

**FACTORS ENCOURAGING AND HINDERING A WIDER  
ACCEPTANCE AND MORE FREQUENT UTILIZATION OF  
MOBILE PAYMENT SYSTEMS  
AN EMPIRICAL STUDY AMONG  
MOBILE PHONE SUBSCRIBERS IN TURKEY**

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**IŐIK UNIVERSITY  
JUNE, 2021**

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**ABSTRACT**

Considering the technological development in mobile payment technology, and extensive literature of technology adoption models; the current state of the related field needs to be examined in more detail to better understand current situation. Such an investigation may be invaluable to enable further expansion, consumer acceptance, market adoption, and help to improve the existing platforms' usability.

This research deals with determining the factors that affect adoption of mobile payment technology among consumers, in Turkey. It seeks to find any patterns and connections that may be of aid in framing an implementation strategy for facilitating further adoption. It has gathered different definitions of "mobile payment" in literature and used a consumer side definition.

This study offers a different perspective by grouping constructs from a broader literature and provides a mobile payment acceptance model based on the constructs used in other studies. Previous studies have been performed with small groups of respondents. This study aims to perform the research model in a cosmopolitan city (Istanbul) where all sorts of mobile payment options are available in the market and in the time of a pandemic when remote delivery and online purchases are widely preferred compared to offline alternatives.

A survey is conducted among mobile phone subscribers in Istanbul, Turkey for primary data collection phase of this research. Istanbul is the city that holds the biggest population and has the highest amount of mobile phone subscribers in the country. Istanbul's current population is more than 15.6million and mobile phone subscriptions are more than 22million as of 2019. Survey responses have been analysed with structural equation modeling and results are presented in the corresponding sections.

Empirical findings of the research show that factors such as usefulness, security, social influence, ease of use, enjoyment and innovativeness have positive effects on

use of mobile payments among consumers. Factors such as attractiveness of alternatives and new technology anxiety have negative effects on use of mobile payments. This study has also discovered that intention to use mobile payments differ among demographic parameters such as education level and gender of respondents.

**Keywords:** Mobile payment, mobile commerce, technology acceptance, technology adoption, structural equation modeling.

**MOBİL ÖDEME SİSTEMLERİNİN  
KABUL VE DAHA GENİŞ KULLANIMINI  
DESTEKLEYEN VE ENGELLEYEN FAKTÖRLER  
TÜRKİYE’DEKİ MOBİL TELEFON ABONELERİ ARASINDA  
AMPİRİK BİR ARAŞTIRMA**

**ÖZET**

Mobil ödeme teknolojilerindeki teknik gelişmeler ve teknoloji kabul modellerinin literatürdeki yaygınlığı göz önünde bulundurulduğunda, bu konunun güncel durumunun daha iyi anlaşılabilmesi için mevcut durumun daha ayrıntılı bir biçimde incelenmesi gerekmektedir. Bu konuda yapılacak incelemeler, mobil ödemelerin daha çok yaygınlaşması, tüketici tarafından kabulünü, pazarın benimsemesi ve mevcut çözümlerin kullanımının geliştirilmesi için de çok faydalı olacaktır.

Bu araştırma, Türkiye’deki tüketiciler arasında mobil ödeme teknolojilerinin kabulünü etkileyen faktörlerin belirlenmesine çalışmaktadır. Mobil ödemelerin daha fazla yaygınlaşması için oluşturulacak uygulama stratejilerine katkı sağlayabilecek bağlantılar ve modeller bulmaya çalışmaktadır. Bu araştırma, “mobil ödeme” için literatürdeki muhtelif tanımları bir araya getirerek tüketiciyi baz alan bir tanım kullanılmaktadır.

Bu çalışmada daha geniş bir perspektifle literatürdeki faktörler gruplanmıştır ve önceki araştırmalarda kullanılan faktörler baz alınarak bir mobil ödeme kabul modeli sunulmaktadır. Geçmişte yapılan araştırmalar küçük gruplardan oluşan katılımcılar üzerinde gerçekleştirilmiştir. Bu çalışma, araştırma modelini muhtelif mobil ödeme seçeneklerinin pazarda yer aldığı ve çevrimdışı alternatiflere kıyasla çevrimiçi satın alımların, uzaktan siparişin yaygın olarak tercih edildiği bir pandemi döneminde, kozmopolitan bir şehir olan İstanbul’da uygulamıştır.

Araştırmanın birincil veri toplama safhası için İstanbul, Türkiye’de bulunan mobil telefon aboneleri üzerinde bir anket gerçekleştirilmiştir. İstanbul, ülkenin en yoğun nüfusunun bulunduğu ve en yüksek sayıda mobil telefon abonesinin bulunduğu şehirdir. İstanbul’un güncel nüfusu 15.6 milyonun üzerindedir ve 2019 verilerine göre

22 milyondan fazla mobil telefon aboneliđi bulunmaktadır. Anket cevapları yapısal eřitlik modeli ile analiz edilmiřtir ve sonuçlar ilgili blmlerde yer almaktadır.

Arařtırmanın ampirik sonuçlarına gre, kullanıřlılık, gvenilirlik, sosyal etki, kullanım kolaylıđı, zevk alma ve yenilikilik gibi faktrlerin tketicilerin mobil deme kullanımına pozitif etkisi olduđu bulunmuřtur. Alternatiflerin cazibesi ve yeni teknoloji endiřesi gibi faktrlerin ise mobil deme kullanımına negatif etkisi olduđu bulunmuřtur. Bu arařtırmada aynı zamanda deneklerin eđitim seviyesi ve cinsiyeti gibi demografik parametrelerin mobil deme kullanımında farklılık gsterdiđi tespit edilmiřtir.

**Anahtar Kelimeler:** Mobil deme, mobil ticaret, teknoloji kabul, teknoloji benimseme, yapısal eřitlik modeli.

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## **LIST OF ABBREVIATIONS**

- A: Attitude toward Using  
ANOVA: Analysis of Variance  
AOA: Attractiveness of Alternatives  
ARPU: Average Revenue per User  
ATM: Automated Teller Machine  
BI: Behavioral Intention to Use  
CFI: Comparative Fit Index  
DOI: Diffusion of Innovations Theory  
E: Perceived Ease of Use  
EFA: Exploratory Factor Analysis  
ENJ: Enjoyment  
EOU: Ease of Use  
EVA: Equal variances assumed  
EVNA: Equal variances not assumed  
HSD: Honestly Significant Difference  
ICT: Information and Communication Technology  
IFI: Incremental Fit Index  
INV: Innovativeness  
IP: Internet Protocol  
IT: Information technology  
KMO: Kaiser-Meyer-Olkin Measure of Sampling Adequacy Test  
LTE: Long Term Evolution  
NFC: Near Field Communication  
NFI: Normed Fit Index  
NTA: New Technology Anxiety  
POS: Point of Sale

QR: Quick Response  
RFID: Radio Frequency Identification  
RMSEA: Root Mean Square Error of Approximation  
SEC: Security  
SEM: Structural Equation Modeling  
SMS: Short Message Service  
SOC: Social Influence  
TAM: Technology Acceptance Model  
TPB: Theory of Planned Behavior  
TRA: Theory of Reasoned Action  
U: Perceived Usefulness  
USF: Usefulness  
UTAUT: Unified Theory of Acceptance and Use of Technology  
WAP: Wireless Application Protocol



# **CHAPTER 1**

## **1. INTRODUCTION**

Internet has become a very important part of our daily lives where almost every activity has an online feature nowadays. It adds efficiency to every business process. Online businesses are being used more and more by consumers and this requires financial systems to adapt to this new business culture as well.

Businesses recognized the importance of being “online” and perception of “shopping” completely changed. Online shopping became a strong alternative for traditional shopping as consumers can explore various alternatives that enable to choose the best for them. Moreover, online shopping enabled people to exceed the barriers of time and place. Because of online shopping, people do not need to hurry for catching closing time of shops or to wait for opening times anymore. Online purchases provide customers with delivery options too. This allows customers to be freed of carrying the goods they purchased.

Since the introduction of online shopping, “online commerce” has become a widely accepted form of commerce. It transformed into “mobile commerce” in the following years. This happened due to the progress in mobile internet access and information and communications technology (ICT).

Before mobile devices were widely available for online shopping, people had to be stable and use desktop devices for this process. As internet technology is advancing, telecommunications and mobile technologies are following this pace too. Mobile phones and other devices are becoming smarter and these tools let every business action to be taken whenever the decision maker wants and independent from where he is located.

Mobile phones have transformed into smart devices with features that exceed the needs of voice calls. This led to the development of mobile device services with high added value for selling and marketing new products.

Online financial transactions are also essential parts of our daily lives that go along with each online shopping action taken. Therefore, payment technologies that provide the financial transactions are becoming more instrumental parallel to the online commerce solutions.

The technological advancements mentioned above gave rise to the “mobile commerce” and “mobile payment” concepts. One of the crucial solutions for online financial transactions are the online payments. The centre of interest for this research is the technology acceptance and adoption of mobile payment systems among consumers.

Mobile payment adoption around the globe is increasing with time in general. Preventing the shadow economy by recording each transaction digitally is a major advantage for the government authorities to promote this technology. Avoiding the need for carrying cash and credit cards is a convenience for the consumers which in turn increases efficiency in daily lives. Each transaction of the consumer is easily accessible from the mobile device. This provides recalling of the financial transaction history as needed which is another convenience for the consumer. If we look from the viewpoint of network service providers and the financial institutions, mobile payment is a new service delivery channel that will create extra revenues. These are a few aspects supporting the adoption of mobile payments from the aspects of different stakeholders in this ecosystem.

However, research on mobile payments suggest that consumers adoption rate is less than the expectations of the stakeholders. There are different reasons for this tardiness which are all independent from each other. One reason could be that mobile payment solutions were not mature enough and not very user-friendly, therefore they were not favoured by the consumers, merchants and financial institutions.

In some regions, people tend to stick to their older payment habits because of security concerns and their anxiety for new technologies. In some other regions, payment solutions cannot be easily implemented because of protective policies of the government and local regulations. Technological infrastructure of the regions also has remarkable effects mobile payment acceptance since not all countries have the same transition rate for telecommunications infrastructure. The performance of the

implemented mobile payment solution depends highly on the telecommunications infrastructure level of the technical parties. Businesses have their own interests to the adoption and acceptance issue. This is mostly related with the payment period and the commission since the business receives the money for the purchase with a period of delay and a deduction from the payer that is involved in the financial transaction process. Payer can either be a financial institution (bank) or the mobile network operator, depending on the local regulations or the business model at stake. Delay period and the deduction percentage depend on the agreement between the business and the service provider.

Conflicts on revenue sharing among the mobile network operator, financial institution, merchant and the government slow down the promotion of the mobile payment services. This situation leads to different business models to occur in the mobile payment ecosystem. Each business model formed favours one stakeholder over another. This eventually leads to a lack of standardization and interoperability on the service provider side which in turn makes it harder for the consumers to adapt to mobile payment systems. Usability issues arise along with the standardization problems. Consumers spend too much time to learn the mobile payment process and mostly give up because they get lost, since there is no single method to perform the mobile payment process.

Purchaser's risk of not paying the bill on the payment due date is another issue for mobile network operators and financial institutions. Even though mobile payment solutions offered by the mobile operator gets used a lot, the revenue stream and profitability will be heavily damaged if the customers do not fulfill their bill payment responsibilities. Banks and financial institutions have a better knowhow on payment collection and its sanctions in case customers do not pay their bills. Mobile network operators however are bounded with the monthly bills of the customers and there is an upper payment amount limit for the mobile payment customers can make. The upper mobile payment amount limit restricts the usage of the service for only small amounts of transactions.

Leading payment tools used by consumers are cash, debit and credit cards in Turkey. Credit cards have a prevailing position and have a very high penetration among both businesses and consumers. The high penetration rate and convenience of credit cards, debit cards and cash make it very hard for mobile payments to be preferred over these alternatives by the consumers.

Introduction of the “e-money” regulation in Turkey helped the digital money circulation in the country. The regulation was introduced in 2013 and 18 companies are actively providing services with the licence by 2020. This policy enabled digital payment ecosystem to be regulated. Regulation requires all server infrastructure of the service providers to be located in Turkey. This restrains international solution providers from entering the market if they already have their businesses running elsewhere and do not want to make another infrastructure investment in Turkey.

The obstacles stated above stand in the way for a fully digitally transformed payment society. In order to accelerate this transformation, the situation must be analysed thoroughly from the consumers’ point of view,

This research investigates the mobile payment acceptance and utilization issue from a consumers’ perspective. It examines the factors that affect mobile payment acceptance in a specific time frame and in a particular region. This immobilizes the regional factors while seeking out answers for the research problems stated below:

1. What are the factors encouraging a wider acceptance of mobile payment systems?
2. What are the factors hindering a wider acceptance of mobile payment systems?
3. What are the key factors affecting mobile payment acceptance?
4. Do demographic parameters such as age, gender, education level affect mobile payment acceptance?
5. What is the mediating effect of perceived usefulness and user attitudes toward users’ behavioral intention to adopt mobile payments?

A survey was conducted among consumers. It took place in Istanbul which is the largest city of Turkey with highest technological and world class telecommunications infrastructure across the city. The market environment is highly dynamic. The consumer population in the market is prone to new technologies. People and businesses have sufficient economic capabilities thus having access to the latest mobile devices. Therefore, it is a matter of willingness to use mobile payment technologies for the consumers rather than technical infrastructure sufficiency that could be beyond consumers’ improvement.

The mobile payment solutions available for use in the market are driven with different business models by different stakeholders. The market is highly regulated by

the government that puts strict measures for solution providers so that it is very hard for international players to get into the market.

Another unique aspect of this study is the time frame it takes place in. The research was conducted in the time of a pandemic when remote delivery and online purchases are widely preferred compared to offline alternatives. There happened to be lockdowns all around the city due to the COVID-19 virus pandemic for a few months between April 2020 and June 2020. Consumers could not go to shops physically. So, they had to use mobile devices and remote methods to fulfill their financial transactions that emerged from their online purchases.

This research also investigates if demographic parameters such as education level and income level, gender and age affect mobile payment acceptance. The survey has 2 sections. In the first section, demographic information such as education level and income level, gender and age are collected. Second section is composed of 26 questions that measure consumers' mobile payment technology acceptance in a 5-point Likert scale from "strongly agree" to "strongly disagree".

Factors encouraging and hindering a wider mobile payments acceptance with a setting described as above are going to be investigated in the following sections. These factors will be gathered from the literature that focus on similar problems related with new technologies and their adoptions. Previous works related with similar concepts will be investigated as well.

A detailed literature review about mobile payments and mobile commerce will be provided in the following chapters. Global data will be presented as well as the local data in the Turkish market. The latter chapters will include research design of the empirical research and its results that are contrasting with previous literature findings. The final section dispenses conclusions and supervision for further research respectively.

## **CHAPTER 2**

### **2. MOBILE PAYMENTS**

#### **2.1. Mobile Commerce Market Dynamics**

Internet and telecommunication (ICT) innovations in the recent years have produced new shopping ways. People can buy all sorts of products from anywhere, any time with their smartphones. This situation led to the increasing awareness of mobile payments compared to conventional types such as cash, debit cards and credit cards.

Online shopping was pioneered by Michael Aldrich in the UK in 1979, and he launched two different systems: Business to Business (B2B) and Business to Consumer (B2C) (Devkishin, 2013).

Mobile payments and mobile commerce encourage impulse buying. This is mainly because it removes the need for consumers to carry cash all the time. It helps the prevention of lost sales opportunities because of customers' lack of cash.

Mobile wallet solutions help businesses in building a more concrete relationship with their customers. Businesses can contact their customers at the optimum times and locations. They can make more personally segmented offers and gain better insights. This is much more efficient than conventional marketing channels. On the other hand, consumers can eliminate the need to carry cash and cards. They can benefit from the loyalty programs of merchants, track their spending. Consumers can also benefit from the security option with less theft and fraud possibility compared to cash and credit cards.

Mobile wallet solutions are more secure, and easier than paying with credit cards. The sensitive information of customers and the transaction are stored in an

encrypted cloud environment instead of a local mobile device. This prevents unauthorized access to personal information since the cloud server and database are protected by the mobile wallet service providers.

The rate of owning smartphones and mobile technologies keep increasing in emerging markets. However, mobile technology utilization is much higher in developed countries. More people living in developed countries have easier access to higher internet bandwidth and latest mobile devices (Poushter, 2016).

The rate of increase in internet accessibility for developing countries has been growing remarkably since 2013. The highest increase was recorded in Turkey according to a research conducted among 16 countries between 2013 and 2015. 41% of the population had access to internet in 2013 in Turkey, whereas this increased to 72% in 2015. At least 60% of the population have access to internet in developing countries. Smartphone ownership level is increasing in developing countries according to the same research. The rate of owning a smartphone among the population was 21% in 2013 whereas this increased to 37% in 2015. South Korea has the highest internet accessibility rate with 94% of the population as of 2015. Australia comes next with 93% and Canada with 90% (Poushter, 2016). The research was published by Pew Research Centre in 2016.

Another aspect of internet access taken into account in the research is the education level difference of individuals. Internet access in the population is higher for people with higher education levels. This situation is present both for developed and developing countries. The difference is as high as 50% in some countries.

Income level also affects internet access and smartphone usage. There is a 51% difference between high income and low-income individuals where the advantage is on the side of people with higher income. The highest rate of owning smart phones is in South Korea with 88% of the population. The rate in Turkey is 59% and its rank is 12 among all other countries in the world. Least rate of smartphone ownership is observed in Pakistan with 11%, and 4% in Uganda and Ethiopia which have considerably low-income levels. There appears to be a direct link with higher income level and higher amount of smartphone ownership.

The rate of increase in smartphone ownership is increasing rapidly in developing countries. Turkey is leading the increase among the countries that are investigated. The smartphone ownership rate was 17% in 2013 in Turkey and has increased to 59% in 2015.

Gender is another factor that is considered. Difference in internet access and smart phone usage occur mainly in countries where gender discrimination is common. 48% of males have access to internet whereas only 29% of females have access to internet in Kenya. There appear to be differences among genders in Europe, in countries such as France, UK and Germany as well even if they are among developed countries (Poushter, 2016). Smartphone ownership among younger people is also more common than older people.

Mobile commerce and mobile payments are on the rise around the globe and in Turkey. The extensive usage of mobile banking by Turkish consumers helps the mobile commerce in Turkey a lot. According to the Mobile Banking 2016 survey by ING Bank, most consumers believe that mobile banking has a positive impact on their cash management, Turkish consumers agreeing with a rate of 85% which is the highest rate in the survey (ING Bank International Research, 2016).

Mobile shopping is another rising subject that is investigated within scope of this survey. 56% of smartphone owners in Europe responded that they will probably use mobile payment during shopping in the following year. 81% of Turkish respondents answered the survey similarly. Main reasons for this preference are the speed, convenience and the extensive usage possibility, respectively.

The conflict between mobile network operators and financial institutions on mobile payment revenue sharing still exists and this conflict slows down the development of mobile payment market. However, all stakeholders still see mobile payments as an alternative revenue channel. Mobile payments can extend its usage areas to parking, movie tickets, transportation tickets etc.

Japan, USA, Germany and the UK are among the leading mobile payment markets around the globe. China is another leading market with Alipay and Wechat Pay apps which are being used by consumers for sending money to peers and making payments. Turkey and Romania are the emerging markets in Europe that have a high trend in mobile payments.

Turkish population is a mobile friendly market with a high rate of mobile payment preference whenever possible. There appears to be a lot of new product development for mobile payment as well. Examples are Papara, Ödeal, Paycell, Payguru etc.



The number of mobile subscribers in Turkey is over 80million by 2018 which is 99% penetration among total population of the country. This is a very strong sign that payment market is going to be develop around mobile devices.

## **2.2. Diverse Mobile Payment Definitions**

Considering the substantial utilization areas of smart phones and vast numbers of available mobile devices around today, it is not a surprise that smart phones are able to be commonly used as a financial transaction device. Especially the telecommunications companies are searching for methods to enhance revenues by moving into alternative business areas since revenues have diminished in voice, SMS and data areas compared to past. Telecom network operators are trying to provide consumers with solutions that let them purchase goods and services via smart phones (Dornan 2001).

Using the mobile phones for carrying out financial transactions depends on effective mobile payment solutions. Essential parts of the mobile commerce ecosystem are the mobile payments. Without the financial transaction, no commerce action would be complete. However, no standard mobile payment system has yet been accepted by all parties involved. This is one of the main reasons that prevents the prevailing mobile commerce activities (Carlsson 2001; Kruger 2001).

There are various definitions for the mobile payment concept in the literature. These definitions are all similar to each other one way or another. They all involve a mobile device, a financial transaction and a confirmation process. Some of the definitions taken from the literature are cited below.

Payment by phone (mobile payment) is a vital process of mobile commerce, and it designates "any payment where a mobile device is used to initiate, authorize and confirm an exchange of financial value in return for goods and services (Au & Kauffman, 2007)."

