THE REPUBLIC OF TURKEY

BAHÇEŞEHİR UNIVERSITY

GROWTH OF DIGITAL FINANCIAL PRODUCTS AND SERVICES: A RESEARCH ON THE EXPANSION OF FINTECH SERVICES AND SOLUTIONS IN TURKEY

Master's Thesis

ELİF BİLGİÇ

İSTANBUL, 2019

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TEŞEKKÜR

Üniversite eğitimim boyunca, tüm çalışmalarımda desteğini hep hissettiğim aileme, bu alanda çalışma yapmama ilham ve motive kaynağı olan Türkiye Vakıflar Bankası T.A.O. Kadıköy Şube Müdürü Sn. Ayşe Füsun ÖZCAN'a teşekkürü bir borç bilir, şükranlarımı sunarım. Bu çalışmanın planlanması, araştırılması ve oluşturulması konusunda güler yüzünü ve samimiyetini, yardımını esirgemeyen, engin tecrübelerini daima paylaşan Danışman Hocam Sn. Dr. Saba Gamze ORAL'a, kardeşim Ayşegül Bilgiç ULUN'a ve Arş. Gör. Cihan ULUN'a sonsuz teşekkürlerimi sunarım.

İstanbul 2019 **Elif BİLGİÇ**

ABSTRACT

GROWTH OF DIGITAL FINANCIAL PRODUCTS AND SERVICES: A RESEARCH ON THE EXPANSION OF FINTECH SERVICES AND SOLUTIONS IN TURKEY

Elif Bilgiç

Entrepreneurship and Innovation Management Program

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The rapid developments in financial technologies in recent years have a significant impact on both the world and Turkey. This new technology, called fintech, is rapidly becoming integrated into the lives of individuals and institutions in order to provide faster and easier financial services. The impact of this development on our country's economy will be even faster through fintech. Our economy will gain fast growth momentum with fintech. The increase in the quality and diversity of the products and services in the field of financial services will result in the growth of our fintech ecosystem and the proliferation of fintech solutions. Turkey's strong and innovative financial sector shows that our country can gain serious advantages in fintech, the young population that grows up with information technologies. The technological developments, changing customer habits and the structure of existing sectors show that they can be permanent by creating differences. Especially in the banking sector, this situation is felt seriously. In recent years, developments in card payment systems in the Turkish banking sector, the introduction of intensive use of mobile technologies has led to serious developments in the field of fintech. In order to be able to follow the developments and to contribute to these developments in the world is very important to be able to evaluate the fintech area actively in the banking sector. Developments in financial technologies allow consumers to access financial services more easily. Especially the increase in the number of users in internet banking and mobile banking shows the success of fintech technologies. Because changing financial services with developing technology has caused a very different customer profile. This customer profile uses mobile contactless card payment via mobile phones, which can use financial services more easily than in the past, can make all payments without going to bank branches on the internet, mainly uses cards instead of cash, and even uses mobile contactless cards instead of Cards. In recent years, the development of fintech technologies and the increasing number of internet banking users, the widespread use of smart phones in the financial sector, and the mobile contactless card payment offered by many banks as a product, have rapidly started to increase the number and volume of users.

The purpose of this study is to evaluate the approach of customers using this product which has existed in the financial sector for several years through the quality of the electronic service. The electronic service quality of the mobile contactless card payment product will be evaluated in terms of the importance of customer satisfaction by using E-s-qual scale.

Key Words: Fintech, Mobile contactless card payment, E-service quality, Scale of E-S-Qual

ÖZET

DİJİTAL FİNANSAL ÜRÜN VE HİZMETLERİN BÜYÜMESİ:
TÜRKİYE'DE FİNTECH HİZMET VE ÇÖZÜMLERİNİN GENİŞLEMESİ ÜZERİNE BİR ARAŞTIRMA

