the most explanatory factors of this research. It is the best factor explaining being of Ease of use's negative relationship with the intention to use mobile payment. Although the relationship between innovativeness and usefulness is relatively low (*t: 0.97, B: 0.097*), its relationship with

intention to use mobile payment is quite high (*t:3.12, B: 0.30*).

Davis (1987) showed the significance of usefulness in the TAM model in their work. The high correlation of ease of use of usefulness showed that it was not a single factor for usefulness intention to use mobile payment. One of the aspects that strengthen the measurability is that the relationship between the usefulness and ease of use of other factors sometimes shows the same and sometimes serious differences. In this study, knowledge, and compatibility also showed a high degree of positive effect on usefulness and ease of use. However, this situation has differed in security. Security's effect on usefulness is relatively low (*t:-0.57, B:-0.034*). But this situation is very different to ease of use. The relationship between Ease of use and security is quite the opposite and negative (*t:-2.59, B:-0.13*). The relationship between ease of use and usefulness is different in social influence. The relationship between social influence and usefulness is relatively low positive (t:1.17, B:0.086). The relationship between social influence and ease of use is negative (*t:-0.15, B:0.0077*). When all these values are examined, the results that can be applied in various sectors, and the ways to be implemented will be drawn from the effect levels of the factors.

5.4 Theoretical and Practical implications

The most important theoretical contribution in this study is the examination of the TAM model and how this model is analyzed in the Istanbul case. It was determined which factors were more important with this review. Determining which factor is meaningful or meaningless based on the relationship within the model will guide the subsequent studies. Measuring and determining the consumption behavior of people living in Istanbul will guide future studies and provide more accurate and better-analyzed studies. A revised model was created by expanding the TAM model in this study. By applying this revised model in the Istanbul case, similarities and differences in human behavior were revealed. As a result of this study shows, there are visible differences in relation to ease of use and security factors with intention to mobile payment compared to previous studies. Although the perception of security is not easy to measure, the approach of people living in Istanbul was measured by adding it to the model. The

inverse relationship between security and ease of use is proof that adding and measuring the security factor within this model makes sense.

Contrary to previous studies, the finding of the negative relationship of security with other factors in this study revealed that the security factor should be a dependent and not an independent variable. This study, which led to this inference, has shown that the relationship between the factors will be meaningful to all the studies that will cover the Istanbul example. Researchers who will work with this model will benefit from this study for the technology adoption and acceptance area. It will also enable the development of the TAM model for the academy and the creation of new valuable models from the factors that are meaningful in this research.

As a practical implication, human behavior has been measured, and some facts have been taken into consideration in this research. Performance and efficiency can be increased by using the results of these measurements in many sectors. The e-commerce industry is one of the foremost among them. There are significant similarities between e-commerce companies and the mobile payment market in terms of adaptation and acceptance of new systems. Therefore, the similarities show that the results of this study are also applicable and suitable for e-commerce companies. The fact that companies such as Alibaba are present in the e-commerce sector together with mobile payment services, which is the clearest indicator of this transparency. More precisely, this study can be effective in any sector where the consumer is the main actor. One of the most important things for advertising companies and advertising companies is to send the right content to the right person. In this study, examining the Istanbul example and measuring behavioral perceptions will help many international companies in Istanbul operations.

6 CONCLUSION

This unit will focus on the conclusion section, limitations, and future directions. As a result of the whole study, compatibility, innovativeness, social influence, knowledge and usefulness have a positive relationship with intention to use mobile payment, while security, cost, and ease of use have a negative relationship with intention to use mobile payment. While compatibility, innovativeness, and social influence have a significant effect, the other could not have a significant positive effect. Negative relationship between ease of use and intention to use mobile payment is a cursor that people from Istanbul would rather nontrivial applications. Innovativeness's impact on intention to use mobile payment is a proof for tendency to not easy application. Even though this study focused on the non-banking sector in order to make narrower direction and measure security perception, security did not calculate as significant effect on intention to use mobile payment.