Mobile payments might as well be defined as; "the electronic payment transaction procedure that enables a payer to use a mobile device to initiate, authorize or confirm a payment" (Yoris, et al., 2008). Therefore, mobile payments provide buying of products and services including the fund transfers between bank accounts of the business and the customer.

Another definition for mobile payments is, “payments that are carried out via the mobile phone (Kruger 2001). Shon & Swatman’s definition for an online payment solution is “any conventional or new payment system which enables financial transactions to be made securely from one organisation or individual to another over a mobile network” (Shon and Swatman 1997).”

Mobile payments are payments for products, services, and bills/invoices with a mobile device (such as a mobile phone, smart-phone, or tablet) by taking advantage of wireless and other communication technologies (such as mobile telecommunications networks, or proximity technologies) (Antovski & Gusev, 2003; Ding & Hampe, 2003b).

From a broader view, a mobile payment is a payment in which a mobile device is utilised to perform a transaction or a transfer of funds in return for purchases (Karnouskos, 2004).

Businesses are developing diverse mobile payment applications for their customers in an increasing manner. Solutions like Samsung Pay, PayPal, Wechat Pay, Apple Pay, Alipay, and Google Wallet are being used frequently all around the world and are gradually taking over conventional payment methods such as cash, debit and credit cards. Local applications in Turkey such as BKM Express, Paycell and Fastpay are also becoming increasingly widespread among Turkish consumers. This shift will disrupt how people transfer and receive money, that might bring about a cash-less globe in the future.

Mobile payment systems enable a fast, basic and somewhat inexpensive fund transfers. Individuals are able to pay bills, invoices, purchase goods, book flights, pay parking fees, taxi fares and buy various other stuff using their mobile devices. Payments at ticketing and vending robots and at sales points with attendants are also possible. Its benefits include the convenience of 7/24 access to payments by the merchants as well.

Credit cards are the most common tools used for conventional payments. These plastic cards can be used in e-commerce and electronic payments via entering its numbers and other required information on the payment platform. A virtual card can also be used in e-commerce which is connected to the main credit card and has a limit specific to the respective purchase. Virtual cards are useful for securing the customer from frauds since the usage limit can be reset after each purchase.

Mobile payments remove the dependency of credit cards and cash. Consumers can track their spending and invoices via their smartphones easily. They can also receive personally tailored discounts, promotions and campaigns from brands.

From merchants' point of view, disruptive technologies such as mobile payments help businesses manage their cash flows more efficiently than conventional methods. In cases with large amount transactions, clearing period is bypassed and related costs are reduced. Paper usage is reduced which helps sustainability and is more environment friendly.

Small-sized businesses that run mostly on cash get a chance to provide customers that do not carry cash with an alternative payment solution. This increases customer loyalty and sales opportunities are not missed due to lack of cash. It also helps the business get a better position compared to its competitors.

Mobile payments provide various advantages; however, the shift from conventional methods to mobile payments needs time. The society's approach to mobile payments is a crucial research topic and technology solution providers and merchants' expectations should cohere for mobile payments to be adopted by consumers.

### **2.3. Types of Mobile Payment**

There are various classification methods for mobile payment systems. Mobile payments are generally categorized as follows:

- Payments for products and services
- Bill payments

Mobile payments usually retrieve deposits in bank accounts and perform actions like money transfers by banking apps, credit cards or debit cards. A common transaction requires a customer who is trying to perform a mobile payment, connect to a main computer via his smart phone to execute authentication and authorization, and confirmation to complete the process. A mobile payment solution involves all developments which are granted to the customer in conjunction with all the burdens that the solution providers achieve to finalize the payment (Rushabh, 2015).

### **2.3.1. Mobile Payment Classification by Payment Distance**

One classification method is made according to the distance of the payment:

- Remote mobile payments (account-based)- Mobile Apps
- Proximity mobile payments (POS or token-based)- Near Field Communication (NFC)

#### **2.3.1.1. Remote Mobile Payments**

Remote kind of mobile payments are triggered via a mobile app on customer's mobile device.

SMS payment is a basic type for remote mobile payments. Customer utilizes his smartphone to pay and approve the purchase. The payment amount is usually charged to the mobile telecom bill.

WAP payment is another method for mobile payments. Mobile wallets use WAP technology. Apple Pay, Google Pay, Amazon and Paypal utilize this technology for their sales. It is fast and user friendly (ICEMD, 2016).

Mobile apps operate as mobile wallets, letting users make payments via internet network. These types of payments access user's account information, payment origin, and payment processor. Mobile wallet service provider such as PayPal, BKM Express, Fastpay or a bank's mobile app can be considered as examples for such a payment method.

#### **2.3.1.2. Proximity Mobile Payments**

Proximity type of mobile payments store the transaction information in customer's mobile device.

This type of payment is usually used at merchant stores or transportation stations. It is a contactless "Tap and Go" payment experience. Near Field Communication (NFC) is a prevalent solution for such payments. NFC is like bluetooth but needs a shorter distance.

Near Field Communication (NFC) is an innovation that enables smart phones and other mobile devices form radio communication with one another via touch or bringing near very closely (Rushabh, 2015). The technical details of NFC are listed in in ISO 18092 (ISO/IEC, 2013). NFC is a wireless communication interface with a

functioning distance which is maximum 10 cm (Haselsteiner & Breitfuß, 2011). “In other words, NFC is the connection between a contactless smartcard (RFID) and a smart phone. Smart phone can therefore act like a contactless card” (Ondrus & Pigneur, 2007). Payments performed via NFC do not depend on internet access unlike mobile apps and mobile wallets to complete the payment transaction.

Along with fastly increasing smartphone usage penetration, mobile payment numbers are also increasing. NFC technology is a driver for mobile payment adoption since it provides a cloud-based encryption which lets it stand out from other card based contactless payment methods. Mobile devices are rather more protected way for performing payments. Mobile payment systems decrease fraudulent activities that are usually associated with credit card payments. They provide consumers with secure and convenient payment solutions that can automatically track spending activities.

NFC innovation is assisted by radio frequency identification (RFID). However, NFC triggers applications and operations whereas RFID helps information exchange between devices. RFID is embedded in payment cards such as Visa and Mastercard. NFC feature is set up inside mobile devices and their counterparts in merchant stores. NFC devices are already commonly used for several purposes other than mobile payments such as consumer retention. Therefore, NFC feature which supports mobile payment functionality in smart phones is already available in the market (Ezell, 2009).

NFC technology provides an easier user experience in payments. A similar technology used in mobile payment solutions is the QR (quick response) code. This is a particular matrix barcode that has to be interpreted by the appropriate reader devices and smart phone cameras. QR code carries the transaction data required to fulfill the payment.

### **2.3.2. Mobile Payment Classification by Payment Method**

Another way of classification is the method used:

- Mobile payment at point of sale
- Mobile payment as point of sale
- Mobile payment platforms

Point of Sale (POS), -contactless- mobile payments can be described as payments where merchant and purchaser must be together for completing the payment.

Near Field Communication, infrared technology or Bluetooth or can be used to finalize the payment. On the other hand, remote mobile payments use SMS or WAP technology to fulfill a transaction. (OECD, 2012).

#### **2.3.2.1. Mobile Payment at Point of Sale**

This type requires the customer's mobile device connecting to the merchant's device to finalize the payment. This payment type can be performed using NFC technology, bluetooth or infrared technology.

A barcode or a QR code is also commonly used for this method of mobile payments in Turkey. Merchants such as Starbucks has established its mobile app to act as a payment solution along with its customer loyalty features.

Google Wallet for Android and Apple Pay for iPhone and are the most prevalent NFC payment options around the world to date. They are developed as mobile wallets and grant customers with prompt access to funds to finalize purchases at shops that have Google Wallet or Apple Pay available. Businesses must be prepared with a contactless chip device reader to utilize NFC payments. Otherwise, this type of payment option is not possible and therefore mobile wallet acceptance is not fully consistent.

Mobile wallets let customers free from the burden of carrying physical wallets and credit or debit cards. Once a customer activated the mobile wallet app on his smart phone, he can securely pay at the point of sale using his smart phone or tablet.

The perks of such payment solutions are the convenience of transactions between customer and business and the rapidness to finalize a payment. The constraint of NFC is that it serves only through short distances. There are a few trust concerns regarding NFC payments as well.

#### **2.3.2.2. Mobile Payment as Point of Sale**

Numerous mobile apps facilitate merchants to handle debit card and credit card payments via using a smartphone or a tablet. This kind of payment solutions offer a mobile POS. A POS consists of a chip and pin terminal and mobile app that lets merchants handle card payments.

It involves inputting or swiping credit card information into a mobile device such as a smartphone or tablet. A card reader called a “dongle” that is connected to a mobile device can also be used. It is a simple technology and does not require point of sale terminal investments. This cost-efficient type of mobile payment is suitable for small businesses that do not have complex technology infrastructure.

This type of mobile payment solution lets customers to pay physically at the stores, remotely for events or wherever the business is. However, customers must have their cards present for payments to be completed. Mobile payments as a point of sale enables businesses to gain advantage of a fast and easy setup, high payment security and low transaction costs.

### **2.3.2.3. Mobile Payment Platforms**

These types of solutions appoint any other platforms available in the Turkish market such as Fastpay, Paycell, BKM Express. A global example is PayPal. Paypal is a web-based service. It permits the consumer send funds to his peers by typing in their email and the required amount of money. After checking the email, receiver has to log in to Paypal to accept the money. The money moved to an account in Paypal app after being taken from the sender’s account (Guadamus, 2004). PayPal serves both SMS and mobile app solutions.

These mobile platforms have been an alternative payment option among merchants and consumers. They are user friendly and have small transaction fees. They also offer a high fund protection security for senders and receivers as conventional cards payment methods were not completely suitable for small amounts of payment at the first place.

### **2.3.3. Mobile Payment Classification by Technology**

Mobile payment systems might be classified by the effected type of payment and the technology used to execute the payment system as well. Various combinations of such classification frameworks exist. There are two types of models according to the technology used (Lim, 2007):

- Credit or Bank Account Based Mobile Payments
- Mobil Network Provider Billing of Mobile Payments

### **2.3.3.1. Credit or Bank Account Based Mobile Payments**

The customer's bank account or credit card is attached to his mobile subscription number. Whenever a customer uses mobile payment at a merchant, merchant's account is credited and customer's account is debited. This model is valid between banks and mobile network providers since they both have an already active customer base and they can generate new income with such a cooperation.

### **2.3.3.2. Mobil Network Provider Billing of Mobile Payments**

Customers use mobile payments via their smart phones and the amount is charged to customers' monthly bills of mobile phones. The most basic way of charging for mobile commerce transactions. However, it contains obstacles such as high payment fees, conflicts between merchants and service providers about revenue sharing, upper limits on payment amounts and collection of payments from the mobile phone subscribers via their phone bills.

## **2.4. Mobile Payment Structure**

Even though implementations for different mobile payment solutions differ, the main structure of all are quite similar to each other.

The mobile payment solution provider provides the required technology framework (software and hardware) for realizing the transactions and behaves as a mediator between the mobile network operator and financial institutions.

The smart phone user reaches out to a merchant, requests to purchase a product or a service. User and the merchant both acknowledge on the payment. They both have to be registered with the service provider before using the service. Registration (subscription) requires a customer to register with a technology solution provider to receive the payment via a specific type. Either one of the parties inform the mobile payment service provider.

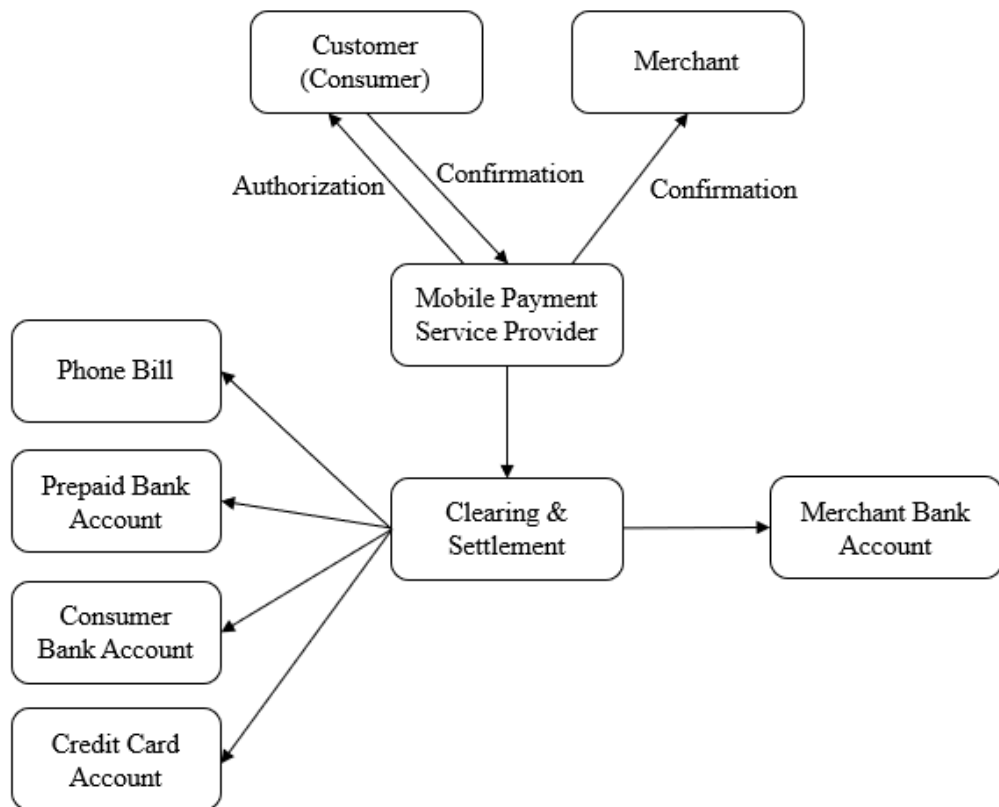
Transaction stage includes the customer initiating a purchase and authentication via SMS, NFC or any protocol that is available. The request is either authorized and authenticated by a trusted third party or declined.



The solution provider affirms the financial payment to user via his smart phone and demands an approval. Customer confirms requested payment and enables the financial transaction.

The mobile payment solution provider then gets the approval and certifies the legitimacy of the user. It conducts the transaction and saves the required fund transfer instructions. Business's account is credited and the user's account is debited. These payment instructions are cleared periodically.

Financial settlements occur in various ways. The bank account or a credit card account is revised on the customer side and another bank account is revised on the business side. The pre-paid settlement scenario involves an advance payment. The monthly mobile phone bill of the customer might be updated in some cases too.



**Figure 2.1** Mobile Payment Structure (adapted from Kruger, 2001)

In most mobile payment cases, technology solution provider is called by the point of sale at the merchant. The solution provider informs the customer by reaching out to the smart phone. Confirmation occurs by typing in a verification password on

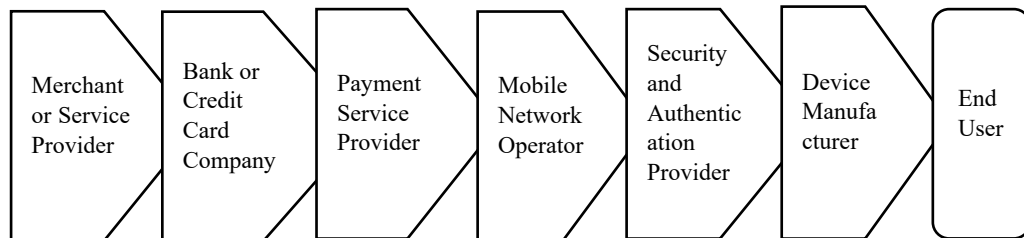
the terminal. This can either be the pin number created by a mobile app on customer's phone, an SMS code sent by the network provider or a barcode scan.

One distinction between all e-payment solutions and a mobile payment solution worth mentioning is the recognition method. Identification of the user and the business is fulfilled by the mobile number in a mobile payment scenario whereas in other electronic payment solutions this is fulfilled by an email address or bank account id.

## 2.5. Mobile Payment Stakeholders

All mobile payment solutions include complementary stakeholders that make up the business models among mobile payment solutions. These stakeholders are;

- a) Consumers (customers)
- b) Merchants (businesses)
- c) Mobile Network operators
- d) Mobile device manufacturers (smart phones, smart watches, tablets)
- e) Financial institutions and banks
- f) Software and mobile payment technology service providers
- g) Governments (regulator)



**Figure 2.2** Mobile Payment Stakeholders

All stakeholders have different interests and strategies. Their interests and strategies might conflict with each other at times. For instance, the mobile network providers want to increase revenues via each mobile payment while merchants and customers want to lower costs for each financial transaction.

These conflicts cause acceptance pace for mobile payment technologies to slow down among consumers and merchants whereas the efficient cooperation of the

stakeholders at different solution scenarios make mobile payments a preferable alternative among other methods.

The anticipations for all stakeholders are outlined below.

Consumers are the mobile device owners who are eager to pay for goods and services. They are looking for personalized services which have minimal learning curves. A new payment method must be easy to learn and adapt to. This helps the user to build trust easily for the payment system. An ideal mobile payment system has to be ubiquitous. It should be available anytime, anywhere via any currency. Interoperability among different payment solutions, network operators and banks are vital for mobile payments to become prevalent among consumers too. Some other reasons for consumer preference are the availability of anonymity of payments similar to cash payments and peer to peer money transfers. Consumers would not like to face any unexpected high costs while using the payment services.

Merchants are the content providers who sell products and services to consumers. They also have their distinctive preference reasons. They prefer to have faster transaction times and cheaper costs compared to alternative payment options they already have in store. A new payment option should easily be integrated to their existing systems and customizable if there be a need.

Banks and financial institutions would like to serve their customers with payment solutions independent from network operators. Therefore, each bank prefers to develop its own payment application to make sure the payment software is compatible with each network operator in the market. Working as partners with software and technology providers, banks get to have their own mobile payment applications. This is an exceptional branding opportunity and alternative service delivery channel for each bank. Having their own mobile payment application helps banks with higher customer loyalty rates and higher transactions volumes via debit and credit cards.

Mobile network operators provide the infrastructure for the payment service providers. They control the transaction flows between merchants and consumers. A mobile payment solution is an alternative income channel for mobile network operators. It can generate new income for the operator by increasing the data traffic going through the network. This leads to an increase in average revenue per user (ARPU) and rise in customer loyalty on consumer side.

Mobile device manufacturers will have larger market adoption rates as mobile payment solutions become more prevalent. More devices will be bought both by consumers and merchants. This means more usage areas for mobile devices which leads to an increase in average revenue per user.

Governments prefer financial transactions to be recorded. Preventing the shadow economy by recording each transaction digitally is a major advantage for the government authorities to prefer mobile payment technology. Local regulations on this issue are formed such that mobile payments are taxed accordingly.

## **2.6. Mobile Payment Business Models**

There are handful of stakeholders in the mobile payment process. Merchants who are trying to sell their products to consumers. Customers who own the mobile devices. Mobile network operators who provide the infrastructure that fulfills the transaction process. Financial institutions who provide the payment solutions. Mobile device manufacturers who provide the hardware and technology to connect payment devices.

Since mobile payment solutions comprise the financial services sector, telecommunications sector and the retail sector, business models are introduced by a group of market players. These market player companies may include telecommunication network service providers, hardware and software providers, clearing houses, banks, solution integrators, credit card companies, resellers and retailers.

Mobile payments still lack the technology and security standards that will enable a universal payment. This issue is critical and a consensus on this technology will produce more value and more investments. The lack of standards and different regulations among countries cause local and fragmented mobile payment solutions to emerge. It can be considered that mobile payment technology is yet in the early development level due to the deficiency of standards (Lim, 2007).

Different stakeholders have developed different business models for mobile payments in compliance with their own interests. These business models can be classified as;

- Bank Network Model
- Affiliate Model
- Retailer Model
- Mobile Operator Model

### **2.6.1. Bank Network Model**

Initially implemented by Visa in 2011 as a mobile wallet app. This mobile payment solution spread across different banks in Europe. A bracelet was used as a non-contact card payment solution in Spain by Caixabank jointly with Orange, Vodafone and Telefonica.

Barclaycard Paytag was introduced in the UK as a smartphone tag by Barclay. It does not require any app to be installed on the phone. It is used with contactless POS terminals through a mobile connectivity and a PIN reader that is plugged into the smartphone.

### **2.6.2. Affiliate Model**

This business model is based on a mobile wallet installed on smartphones. The mobile wallet stores the credit card information of the user and payments are made by connecting the smartphone with the POS terminal of the merchant via NFC.

Apple Pay is a payment solution provided for the Apple smart phones. Infrastructure developer Apple gets a commission for each payment completed from credit card providers such as Mastercard, Visa and American Express. Google Wallet and Android Pay are the similar solutions developed for Android devices. Credit card information for each user is encrypted and a unique device number is created by the apps for each user.

### **2.6.3. Retailer Model**

Mobile connectivity and high-speed mobile internet have changed consumer behavior drastically. Companies can interact with their customers any time and vice versa. The vast availability of brand options has caused companies to invest more on their customer relationship systems and digital marketing in order to keep up with the competition.