Elif Bilgiç

Girişimcilik ve İnovasyon Yönetimi Programı

Tez Danışmanı: Dr. Saba Gamze Oral

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Son yıllarda finansal teknolojilerde meydana gelen hızlı gelişmeler hem dünyayı hem de Türkiye'yi oldukça etkilemektedir. Finansal hizmetlerin daha hızlı ve kolay sağlanabilmesi için Fintech olarak adlandırılan bu yeni teknoloji kişilerin, kurumların hayatına hızla entegre olmaya başlamıştır. Bu gelişmenin etkisinin, ülke ekonomimiz üzerinde fintech aracılığı ile daha da hızlı olacağı görülmektedir. Ekonomimiz fintech ile hızlı bir büyüme ivmesi kazanacaktır. Finansal hizmetler alanında yer alan ürün ve hizmetlerin kalitesinin ve çeşitliliğinin artması, fintech ekosistemimizin büyümesi ve fintech çözümlerinin çoğalması ile sonuçlanacaktır. Türkiye'nin sahip olduğu güçlü ve yenilikçi finans sektörü, bilgi teknolojileri ile yetişen genç nüfusu fintech alanında ülkemizin ciddi avantajlar elde edebileceğini göstermektedir. Yaşanan teknolojik gelişmeler, değişen müşteri alışkanlıkları, var olan sektörlerin yapısının farklılıklar yaratarak kalıcı olabileceğini göstermektedir. Özellikle bankacılık sektöründe bu durum ciddi bir şekilde hissedilmektedir. Son yıllarda Türk bankacılık sektöründe yaşanan kartlı ödeme sistemlerinde meydana gelen gelişmeler, mobil teknolojilerin yoğun olarak kullanılmaya başlanması fintech alanında ciddi gelişmelerin yaşanmasına sebep olmuştur. Dünyada yaşanan ilerleme ve gelişmeleri takip edebilmek, bu gelişmelere katkıda bulunabilmek için fintech alanını özellikle bankacılık sektöründe aktif olarak değerlendirebilmek oldukça önemlidir. Finansal teknolojilerde yaşanan gelişmeler tüketicilerin finansal hizmetlere daha kolay erişebilmesine imkan vermektedir. Özellikle internet bankacılığı ve mobil bankacılıkta meydana gelen kullanıcı sayısının artışı fintech teknolojilerinin başarısını göstermektedir. Çünkü gelişen teknoloji ile değişen finansal hizmetler çok farklı bir müşteri profili oluşmasına sebep olmuştur. Bu müşteri profili geçmişe kıyasla finansal hizmetleri daha kolay kullanabilen, internet üzerinden banka şubelerine gitmeden tüm ödemelerini yapabilen, nakit para yerine ağırlıklı olarak kart tercih eden, hatta kart yerine akıllı cep telefonları aracılığı ile mobil temassız kartlı ödeme kullanabilen bir yapıdadır. Son yıllarda Fintech teknolojilerinin gelişmesi ve internet bankacılığı kullanıcı sayısının yükselmesi, akıllı telefonların finans sektöründe kullanımının yaygınlığının artması ile birçok bankanın ürün olarak müşterilerine sunduğu mobil temassız kartlı ödeme hızla kullanıcı sayısı ve hacmini artırmaya başlamıştır.

Bu çalışmanın amacı finans sektöründe birkaç yıldır var olan bu ürünü kullanan müşterilerin yaklaşımının elektronik hizmet kalitesi aracılığı ile değerlendirebilmektir. Çalışma yapılırken E-S-Qual ölçeği kullanılarak mobil temassız kartlı ödeme ürününün elektronik hizmet kalitesi müşterilerin memnuniyetinin önemi açısından değerlendirilecektir.

Anahtar Kelimeler: Fintech, Mobil temassız kartlı ödeme, E-hizmet kalitesi, E-S-Qual Ölçeği.

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LIST OF ABBREVIATIONS

AB	: European Union
ABD	: United States of America
ANOVA	: Analysis of Variance
ATM	: Automated Teller Machine
BDDK	: Banking Regulation and Supervision Agency
BIST	: Stock market İstanbul
BKM	: Interbank Card Center
CFA	: Confirmatory factor analysis
E-	: Elektronic
EFT	: Electronic Funds Transfer
e-S-Qual	: e-Service Quality
IMF	: International Monetary Fund
OECD	: Organisation for Economic Co-operation and Development
POS	: Point of Sale (Satış Noktası Cihazı)
SPK	: Capital Markets Board
SPSS	: Statistical Package for Social Sciences
SWIFT	: Society for Worldwide Interbank Financial Telecommunication
TBB	: The Banks Association of Turkey
TCMB	: Central bank of the Turkish Republic
TKBB	: Participation Banks Association of Turkey
TL	: Turkish lira
TMSF	: The Savings Deposit Insurance Fund
USD	: United states dollar

LIST OF SYMBOLS

Adjusted goodness of fit index	:	AGFI
Average of the data	:	M
Chi-Square goodness of fit	:	χ^2
Comparative fit index	:	CFI
Data were moving away from the average	:	SD
Degree of freedom	:	df
Goodness of fit index	:	GFI
Maximum value that each data can take.	:	Max
Minimum value that each data can take	:	Min
Non-normed fit index	:	NNFI
Normed fit index	:	NFI
Root mean square error of approximation	:	RMSEA
Root mean square residuals	:	RMR
Sample size	:	N
Significance Level	:	p
Significant difference between means	:	t
Standardized root means square residuals	:	SRMR

1. INTRODUCTION

The technological developments in today's world show us that we must accept the fact that technology is an inevitable part of our lives. In our age, speed, quality, being up to date, easily adapting to change, convenience, competition has gained more value than ever before, and has become a prerequisite for acceptance in all areas of success and community life.

According to Birch, the new economy and the new society should be established on the basis of a new identity and a new definition of money, and that these concepts are definitely integrated with each other (Birch 2016, p.16). Based on Birch's view, it can be said that these new technological developments seems to accelerate globalization of digital life, and consequently the recent world system.

The digital world has made a rapid entry into our lives in every sector, in every field in our daily life and has shown that we cannot live without digital life and our quality of life will decrease. As in every sector, digital innovations have brought innovation to the financial world, brought about fundamental changes, and brought about the restructuring of financial systems and different structures.