6.1 Limitations

This study was limited in some parts that may affect to results and findings of this study. The first of all these limitations can be defined as the Scope of the study. This study was carried out for six months, and the survey took more than two months to complete. The questions were filled online by people living in Istanbul. Filling the questionnaire online instead of face to face may have reduced the accuracy and seriousness of the answers given. Since the number of participants filling the questionnaire does not cover the population of the entire Istanbul, there may be deficiencies in representation. Although many examples make all of the Istanbul turkey population total performed, the average population of Istanbul can also remove a significant result for Turkey. Although all demographic values obtained in the survey results show the distribution in a balanced way, there is a possibility that the population that needs to complete the survey may not be distributed appropriately. This variable situation may have changed the answers that they should give in normal time. At the same time, personal prejudices had an impact on the answers, and the most accurate answers could not be obtained. Knowing these

limitations will be effective in the process of creating future research. Except for the limitations in the Scope of the study section, factor scopes come in second. The TAM model used in previous studies and the expanded version in this study may not have been sufficient for explanatory. The revised model may have had deficiencies or excesses. Therefore, in future studies, additions or subtractions can be made by knowing the significance of the factors examined in this model.

6.2 Future Directions

In this study, future studies can be directed by expanding or narrowing the revised TAM model. Some of the factors in the model could not affect the intention to use mobile payment. There will be other variables that may influence more these factors in future studies or by making use of other fields. The fact that security and ease of use have a negative effect on the intention to use mobile payment revealed that the dependency of these factors should be changed or improved in subsequent studies that will examine Istanbul. Finally, demographic changes are in a position to guide these studies. Therefore, the changing demographic structure in Istanbul will be a significant opportunity for comparison; the acceptance or adaptation of the mobile payments system.

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APPENDIX

Appendix 1: Example of Survey in English (Ors, 2018).

CONTROL VARIABLES	• City • Age • Level of Education • How long have you been using a smartphone? • How long have you been using any mobile payment system?	
USEFULNESS	• My purchases are made faster with mobile payments. • My purchases are made easier with mobile payments. • Mobile payment increases my effectiveness during purchases. • Mobile payment increases my efficiency during purchases. • I make better decisions when purchasing with mobile payment systems. • I generally find mobile payment systems useful.	

	• Learning to use mobile payment would easy for me.	
	• It is easy for me to understand the use of mobile payments	
EASE OF USE	• It is easy to get the information I want from mobile payments.	
	• It is easy for me to be competently using mobile payments (mastering shortcuts and advanced options).	
	• Mobile payment would easy for me.	
	• My interaction with mobile payment is clear and straightforward.	
	• The use of mobile payment's compatible with all aspects of life.	

	•	

	• The use of mobile payments is compatible with my current situation.	
COMPATIBILITY	• Mobile payment usage is suitable for my lifestyle.	
	• According to me, the use of mobile payments is suitable for my purchases.	
KNOWLEDGE	• I can use mobile payment services without detailed instructions.	
	• I have sufficient knowledge and skills to purchase products with mobile devices.	
	• I am confident to purchase products using mobile devices.	
	• Generally, I am competent in the use of mobile payment.	
	• Mobile payment systems are safe for me.	
SECURITY	• Mobile payment systems give me confidence.	

	• I feel safe when sending sensitive information with mobile payments	
	• There is low risk of intervention by unauthorized parties during mobile payment.	
	• There are financial barriers (phone prices and internet access fees) that prevent me from using mobile payments.	
COST	• Mobile payment fees are reasonable.	
	• Using mobile payment systems does not occur additional costs.	
	• The expenditures for mobile payment is an appropriate expense.	
	• Mobile payment provides good value with its current costs.	
	• If I aware of a new information technology, I will look for ways to try it.	
INNOVATIVENESS	• I am usually the first one to try new information technology in my neighborhood.	

	• I like to try new information Technologies.	
	• People whose are important to me confirm use of mobile payment systems.	
	• People who use mobile payments around me have a higher profile than those who don't.	
	• The people who are important to me think that it is a good idea to use the mobile payment system.	
SOCIAL INFLUENCE	• People who are important to me find their mobile payment systems as useful.	
	• People who are important to me recommend using mobile payment systems.	
	• The use of mobile payments is a status symbol around me.	
	• People who use mobile payments around me have more prestige than those who don't.	

	• In case of opportunity, I would use mobile payment systems.	
INTENTION TO USE MOBİLE PAYMENT	• I tend to use mobile payment in the near future.	
	• I am open to using mobile payment systems in the near future.	
	• If there is an opportunity, I intend to use mobile payment systems.	