Loyalty apps with embedded mobile payment feature are created by chain stores in this business model. Users of the app can load money, purchase brands' products, earn loyalty bonuses and track their spending. Money is loaded into the app by credit or debit card information of the user. Payment transactions go thru the banking system similar to a POS terminal and a credit card scenario.

Starbucks mobile app is an example for this business model which is running in all stores globally and in Turkey as well.

#### **2.6.4. Mobile Operator Model**

Mobile telecom billing systems were initially charged customers for voice and SMS usage. Later on, billing systems have been adapted to charge other value-added mobile services as these services emerged. Charging for mobile commerce activities via telecom billing systems is technically the most convenient method among alternatives. However, this method has its peculiar regulatory and business model obstacles. High transaction fees to stakeholders cause consumers to prefer alternative payment methods. Conflicts between network service providers and merchants about revenue sharing is still unsolved. Regulations of upper limit for this kind of mobile payment by some governments do not allow high transactions to be made with this method. Bill collection is another issue for mobile operators. Telecom bills do not have as strict penalties as credit cards payments of banks. Therefore, network service providers have a hard time collecting the bills if they are not paid by the customer on time.

In regions where banking penetration is lower than mobile telecom penetration, mobile network operators intend to benefit from the opportunity by providing the customers with money transfer and payment solutions.

A successful use case for the mobile operator model is the "M-pesa" mobile money transfer system that is running in Kenya. Customers can send money to other individuals via SMS after registering their phone numbers as accounts to the system and depositing money to their accounts via local agents. The main reason for its success is that M-pesa does not require latest mobile devices since it works with SMS technology. Another reason is the ecosystem it works in. The banking infrastructure is very weak in Kenya therefore making M-pesa an attractive option of mobile payment and money transfer for consumers.

Mobile telecom operators tend to develop mobile payment solutions for public transportation payments too. Such solutions are already running in France by Orange Telecom in the city of Nice and by Vodafone in Valencia, Spain and by O2 in the UK.

A strategic partnership framework model among mobile payment stakeholders was proposed based on revenue generation via loyalty points of intermediaries (Aydin and Burnaz, 2016). The importance of NFC based mobile applications was considered in suggesting new business models. This collaborative business model suggests financial institutions and technology solution providers to associate with mobile wallet developers. Collaborative implementation of a trusted third-party solution including assurance and authorization tools into mobile payment solutions would increase trust among users (Kasavana 2009).

## **2.7. History of Mobile Payments**

The invention of mobile phones that comprise several functions and its proliferation among consumers gave rise to rewarding opportunities for merchants and value-added service providers. Mobile payment systems became an attractive business topic in the late 1990s and early 2000s and prevailed popular after the rush of the Internet bubble. Various mobile payment systems together with digital payment and online banking services were presented to consumers all around the globe. (Dahlberg T, 2006).

First mobile banking services included balance inquiries and fund transaction functions. Mobile banking expanded into various other functions in the upcoming years.

Mobile payments topic has become more popular among researchers especially as smart phones became more affordable in the recent years. Mobile networks and mobile telecommunications have come a long way since 1980s. Four generations of new technologies are introduced to market as standards which are called 1G, 2G, 3G and 4G respectively. Each generation of standards brought faster connections than the previous one. 3G technology was introduced in Turkey in 2009 with the main innovation being its data-driven nature compared to 2G which was based on voice-over transmission. Value added new services and applications are introduced to market along with each generation shift.

4G is the fourth generation of such technologies. It provides a full IP based communication solution for voice, data and streaming mobile devices with high data transfer speeds. It is integrated with all IP-based computer networks via 100 Mbit/s and 1 Gbit/s data transmission capacity.

The introduction of LTE technology which is also named as “4.5G technology” in Turkey in 2016 provided all mobile devices with high-speed internet. New generation mobile phones that are suitable for high-speed communication channels with powerful processors help the extensive usage of innovative mobile payment services. Henceforth, consumers can access online services from their smart phones more easily. This led to more e-commerce and payment activities to be carried out via mobile devices.

Mobile payment systems need high volume of transactions and large customer bases in order to succeed. If ruling retail businesses don't financially support mobile payments, there is scarcely any possibility of prosperity for such an alternative payment technology. There are various business models and technologies for mobile payments available in the market. Mobile payment systems have to evolve from special solutions that are limited to some businesses in the direction of normalized and collective standardised solutions to cover all the market.

### **Considerable Milestones in Mobile Payment History**

- 1998 – Launch of Paypal
- 1999 – Purchasing movie tickets by mobile phones by Ericsson and Telenor Mobil.
- 2003 – 34% of Internet users have purchased something via mobile devices around the world.
- 2004 – Sony founded “FeliCa” a contactless RFID smart card system in Japan.
- 2007 – Introduction of IOS and Android operating systems.
- 2010 – Launch of Square.
- 2011 – Launch of Google Wallet.
- 2014 – Launch of Apple Pay.
- 2015 – Launch of Samsung Pay.
- 2016 – \$75 billion of mobile payments were made.



- 2019 – Dan Schulman from Ppaypal anticipates electronic payments will become a \$100trillion industry (cnbc.com, 2019).
- 2020 - 90% of mobile phone users will perform a mobile payment transaction with their smart phones.
- 2026 – Mobile payments market will attain \$457 billion (techcrunch.com, 2016).

Reports state that mobile payment industry is predicted to grow at a yearly rate of 33% between 2019 and 2026, reaching US \$457 billion in 2026 (sbwire.com, 2019).

Even if mobile payments have gained prompt attention in recent years, there are clear signs that consumers are concerned about accepting this technology. In fact, there have been some failed launches and discontinued mobile payment systems in Turkey such as Paypal.

## **2.8. Future of Mobile Payments**

Mobile payments will probably shape the payment industry of near future. It allows businesses to accept payments very fast, at any location, at any time without needing extra investments.

Consumers will be able to stop using either cash, or credit cards. Individually tailored loyalty programs will be much more common among brands and exchanging benefits between different brands will be commonly available. Financial institutions will reach out to consumers much easier without having them physically visit their offices. Consumers will be able to manage their spending and cashflows easier independent from time and place.

## **2.9. Evolution of Mobile Payments**

Reports state that mobile payment industry is predicted to grow at a yearly rate of 33% between 2019 and 2026, reaching US \$457 billion in 2026 (sbwire.com, 2019). It is observed that mobile payment market development in developing economies climbs faster when compared with developed economies (Flood et al. 2013). Therefore, there is a huge potential of expansion and investment for international online payment players like Google, Samsung and Apple. These software companies

can accelerate the consumer adoption process by investing in developing economies and receiving big returns.

## **2.10. Mobile Payment Technology Acceptance Challenges**

Mobile payment solutions compete with other sophisticated physical and electronic payment solutions. As smart phones are becoming the main device for online commercial activities, the potential for mobile payments to overtake traditional payment methods is becoming more probable in the near future. However, service providers are still striving to widen the acceptance of mobile payment solutions.

Adoption and consumer acceptance topics are covered in some of the published mobile payment studies in literature. This is an essential issue for all the parties involved in mobile payment ecosystem. Technology service providers, merchants and consumers are all associated with it. A successful adoption of mobile payment systems depends on various factors. These factors reflect either the user's or the merchant's or service provider's view.

A research conducted by Visa in the United Kingdom in 2016 analysing the mobile consumer profile found that more than 70% of the consumers utilize their smart devices for financial transactions.

A study that focuses on effectiveness criteria of online payment systems brought out fifteen factors distributed among stakeholders. Reliability and security were crucial for the stakeholders. Reduced transaction rates were substantial for consumers, businesses and banks. Scalability was important for network providers and flexibility was also crucial for businesses (Shon and Swatman 1997).

A research investigates the Mondex solution, which was offered as a replacement for cash in 1990's developed by Mastercard. The agents that affect the prosperity of this payment solution are not in case product's gains will surpass the development costs estimating it is commonly used, but rather user and business adoption, channel coordination. Prosperity of payment solutions is related with reaching a critical mass of merchant and consumer acceptance. This is closely tied to how universally available the payment solution is in the market (Clemons, Croson et al. 1997).

A study conducted by Jayawardhena and Foley states that any online payment system should meet some requirements in order to succeed. These are mainly related

to cost, ease of use, exchangeability and universality, security requirements such as privacy, anonymity and trustworthiness. Other requirements are listed as regulatory framework, integration with backend systems and support (Jayawardhena and Foley 1998).

Changes in telecommunication technologies, social/cultural and regulatory environment along with competition in financial services market leads to new advances in payment solutions payments (Javalgi and Ramsey, 2001).

People's buying behaviour and consumption styles change along with changes in their social and cultural environment. People tend to look for new payment offers as they become more mobile. There are cultural reflections on payment preferences as well. Debit cards are more commonly preferred compared to credit cards in Europe whereas it is vice versa in US (Bohle and Krueger, 2001).

Introduction of new technologies in telecommunications industry have influenced the mobile payment solutions. Development of bluetooth, infrared, RFID and NFC technologies led to the introduction of new mobile payment options (Zmijewska, 2005).

Legal and regulatory structures of different regions affect the requirement of standardization for payment solutions. Financial activities amidst distinct countries are especially complicated because of different financial regulations among governments. This situation may be overcome by unifying the regulations among a group of countries such as the European Union.

These issues all create compelling influence on the acceptance of mobile payments. However, these factors are all beyond the control of the stakeholders in mobile payment industry.

Four main factor groups are identified in a research by Bohle (2000) on the outlook of retail online payment systems that are related to demands of different parties involved. These factors are regulations, standardisation, security, and integration of payments into online transactions.

Another study that investigates whether an online payment system will be widely accepted and lists the factors that will affect this matter. These factors are stated as divisibility, independence, ease of use anonymity, transaction fees, interoperability and security. Payment system's requirement of how much specialized hardware and software it needs is the independence factor. Interoperability is defined as how a payment system integrates with other infrastructure that is already available. Online

payment systems must secure the transaction between the merchant and the consumer. Divisibility is the payment amounts supported by the system. Effort put by the user to perform the transaction is stated as ease of use. Transaction fee is the commission taken from the business and the mobile payment user for a successful transaction (Turban, King et al. 2002).

This research is mainly going to focus on factors that fall within the consumer's view. Consumers create the demand for mobile payment solutions and lead its success by using it. Therefore, adoption success depends on the number of users and transaction volumes. However, consumers do not have the direct impact to steer the development of innovations at service providers' side at the early stages. Business requirements and improvements have more effect on solution developments since there are a limited number of users at the early stages. This increases the failure risk of the newly introduced payment solutions.

Merchants have crucial importance in mobile payment adoption and development. They facilitate the industry for technology solution providers and financial institutions. It is rather very difficult for a payment solution to be commonly used unless merchant promotion is available. A mobile payment solution can easily be rejected if it does not suit the business conditions of the merchants such as high commission fees. It is also possible for merchants to provide their own mobile payment solutions and promote them. Starbucks mobile app is an example with built-in payment options and customer loyalty features.

Cash, debit and credit card payment options are still more preferred compared to the more digital alternatives in Europe. The only exception is the Scandinavian countries. Mobile payment solutions have emerged mainly due to the need for a payment solution to assist mobile commerce. Similarly, bill payments have moved to mobile payment platforms due to the developments in internet banking solutions. Some trends consider mobile payments as just an alternative channel for current payment market, whereas there is a compromise which mobile payments are a potential threat to conventional payment types with the entrance of mobile payment operators into the market.

Results of a research conducted in the Swiss market indicated that traditional card payment methods were preferred over mobile payments (Ondrus & Pigneur, 2005). Another study showed that mobile payments would be used to complement existing traditional payment methods (Mallat et al., 2006).

It is discovered in a research that the biggest concern of smart phone users who do not use mobile payments was the security risk. Consumers thought saving their credit card information in their smart phones was more open to theft than having their credit cards stolen from their wallets (Huh et al. 2016).

A similar research that was carried out by Creative Strategies Incorporation (CSI) found that trust was the main barrier for mobile payment consumer acceptance. Therefore, biometric technology along with pin codes and one-time passwords were suggested to be used as additional layers of security, so that consumers would feel more secure and be more willing to use mobile payment systems (Weiss, 2011).

Although there are laws that cover the mobile payments from the aspect of financial services, there still exists a remaining question if the regulations are adequate in providing high protection to consumers. This issue is considered because mobile wallets and payment solution providers are applications for realizing the technical aspects of mobile payments and they are not the financial service providers (Lowry, 2016).

There have been some attempts to accelerate the acceptance of mobile payment solutions by giving incentives to users. Financial institutions and merchants compensate the incentives in developing countries so that their services become more efficient and reduce the usage of traditional payment methods via ATMs and physical branches which are more costly (Alexandre et al., 2011). The reason why this method works in developing countries is the lack of high-quality traditional payment services. In developed countries, even if a big latent exists for mobile payments in the market, people see the traditional methods safe and do not want to switch. However, in poor countries, people feel insecure with cash and credit cards because of the high fraud and theft risk. This leads to a choice of more innovative, more secure mobile payment solution by the consumers. More preference of mobile payments instead of cash shifts the unrecorded financial movements to a formal, recorded area.

Mobile payment solutions that are available mostly require a separate app to be installed on users' smartphones. Unless a universal standard is built by the stakeholders, users will resist fully adopting mobile payments. Otherwise, if standards are finally accepted by all stakeholders, consumers will enjoy mobile commerce independent of country borders and the process will be much more simplified.

It is rather difficult for technology service providers to develop the perfect mobile payment solution that will suit all the needs of users, besides merchants and

the regulators. There exist diverse aspects on acceptance of mobile payment solutions listed in the literature that have been identified during the pursuit for a perfect mobile payment system.

Infrastructure limitations, security, and absence of standards are the main aspects affecting mobile payment acceptance in the research based on existing studies on mobile payments by Diniz H et al., (2011) presented in the table below.

**Table 2.1** Obstacles for Mobile Payment Adoption

<b>Obstacles for Mobile Payment Adoption</b>	<b># of papers</b>	<b>%</b>
Technological / security / user interface limitations	16	18%
Lack of infrastructure (mobile coverage etc.)	5	6%
Unwillingness of consumers and merchants to adopt / lack of trust	16	18%
Lack of standards / interoperability	10	11%
Regulations / legal framework	7	8%
Problems of scale / network effect	6	7%
High costs / overhead	8	9%
Lack of cooperation between market players	4	5%
Lack of knowledge on mobile payments	10	11%
Low levels of literacy and financial education	3	3%
Other	2	2%

The study is focused on the investigation of 196 research papers. The study focuses on the limitations that prevent mobile payments from being widely adopted. It states that user acceptance aspects are generally related to trust, privacy, security, risk perception and fraud. the study mentions the emotional hurdles brought about new technology anxiety too.

There exists a rise in the number of papers published on mobile payment research over the years. It is studied in a wide range of locations and countries. China, Germany and Spain are among the leading countries.

Technical and security standards must be superior for a prevalent usage and consumer acceptance of mobile payments. Privacy must not be a matter of concession and there must not be any chance of monetary damages for users. On the other hand,

customer authentication is a vital issue for merchants who are providing mobile payment services to customers. Integrity and confidentiality must be assured by the technology solution providers (Misra and Wickamasinghe, 2004).

Even though mobile payment solutions are available for a decade now, they still lack the technology standards that will provide a universal payment solution. Standards integration for mobile commerce is crucial and this is going to let solution providers and users to invest more on this matter to produce more value. Lack of standardization causes several fragmented and domestic varieties of mobile payment solutions developed by distinct companies. Some solutions are bank centred whereas the others are mobile network operator centred depending on the business models.

Standards have to ensure the trust, privacy and security matters for users along with the joint working between several solutions. Standardization is a course of cooperation among all related parties. It is a legislative and commercial negotiation rather than a theoretical debate. There are some widely accepted models in the market that are settled by the first movers. These early solution providers have come up with standards proposals hoping to set them default using their early mover commercial benefit. However, there is no consensus among different solution providers and governments in terms of mobile payment standards setting (Lim, 2007).

Regulations for the companies in the banking business are distinct from those controlling the communications business. Therefore, it is a major challenge for the regulatory authorities to standardize the regulations that suit all the parties involved in mobile payments.

Collaboration between telecommunication network solution providers and banking establishments on mobile payment solutions is limited since both stakeholders are trying to control bigger share in the value chain to boost their revenues. Nonetheless, traditional payment solution providers are possibly going to adapt their operations to the mobile payments and a new payment channel will become commonly available as network providers support mobile payment solutions by providing the infrastructure. Some new mobile payment services also arise where banks and network service providers both get to support the business model as enablers.

Lack of an ideal business model is an obstacle on the service provider and merchant side of the mobile payment acceptance issue. Even though various business models are available in the market, they are all developed considering the interests of different stakeholders. No standard business model is accepted by all so far. The

essential cause for this situation is the distinct interests of various merchants, service providers and regulation authorities which is mainly the government.

Operations management, agents in merchant stores and resellers are not fully compatible with mobile payments because due to lack of standards, clear commission structures and ideal business models accepted by all parties in the ecosystem. These obstacles prevent the easy adoption of mobile payment systems among agents. More trainings are required for the agents to facilitate the wide spread of such innovative payment solutions.

High service availability and coverage are also concerns for the consumers and merchants. Mobile payment option might not be available all the time everywhere. Therefore, peers who are about to make the transaction might have to look for alternative ways for payment during their commerce. Lack of training of the agents might also affect the service availability for mobile payment solutions on the business side. Agents might look for easier methods for performing the payment transaction since he is not highly familiar with the mobile payment process.

Price and in other words, cost of the service is another concern for acceptance of mobile payment technology. Consumer side is interested in the price of the devices and services and financial initiatives whereas the merchant side is interested in commissions and financial sustainability of the initiatives.

It seems that costs, security, infrastructure and reliability are the main aspects which determine mobile payment acceptance. Nonetheless, mobile payment acceptance level is also affected by the socio-economic factors in the market such as regulations, previous user habits and readiness of the economy. It is also worth mentioning merchant characteristics and location of a market when discussing the mobile payment acceptance systems according to the research carried out in literature.

Mallat performed a qualitative research in 2007 on mobile payment adoption. There appeared some compatibility issues regarding larger amount of transactions during the focus group interviews. Users were fine with making payments not more than €100 using their mobile phones. They were concerned about security of their payments beyond this value.

Users also complained about the complexity of mobile payment services and mentioned this as a concern that would prevent further adoption. They mentioned the lack of information to complete the transaction in cases where an SMS is used and the large amount of time a user needs to enter payment codes (Mallat, 2007).



Users mentioned that the number of merchants offering mobile payment option is very limited. They are also concerned that there may appear to be hidden costs associated with mobile payments. Therefore, users were not willing to use the mobile payment option if the cash payment option was already available (Mallat, 2007).

The evidence in Mallat's research also indicated that trusting businesses and solution providers decreased the risk perception for mobile payment solutions. Users became keener to perform mobile payment transactions which involved credible banks, well known technology service providers and telecom operators. Payment solutions that involved banks were more favoured compared to other solution providers (Mallat, 2007).

Existing research studies on mobile payment acceptance in literature focus on case studies, literature reviews, experiments, focus groups, interviews and surveys. This research aims to use a survey performed in Istanbul, Turkey as main source of data. This form of examination on mobile payments may provide new insight, patterns and unbiased results on this topic.

## **CHAPTER 3**

### **3. APPROACHES FOR TECHNOLOGY ADOPTION**

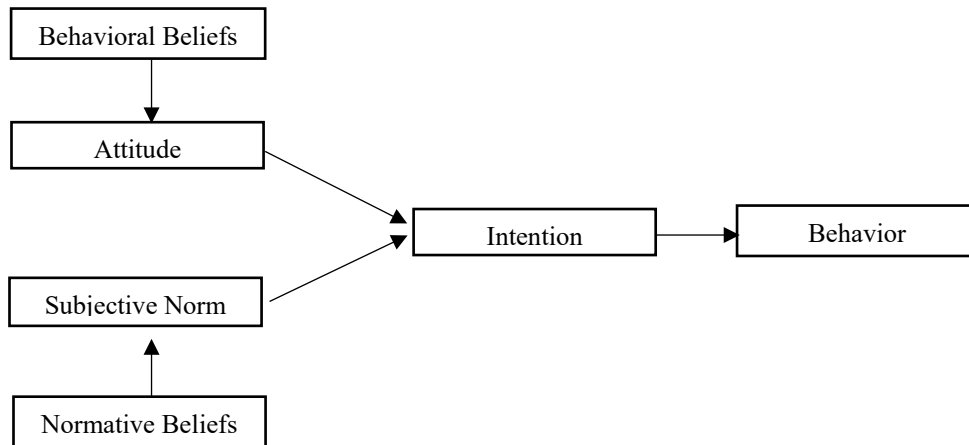
Technology adoption research have been carried out with different models in the literature. Some of these models are;

- Theory of Reasoned Action (TRA) by (Fishbein & Ajzen, 1975),
- Technology Acceptance Model (TAM) by (Davis, 1989),
- Theory of Planned Behavior by Ajzen, 1991,
- Diffusion of Innovations (DOI) by (Rogers, 1995),
- Unified Theory of Acceptance and Use of Technology by (Venkatesh et al, 2003).