By integrating technology into the financial system, instead of the payments made with cash money, it gradually gave way to digital payment systems and each day different alternatives and rational, technological payment systems have been developed which led to the emergence of a different area.

With the advancing technologies, the use of cash is gradually decreasing and the use of non-cash payment techniques increases. This leads to an increase in the value of digital payment systems and fintech technologies and rapidly spreading them.

Instead of cash payment systems, alternative digital payment systems have started to pass. Instead of cash, which is a cash payment instrument, it is seen that digital payment systems are gradually getting more and more. People can make money transfers without using cash, without the risk of carrying cash, thanks to their internet networks, and they can perform their transactions instantly, without waiting.

It is seen that products and systems such as Bitcoin, various crypto coins, blockchain, which are not widely used or used in the past years, have emerged and rapidly come into a position that affects the habits of consumers.

This situation creates a consumer type that is different from the usual consumer consumption habits and consumer profile of our age, has a different characteristic, is looking for more competent, more rational solutions, is selective, does not leave the quality and has a certain criteria.

This raises the fact that a large part of the cash transactions in the very near future can be done digitally with a virtual system without products such as cash and credit cards. In fact, many alternative payment requests have started to be developed in the world. Countries have begun active work to create their own virtual money.

As the famous economist Adam Smith said “money is merely an instrument of change, not the true measure of value”. So, it doesn't matter how the money is, what material it is made of when it is used as a means of exchange, whether it is gold or silver.

When we adapt this idea of Adam Smith to the present day, the phenomenon that measured our values and wealth in the modern age is no longer cash. With the development of technology, it is clearly seen in the recent developments that paper money will leave itself to more advanced, dynamic, more secure virtual money and alternative payment systems.

In today's consumer society, the importance of speed and efficient use of time have started to come to the forefront. Shopping, pay, spending styles vary dramatically. People make their purchases mostly via internet sites without more time consuming. One of the important elements that make this preference so popular is the development, use and dissemination of virtual payment systems, and alternative payment systems in general. The products developed, the rapid progress of the technology and the financial system bring the human life to a whole new level. In the coming years, such as Bitcoin, such as blockchain with high-quality inventions in all areas of our lives radically, effectively, on behalf of humanity is expected to open new epochs of inventions.

In the study, firstly literature research was conducted and then research methodology was started. In the literature review section, financial products and services, financial

institutions and systems are explained. Banks from the mentioned financial institutions were given a broader scope. After that, innovation in financial products, digital financial products, fintech concept and products developed with fintech are explained. After these explanations, research methodology section was started.

In this study, non-cash payment systems with credit card cash usage habits in Turkey, debit cards, prepaid cards, mobile banking, mobile contactless card payment systems, the numbers increased for products like Internet banking will be examined by means of tables and figures. In expressing this situation, the definition of money will made first. Then the financial systems and financial institutions in Turkey will be discussed. In the followings, brief information on innovation and innovations in financial products will be given. The impact of developed fintech products and services on Turkey will be evaluated in terms of consumer habit and economic system.

Afterwards, the emphasis will be placed on the new financial instruments produced by the developments in the world of fintech and the traditional financial instruments. Research will be carried out on within the scope of these financial instruments, mobile contactless card payment method and the fact that credit cards have a digital feature. People using this method of payment were asked various questions and their approaches to this payment system were evaluated.

2. LITERATURE REVIEW

In this section, the most important means of payment, mainly cash, money like products, developing digital currency systems, developed alternative payment methods to investigate the literature on the relevant information was transferred.

First of all, it is explained to the concept of money and examples of institutions and organizations related to the concept of currency are given. Apart from the physical use of money, non-cash payment systems that can be used like liquidity are explained. Products that provide innovation in financial markets are explained within the framework of fintech technology.

By giving examples of products and services that enable the digitalization of financial markets to be developed, the products such as blockchain technology and crypto money, which are one of the alternatives that can be widely used in the world of the future, are mentioned briefly.

A mobile contactless card payment method which can digitize credit cards, which is the most important alternative of cash, is explained. Information on the validity and availability of this method is given. The literature review of fintech and electronic service quality are as follows.

In the recent researches, Göktepe (2018) emphasizes that after the crisis of 2008, financial services and technology have merged, they have made new developments in the markets and this enables the development of markets. Studies aiming to measure customer satisfaction from different perspectives are very important. Kipman (2013) used the method of electronic service quality developed by Parasuraman, Zeithaml, Malhotra (2005) which have been traditionally accepted and investigated the validity of this method on Electronic retailers. Kayık (2013) stated that e-service quality of the shopping site affected the customer satisfaction and perceived value in his study. And customer satisfaction and perceived value affect customer loyalty.

Özer (2011), e-service quality of the online shopping site as a result of Özer work has found that it affects customer satisfaction. Customer satisfaction has been determined to affect customer loyalty. Kuzu (2018), using the electronic service quality scale to measure

the quality of electronic services in mobile banking, Kuzu researched the validity of the method on this product. Teuman (2011), in his study, has evaluated E-s-qual quality measurement model for internet banking services in Turkey. The E-S-qual model has been evaluated in the measurement of internet banking service quality in Turkey by him. Erdoğan (2016), in his study, has emphasized of the amount of shopping on the internet very high, the importance of the quality of service due to the fact that it reaches to the figures and has investigated the relationship between electronic service quality and customer loyalty. It can be said that electronic service quality is an important factor in determining customer satisfaction in online services using the electronic service quality criterion.

Firstly, before giving knowledge about digital and innovative products developed with fintech technologies, information about money, financial system and banks will be given.

2.1 FINANCIAL PRODUCTS and SERVICES

One of the most important financial products is money. First of all, the concept of money should be defined.

2.1.1 What is Money

Because of the fact that the goods that we call exchange, exchange or exchange with goods are the first necessities of humanity, that is, the necessities and types of goods in primitive economies, they could complete their purchases without a commodity like money. It is impossible to think of such a market in our age conditions.

In exchange economies, tramp difficulties result in the emergence of money. With the emergence of money, it is seen that in economic system, the exchange in trade becomes easier and faster. This makes significant contributions to the economies of countries. Money is a general exchange tool.

In economic analysis, money is defined as what is generally accepted in the purchase of goods and services and the reimbursement of debts (Ünsal 2005, p.473).

The indispensable concept of modern economies becomes the heart of economic life with the development of humanity. The success of the change in the money is due to the general acceptance of the debts (Parasız 1994, p.9).

Money is the most fundamental element in today's economic systems. The most obvious reason for the emergence of money is the easy and fast exchange. Thus, money has led to the emergence of a means of change accepted by societies (Öksüz 2010, p. 59).

Money is an element that enables individuals to buy and to be free from all kinds of debts and liabilities and to provide value protection (Öçal and Çolak 1999, p.11).

It facilitates community life with its generally accepted feature because it is a common value measure and a means of payment for societies. The fact that money is a measure of common value is very important in order to avoid confusion and to apply the rule of general acceptance. According to a common definition of money, it is expressed as a means of exchange that people generally accept in everyday life. It is often used here to indicate that there is flexibility in defining the elements within the scope of the money (Paya 1998, p.15).

Money has three functions. Money is a payment tool, money is an account unit, money is a value tool (Parasız 2007, p.8). As a means of payment money must operate within a payment system, which requires the use of special objects of generally accepted value (Eagleton and Williams 2011, p.304).

2.1.2 Properties and Functions of Money

Money used in the trading of goods and services in an economy, at the same time everyone is accepted by an exchange tool (Dinler 2000, p. 355). However, what will be considered money is primarily to include two functions, namely "exchange" and "value-keeping". Economists describe everything that is accepted for the payment of goods and services or for the payment of debts as money (Frederic S. Mishkin 2004, p. 44). The most important financial asset in the economy is money (Rose 1986, p. 38).

The main purpose of money in the economic system is to facilitate the exchange of goods and services and to reduce the time and effort required for trade (Chandler 1973, p. 5).

Almost all transactions in the economy are made with money and money similar; all of the goods and service payments are made with these. The use of money as a tool of exchange automatically makes money the most liquid asset (Krugman and Obstfeld 2006, p. 340).

2.1.3 Other Financial Instruments

It refers to other capital market instruments determined by Capital Markets Board, including securities and derivative instruments and investment contracts. Shares, other shares like shares, debt instruments etc.[1]

2.1.3.1 Shares

Share is the capital of the company, divided by certain nominal value. Gives rights to each shareholder in a joint stock company within the framework of the Articles of Association and the Articles of Association.[2] It gives the shareholder the right to be a shareholder in the assets and property of the issuing company. In the natural result of this

[1] Capital market law (Law no. 6362), **Official newspaper,** 28513; 30 December 2012.
[2] Sermaye Piyasası araçları 1.2018. https://www.spl.com.tr/spl/eep/kurumportal/Content/sinav-calisma-notlari/56/ [accesed 05, December, 2018].

right, the shareholder has a say in making decisions about the partnership in accordance with the share ratio it has.

Equity shares are of critical importance from an economic point of view. By saving small households to the economy, they provide significant contributions to the country's economy, such as the accumulation of capital required for the country to develop.

2.1.3.2 Other instruments like share

Other instruments such as shares are securities that are not obliged to be represented in the capital, which do not have a fixed return commitment and which give one or a portion of the shareholding rights.[3]

2.1.3.3 Debt instruments

Debt instruments can be classified as bonds, convertible bonds, financing bills, precious metal bonds, and capital market instruments accepted by the Capital Markets Board as a debt instrument. Bonds can be defined as debt instruments that are 365 days or longer, which include issuance and sale of debtors in the capacity of a debtor in the provisions of the communique on debt instruments and the commitment of the nominal value to be repaid to the investor in installments on the due date or due date.[4] In the debt instruments communique, the financing bond is defined as a borrowing instrument with a maturity of less than 30 days less than 364 days, which includes the commitment of exporters as debtor and the commitment of the nominal value to be paid back to the investor in installments on the due date or due date.