Technology Acceptance Model is used in most of the studies.

### 3.1. Theory of Reasoned Action

The theory was developed by Fishbein and Ajzen in 1975. It has three principal constructs. They are; subjective norm, attitude and behavioral intention.



**Figure 3.1** Theory of Reasoned Action

“Subjective norms” are affected by “normative beliefs” and “attitude” is affected by “behavioral beliefs”. (Fishbein & Ajzen, 1975).

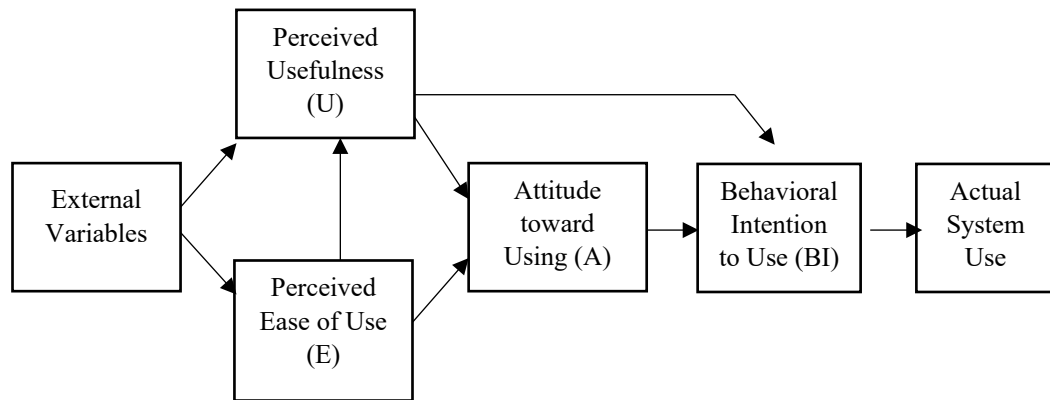
**Attitude:** The way users feel towards a behavior directed by the strengths of the sum of their behavioral beliefs.

**Subjective Norms:** The effect of relevant individuals in users’ social ecosystem among his behavioral intentions; these individuals’ beliefs and relative significance of their judgments will affect users’ behavioral intention.

**Behavioral Intention:** The effect of subjective norms and attitude regarding a behavior which together predict actual behavior.

### 3.2. Technology Acceptance Model

Technology Acceptance Model was developed by Davis in 1989. It is a humble, but a compelling model. It is used in several other research. The principal aspects of the model are “perceived usefulness” and “perceived ease of use”. These factors together influence the attitude. Behavioral Intention is influenced by attitude and intention influences actual system usage.



**Figure 3.2** Technology Acceptance Model

Technology acceptance model (TAM) is utilised for predicting new users’ intention to adopt a new technology.

Final spot where all individuals are comfortable using a new technology is the “actual system use”. Therefore, a factor which guides the potential users to use the technology is created as “behavioral intention (BI)”. This factor is affected by the “attitude (A)” which is defined as the common feeling against a new technology solution.

TAM proposes that some factors affect users’ judgment on the course of when and how they are going to utilize the new technology when they are exposed to it.

**Perceived Ease of Use (E):** The extent to which an individual thinks that using a specific technology will be effortless. Usefulness, attitude, intention and the actual usage of a new technology are affected by perceived ease of use. It is probable for people to refuse new technologies if they need perpetual exercise of knowledge (Chau, 1996).

**Perceived Usefulness (U):** The extent to which an individual thinks that using a specific technology will increase the job performance (Davis, 1993).

**External Variables:** External factors like social influence are crucial aspects for designating the attitude. When (TAM) is properly utilised, individuals are going to have the intention and attitude to use the new technology. Nonetheless, the perception might vary based on demographic parameters like gender and age since all people are different from each other.

**Attitude toward Using:** It is the positive or negative impression of a user to use a new technology. Positive or negative convictions towards a new technology

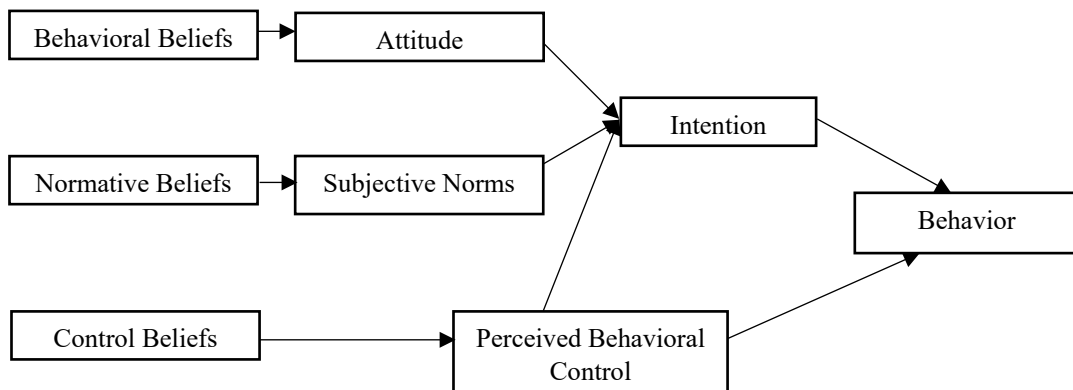
determines a user's decision to use it (Fishbein and Ajzen, 1975). Attitude regarding the usage of a new technology is influenced deeply among the ecosystem and society it is developed in.

**Behavioral Intention to Use (BI):** It is probable for people to refuse a new technology provided that it needs perpetual exercise of knowledge (Chau, 1996). However, people might still use the technology once it is commonly installed. Therefore, future intention to use it will not be affected.

It is more probable for individuals to develop an intention towards using a new payment technology at the time of payment rather than at a random moment when they are looking out to learn about mobile payments (Gefen and Straub, 1997).

### 3.3. Theory of Planned Behavior

The theory was formed after Theory of Reasoned Action. It consists of "Control Beliefs" that affect "Perceived Behavioral Control". "Intention" and "Behavior" are affected by "Perceived Behavioral Control". It is very akin to TRA.

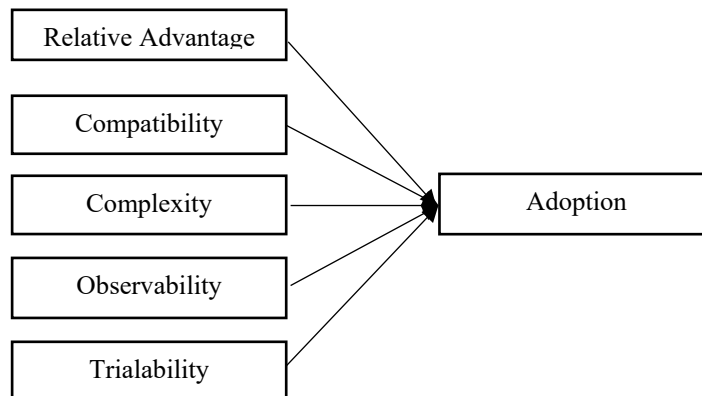


**Figure 3.3** Theory of Planned Behavior

**Perceived Behavioral Control:** Users' understanding of the convenience or hardship of fulfilling the required behavior. It is related with the self-efficacy. Self-efficacy is the user's expectation of whether he can exhibit processes to accomplish a mission good enough.

### 3.4. Diffusion of Innovation Theory

This is an early stage model utilised for technology adoption, built by Rogers in 1962. Time, social system, innovation and communication channels are the fundamentals. Independent variables are;



**Figure 3.4** Diffusion of Innovation Theory

**Relative Advantage:** The extent to which a new technology is perceived as outperforming the one it substitutes.

**Compatibility:** The extent to which a new technology is perceived as being coherent with the prevalent values, past experiences and needs of latent users.

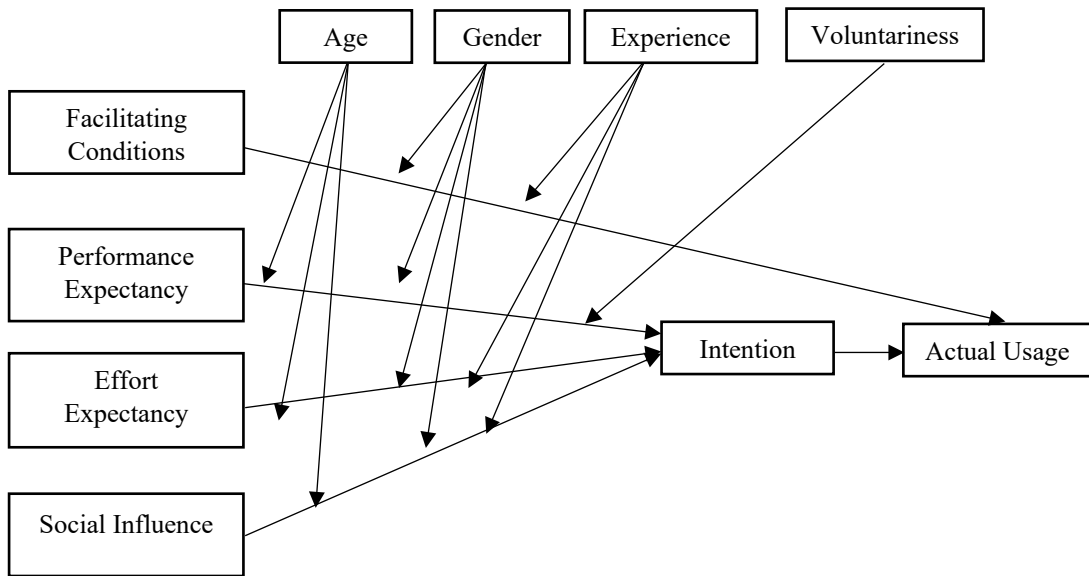
**Complexity:** The extent to which a new technology is perceived as being hard to use and comprehend.

**Observability:** The extent to which the results of a new technology are visible and substantial to latent users.

**Trialability:** The extent to which a new technology might be experienced before a commitment to adoption is made.

### 3.5. Unified Theory of Acceptance and Use of Technology

The theory is created to be a combination of previous technology adoption models in literature. Independent variables “social influence”, “effort expectancy”, “performance expectancy” and “facilitating conditions” are moderated by “voluntariness”, “gender”, “experience” and “age” (Venkatesh et al, 2003).



**Figure 3.5** Unified Theory of Acceptance and Use of Technology

**Facilitating Conditions:** The extent to which a user thinks that technical and institutional infrastructure is available to assist the use for a new technology.

Facilitating conditions refer to the available capabilities required for a new service to be used. Intention and facilitating conditions are two factors that directly affect actual usage in UTAUT model.

Examples for facilitating conditions are the highly available mobile network quality, high number of smart mobile devices around the market, prevalence towards mobile payment acceptance at the businesses in this case. These factors create positive facilitating conditions for mobile payments and therefore influence positive attitude and perceived usefulness towards mobile payments.

**Effort Expectancy:** The extent of ease related with the use of a new technology.

**Performance Expectancy:** The extent to which a person thinks using the new technology is going to increase his or her job performance.

**Social Influence:** The extent to which a person thinks that important people around consider the new technology is worth being used by him or her.

## CHAPTER 4

### 4. RESEARCH DESIGN

#### 4.1. Purpose of the Study

Although various researchers have conducted work into methods of “payment by phone”, there is still relatively low academic understanding on how mobile payment systems work. For this reason, this study will use current empirical research concerning mobile payments and scientific research on digital payment methods such as proximity payments that use near field communication (NFC), bluetooth or infrared technology and remote payment solutions that use mobile apps to address the research gaps.

Some studies concentrated on performing theory and conceptual systems to understand mobile payment acceptance and other studies focused on explaining the benefits and challenges of mobile payments. Some other studies focused on shifting from a conventional to a digital money ecosystem.

This study offers a different perspective by grouping constructs from a broader literature. Moreover, in this study, a model is proposed based on the constructs used in other studies after a comprehensive literature review. Previous studies in Turkey and around the world have been performed with small groups of respondents. This study provides a mobile payment acceptance model after a thorough literature review. It aims to perform the research model in a cosmopolitan city “Istanbul” where all sorts of mobile payment options are available in the market and in the time of a pandemic when remote delivery and online purchases are widely preferred compared to offline alternatives.

This study aims to attain the aspects affecting mobile payment technology usage.



## 4.2. Importance of the Study

The future of digital payments and financial technologies are crucial for consumers, merchants and telecommunication service providers all around the globe. Mobile payments will be a worthy section for every economy, as they encourage consumer spending, increase payment speed and decrease transaction costs. Reports state that mobile payment industry is predicted to grow at a yearly rate of 33% between 2019 and 2026, reaching US \$457 billion in 2026 (sbwire.com, 2019).

Since it is a fast-growing industry, it is crucial to study consumers' perceptions and opinions on mobile payments. Such research will be very valuable to develop further usage advancement and market acceptance together with helping technology providers ameliorate their prevalent platforms.

Digital payment solutions emerge as cheaper and better structured substitutes to conventional payment systems. Businesses should start seeking ways to improve the surroundings to make commercial payments more secure and more competent. (Jain, 2014). However, consumers' user experiences, attitude and intention towards mobile payments can't be neglected. Businesses should be conscious about how the societies correspond to the future of mobile payments.

Tracking consumer acceptance is vital for all innovative trends and timely actions can make remarkable effects on user acceptance for the future. the statement is especially genuine for disruptive technologies. Determining pros, cons and potential users' requests is vital, as mobile payment solutions grow into a prevalent payment method.

Even if there have been above 100 mobile money solutions launched in 70 emerging economies (Beshouri, et al., 2010), mobile payment method has become prevalent in a few countries. The inefficacy to spread such a product with enormous latent globally demonstrates that the causes leading the prosperous and failed deployments are not extensively studied, and consequently, are not applied to latter implementations (Diniz, 2011). Mobile payment technologies have a huge potential which has not been fully materialized to date. The initiators of mobile payment solutions should find superior approaches to persuade latent users to utilise their mobile devices instead of the cards and persuade merchants that accepting new payment forms and investing in this technology is rewarding.

The aim of this research is to illuminate consumers' attitudes towards mobile payments and their intention to use them. It tries to discover patterns and limitations which will help establish a roadmap to ease farther acceptance of mobile payment systems.

### **4.3. Beneficiaries of the Study**

This study is relevant for solution providers of mobile payment technologies. As solution providers look for ways to appeal to consumers and merchants to these technologies, a better perception on their potential customers' intention and attitude is going to guide solution developers in perfecting their products, and eventually, is going to assist them with meeting the requirements of target markets.

By examining this research, existing findings will hopefully be understood better by industry professionals and by researchers who are working on mobile payments.

Legal infrastructure and regulations on digital payments have recently been become effective especially in Turkey where this research is performed. Law makers and government legislators may find this study helpful in establishing better criteria for mobile payment technology service providers and businesses. This study also attempts to provide valuable information for the academia and marketing professionals by filling the gap in the literature on mobile payment acceptance in the area of social sciences, and moreover, in the area of technology.

### **4.4. Dissertation Road Map**

Chapter 1 presents background information and the context of this research. It outlines the research questions.

Chapter 2, 3, 4 review available literature related with the study. Subjects of interest include mobile commerce, descriptions of mobile payments, adoption issues and security concepts.

Chapter 5 portrays the research methodologies used. It investigates the strong and weak sides of the chosen methods. It portrays how the data collection was performed as well.

Chapter 6 analyses the collected data and sheds light on the findings. It lists the results coming after the analyses and constraints that limit the research.

Dissertation ends with the conclusion section which presents the findings of this research and recommends further research questions.

#### **4.5. Research Questions and the Scope**

The main scope of this research is to explore the factors (i.e., usefulness, security, social influence, attractiveness of alternatives, ease of use, enjoyment, new technology anxiety, innovativeness) that affect society's attitudes toward mobile payment acceptance.

Following research questions are examined to touch upon this objective:

- What are the factors encouraging and hindering a wider acceptance of mobile payment systems?
- What are the key factors affecting mobile payment acceptance?
- How are the factors affecting each other?
- What are the factors encouraging and hindering a wider acceptance of mobile payment systems?
- What are the prospective restraints that might hinder mobile payments from farther adoption?
- What is the mediating effect of perceived usefulness and attitudes toward users' behavioral intention to adopt mobile payments?

#### **4.6. Research Methodology**

Literature review is conducted by identifying the keywords and the research questions. Various research databases are searched according to the keywords and mobile payment adoption. An initial research model is formed using technology acceptance model.

Independent variables are gathered from the literature and previous research papers. The research model is modified according to these variables. Quantitative methodology is used for the statistical analysis of the surveys. Interpretations are made according to the statistical results. A measuring instrument is prepared for factor analysis of mobile payment acceptance.

Results are evaluated using SPSS and AMOS software for statistical analysis.

75% of the research papers in the literature used quantitative methodology. This rate is followed by some papers which used both qualitative and quantitative methods and few papers used qualitative method only.

#### **4.7. Research Model**

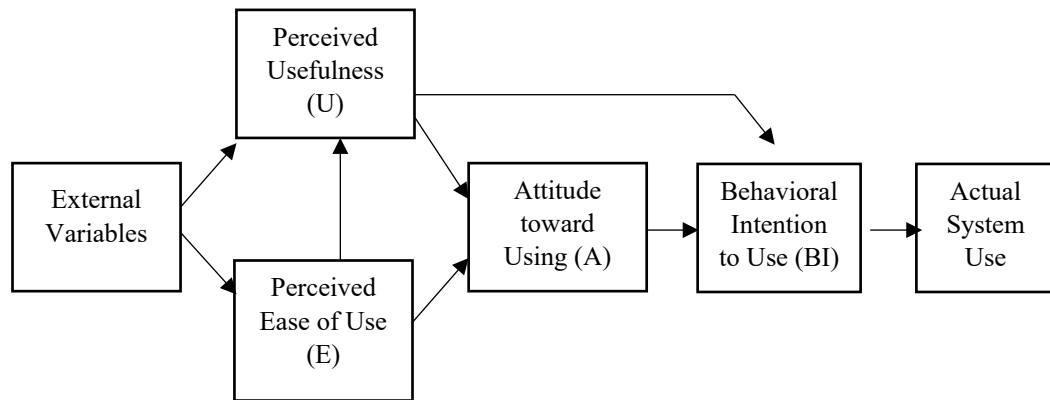
Adoption of mobile payments in a society is a very complex issue that depends on social, cultural and economic matters. These matters are unique to each society and there are perceived parameters that need to be considered.

Constructs regarding mobile payment acceptance that are used in this research are arranged by the method utilized by Amoroso and Watanabe (2011). These constructs are gathered from technology acceptance model (TAM) that measure consumers' tendency to use mobile payment solutions. Technology Acceptance Model is the basis for this study.

Some research has been done in the past studying consumer adoption factors. These studies are mostly based on technology acceptance model amidst optional aspects included like speed, mobility, cost, privacy, security, system quality.

A mobile payment adoption framework based on technology acceptance model was developed using eleven consumer related variables (Amoroso and Watanabe, 2011). These variables are; perceived ease of use, perceived usefulness, attitude toward using, facilitating conditions, social influence, perceived risk, perceived security and privacy, trust, perceived value, attractiveness of alternatives, behavioral intention to use.

Technology Acceptance Model was developed by Davis in 1989. It is a humble, but a compelling model. It is used in several other research. The principal aspects of the model are "perceived usefulness" and "perceived ease of use". These factors together influence the attitude. Behavioral Intention is influenced by attitude and intention influences actual system usage.



**Figure 4.1** Technology Acceptance Model

Technology acceptance model (TAM) is utilised for predicting new users' intention to adopt and use a new technology.

Final spot where all individuals are comfortable using a new technology is the “actual system use”. Therefore, a factor which guides the potential users to use the technology is created as “behavioral intention (BI)”. This factor is affected by the “attitude (A)” which is defined as the common feeling against a new technology solution.

TAM proposes that some factors affect users' judgment on the course of when and how they are going to utilize the new technology when they are exposed to it.

**Perceived Ease of Use (E):** The extent to which an individual thinks that using a specific technology will be effortless. Usefulness, attitude, intention and the actual usage of a new technology are affected by perceived ease of use. It is probable for people to refuse new technologies if they need perpetual exercise of knowledge (Chau, 1996).

**Perceived Usefulness (U):** The extent to which an individual thinks that using a specific technology will increase the job performance (Davis, 1993).

**External Variables:** External factors like social influence are crucial aspects for designating the attitude. When (TAM) is properly utilised, individuals are going to have the intention and attitude to use the new technology. Nonetheless, the perception might vary based on demographic parameters like gender and age since all people are different from each other.