2.1.3.4 Derivative financial instruments

Derivative instruments are financial instruments that provide returns based on the return of the underlying asset. Generally, the underlying assets of derivatives are commodities, securities, foreign exchange, interest rate, precious metal and stone, statistics, index, indicator and other derivative instruments.[5] Derivative transactions are divided into four

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[3] Sermaye Piyasası araçları 1.2018. https://www.spl.com.tr/spl/eep/kurumportal/Content/sinav-calisma-notlari/56/ [accesed 07, December, 2018].
[4] Sermaye Piyasası araçları 1.2018. https://www.spl.com.tr/spl/eep/kurumportal/Content/sinav-calisma-notlari/56/ [accesed 07,December, 2018].
[5] Capital market law (Law no. 6362), **Official newspaper,** 28513; 30 December 2012.

parts as forward, future, option and swap transactions. The benefits of derivative instruments can be listed as contributing to healthy price formation, managing risk and decreasing transaction costs.

2.1.3.5 Public debt instruments

According to the source borrowed by the government, public finance is divided into domestic borrowing and foreign borrowing and rent certificates. Domestic borrowing is the provision of public finance from domestic sources. External borrowing is the provision of public finance from foreign sources.

Lease certificates are securities issued by asset leasing companies for the benefit of the owners and the owners of their own names and for the purpose of financing the assets that are acquired by leasing or leasing.[6]

2.1.3.6 Interest free finance instruments

Interest free financial instruments are financial instruments that are not based on interest income. The system argues that there should be a price difference between the purchase and sale of a good and the purchase and sale of a commodity. Interest free financial system has a ban on interest. Rent certificates are the most basic tools of the system.[7]

2.1.3.7 Real estate certificates and warrants

Real estate certificates are very important in terms of realization of real estate properties in the capital market and of fulfilling the quality of an investment instrument efficiently. Because of the benefits they provide for the diversification of financial markets and the deepening of the financial markets, they have important contributions to the economies and markets of the country. Because the passive resources are transferred to the economy and a new fund source is created.

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[6] Capital market law (Law no. 6362), **Official newspaper,** 28513; 30 December 2012.
[7] Capital market law (Law no. 6362), **Official newspaper,** 28513; 30 December 2012.

Warrants are capital market instruments in which the investor has the right to buy or sell the underlying asset or indicator from a predetermined price on a specified date or at a specific date and that the right is used with the record delivery or cash settlement.[8]

2.1.4 Check

The cheque is the bill that gives the beneficiary or his bearer the order to pay a certain amount of money. There are parties such as debtor, creditor, interlocutor bank or participation bank. Check address is always the bank (Çelik 2013, p.420).

The cheques cannot be added to the terms such as maturity date, acceptance annotation, interest registration. It is a payment instrument paid when a check is seen. Checks have no maturity (Çelik 2013, p.423).

2.2 FINANCIAL SYSTEM and FINANCIAL INSTITUTIONS IN TURKEY

In order to understand the financial system in Turkey, it is necessary to define financial institutions first.

2.2.1 Financial system and financial markets

Banks and financial markets, which are one of the most important institutions of financial system and financial markets, are explained.

2.2.1.1 Concept of market

It is the environment where the buyers and sellers are in mutual interaction and communication, and the exchange of goods and money can be made.

As explained by Parasız (2007, p.466).

> *A set of communication tools is called a market that allows merchants and buyers to communicate what they have, what they need, what price they demand, and what price they offer. Markets are network. The most traditional form of market is municipal or public.*

Markets are divided into real markets and financial markets. The real markets are the markets in which the goods and services are met by the supply and demand of the goods. Financial markets are the markets where funding demand and funding supply meet.

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[8] Capital market law (Law no. 6362), **Official newspaper,** 28513; 30 December 2012.

2.2.1.2 Financial systems and financial markets

Financial markets are the markets in which financial assets are bought and sold. The financial market is a broad concept that includes money and capital markets. Financial markets consist of those who supply funds, savings owners, those who demand funds, consumers and investors, financing tools, investment tools (Özdemir, M.,2016).

The functions of financial markets are to provide resources to the real market, to make capital accumulation, to provide liquidity to the market, to minimize the risk of the investor's investment decision and to evaluate the savings. Financial markets are classified in Table 2.1.

Table 2. 1: Classification of financial markets according to market substitution and market fund supply demand period

ACCORDING TO MARKET LOCATION	ACCORDING TO MARKET FUND SUPPLY AND DEMAND
1. ORGANIZED MARKETS - Central bank markets (open market operations, foreign exchange market) - Borsa İstanbul markets - Settlement and custody Bank markets - Interbank TL markets - Interbank repo markets **2. UNORGANIZED MARKETS** - Bond markets - Interbank foreign currency market - Free foreign exchange market - Free gold market	**1.MONEY MARKETS** **2.CAPITAL MARKETS** - Primary market - Secondary market

Source: Parasız, 2007.

Financial markets have many functions.[9] These tasks are to ensure the flow of resources between the fund suppliers and those who demand funds, to facilitate the provision of

[9] Finansal Piyasalar.2018. https://www.spl.com.tr/spl/eep/kurumportal/Content/sinav-calisma-notlari/56/ [Accesed 02, December, 2018].

liquidity to the market, to provide savings to the economy. Financial markets are classified in Table 2.2.

Table 2. 2: Classification of financial markets

According to the nature of financial assets	According to the purchase and sale of financial assets for the first time	According to market type where financial assets are sold	According to sales time of financial assets	According to the maturity structure of financial assets
Debt Market	Primary market	Organized markets	Spot market	Capital market
Partnership market	Secondary market	Over the counter markets	Futures markets	Money market

Source: Parasız,2007.

2.2.1.3 Capital market

They are the markets that the fund seekers are applying to perform their medium and long term planned investments. Capital Markets have functions such as providing liquidity, transforming risks. According to the Capital Market Law Article m.35, capital market institutions can be listed as investment institutions, collective investment organizations, independent audit, valuation and Rating Organizations, portfolio management companies, mortgage financing companies, housing financing and asset financing companies, asset leasing companies, central bank institutions, central depository institutions, data storage institutions, other capital market institutions.[10]

2.2.2 Banks

Banks are financial institutions that contribute greatly to the social, cultural and economic development of the countries.

2.2.2.1 Definition and activities of banks

Banks are one of the most important and main institutions of the financial system. They ensure that cash circulation is uniform and regular in the country. These institutions, which operate in a system specific to themselves, form the framework of the financial system. It has an important place in the financial system (Yetiz 2016, p.106). Banks contribute enormously to the social, cultural and economic development of countries. In

[10] Capital market law (Law no. 6362), **Official newspaper,** 28513; 30 December 2012.

addition to ensuring the flow of funds in the economy, banks also have other important features in terms of economy, such as providing money formation, allowing money and fiscal policies to be implemented, and contributing to the distribution of income and wealth. The fact that the banking sector is strong will ensure that the economies of the country are strong.

2.2.2.2 Concept of banking

Banks are financial institutions that accept deposits, collect funds, and collect these resources as short and long-term loans to real and legal persons who are in need of funds (Yetiz 2016, p.107).

Banking is to accept deposits according to the demand of individuals and institutions in the community in order to lend or invest (Yağcılar 2011, p.5). As a result of the complexity of the economic cycle and increasing volume of production, the importance of the financial market in the capitalist system has increased (Öçal and Çolak,1999 p. 36). Banks are the most important actor in the financial market. Banks are the enterprises that accept the savings they have created over time and the services that people can make use of these savings in a profitable way, see the various services such as brokerage, money transfer, commercial paper and escrow acceptance (Yağcılar 2011, p. 5).

2.2.2.3 Basic functions of banks

The banking sector is an active and dynamic sector that has a serious impact on the economic situation and structure of the countries. Banks are financial institutions that contribute to the financial structure of other sectors and enable them to perform their operations by providing higher quality and efficiency. Banking is a system that changes as the function of money increases (Takan and Boyacıoğlu 2011, p.1).

They provide the distribution of resources among the sectors that make up the economies of the countries, the distribution of income and wealth in the society, and the institutions that make important contributions to the transfer of investments to efficient areas. Banks create funds by means of deposits that are collected from small large enterprises that constitute the country's economy, and convert these funds into loans. This function is very important for the development of national economies and for the realization of strong investments.

2.2.2.4 The banking system in Turkey

The banking sector which accounts for almost all of the Turkish financial sector, is a determinant of the economy. Developments in the banking sector trigger the development of the economy and economic developments affect the banking sector. Analyzing the financial soundness and performance of banks operating in the banking sector has gained even more importance (Güney and Ilgın 2016, p.304).

With globalization, the banking sector has taken an important place in terms of finding resources for investments and evaluating savings in order to respond to the demands of those who need funds in the market. It is very important to better analyze the financial structures of banks, to establish an effective audit and supervision mechanism along with the necessary infrastructure and legal regulations, and to continuously monitor their performance (Güney and Ilgın 2016, p. 328).

In the studies carried out by The Banks Association of Turkey which is concerned with the stages of the banking system from the proclamation of the Republic to the present day, the banking sector has been divided into periods as follows (Coşkun and oth. 2012, p.4-34).

a) Establishment Period (1923-1932)

b) Statism Period (1933-1944)

c) New Liberal and Liberal Period (1945-1960)

d) Planned Period (1960-1980)

e) Outward opening and market economy period (1980-2000)

f) Restructuring period in banking sector (2000-2010)

g) Current period (2010-2017)