**Attitude toward Using:** It is the positive or negative impression of a user to use a new technology. Positive or negative convictions towards a new technology

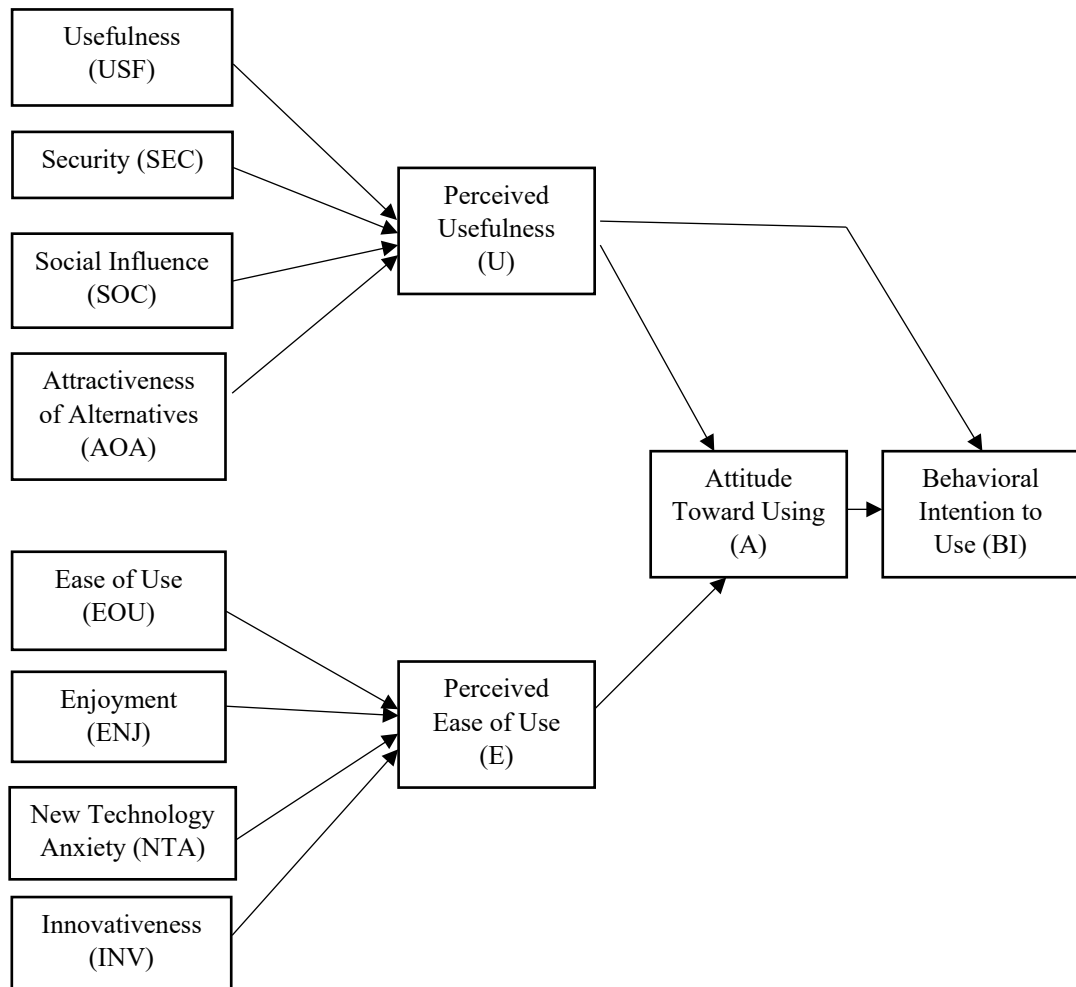
determines a user's decision to use it (Fishbein and Ajzen, 1975). Attitude regarding the usage of a new technology is influenced deeply among the ecosystem and society it is developed in.

**Behavioral Intention to Use (BI):** It is probable for people to refuse a new technology provided that it needs perpetual exercise of knowledge (Chau, 1996). However, people might still use the technology once it is commonly installed. Therefore, future intention to use it will not be affected.

It is more probable for individuals to develop an intention towards using a new payment technology at the time of payment rather than at a random moment when they are looking out to learn about mobile payments (Gefen and Straub, 1997).

The technology acceptance model which is used for all technology adoption studies in general is modified considering the needs for the "mobile payment" topic. Among the study papers in the literature, "Security" is the most common construct. "Usefulness" and "Ease of Use" are adopted a lot since these are the main constructs for the Technology Acceptance Model (TAM). Remaining factors used during this research process are gathered from the literature according to their usage rate. Some of the constructs are grouped together according to their similarity.

#### 4.8. Modified Research Model



**Figure 4.2** Initially Proposed Research Model

**Table 4.1** Research Questions and Corresponding Hypotheses

Question Number	Research Question	Corresponding Hypotheses
RQ1	What are the key factors affecting mobile payment acceptance?	H1, H2, H3, H4, H5, H6, H7, H8
RQ2	What are the factors encouraging and hindering a wider acceptance of mobile payment systems?	H1, H2, H3, H4, H5, H6, H7, H8
RQ3	What are the key factors affecting mobile payment acceptance?	H1, H2, H3, H4, H5, H6, H7, H8
RQ4	What is the mediating effect of perceived usefulness and user attitudes toward users' behavioral intention to use mobile payment systems?	H9
RQ5	Do demographic parameters such as age, gender, education level affect mobile payment acceptance?	

#### 4.8.1. Constructs for Perceived Usefulness

**Usefulness:** The extent to which an individual thinks that using a mobile payment solution will increase the job performance” including technical elements such as smartness, responsiveness, availability, quality of the system and speed. (Davis, 1989). Incentives are also considered a part of usefulness in this research which are, events or objects independent of the user that can provoke action.

Network service uptime is considered a part of usefulness within the scope of this research.

**H1:** Higher level of usefulness (USF) has a positive effect on use of mobile payment systems.

**Security:** The extent to which a mobile payment user feels secure by using a mobile payment solution or sending private information over a mobile payment system” (Shin, 2009) (Özkan Yıldırım et al, 2010).



Uncertainty in newly introduced technologies leads to privacy and security concerns amidst users. Concern of personal and financial information theft might deter consumers from using mobile payments. The more security concerns the users have, the longer its acceptance will take (Yang & Forney, 2013).

The perceived security and risk vary among different markets. People might feel safe in countries where crime rate is low, whereas users might have a higher security concern in countries in which thefts and cyber frauds are more common. Extra authentication layers such as biometric fingerprint and face recognition technologies can be used in mobile payment solutions in high-risk markets (Wang et al., 2016).

Since mobile devices are used for multiple purposes along with mobile payments, they are prone to cyber threats. Other purposes include; email management, downloading apps, streaming visual content and file sharing. These purposes are vulnerable to spoofing, phishing, malware and spam. Therefore, mobile payment solutions have to address these risks considering the following matters (Wang et al., 2016);

- Transmitted data confidentiality
- Authentication among involved trusted parties
- Transmitted data integrity and security
- Authorisation of transaction by regulators
- System availability and accessibility at all times
- Access control via password and biometric recognition for transaction authentication
- Non-repudiation of the transaction by the user

Trust is considered as the assumption that merchants will execute activities considering customer expectations. Mobile payment users are also believed to think in a similar manner and this factor will affect the acceptance of mobile payments among consumers (Amoroso & Watanable, 2011).

Perceived risk is the perception that a service will cause loss when it is used. Users might feel the risk of experiencing a loss if they share their personal and financial information via a mobile payment solution. Risk perception is decreased as trust and security perception for the service is improved (Amoroso & Watanable, 2011). Implementing extra security layers and setting upper limits for transactions reduce the

fraud potential therefore diminishing the perceived risk of mobile payment solutions. The extra precautions build a positive attitude, trust and therefore a higher behavioral intention to use mobile payments.

Feeling secure, risky or trusting the solutions are considered as complementary issues within the extent of this research.

**H2:** Higher level of security (SEC) has a positive effect on use of mobile payment systems.

**Social Influence:** The extent to which a person thinks that important people around consider the new technology is worth being used by him or her.

This factor is named as “subjective norm” in the variables of UTAUT model. It basically relates to how a group of people in the environment influence a single user’s behavioral intention to use a new innovation and how this perception reduces the uncertainty and risk concerns (Ajzen & Fishbein, 1975).

Satisfied users tend to act as advocates for a new technology. They make sure more people around them get to benefit from the new experience and help their peers with the potential risks.

**H3:** Higher level of social influence (SOC) has a positive effect on use of mobile payment systems.

**Attractiveness of Alternatives:** It is the presence of substitutes in the market. It evaluates the extent to which the substitutes influence the consumers’ intention to use a new technology (Shin, 2009).

Mobile payment solutions have been around the market for years now. However, they still have strong rivals with an established network such as card-based payments and the conventional cash payments. These alternatives prevent mobile payment solutions to be extensively adapted. A switching cost appears in terms of convenience for consumers trying to use the innovative mobile payment solutions instead of more common methods.

The perceived value of mobile payments is the compensation of what users give up like time, opportunity cost, effort, price, cost and the benefits received in return. In other words, it can be described as a difference between what customers pay for a service and what they were willing to pay at first (Amoroso & Watanabe, 2011).

Usage cost is the expense that must be spent for using mobile payments and the necessary tools such as the mobile devices to be acquired to be able to use the technology.

Perceived value and usage cost are considered as a part of attractiveness of alternatives construct within the context of this research.

**H4:** Higher level of attractiveness of alternatives (AOA) has a negative effect on use of mobile payment systems.

#### **4.8.2. Constructs for Perceived Ease of Use**

There is an agreement between researchers that perceived ease of use affects the usefulness, attitude, behavioral intention and actual usage of a new innovation (Chau, 1996). Chau discovered that it is probable for people to refuse a new innovation if it needs perpetual exercise of knowledge, even if the same aspect will not substantially influence their behavioral intention to adopt it in the future once the technology is established (Murthy and Mani, 2013).

**Ease of Use:** the extent to which an individual thinks that using a specific technology will be effortless” (Davis, 1989). Compatibility is also considered as a part of this construct, which is “the extent to which a new technology is perceived as being coherent with the prevalent values, necessities, and past experiences of latent users” (Rogers, 1995).

**H5:** Higher level of ease of use (EOU) has a positive effect on use of mobile payment systems.

**Enjoyment:** The fun or entertainment gotten by using a new technology” (Venkatesh et al, 2012) (Oliveira et al, 2016).

**H6:** Higher level of enjoyment (ENJ) has a positive effect on use of mobile payment systems.

**New Technology Anxiety:** The user’s worry or concern of, adopting, or thinking of using a new technology” (Venkatesh, 2000) (Bailey et al, 2017).

**H7:** Higher level of new technology anxiety (NTA) has a negative effect on use of mobile payment systems.

**Innovativeness:** The extent to which an individual’s eagerness or enthusiasm to try a new technology (Slade et al, 2015). Knowledge is also considered as a part of this construct, which is the degree of acquired awareness or information by experimenting or education on a new technology.

**H8:** Higher level of innovativeness (INV) has a positive effect on use of mobile payment systems.

**Attitude:** The total of beliefs about a specific behavior scaled by assessment of those beliefs" (Davis, 1989).

Attitude toward using evaluates the positive or negative feeling of a person among using a new technology. Fishbein and Ajzen (1975) discovered that a person's judgment on adopting or not adopting a new technology depends on that individual's positive or negative opinions on adopting that specific innovation.

**H9:** Higher level of attitude (A) has a mediating effect on intention towards mobile payment technology acceptance.

**Behavioral Intention:** The role of attitudes regarding a behavior which has been discovered to foresee actual behavior (Davis, 1989).

It is a user's inclination to act in a specific manner that designates actual usage of a technology. Behavioral intention is negatively affected by "new technology anxiety" and "attractiveness of alternatives" factors (Yang et al., 2012).

#### **4.9. Survey Design and Measurement of Variables**

A survey is prepared to measure the effects of the constructs listed above. Google Forms is employed for the technical development. There are two sections in the survey. First section gathers information on respondents' demographic status and mobile payment usage level. Second section consists of questions that are gathered and modified from the literature. Survey is performed in Turkish since the respondents are all Turkish speaking individuals. There is an introduction section about the research goal just before the questions.

##### **4.9.1. Sampling Method**

Sample size mean for analysis in previous studies is 465. Sample size median is 292. Research with highest sample size is 2587 (Liébana-Cabanillas et al, 2018). Technology adoption studies are mostly carried out with university students since this is a rather easier task. Although reaching out to schools is faster and cheaper, getting the sample from university students cannot represent the population.

This research uses a wider range of sample size. A sample of 685 respondents located in Istanbul for this study from age groups of 18+ and all education levels are comprised among the survey.

**Population:** To have a generalizable result after data collection, population is considered as "*the smart phone using mobile phone subscribers in Istanbul, Turkey*"

**Sampling Frame:** The information about the population regarding this study is collected from The Information and Communication Technologies Authority (ICTA) (Bilgi Teknolojileri ve İletişim Kurumu (BTK)). The latest report was published in 2019 which covers the 2018 data.

According to the yearly report covering the telecommunications statistics based on cities;

Number of Mobile Telephony Subscriptions (TURKEY): 80,117,999

Number of Mobile Telephony Subscriptions (Istanbul): 21,939,056

Mobile phone subscribers located in Istanbul are used for this study which is the largest subscription city in Turkey.

There will be a slight coverage error since this research will be performed in March 2020 and the data is published in December 2018.

#### **4.9.2. Sampling Design**

**Istanbul mobile subscribers:** 21,939,056

**Stratification:** Age, Gender, Income level, Education level

**Confidence Level:** 95%,  $K = 1.96$

**Sample Size:** 685 (Confidence interval of the sampling size = 3.74), for the covered city Istanbul since the population is greater than 1million.

#### **4.10. Sampling Process Execution**

The delivery of the survey to mobile phone subscribers is arranged via convenience sampling method for them to fill the survey questionnaire. Survey links are shared in whatsapp, linkedin, facebook for people to share with their social and professional network too.

The research is conducted in Istanbul. Therefore, respondents are located in Istanbul and respondents who are located in cities other than Istanbul are eliminated from the data.

### Survey Invitation Message:

*Selamlar;*

*Üzerinde çalıştığım doktora tezim için Türkiye'deki cep telefonu kullanıcılarının Mobil Ödeme Kullanım Eğilimleri'ni araştırıyorum. Siz de ülkemizin dijitalleşmesine katkı sağlayacak bu araştırmayı desteklemek isterseniz, 3 dakika sürecek şekilde hazırladığım anketi doldurmanızı ve en az 2 arkadaşınıza bu mesajı iletmenizi rica ederim.*

*<https://tinyurl.com/mobil-odeme-anketi>*

*Araştırma tamamlandığında sonuçlarından haberdar olmak isterseniz iletişim bilgilerinizi anketin sonuna yazabilirsiniz.*

*Çok teşekkürler!* 

**Figure 4.3** Survey Invitation Message

First section of the survey collects demographic information such as respondent's mobile operator, city, age, gender, education level, monthly income, how long and how often the respondent engages with mobile payment.

Second section of the survey questions will be in a 5-point Likert Scale as; Strongly Agree (5), Agree (4), Undecided (3), Disagree (2), Strongly Disagree (1).

#### 4.11. Items of Factors and Related Studies

**Table 4.2** Items of Factors and Related Studies

<b>Construct</b>	<b>Items</b>	<b>Source</b>
<b>Usefulness</b>		
USF1	Mobile payment would enhance my efficiency in making a purchase.	(Pham & Ho, 2015)
USF2	Using mobile payments would make it easier for me to conduct transactions.	(Pham & Ho, 2015)
USF3	Mobile payment will offer prompt and uninterrupted service to me.	(Pham & Ho, 2015)
USF4	I would like to benefit from promotions offered by the mobile payment.	Author generated
<b>Security</b>		
SEC1	I would feel secure sending sensitive information across mobile payment.	(Oliveira et al, 2016)
SEC2	The risk of an unauthorized party intervening in the mobile payment process is low.	(Liébana-Cabanillas et al, 2015)
<b>Social Influence</b>		
SOC1	People who are important to me would recommend using the mobile payment system.	(Liébana-Cabanillas et al, 2015)
SOC2	The people in my environment who use mobile payment are more prestigious than those who do not use it.	(Liébana-Cabanillas et al, 2014)
<b>Attractiveness of Alternatives</b>		
AOA1	Mobile payment service fees are reasonably priced	(Oliveira et al, 2016)
AOA2	I think mobile payment is more hygienic.	Author generated
AOA3	There are better payment methods compared to mobile payment.	(Pham & Ho, 2015)
<b>Ease of Use</b>		
EOU1	The use of mobile payment would be easy to understand.	(Pham & Ho, 2015)

**Table 4.2** Items of Factors and Related Studies (continued).

<b>Construct</b>	<b>Items</b>	<b>Source</b>
EOU2	I think that using mobile payment fits well with the way I like to buy.	(Oliveira et al, 2016)
<b>Enjoyment</b>		
ENJ1	Using mobile payment is enjoyable.	(Oliveira et al, 2016)
ENJ2	Using mobile payment is very entertaining.	(Oliveira et al, 2016)
<b>New Technology Anxiety</b>		
NTA1	I fear that I will do the wrong thing when I use new technology.	(Bailey et al, 2017)
NTA2	I feel apprehensive about using new technology.	(Bailey et al, 2017)
<b>Innovativeness</b>		
INV1	If I heard about a new information technology, I would look for ways to experiment with it.	(Pham & Ho, 2015)
INV2	I have the skills/knowledge necessary for purchasing products via mobile devices.	(Lwoga & Lwoga, 2017)
<b>Attitude</b>		
A1	Using mobile payment is a good idea.	(Ajzen, 1991)
A2	Using mobile wallets is a wise thing to do.	(Ajzen, 1991)
<b>Behavioral Intention</b>		
BI1	Given the opportunity, I intend to use mobile payment systems.	(Venkatesh and Davis 2000)
BI2	I am likely to use/continue using mobile payment services in the near future.	(Bhattacharjee, 2001)

#### 4.12. Survey Questions

The survey questions gathered from the literature have been rephrased after the pilot survey. The rephrases are performed in accordance with the feedbacks from the



respondents so that the questions are easier to understand and that they reflect the meanings better.

Survey URL: <https://tinyurl.com/mobil-odeme-anketi>

### **Section 1: General Information about the user for demographic Stratification**

1. Which mobile operator are you subscribed to? / Hangi mobil operatörü kullanıyorsunuz?

• Turkcell • Vodafone • Turk Telekom Mobil (Avea)

2. Which city do you live in? / Hangi şehirde yaşıyorsunuz?

• Istanbul • Izmir • Ankara • Bursa • Antalya • Diğer

3. How old are you? / Kaç Yaşındasınız?

• Choose / • Seçiniz

4. What is your gender? / Cinsiyetiniz nedir?

• Male • Female

• Erkek • Kadın

5. What is your level of education? / En son mezun olduğunuz okul nedir?

• Primary school • Secondary school • High school • Two-year degree • Bachelor's degree • Master's degree or more

• İlkokul • Ortaokul • Lise • Önlisans • Lisans • Yüksek Lisans ve Üzeri

6. What is your monthly income? / Aylık geliriniz nedir?

• 0 TRY – 2,999 TRY

• 3,000 TRY – 5,999 TRY

• 6,000 TRY – 8,999 TRY

• 9,000 TRY – 11,999 TRY

• 12,000 TRY – 14,999 TRY

• 15,000 TRY or more

7. How long have you been using a smartphone? / Ne kadar süredir akıllı telefon kullanıyorsunuz?

- I have never used a smartphone before. • 1-3 years • 4-6 years • 7-9 years • 10 years or more.
- Akıllı telefon hiç kullanmadım. • 1-3 yıl • 4-6 yıl • 7-9 yıl • 10 yıl ve üzeri.

8. How long have you been using any of the mobile payment systems? / Mobile payment is defined as any payment where a mobile device (phone, tablet, smartwatch etc.) is used to conduct financial transactions. (Mobile apps, NFC, bluetooth, QR code, SMS, BKM Express, Paycell, Fastpay, etc.)

Ne kadar süredir mobil ödeme kullanıyorsunuz? Mobil Ödeme; bir mobil cihaz (telefon, tablet, akıllı saat vb.) aracılığıyla gerçekleştirilen ödemelere denir. (mobil uygulamalar, NFC, bluetooth, QR kod, sms, BKM Express, Paycell, Fastpay, vb.)

- I have never used mobile payments. • 1-3 years • 4-6 years • 7-9 years • 10 years or more
- Mobil ödeme hiç kullanmadım. • 1-3 yıl • 4-6 yıl • 7-9 yıl • 10 yıl ve üzeri

9. How often do you use mobile payments? / Hangi sıklıkla mobil ödeme kullanıyorsunuz?

- I have never used mobile payments. • Once a year • Once a month • Once a week • Once a day • More than once a day
- Mobil ödeme hiç kullanmadım. • Yılda 1 • Ayda 1 • Haftada 1 • Günde 1 • Günde 1'den fazla

## **Section 2: Questions regarding the research constructs**

### **Usefulness**

10. Mobile payment would enhance my efficiency in making a purchase. 1 – 2 – 3 – 4 – 5

Mobil ödeme, ödemelerimi daha hızlı yapmamı sağlar.

11. Mobile payments makes it easier for me to conduct my transactions. 1 – 2 – 3 – 4 – 5

Mobil ödeme, harcamalarımı daha kolay takip etmemi sağlar.