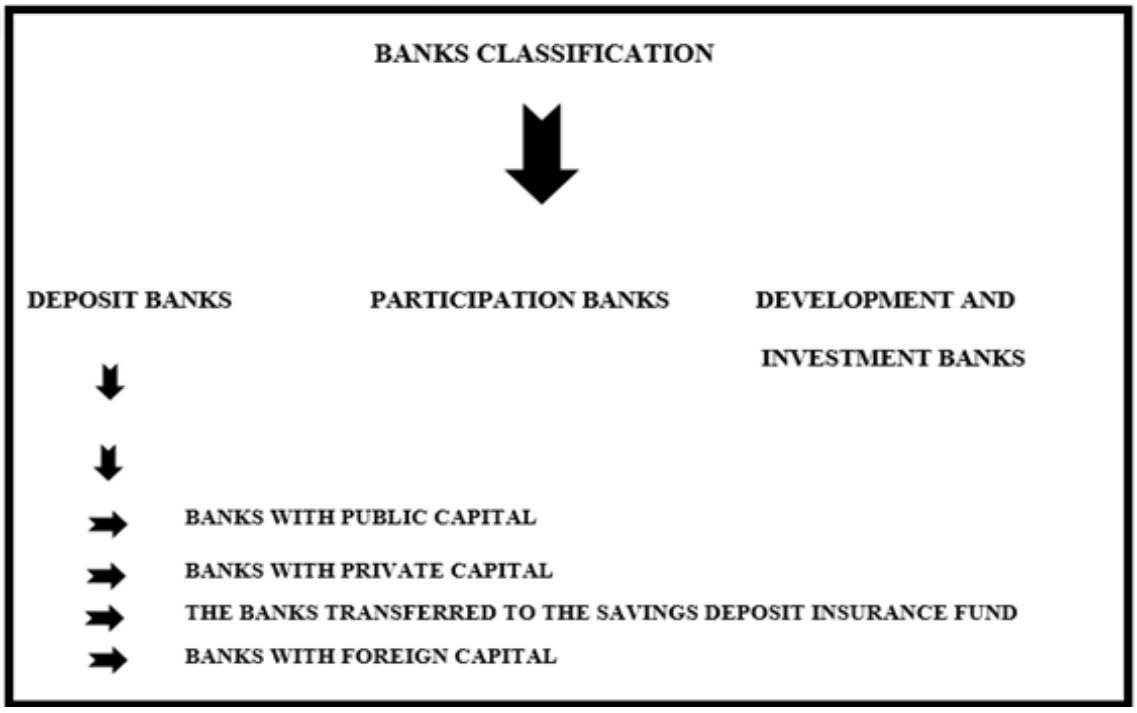
According to the analysis of the Banking Sector Assessment of TBB, as of December 2017, if the sector evaluates the banking sector, the sector has achieved a profitability of 359 billion TL and an average of 14.7 percent profitability. The sector complies with

international capital adequacy ratios. Banking sector assets increased compared to the previous year.[11] [12]

2.2.2.5 Structure of Turkish Banks and classification

Banks, one of the most important actors of the economy, are exposed to a certain cost while providing services to their customers. Banks are also profit oriented institutions. [13] While explaining the working principles of banks, it is necessary to define the legal structures and operating structures. Figure 2.1 shows the classification of the banks in Turkey.

Figure 2. 1: Classification of banks in Turkey



Source: Güney and Ilgın 2016.

[11] Bankalarımız 2017. 2018. https://www.tbb.org.tr/Content/Upload/Dokuman/7519/Bankalarimiz_2017.pdf [Accesed 01, September,2018].
[12] Bankacılık Sektörü Değerlendirmesi 2017.https://www.tbb.org.tr/Content/Upload/Dokuman/7502/TBB_BN_Aralik_080218.pdf [Accesed 01, September,2018].
[13] Bankacılık Sektörü Değerlendirmesi 2017.https://www.tbb.org.tr/Content/Upload/Dokuman/7502/TBB_BN_Aralik_080218.pdf [Accesed 01, September,2018].

2.2.2.6 Institutions and organizations related to the banking system

Important institutions related to banking system are BDDK, TCMB, TBB, TKBB, SPK, Borsa İstanbul A.Ş., TMSF and BKM.

2.2.2.6.1 BDDK

The Banking Regulation and Supervision Agency (BDDK) is responsible for the regulation and supervision of the Banking Law No. 5411 as required.[14] BDDK independently perform and exercise its duties and responsibilities. As a result of the economic crisis in Turkey in the late 1990s, a shortcoming of the institution will assume the regulatory and supervisory tasks independently in the banking sector has gained significantly in importance. Following the economic crisis in November 2000 and February 2001 the government of Turkey which supported by the IMF and the World Bank has started to implement a new stabilization program (Kazgan 2002, p. 468).

The aim of the establishment of an institution to collect the necessary qualifications needs to make regulations that will increase competition and efficiency in the economy has laid the foundation for the emergence of the banking regulation and Supervision Agency. With the start of operation of BDDK, Turkish Banking system has started to operate in a more professional, more rational working system. These boards (BDDK etc.) ensure that regulatory and supervisory functions are carried out by persons with technical expertise and independent of political influences (Erol 2003, p.85-87).

Sonay Bayramoğlu (2005, p.22) emphasizes the importance of the existence of independent regulatory with these sentences.