12. Mobile payment will offer prompt and uninterrupted service to me. 1 – 2 – 3 – 4 – 5

Mobil ödeme esnasında servis kesintisi yaşanmaz.

13. I would like to benefit from promotions offered by mobile payment. 1 – 2 – 3 – 4 – 5

Mobil ödemenin sunduğu promosyonlardan faydalanmak isterim.

### **Security**

14. I would feel secure sending sensitive information across mobile payment. 1 – 2 – 3 – 4 – 5

Mobil ödeme sırasında hassas bilgilerimi karşı tarafa gönderirken güvende hissedirim.

15. The risk of an unauthorized party intervening in the mobile payment process is low. 1 – 2 – 3 – 4 – 5

Mobil ödeme sürecine dolandırıcıların müdahale etme riski düşüktür.

### **Social Influence**

16. People who are important to me would recommend using mobile payments. 1 – 2 – 3 – 4 – 5

Görüşlerine değer verdiğim ve güvendiğim insanlar, mobil ödeme kullanmayı tavsiye ederler.

17. People in my environment who use mobile payment are more prestigious than those who do not use it. 1 – 2 – 3 – 4 – 5

Çevremdeki mobil ödeme kullanan insanlar, kullanmayanlara göre daha saygındırlar.

### **Attractiveness of Alternatives**

18. Mobile payment service fees are reasonably priced. 1 – 2 – 3 – 4 – 5

Mobil ödeme hizmet ücretleri bana göre makuldür.

19. I think mobile payment is more hygienic. 1 – 2 – 3 – 4 – 5

Mobil ödemenin daha hijyenik olduğunu düşünüyorum.

20. There are better payment methods compared to mobile payment. 1 – 2 – 3 – 4 – 5

Mobil ödemeye göre daha çok tercih ettiğim ödeme yöntemleri var.

### **Ease of use**

21. It was easy for me to learn using mobile payments. 1 – 2 – 3 – 4 – 5

Mobile ödeme kullanmayı öğrenmek benim için kolay oldu.

22. I think using mobile payments fits well with the way I like to buy. 1 – 2 – 3 – 4 – 5

Mobil ödeme kullanımı benim önceki harcama alışkanlıklarım ile uyumludur.

### **Enjoyment**

23. Using mobile payments is enjoyable. 1 – 2 – 3 – 4 – 5

Mobil ödeme kullanımı bana göre eğlencelidir.

24. Using mobile payments is very entertaining. 1 – 2 – 3 – 4 – 5

Mobil ödeme kullanmaktan keyif alırım.

### **New Technology Anxiety**

25. I fear that I will make a mistake when using a new technology. 1 – 2 – 3 – 4 – 5

Yeni bir teknoloji kullanırken, yanlış bir şey yapacağımdan korkarım.

26. I feel apprehensive about using new technologies. 1 – 2 – 3 – 4 – 5

Yeni teknolojilere endişeyle yaklaşırım.

### **Innovativeness**

27. If I hear about a new information technology, I will look for ways to try it. 1 – 2 – 3 – 4 – 5

Yeni bir teknolojiden haberdar olursam, onu denemek isterim.

28. I have the skills/knowledge necessary for using mobile payments. 1 – 2 – 3 – 4 – 5

Mobil ödeme kullanmak için yeterli bilgiye sahibim.

### **Attitude**

29. Using mobile payment is a good idea. 1 – 2 – 3 – 4 – 5

Mobil ödeme kullanmanın iyi bir fikir olduğunu düşünüyorum.

30. Using mobile payment is a wise thing to do. 1 – 2 – 3 – 4 – 5

Mobil ödeme kullanmanın akıllıca olduğunu düşünüyorum.

### **Intention**

31. Given the opportunity, I intend to use mobile payments. 1 – 2 – 3 – 4 – 5

Fırsat olduğunda, mobil ödeme kullanmaya niyetliyim.

32. I am likely to use/continue using mobile payment services in the near future. 1 – 2 – 3 – 4 – 5

Yakın gelecekte mobil ödeme sistemlerini tekrar kullanmaya açığım.

33. Feel free to share your contact information in case you would like to hear about the research results. (Not compulsory, optional.) Araştırma sonuçlarından haberdar olmak isterseniz iletişim bilgilerinizi aşağıya yazabilirsiniz. (zorunlu değil, isteğe bağlı)

### **4.13. Data Collection Process:**

Data is collected via convenience sampling method between 26.04.2020 and 05.05.2020. The survey URL is provided to the respondents via whatsapp, linkedin, facebook messages for them to fill and share with their social / professional network.

Total of 685 relevant surveys are collected from mobile phone subscribers located in Turkey, in Istanbul. 14 surveys that are out of scope of this research that are identified according to the answers for demographic questions are removed from the data set.

Examples:

- Respondents who do not use smart phones.
- Respondents who are located in cities other than Istanbul.

- Respondents who submitted duplicate responses.

112 respondents out of 685 who have not used any mobile payments to date have been included in data analysis since this group was aware of the technology and did not use it deliberately either because of security concerns or did not prefer mobile payment method as regards to other type of payments such as credit cards or cash.

## **CHAPTER 5**

### **5. DATA ANALYSIS AND EMPIRICAL FINDINGS**

There exists a broad scale of analysis tools used in the literature of mobile payment studies. Most studies employed Structural Equation Modeling (SEM) for testing the data collected. Regression analysis is the next tool used and some studies used basic descriptive analyses. 75% of the studies used SPSS with AMOS as statistics software. The rest of the studies used SmartPLS, MPlus, WarpPLS and Microsoft Excel respectively.

This research aims to investigate consumers' attitudes towards mobile payment acceptance via the means of survey data. Data is collected via convenience sampling method between 26.04.2020 and 05.05.2020. The analysis is expected to describe an accurate image of how consumers in Turkish market perceive mobile payments through identifying the factors that affect mobile payment acceptance. The insights gathered from this research will hopefully aid further development and successful implementation of mobile payment solutions and facilitate an improved comprehension of the aspects concerning this innovation's acceptance.

Quantitative analyses and results are given below. Sample properties, duplicate data handling, Structural Equation Modeling (SEM) assessment, statistical results of the models are provided.

Microsoft Excel is used for data handling. SPSS is employed for Cronbach's alpha, factor analysis and correlation statistics. AMOS software is employed for structural equation modeling algorithm.

### 5.1. Cronbach's Alpha Reliability Analysis

Reliability is a term that reveals consistency and homogeneity in measuring the problems under consideration between the questions of a survey. On the other hand, it evaluates the reliability of the instruments used in the measurement. If a survey is employed during a research, Cronbach's Alpha coefficient is the most preferred reliability analysis method.

Cronbach's alpha values are examined for measuring the internal consistency of the survey. Good level of internal consistency requires Cronbach's alpha values to be between 0.7 and 0.95 (Tavakol & Dennick, 2011).

The criteria considered for evaluating Cronbach's Alpha coefficient;

- $0 < a < 0.20$  measurement is less reliable.
- $0.21 < a < 0.40$  measurement is somewhat reliable.
- $0.41 < a < 0.60$  measurement is pretty reliable.
- $0.61 < a < 0.80$  measurement is reliable.
- $0.81 < a < 1.00$  measurement is very reliable.

Source: (Triton, 2006)

All Likert scaled items of the survey are analysed in means of reliability and the results are given below.

**Table 5.1** Reliability Analysis of Likert Scaled Items

Item	# of Questions	Cronbach's Alpha	Reliability
All items	23	0.714	Reliable

Cronbach's Alpha is calculated as 0.714. This leads to the outcome that the internal consistency reliability conditions are met.



## 5.2. Main Characteristics of the Sample

685 relevant responses were collected. Demographic information of the sample is listed below.

**Table 5.2** Mobile Operator Subscriptions

<b>1. Which mobile operator are you subscribed to?</b>		
	<b>Frequency</b>	<b>Percentage</b>
Turk Telekom Mobil (Avea)	136	19.9 %
Turkcell	372	54.3 %
Vodafone	177	25.8 %
Total	685	100%

The highest number of subscribers belongs to the Turkcell mobile network operator (54.3%). This is expected as Turkcell has the highest market share in the region. However, this might cause a bias in our findings since mobile operator subscriptions are not equally distributed.

**Table 5.3** Age Groups

<b>Age Groups</b>		
	<b>Frequency</b>	<b>Percentage</b>
18-29	152	22.2 %
30-39	252	36.8 %
40-49	180	26.3 %
50-59	84	12.3 %
60+	17	2.5 %
Total	685	100%

Age group with highest frequency is “30-39” (36.8%). However, “60+” age group has a slight weight in the sample.

**Table 5.4** Genders

<b>4. What is your gender?</b>		
	<b>Frequency</b>	<b>Percentage</b>
Female	308	45 %
Male	377	55 %
Total	685	100%

Female and male respondents' ratio is almost as the same with the population considered.

**Table 5.5** Education Levels

<b>5. What is your level of education?</b>		
	<b>Frequency</b>	<b>Percentage</b>
Primary School	6	0.9 %
Middle School	7	1 %
High School	107	15.6 %
Associate Degree	48	7 %
Bachelor's Degree	323	47.2 %
Master's Degree or more	194	28.3 %
Total	685	100%

The sample is skewed to "Bachelor's Degree or more" in education.

**Table 5.6** Income Levels

<b>6. What is your monthly income?</b>		
	<b>Frequency</b>	<b>Percentage</b>
0 TL - 2.999 TL	119	17.4 %
3.000 TL - 5.999 TL	180	26.3 %
6.000 TL - 8.999 TL	124	18.1 %
9.000 TL - 11.999 TL	75	10.9 %
12.000 TL - 14.999 TL	70	10.2 %
15.000 TL - 17.999 TL	28	4.1 %
18.000 TL or above	89	13 %
Total	685	100%

**Table 2** Smartphone Ownership Period

<b>7. How long have you been using a smartphone?</b>		
	<b>Frequency</b>	<b>Percentage</b>
1-3 years	4	0.6 %
4-6 years	80	11.7 %
7-9 years	213	31.1 %
10 years or more	388	56.6 %
Total	685	100%

Most of the respondents have been using smartphones for “more than 7 years” (87.7%).

**Table 5.8** Mobile Payment Usage Period

<b>8. How long have you been using any of the mobile payment systems? / Mobile payment is defined as any payment where a mobile device (phone, tablet, smartwatch etc.) is used to conduct financial transactions. (Mobile apps, NFC, bluetooth, QR code, SMS, BKM Express, Paycell, Fastpay, etc.)</b>		
	<b>Frequency</b>	<b>Percentage</b>
I have never used mobile payments	112	16.4 %
1-3 years	199	29.1 %
4-6 years	190	27.7 %
7-9 years	103	15 %
10 years or more	81	11.8 %
Total	685	100%

112 out of 685 respondents in our study “have never used mobile payments” (16.4%).

**Table 5.9** Mobile Payment Usage Frequency

<b>9. How often do you use mobile payments?</b>		
	<b>Frequency</b>	<b>Percentage</b>
I have never used mobile payments	112	16.4 %
Once a year	53	7.7 %
Once a month	244	35.6 %
Once a week	191	27.9%
Once a day	51	7.4 %
More than once a day	34	5 %
Total	685	100%

Mobile payments seem to be used mostly in either “once a week” or “once a month” frequency (27.9%, 35.6%) respectively.

### 5.3. Measurement of the Study

The survey was envisioned by adopting a multi-item approach. All factors were performed by a five-point Likert-scale, ranging from strongly disagree (1) to strongly agree (5). Items were acquired from existing literature findings and adapted for the context of this research.

SPSS and AMOS statistics software are used for data analysis.

### 5.4. Analysis of the Collected Data

Exploratory factor analysis is the first one in the overall analyses. Questions regarding each of the eight constructs have been analysed in SPSS via exploratory factor analysis. The goal of this analysis was to observe if our constructs are well suited with the questions asked in the survey.

#### 5.4.1. Factor Analysis for Independent Variables

#### KMO and Bartlett's Test for Independent Variables

**Table 5.10** KMO and Bartlett's Test for Independent Variables

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.756
Bartlett's Test of Sphericity	Approx. Chi-Square	5042.579
	df	171
	Sig.	0.0

The first step of the factor analysis is the Kaiser-Meyer-Olkin (KMO) Test. It is executed to see whether the data is appropriate enough for factor analysis. The test result is 0.756 which should not be less than 0.6. Therefore, factor analysis can be run.

## Rotated Component Matrix for Independent Variables

**Table 5.11** Factor Analysis for Independent Variables

	Component (Cronbach's Alpha)							
	1 (USF)	2 (SEC)	3(ENJ)	4 (AOA)	5 (NTA)	6 (EOU)	7 (INV)	8 (SOC)
10. Mobile payment would enhance my efficiency in making a purchase	0.822							
11. Using mobile payments would make it easier for me to conduct transactions.	0.806							
13. I would like to benefit from promotions offered by mobile payment.	0.751							
12. Mobile payment will offer prompt and uninterrupted service to me.	0.729							
15. The risk of an unauthorized party intervening in the mobile payment process is low.		0.910						
14. I would feel secure sending sensitive information across mobile payment.		0.882						
24. Using mobile payments is very entertaining.			0.915					
23. Using mobile payments is enjoyable.			0.911					
18. Mobile payment service fees are reasonably priced.				0.808				
20. There are better payment methods compared to mobile payment.				0.701				

**Table 5.11** Factor Analysis for Independent Variables (continued).

	Component (Cronbach's Alpha)							
	1 (USF)	2 (SEC)	3(ENJ)	4 (AOA)	5 (NTA)	6 (EOU)	7 (INV)	8 (SOC)
19. I think mobile payment is more hygienic.				0.685				
25. I fear that I will make a mistake when using a new technology.					0.928			
26. I feel apprehensive about using new technologies.					0.908			
22. I think using mobile payments fits well with the way I like to buy.						0.859		
21. It was easy for me to learn using mobile payments.						0.859		
27. If I hear about a new information technology, I will look for ways to try it							0.872	
28. I have the skills/knowledge necessary for purchasing products via mobile payments							0.784	
17. The people in my environment who use mobile payment are more prestigious than those who do not use it.								0.909
16. People who are important to me would recommend using mobile payments.								0.698

Factor analysis for independent variables table above demonstrates that all factor loadings are above 0.5 and the lowest is 0.685.

The questions in the survey are well grouped similar to the previous studies in the literature review. The factor structure that is formed according to the modified research model is parallel with the models reviewed in the literature. The survey questions are found to be well chosen for the constructs.

#### 5.4.2. Factor Analysis for Dependent Variables

Kaiser-Meyer-Olkin (KMO) Test is performed to see if the data is appropriate enough for factor analysis. The test result is 0.713 which should not be less than 0.6. Therefore, factor analysis can be run for the dependent variables.

#### KMO and Bartlett's Test for Dependent Variables

**Table 5.12** KMO and Bartlett's Test for Dependent Variables

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.713
Bartlett's Test of Sphericity	Approx. Chi-Square	1057.289
	df	6
	Sig.	0.0

#### Rotated Component Matrix for Dependent Variables

**Table 5.13** Factor Analysis for Dependent Variables

	Component (Cronbach's Alpha)	
	1 (A)	2 (BI)
32. I am likely to use/continue using mobile payment services in the near future	0.905	
31. Given the opportunity, I intend to use mobile payments	0.878	
29. Using mobile payment is a good idea.		0.857
30. Using mobile payment is a wise thing to do		0.855



Factor analysis for dependent variables table above demonstrates that all factor loadings are above 0.5 and the lowest is 0.855.

The questions in the survey for dependent variables are well grouped too. The EFA results show a well grouping structure of the questions. The survey questions are found to be well chosen for the constructs.

### 5.4.3. Descriptive Statistics of Sample Data

**Table 5.14** Descriptive Statistics of Sample Data

<b>Variable</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
Usefulness (USF)	685	3.77	0.85
Security (SEC)	685	3.22	1.03
Social Influence (SOC)	685	3.20	0.87
Attractiveness of Alternatives (AOA)	685	2.64	0.88
Ease of Use (EOU)	685	3.75	1.00
Enjoyment (ENJ)	685	3.79	0.86
New Technology Anxiety (NTA)	685	2.89	1.09
Innovativeness (INV)	685	3.88	0.90
Attitude toward Using (A)	685	3.87	0.99
Behavioral Intention to Use (BI)	685	3.79	1.03

Table above shows the mean scores for the factors.

### 5.4.4. T-Test Analysis for Gender

At this stage of the research, additional analyses are applied to the research study for hypothesis testing by comparing means of demographic variables. This is investigated to compare and discover if there is a difference in means of constructs between different demographic groups in the study.

Independent sample t- test is a statistical test that is employed to compare if there exists a significant difference between the means of two groups, which may be related in certain features. It helps to determine whether two groups are different from another for a measured variable.

Independent t- test can only be used when comparing the means of two groups; one- way ANOVA should be used for the same comparison if there are more than two groups to be compared.

In this research, independent sample t-test is applied to compare the group means of genders (1. Male, 2. Female) and one way ANOVA is applied to compare the education levels (1. High school and below, 2. Two year degree and bachelor’s degree, 3. Master’s degree or more) and mobile operators (1.Turk Telekom Mobile (AVEA), 2. Turkcell, 3. Vodafone).

Table below shows the mean and standard deviations of males’ and females’ responses to constructs.

**Table 5.15** Mean and Standard Deviation of Male and Female Responses to Constructs

<b>Construct</b>	<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Std. Error Mean</b>
Usefulness (USF)	Female	308	3.82	0.86	0.049
	Male	377	3.73	0.85	0.044
Security (SEC)	Female	308	3.18	1.00	0.057
	Male	377	3.25	1.05	0.054
Social Influence (SOC)	Female	308	3.20	0.83	0.047
	Male	377	3.20	0.90	0.046
Attractiveness of Alternatives (AOA)	Female	308	2.64	0.88	0.050
	Male	377	2.65	0.88	0.045
Ease of Use (EOU)	Female	308	3.73	1.01	0.057
	Male	377	3.76	1.00	0.052
Enjoyment (ENJ)	Female	308	3.85	0.87	0.050
	Male	377	3.75	0.85	0.044
New Technology Anxiety (NTA)	Female	308	2.98	1.07	0.061
	Male	377	2.81	1.10	0.057
Innovativeness (INV)	Female	308	3.80	0.89	0.050
	Male	377	3.95	0.90	0.046
Attitude toward Using (A)	Female	308	3.84	0.99	0.057
	Male	377	3.90	0.98	0.051
Behavioral Intention to Use (BI)	Female	308	3.80	1.05	0.060
	Male	377	3.78	1.01	0.052

Table below shows the results of independent t-test for gender.

**Table 5.16** Independent T-test for Gender

Construct		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Usefulness (USF)	EVA*	0.019	0.890	1.321	683	0.187
	EVNA**			1.320	654	0.187
Security (SEC)	EVA	1.259	0.262	-0.987	683	0.324
	EVNA			-0.991	666	0.322
Social Influence (SOC)	EVA	3.800	0.052	0.026	683	0.979
	EVNA			0.027	674	0.979
Attractiveness of Alternatives (AOA)	EVA	0.001	0.978	-0.102	683	0.918
	EVNA			-0.102	655	0.918
Ease of Use (EOU)	EVA	0.169	0.682	-0.475	683	0.635
	EVNA			-0.475	655	0.635
Enjoyment (ENJ)	EVA	0.097	0.756	1.545	683	0.123
	EVNA			1.542	651	0.123
New Technology Anxiety (NTA)	EVA	1.953	0.163	1.989	683	0.047
	EVNA			1.995	663	0.046
Innovativeness (INV)	EVA	0.343	0.559	-2.282	683	0.023
	EVNA			-2.286	660	0.023
Attitude toward Using (A)	EVA	0.163	0.687	-0.847	683	0.397
	EVNA			-0.846	653	0.398
Behavioral Intention to Use (BI)	EVA	0.161	0.689	0.222	683	0.824
	EVNA			0.221	647	0.825

\*Eva: Equal variances assumed.

\*\*Evna: Equal variances not assumed.

Independent Sample t-test results indicate that there exists only a difference for “New Technology Anxiety (NTA)” and “Innovativeness (INV)” among males and females ( $p < .05$ ). Females are having more anxiety towards new technology ( $X_{\text{Female Mean}} = 2.98$ ) than males ( $X_{\text{Male Mean}} = 2.81$ ).

#### 5.4.5. Anova Analysis for Education Level

The means of constructs are also compared for education levels by ANOVA. Table below show the results for ANOVA on education levels. The sample is gathered to three education levels. “High school and below”, “two-year degree” and “bachelor’s degree, master’s degree and above”. The means and standard deviation of constructs for the three groups are given in the table below.

#### Descriptives according to Educational Levels

**Table 5.17** Descriptives According to Education Levels

<b>Construct</b>	<b>Education Level</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
USF	Highschool and below	120	3.72	0.91
	University	371	3.79	0.85
	Master's degree and more	194	3.76	0.83
	Total	685	3.77	0.85
SEC	Highschool and below	120	3.02	1.05
	University	371	3.29	1.00
	Master's degree and more	194	3.21	1.06
	Total	685	3.22	1.03
SOC	Highschool and below	120	3.18	0.94
	University	371	3.22	0.84
	Master's degree and more	194	3.17	0.88
	Total	685	3.20	0.87
AOA	Highschool and below	120	2.80	0.84
	University	371	2.60	0.89
	Master's degree and more	194	2.63	0.87
	Total	685	2.64	0.88
EOU	Highschool and below	120	3.53	1.08
	University	371	3.82	0.97
	Master's degree and more	194	3.74	1.01
	Total	685	3.75	1.00

**Table 5.17** Descriptives According to Education Levels (continued).

<b>Construct</b>	<b>Education Level</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
ENJ	Highschool and below	120	3.83	0.81
	University	371	3.80	0.88
	Master's degree and more	194	3.76	0.86
	Total	685	3.79	0.86
NTA	Highschool and below	120	3.16	1.01
	University	371	2.88	1.07
	Master's degree and more	194	2.73	1.14
	Total	685	2.89	1.09
INV	Highschool and below	120	3.78	0.98
	University	371	3.90	0.87
	Master's degree and more	194	3.91	0.89
	Total	685	3.88	0.90
A	Highschool and below	120	3.69	1.04
	University	371	3.92	0.96
	Master's degree and more	194	3.89	1.00
	Total	685	3.87	0.99
BI	Highschool and below	120	3.55	1.09
	University	371	3.82	1.00
	Master's degree and more	194	3.88	1.03
	Total	685	3.79	1.03

ANOVA for the comparison of education levels shows that there is a difference for four of the constructs among different educational levels. The results can be seen in the table below.

For these four constructs Tukey HSD Post hoc test is used to find which education level is different from the other groups.

Examining the ANOVA table, no difference between the group means is seen for the “usefulness”, “social influence”, “attractiveness of alternatives”, “enjoyment”, “innovativeness” and “attitude toward using” ( $p < 0.05$ ).

Constructs; “security”, “ease of use”, “new technology anxiety” and “behavioral intention to use” scores are having a difference between different educational levels ( $p < .05$ ).

## ANOVA for Educational Levels

**Table 5.18** Anova for Education Levels

		Sum of Squares	df	Mean Square	F	Sig.
USF	Between Groups	0.6	2	0.30	0.415	0.660
	Within Groups	498.1	682	0.73		
	Total	498.7	684			
SEC	Between Groups	6.6	2	3.32	3.157	0.043
	Within Groups	717.5	682	1.05		
	Total	724.1	684			
SOC	Between Groups	0.4	2	0.19	0.248	0.780
	Within Groups	516.0	682	0.76		
	Total	516.4	684			
AOA	Between Groups	3.6	2	1.80	2.344	0.097
	Within Groups	524.0	682	0.77		
	Total	527.6	684			
EOU	Between Groups	7.7	2	3.86	3.855	0.022
	Within Groups	682.6	682	1.00		
	Total	690.3	684			
ENJ	Between Groups	0.4	2	0.21	0.276	0.759
	Within Groups	509.2	682	0.75		
	Total	509.6	684			
NTA	Between Groups	13.8	2	6.89	5.907	0.003
	Within Groups	796.1	682	1.17		
	Total	809.8	684			
INV	Between Groups	1.6	2	0.79	0.991	0.372
	Within Groups	547.1	682	0.80		
	Total	548.7	684			
A	Between Groups	4.9	2	2.47	2.544	0.079
	Within Groups	661.0	682	0.97		
	Total	666.0	684			
BI	Between Groups	9.0	2	4.52	4.323	0.014
	Within Groups	712.7	682	1.05		
	Total	721.8	684			

## Multiple Comparisons

**Table 5.19** Multiple Comparisons

<b>Tukey HSD</b>					
<b>Dependent Variable</b>			<b>Mean Difference (I-J)</b>	<b>Std. Error</b>	<b>Sig.</b>
USF	Highschool and below	University	-0.078	0.090	0.661
		Master's degree and more	-0.038	0.099	0.920
	University	Highschool and below	0.078	0.090	0.661
		Master's degree and more	0.039	0.076	0.862
	Master's degree and more	Highschool and below	0.038	0.099	0.920
		University	-0.039	0.076	0.862
SEC	Highschool and below	University	-,27040*	0.108	0.033
		Master's degree and more	-0.195	0.119	0.232
	University	Highschool and below	,27040*	0.108	0.033
		Master's degree and more	0.076	0.091	0.682
	Master's degree and more	Highschool and below	0.195	0.119	0.232
		University	-0.076	0.091	0.682
SOC	Highschool and below	University	-0.039	0.091	0.904
		Master's degree and more	0.012	0.101	0.993
	University	Highschool and below	0.039	0.091	0.904
		Master's degree and more	0.051	0.077	0.787
	Master's degree and more	Highschool and below	-0.012	0.101	0.993
		University	-0.051	0.077	0.787
AOU	Highschool and below	University	0.198	0.092	0.081
		Master's degree and more	0.168	0.102	0.224
	University	Highschool and below	-0.198	0.092	0.081
		Master's degree and more	-0.030	0.078	0.923
	Master's degree and more	Highschool and below	-0.168	0.102	0.224
		University	0.030	0.078	0.923
EOU	Highschool and below	University	-,29159*	0.105	0.016
		Master's degree and more	-0.213	0.116	0.159
	University	Highschool and below	,29159*	0.105	0.016
		Master's degree and more	0.078	0.089	0.650
	Master's degree and more	Highschool and below	0.213	0.116	0.159
		University	-0.078	0.089	0.650

**Table 5.19** Multiple Comparisons (continued).

<b>Tukey HSD</b>					
<b>Dependent Variable</b>			<b>Mean Difference (I-J)</b>	<b>Std. Error</b>	<b>Sig.</b>
ENJ	Highschool and below	University	0.030	0.091	0.942
		Master's degree and more	0.071	0.100	0.757
	University	Highschool and below	-0.030	0.091	0.942
		Master's degree and more	0.041	0.077	0.851
	Master's degree and more	Highschool and below	-0.071	0.100	0.757
		University	-0.041	0.077	0.851
NTA	Highschool and below	University	,28245*	0.113	0.035
		Master's degree and more	,43054*	0.125	0.002
	University	Highschool and below	-,28245*	0.113	0.035
		Master's degree and more	0.148	0.096	0.270
	Master's degree and more	Highschool and below	-,43054*	0.125	0.002
		University	-0.148	0.096	0.270
INV	Highschool and below	University	-0.122	0.094	0.395
		Master's degree and more	-0.133	0.104	0.407
	University	Highschool and below	0.122	0.094	0.395
		Master's degree and more	-0.011	0.079	0.990
	Master's degree and more	Highschool and below	0.133	0.104	0.407
		University	0.011	0.079	0.990
A	Highschool and below	University	-0.232	0.103	0.065
		Master's degree and more	-0.198	0.114	0.196
	University	Highschool and below	0.232	0.103	0.065
		Master's degree and more	0.034	0.087	0.920
	Master's degree and more	Highschool and below	0.198	0.114	0.196
		University	-0.034	0.087	0.920
BI	Highschool and below	University	-,27492*	0.107	0.029
		Master's degree and more	-,33303*	0.119	0.014
	University	Highschool and below	,27492*	0.107	0.029
		Master's degree and more	-0.058	0.091	0.797
	Master's degree and more	Highschool and below	,33303*	0.119	0.014
		University	0.058	0.091	0.797



Tukey HSD post-hoc results shows the difference between the group means. According to the post hoc results, “security” score is significantly different for “high school and below” from “two-year degree” and “bachelor’s degree”. ( $X_{SEC}$ ; High School Mean=3.02), ( $X_{SEC}$ ; University Mean=3.29), ( $p < 0.05$ ).

“Ease of use” score is also seen as significantly different among “high school and below” group and “two-year degree” and “bachelor’s degree”. ( $X_{EOU}$ ; High School Mean=3.53), ( $X_{EOU}$ ; University Mean=3.82), ( $p < 0.05$ ).

“New technology anxiety” score is found significantly different among the three levels of education. ( $X_{NTA}$ ; High School Mean=3.16), ( $X_{NTA}$ ; University Mean=2.88), ( $X_{NTA}$ ; Masters Mean=2.73), ( $p < 0.05$ ). “New technology anxiety” is decreasing while the education level increases.

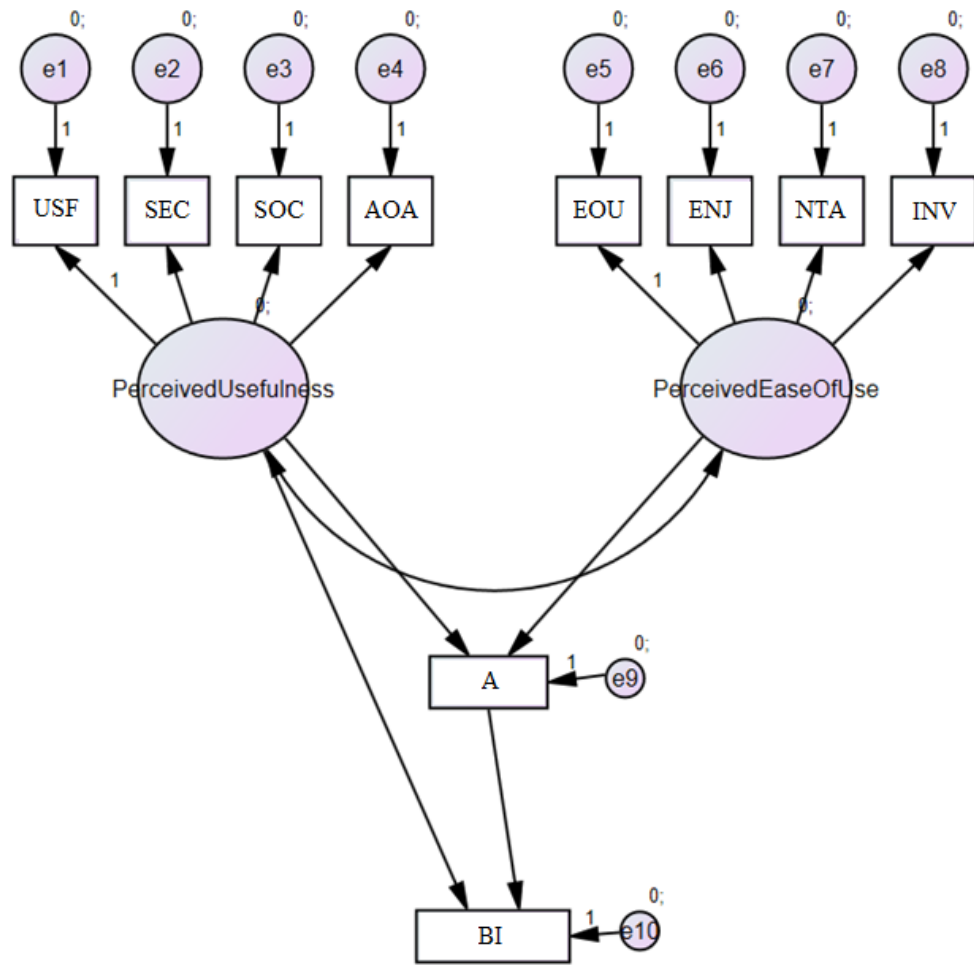
“Behavioral intention to use” scores are also found to be significantly different among the three different educational levels. ( $X_{BI}$ ; High School Mean=3.52), ( $X_{BI}$ ; University Mean=3.55), ( $X_{BI}$ ; Masters Mean=3.88), ( $p < 0.05$ ).

## **5.5. Structural Equation Modeling**

Research model is examined with statistical analyses. Then first proposed research model is examined using path analysis. Research model is changed according to the results and final research model is tested again and exhibited.

Structural Equation Modeling (SEM) is adopted for analysing the structural model of the factors. AMOS software is used for this analysis. Covariance based SEM is more useful for theory testing and confirmation. Covariance based SEM is used for this research for theory testing and confirmation.

### 5.5.1. Initial Research Model



**Figure 5.1** Initial Research Model

Initial test results indicate that chi-square value for the initial model will significantly improve if e8 and e10, e2 and e3 are correlated.

## Covariances

**Table 5.20** Covariances

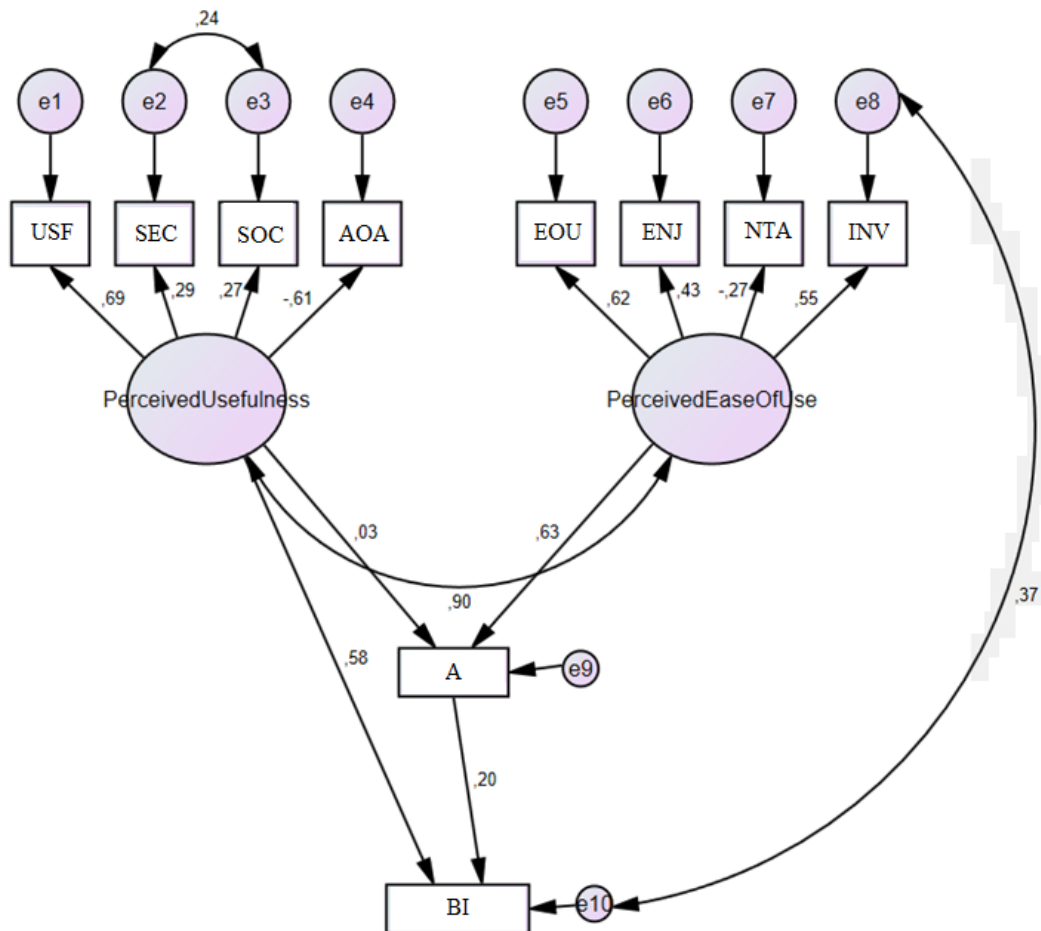
Modification Correction			Modification Index (M.I.)	Change Ratio
e8	<-->	Perceived Usefulness	4.18	0.012
e8	<-->	e10	45.129	0.141
e6	<-->	e10	4.781	-0.049
e5	<-->	Perceived Usefulness	5.53	-0.015
e5	<-->	Perceived Ease of Use	5.027	0.015
e5	<-->	e9	5.831	0.064
e5	<-->	e10	8.22	-0.069
e4	<-->	e8	4.084	0.043
e3	<-->	e10	4.688	-0.052
e3	<-->	e6	8.364	0.074
e2	<-->	e6	14.837	0.117
e2	<-->	e3	39.638	0.201
e1	<-->	e8	10.579	-0.065
e1	<-->	e3	4.94	0.05

Modification indices indicate how much the model fit would improve if the parameters were free instead of constrained.

Modification index between e8 and e10 is 45.129. Modification index between e2 and e3 is 39.638. These values show a serious evidence of misfit.

### 5.5.2. Final Research Model

Following results are found after the model is run with AMOS software.



**Figure 5.2** Final Model

#### General Model Fit

Chi-square goodness of fit test result gives a way to decide if the data values are a “good enough” fit to the model.  $\chi^2/DF$  value to be lower than 3 is a sign for a good fit.

CMIN shows the chi-square values (1.563) are lower than 3, therefore test indicates a good fit with the data and the model.

**Table 5.21** General Model Fit

	NP	AR	CMIN	DF	P	CMIN/DF
Default Model	35		46.878	30	0.026	1.563
Saturated Model	65		0	0		
Independence Model	20		1466.168	45	0	32.582

$$X^2/DF = 1.563 \leq 3$$

### **Compared Fit Indices**

#### **Normed Fit Index (NFI):**

It rescales the Chi-square value of the proposed model between 0 and 1 and compares it to a statistically meaningful benchmark. It is designated as Bentler-Bonett Normed Fit Index as well, NFI is an incremental calculation of goodness of fit for any statistical model that is not influenced by the number of factors in the model. An NFI of 0.95, shows the model improves the fit by 95%

0.968 is the calculated value for NFI and this shows a good fit. NFI value higher than 0.90 usually represents an acceptable fit.

#### **Incremental Fit Index (IFI):**

IFI has a value between 0 and 1. Model fit increases as IFI value is closer to 1, over 0.90 is a good fit, but it can exceed 1.

0.988 is the calculated value for IFI in this study and this shows a good fit.

#### **Comparative Fit Index (CFI):**

CFI is a altered form of NFI. It is not quite sensitive to the sample size. It compares the fit of a target model to the fit of a null or independent model. CFI value that is over 0.97 is a good fit.

0.988 is the calculated value for CFI in this study and this shows a good fit.

## Baseline Comparisons

**Table 5.22** Baseline Comparisons

	NFI	RFI	IFI	TLI	CFI
	Delta1	Rho1	Delta2	Rho2	
Default Model	0.968	0.952	0.988	0.982	0.988
Saturated Model	1		1		1
Independence Model	0	0	0	0	0

$$0.95 \leq \text{NFI} \leq 1, 0.95 \leq \text{IFI}, \text{CFI} \geq 0.97$$

### 5.5.3. Root Mean Square Error of Approximation (RMSEA)

A good fit exists can be observed when RMSEA value is equal to or lower than 0.05. An adequate fit exists if the value is higher than 0.05 and below 0.08. Values between 0.08 and 1.00 are considered to be acceptable. RMSEA values over 1 are not acceptable.

RMSEA value in this study is calculated as 0.029. Therefore, a good fit exists.

**Table 5.23** Root Mean Square Error of Approximation (RMSEA)

	RMSEA	LO 90	HI 90	PCLOSE
Default Model	0.029	0.01	0.044	0.991
Independence Model	0.215	0.205	0.224	0

$$\text{RMSEA} = 0.029 \leq 0.05$$

## 5.6. Hypotheses Testing

Very valuable findings are acquired as a result of this research. Hypotheses can be accepted according to the analyses performed above. All factors are evaluated depending on the outcomes acquired from the statistical analyses. Quantitative analyses are compared with the previous results acquired from the literature.

### **Usefulness**

H1: Higher level of usefulness (USF) has a positive effect on use of mobile payment systems.

Usefulness is a powerful aspect influencing mobile payment acceptance. This is in line with the literature findings as it is stated in previous studies (Zhong et al, 2013) (Guo, 2017).

The relations path coefficient between usefulness and perceived usefulness is 0.69.

Perceived usefulness (U) has a positive effect 0.58 on behavioral intention (BI) directly.

Therefore, H1 is accepted. Higher level of usefulness (USF) has a positive effect on use of mobile payment systems.

### **Security**

H2: Higher level of security (SEC) has a positive effect on use of mobile payment systems.

Security and fraud concerns are very common among consumers. They are worried to be exposed to financial and identity theft while using mobile payments. It is vital for service providers to invest more on anti-fraud and security development in order to ensure the prevalence of mobile payments. Otherwise, these issues will be a huge obstacle that prevents mobile payments from further adoption.

The relations path coefficient between security (SEC) and perceived usefulness (U) is 0.29.

Security (SEC) has a positive effect 0.58 on behavioral intention (BI) directly.

Therefore, H2 is accepted. Higher level of security (SEC) has a positive effect on use of mobile payment systems.

Results found in previous literature suggest that the amount of effort put on mobile payment course would be less if the user feels more secure about the solution and the service provider. Therefore, perceived usefulness is directly affected by security (Khalilzadeh et al, 2017).

However, another study found that subjective security was not a big concern for users and consumers are feeling more comfortable with mobile payments. Therefore, solution providers can spend their resources on other development issues (Pousttchi and Wiedmann, 2007).

### **Social Influence**

H3: Higher level of social influence (SOC) has a positive effect on attitude towards mobile payment technology acceptance.

The relations path coefficient between social Influence (SOC) and perceived usefulness (U) is 0.27.

Social influence (SOC) has a positive effect 0.58 on behavioral intention (BI) directly.

Therefore, H3 is accepted. Higher level of social influence (SOC) has a positive effect on use of mobile payment systems.

However, in previous studies there are some cases in which this hypothesis is rejected (Shin, 2009) (Kim et al, 2016).

### **Attractiveness of Alternatives**

H4: Higher level of attractiveness of alternatives (AOA) has a negative effect on use of mobile payment systems.

The relations path coefficient between attractiveness of alternatives (AOA) and Perceived Usefulness (U) is -0.61.

Attractiveness of alternatives (AOA) has a positive effect 0.58 on behavioral intention (BI) directly.

Therefore, H4 is accepted. Higher level of attractiveness of alternatives (AOA) has a negative effect on use of mobile payment systems.

Cost factor, which is considered as a part of attractiveness of alternatives in this research was tested previously in literature. Cost's effect on usefulness was found significant (Pham & Ho, 2015) (Slade et al, 2015) (Ooi & Tan, 2016).

### **Ease of Use**

H5: Higher level of ease of use (EOU) has a positive effect on use of mobile payment systems.

The relations path coefficient between ease of use (EOU) and perceived ease of use (E) is 0.62.

Therefore, H5 is accepted. Higher level of ease of use (EOU) has a positive effect on use of mobile payment systems.



This result is parallel with the studies in the literature. Ease of use increases the behavioral intention to use mobile payment systems (Qasim & Abu-Shanab, 2016) (Liébana-Cabanillas et al, 2017).

Compatibility is also considered as a part of ease of use in this study. In previous literature studies, compatibility has a positive effect both on security and usefulness (Pham & Ho, 2015) (Ramos-de-Luna, 2016) (Ooi & Tan, 2016). It seems that as consumers' lifestyle get more familiar with mobile payments, they tend to feel more secure and find mobile payments more useful. If the user's previous habits are more akin to the experience created by mobile payments, he feels less anxious and more secure to use it (Peng et al, 2012).

### **Enjoyment**

H6: Higher level of enjoyment (ENJ) has a positive effect on use of mobile payment systems.

The relations path coefficient between enjoyment (ENJ) and perceived ease of use (E) is 0.43.

Therefore, H6 is accepted. Higher level of enjoyment (ENJ) possesses a positive effect on use of mobile payment systems.

In previous studies, there are some cases in which "enjoyment" was observed to affect "ease of use" and "usefulness" (Koenig-Lewis et al, 2015).

### **New Technology Anxiety**

H7: Higher level of new technology anxiety (NTA) has a negative effect on use of mobile payment systems.

The relations path coefficient between new technology anxiety (NTA) and perceived ease of use (E) is -0.27.

Therefore, H7 is accepted. Higher level of new technology anxiety (NTA) possesses a negative effect on use of mobile payment systems.

### **Innovativeness**

H8: Higher level of innovativeness (INV) has a positive effect on use of mobile payment systems.

Innovative people are yet inclined to using new innovations. Therefore, mobile payment usage is a strong field of interest for them.

The relations path coefficient between innovativeness (INV) and perceived ease of use (E) is 0.55.

The results obtained in this research is parallel with the literature outcomes (Slade et al, 2015) (Liébana-Cabanillas et al, 2015). Innovative individuals are more inclined to experience new stuff. Mobile payments in this case can be considered as a new technology.

### **Attitude**

H9: Higher level of attitude has a mediating effect on intention towards mobile payment technology acceptance.

Attitude acts as a mediator for perceived ease of use (E) and perceived usefulness (U) with 0.03 on behavioral intention (BI) indirectly.

### **5.7. Limitations of the Research**

Convenience sampling method is used in this research for data collection. Therefore, collected data might be of similar cultural background. This prevents the examination of the total population. Some attributes of the population might have been avoided and the outcomes cannot represent the population as a whole.

As a result of inadequate resources, there was a time constraint too. Therefore, this research cannot be considered adequately representing the society as a whole.

Another limitation would be the lack of some texts in the literature review. Some papers published around the globe on mobile payments may not have been included in this research. This prevents reaching to a definite conclusion on this subject.

## **CHAPTER 6**

### **6. CONCLUSION**

This research provides us with a wider view on mobile commerce. It has shown that mobile payments are a potential mainstream trend for the near future. Common usage of smart mobile devices helps mobile payment solution providers in building new payment channels. Several benefits of the mobile payment value chain have been identified for both technology providers and the consumers. Other findings of this research can be stated as the challenges which the stakeholders are experiencing while trying to extend mobile payment technologies to a wider consumer base. The resistance that prevents consumers from adopting the mobile payment solutions can be observed via this research. Therefore, the results and the variables can be used by service providers who want to launch new mobile payment solutions for similar markets and they can take actions for getting more efficient results accordingly.

Literature review studies in this field have been conducted before several times. However, this research intended to appeal to a space in the literature by presenting a different perspective. It grouped factors from a broader literature and embedded the factors into a modified research model. A mobile payment acceptance model was developed for this study referring to the constructs adopted in other research after a thorough literature review. Some author generated questions were added to the survey such as the one expressing the hygiene feature of mobile payments.

Previous studies in Turkey and around the world have been performed with small groups of respondents. Therefore, their results could not be generalized to the population. This research managed to gather 685 respondents that is higher than the median of the sample size in literature. Mean of the sample size for analysis in previous studies was 465 and the median was 292.

This research was conducted in a cosmopolitan and technology friendly city Istanbul where all sorts of mobile payment options are available in the market. This is another distinguishing fact for this study since the sample was already widely exposed to the mobile payment technology in their daily lives.

This study was the first research to be conducted on mobile payment acceptance during a pandemic. As social distancing and remote delivery and online purchases became more common for shopping, experimenting mobile payments became more inevitable for consumers. Therefore, the effect of the compulsory usage is reflected to the results of this study in a positive way. Consumers are more familiar with the mobile payment technology henceforth and they easily prefer mobile payments compared to offline alternative methods.

Each market has its own characteristics and consumers have their unique expectations. Convincing potential customers to use new mobile payment solutions requires all stakeholders to work in a highly cooperative manner. The benefits of governments, technology service providers, financial institutions, merchants and network service providers must be considered as much as the consumers' needs.

Consumer needs might either be real or perceived. The fulfillment of these needs determines whether a technology solution will become fully adopted. In emerging markets, the challenge is to make sure new innovations are properly regulated. This involves a support for new product developers too. Governments should assist fintech companies in research and development and marketing of their mobile payment solutions. Otherwise, these start-up companies will have a hard time cooperating with large financial institutions and mobile network operators in equal terms. In developed markets where financial infrastructure is well established, current regulations will more likely play the main role. Already running regulations will cover security issues for mobile payments and new solutions will have a faster go to market period.

There is a strong effect of usefulness on mobile payment usage. Consumers must be convinced that mobile payment methods provide outstanding mobility benefits compared to alternative methods. Otherwise, if the mobile payment process is not more convenient, this will be a big barrier for consumer adoption.

Technology infrastructure is a crucial parameter for motivating the people to use mobile payment systems. The speed and technical high availability reduce the new technology anxiety among users which has an effect on perceived usefulness. As the

technical infrastructure gets better, a positive attitude towards mobile payments is created.

Power of alternatives / substitutes that prevent mobile payments to be widely accepted may vary between different markets. Europe, Asia, USA, Africa.

Turkey especially has a very high increasing rate of 4G adaptation, mobile broadband internet usage and latest mobile devices ownership over the past years. This happens both on the consumer and the merchant sides. The rapid developments provide speed and convenience for all parties involved in mobile payments.

Ease of use appears to be a vital factor to focus on to improve mobile payment adoption. Developing a more user-friendly interface will definitely increase perceived ease of use as well as perceived usefulness. New generation mobile devices and their features must be considered when developing mobile payment interfaces and mobile apps.

Social influence does not offer a condition to make consumers use mobile payments. People are rather affected by security than their social environment. Social influence is more important during the early stages of technology adoption. However, technology adoption of innovative solutions depends mostly on how easy they can be learned. Trust and security issues play a major role on intention too. But instead of adding extra security layers to the solution, these issues can be overcome by social influence during the early stages.

Because of social influence's effect on intention, social influence contributes to decreasing the perceived security risk. Previous studies suggest that mobile payment service providers should include extra security layers in their solutions to increase user acceptance (Khiaonarong, 2014). Trusted third party mobile security systems are similarly important and suggested in literature for increasing perceived security and therefore increasing user acceptance (Shin, 2009).

These outcomes imply that mobile payment solutions can increase customer loyalty, satisfaction, and revenues. It is possible for mobile payment solutions to provide economic growth and innovation by improving business processes and leading to new service offerings.

This research clarified that security is a main factor that prevents mobile payments from being adopted fast enough.

The speed of mobile payment solutions to be available in the market is another issue that slows down mobile payment acceptance. Previous studies in literature

suggest that there are several reasons for slow introduction to market. These are mainly; security concerns, lack of infrastructure, high costs, lack standards and regulations.

There are several obstacles to be cleared out for mobile payments to be a mainstream payment option. Several solutions have been tried and failed before. Solution providers, financial institutions, merchants and consumers all have to be in a mutually beneficial relationship. These stakeholders will altogether create the optimum business models. Governments should then license the tested and standardized solutions to successful solution providers to be implemented all around the market.

As a conclusion, the study successfully addressed the gap in the literature by shedding more light onto the factors encouraging and hindering mobile payments' acceptance and utilization challenges with several contributions to the literature, actionable insights for marketing managers and ideas for further research.

### **6.1. Additional Observations of Interest**

Businesses that provide their customers with value added services like mobile payment options will definitely gain advantage in acquiring new customers. These businesses will increase their customer retention and will have a significant competitive advantage.

Security of mobile payment apps and fraud risks are repeatedly mentioned by people during this research. This is a strong indication of consumer attitude towards this technology. Therefore, it is vital for businesses to provide their customers with clear legal guidelines and maintain high security standards for them when promoting the mobile payment solutions.

### **6.2. Implications for Further Research**

Mobile payments have a rapidly growing demand in the market. It is changing the way transactions are carried out both for consumers and businesses. It is crucial to study this topic further. The scope can be enhanced to get a better understanding on how consumers perceive mobile payments and what can be done to increase user acceptance.

This research has constraints for reasons such as resource and time limitations. The research took place in a specific time frame, among a specific group of people belonging to a specific culture.

Further research can be conducted during another time frame when mobile payments are more commonly used in a different society. Sample size can be enhanced. Additional variables can be discovered and examined. These alternative modifications will probably yield much better results and create better structural equation models.

An extensive research can be carried out about the effect of culture on mobile payments acceptance as well.

Several innovations and business models in mobile payments solutions have failed to increase consumer adoption. Universal regulations are still not available for all stakeholders. These obstacles cause fragmented markets with non-standard solutions. A wider acceptance of mobile payments for consumers is still an issue and further research can help in building better business models and developing optimum solutions.

This research was carried out during a global pandemic from which Turkey is affected at least as much as any other country. The survey responses were collected between April and June 2020. Contactless payments, remote delivery and online purchases were much more preferred compared to offline alternatives. Therefore, it is worth considering executing similar studies when the pandemic is totally over to see the possible effects of the extraordinary pandemic period.

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## APPENDICES

### Appendix A – Survey Questionnaire in English

#### Mobile Payment Usage Tendencies 2020 Research

Dear Respondent;

This 3-4 minutes survey is conducted by a PhD student in IŞIK University Social Sciences Institute Ertan Coşkun ( ) in guidance with Prof.Dr. Murat Ferman ( ). It is carried out to evaluate the mobile payment tendencies of mobile phone subscribers in Turkey.

Mobile payment refers to any payment where a mobile device (mobile phone, tablet, smart watch etc.) is used to fulfill the transaction within the context of this research.

Any one of NFC, bluetooth, QR code, SMS technologies, mobile apps, or digital wallets (BKM Express, Paycell, Fastpay vb.) can be used to initiate, authorize and confirm the exchange of financial value in return for goods and services.

The data collected with this survey will be used for academic purposes only. No identity information will be asked from you in accordance with the “Law on the Protection of Personal Data” (LPPD).

\* Required fields.

1. Which mobile operator are you subscribed to? \*

- Turkcell
- Vodafone
- Turk Telekom Mobil (Avea)

2. Which city do you live in? \*

- İstanbul
- İzmir
- Ankara
- Bursa
- Antalya
- Other

3. How old are you? \*

- Choose.

4. What is your gender? \*

- Male
- Female

5. What is your level of education? \*

- 1. Primary school
- 2. Secondary school
- 3. High school
- 4. Two-year degree
- 5. Bachelor's degree
- 6. Master's degree or more

6. What is your monthly income? \*

- 0 TRY – 2,999 TRY
- 3,000 TRY – 5,999 TRY
- 6,000 TRY – 8,999 TRY
- 9,000 TRY – 11,999 TRY
- 12,000 TRY – 14,999 TRY
- 15,000 TRY – 17,999 TRY
- 18,000 TRY or above

7. How long have you been using a smartphone? \*

- I have never used a smartphone.
- 1-3 years

- 4-6 years
- 7-9 years
- 10 years or more.

8. How long have you been using any of the mobile payment systems? / Mobile payment is defined as any payment where a mobile device (phone, tablet, smartwatch etc.) is used to conduct financial transactions. (Mobile apps, NFC, bluetooth, QR code, SMS, BKM Express, Paycell, Fastpay, etc.) \*

- a. I have never used mobile payments.
- b. 1-3 years
- c. 4-6 years
- d. 7-9 years
- e. 10 years or more.

9. How often do you use mobile payments? \*

- I have never used mobile payments.
- Once a year
- Once a month
- Once a week
- Once a day
- More than once a day

10. Mobile payment would enhance my efficiency in making a purchase. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

11. Mobile payments makes it easier for me to conduct my transactions. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree

- 5. Strongly Agree

12. Mobile payment offers prompt and uninterrupted service to me. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

13. I would like to benefit from promotions offered by mobile payment. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

14. I would feel secure sending sensitive information across mobile payment. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

15. The risk of an unauthorized party intervening in the mobile payment process is low. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

16. People who are important to me would recommend using mobile payments. \*

- 1. Strongly Disagree
- 2. Disagree

- 3. Undecided
- 4. Agree
- 5. Strongly Agree

17. People in my environment who use mobile payment are more prestigious than those who do not use it. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

18. Mobile payment service fees are reasonably priced. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

19. I think mobile payment is more hygienic. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

20. There are better payment methods compared to mobile payment. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

21. It was easy for me to learn using mobile payments. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

22. I think using mobile payments fits well with the way I like to buy. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

23. Using mobile payments is enjoyable. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

24. Using mobile payments is very entertaining. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

25. I fear that I will make a mistake when using a new technology. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

26. I feel apprehensive about using new technologies. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

27. If I hear about a new information technology, I will look for ways to try it. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

28. I have the skills/knowledge necessary for using mobile payments. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

29. Using mobile payment is a good idea. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

30. Using mobile payment is a wise thing to do. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree

- 5. Strongly Agree

31. Given the opportunity, I intend to use mobile payments. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree

32. I am likely to use/continue using mobile payment services in the near future. \*

- 1. Strongly Disagree
- 2. Disagree
- 3. Undecided
- 4. Agree
- 5. Strongly Agree



## Appendix B – Survey Questionnaire in Turkish

### Mobil Ödeme Kullanım Eğilimleri 2020 Araştırması

Değerli Katılımcı;

Toplam 3-4 dakikanızı alacak bu anket; Prof. Dr. Murat Ferman ( ) danışmanlığında, Işık Üniversitesi Sosyal Bilimler Enstitüsü doktora Öğrencisi Ertan Coşkun ( ) tarafından Mayıs ayı boyunca Türkiye'deki cep telefonu kullanıcılarının mobil ödeme eğilimlerini değerlendirmek amacıyla gerçekleştirilmektedir.

Bu araştırma kapsamında Mobil Ödeme; bir mobil cihaz (telefon, tablet, akıllı saat vb.) aracılığıyla gerçekleştirilen ödemelere denir.

Ürün veya hizmete karşılık yapılan finansal transferin başlatılıp onaylanmasında NFC, bluetooth, QR kod, sms teknolojilerinden herhangi biri, mobil uygulamalar veya dijital cüzdanlar (BKM Express, Paycell, Fastpay vb.) kullanılabilir.

Araştırma sonucunda elde edilecek veriler sadece akademik amaçla kullanılacak olup, "Kişisel Verilerin Korunması Kanunu" (KVKK)'na uygun olarak sizden herhangi bir kimlik bilgisi talep edilmeyecektir.

\* Doldurulması zorunlu alanlar.

1. Hangi mobil operatörü kullanıyorsunuz (abonesisiniz)? \*

- Turkcell
- Vodafone
- Turk Telekom Mobil (Avea)

2. Hangi şehirde yaşıyorsunuz? \*

- İstanbul
- İzmir
- Ankara
- Bursa
- Antalya
- Diğer

3. Kaç yaşındasınız? \*

- Seçiniz.

4. Cinsiyetiniz nedir? \*

- Erkek
- Kadın

5. En son mezun olduğunuz okul nedir? \*

- İlkokul
- Ortaokul
- Lise
- Önlisans
- Lisans
- Yüksek Lisans ve üzeri

6. Aylık geliriniz nedir? \*

- 0 TL - 2.999 TL
- 3.000 TL - 5.999 TL
- 6.000 TL - 8.999 TL
- 9.000 TL - 11.999 TL
- 12.000 TL - 14.999 TL
- 15.000 TL - 17.999 TL
- 18.000 TL ve üzeri

7. Ne kadar süredir akıllı telefon kullanıyorsunuz? \*

- Akıllı telefon hiç kullanmadım.
- 1-3 yıl
- 4-6 yıl
- 7-9 yıl
- 10 yıl ve üzeri

8. Ne kadar süredir mobil ödeme kullanıyorsunuz? Mobil Ödeme; bir mobil cihaz (telefon, tablet, akıllı saat vb.) aracılığıyla gerçekleştirilen ödemelere denir. (mobil uygulamalar, NFC, bluetooth, QR kod, sms, BKM Express, Paycell, Fastpay, vb.) \*

- Mobil ödeme hiç kullanmadım.
- 1-3 yıl
- 4-6 yıl
- 7-9 yıl
- 10 yıl ve üzeri

9. Hangi sıklıkla mobil ödeme kullanıyorsunuz? \*

- Mobil ödeme hiç kullanmadım.
- Yılda 1
- Ayda 1
- Haftada 1
- Günde 1
- Günde 1'den fazla

10. Mobil ödeme, ödemelerimi daha hızlı yapmamı sağlar. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

11. Mobil ödeme, harcamalarımı daha kolay takip etmemi sağlar. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

12. Mobil ödeme esnasında servis kesintisi yaşanmaz. \*

- 1. Kesinlikle katılmıyorum.

- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

13. Mobil ödemenin sunduğu promosyonlardan faydalanmak isterim. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

14. Mobil ödeme sırasında hassas bilgilerimi karşı tarafa gönderirken güvende hissedirim. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

15. Mobil ödeme sürecine dolandırıcıların müdahale etme riski düşüktür. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

16. Görüşlerine değer verdiğim ve güvendiğim insanlar, mobil ödeme kullanmayı tavsiye ederler. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

17. Çevremdeki mobil ödeme kullanan insanlar, kullanmayanlara göre daha saygındırlar. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

18. Mobil ödeme hizmet ücretleri bana göre makuldür. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

19. Mobil ödemenin daha hijyenik olduğunu düşünüyorum. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

20. Mobil ödemeye göre daha çok tercih ettiğim ödeme yöntemleri var. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

21. Mobil ödeme kullanmayı öğrenmek benim için kolay oldu. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.

- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

22. Mobil ödeme kullanımı benim önceki harcama alışkanlıklarım ile uyumludur. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

23. Mobil ödeme kullanımı bana göre eğlencelidir. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

24. Mobil ödeme kullanmaktan keyif alırım. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

25. Yeni bir teknoloji kullanırken, yanlış bir şey yapacağımdan korkarım. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

26. Yeni teknolojilere endişeyle yaklaşırım. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.

- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

27. Yeni bir teknolojiden haberdar olursam, onu denemek isterim. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

28. Mobil ödeme kullanmak için yeterli bilgiye sahibim. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

29. Mobil ödeme kullanmanın iyi bir fikir olduğunu düşünüyorum. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

30. Mobil ödeme kullanmanın akıllıca olduğunu düşünüyorum. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

31. Fırsatını bulduğumda mobil ödeme kullanmaya niyetliyim. \*

- 1. Kesinlikle katılmıyorum.

- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.

32. Yakın gelecekte mobil ödeme sistemlerini tekrar kullanmaya açığım. \*

- 1. Kesinlikle katılmıyorum.
- 2. Katılmıyorum.
- 3. Fikrim yok.
- 4. Katılıyorum.
- 5. Kesinlikle katılıyorum.



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