> *Independent regulatory boards are the institutional structure that best fits the need for global capital management and the need for global capital and foreign capital. Independent regulatory boards are the most effective means of connecting the global, national and local levels of the capital accumulation process.*

Regulation and supervision of the banking sector, protection of the rights of savers, effective and regular attendance of loans system, confidence in financial markets are very important to ensure stability.

[14] Banking Law law (Law no. 5411), **Official newspaper,** 25983; 01 November 2005.

2.2.2.6.2 TCMB (Central bank of the Turkish Republic)

The Central Bank of the Republic of Turkey was established and became operational in 1931.[15] The duties of the central bank can be listed as follows. Open market operations, to take necessary measures to protect the internal and external value of the Turkish Lira, determine the rules for reserve requirements, manage gold and foreign exchange reserves etc.

2.2.2.6.3 TBB (The Banks Association of Turkey)

TBB is a public institution established in 1958.[16] It is a very important place for the banking sector to ensure the banking sector to operate and grow effectively, to defend the rights of the banks, to protect the value of the banking profession, and to prevent unfair competition in the sector from occurring. All commercial banks operating in Turkey, investment and development banks must be members of the TBB. This is an important necessity. TBB is an institution in which articles, researches and detailed studies are carried out on the banking sector. The focus of these studies is to enable the sector to develop at the international level, adapting to the developing technological steps, and ensuring that scientific studies and new techniques are adapted to the banking sector.

2.2.2.6.4 TKBB (Participation Banks Association of Turkey)

Participation Banks Association of Turkey (TKBB), prescribed by the Banking Act established a professional organization can be defined as the quality of public institutions. All participation banks must be members of TKBB.[17]

2.2.2.6.5 SPK (Capital Markets Board)

The Capital Markets Board has been established with the Capital Market Law in order to ensure that the capital market operates in an effective, transparent and committed manner, and to regulate and control the protection of the rights and interests of the savings holders. The SPK is an independent audit organization.[18]

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[15] https://www.tcmb.gov.tr/wps/wcm/connect/TR/TCMB+TR/Main+Menu/Banka+Hakkinda/Tarihce [Accesed 01, October 2018].
[16] https://www.tbb.org.tr/tr/hakkimizda/kurumsal/hakkinda/kurulus/10 [Accesed 01, October,2018].
[17] http://www.tkbb.org.tr/tarihce [Accesed 01, October,2018].
[18] Capital market law (Law no. 6362), **Official newspaper,** 28513; 30 December 2012.

2.2.2.6.6 Borsa İstanbul A.Ş.

Borsa İstanbul A.Ş. is an institution with an established private law personality. [19] The most important aim of the establishment of all the stock exchanges is to create more efficient market conditions.

The subject of the activity is to ensure that the capital market instruments, precious metals and precious stones can be bought and sold under safe, effective and stable market conditions in accordance with the Capital Market Law.[20]

2.2.2.6.7 TMSF (The Savings Deposit Insurance Fund)

TMSF is which depending on the Central Bank of the Republic of Turkey on savings deposits Savings Deposit Insurance Fund was established in 1983 in order to insure. TMSF's powers in the wake of the 1994 economic crisis experienced in Turkey has been expanded.[21] In 2003, the TMSF was transformed into an autonomous status. It has duties such as the management of fund banks, strengthening, restructuring, transferring, merging, selling and liquidating financial institutions, insurance of deposits and participation funds. [22]

2.2.2.6.8 BKM (Interbank Card Center)

Founded in 1990, the center contributes to the economy and every sector by making efforts to develop alternative payment methods as well as cash usage. [23]The company, which works for debit cards and credit cards and other payment systems, conducts studies in line with continuous innovations and technologies.

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[19] http://www.borsaistanbul.com/kurumsal/borsa-istanbul-hakkinda/hakkimizda [Accesed 02,October,2018].
[20] Capital market law (Law no. 6362), **Official newspaper,** 28513; 30 December 2012.
[21] https://www.tmsf.org.tr/tr/Tmsf/Info/tarihce.tr [Accesed 11, November,2018].
[22] https://www.tmsf.org.tr/tr/Tmsf/Info/tarihce.tr [Accesed 11, November,2018].
[23] https://bkm.com.tr/bkm-hakkinda/bkmyi-taniyin/tarihce/ [Accesed 15, November,2018].

2.3 INNOVATION AND FINANCIAL PRODUCTS

Innovation in financial products, is extremely important for the development of financial markets.

2.3.1 What is innovation

The new or substantially modified service is the application of the product or process in internal applications or in new or different ways of delivering to the market (Oslo Manual 2006, OECD and Eurostat). Innovation is defined as the product of a culture that is identified with the desire to change, openness to innovation and the spirit of entrepreneurship by transforming knowledge into economic and social benefits with the broadest definition (Elçi 2006, p.2). In order for a new idea to be considered as an innovation, it must be commercially available. The way to increase productivity is through innovation. Innovation is the key to quality of life (Elçi 2006, p. 32).

2.3.2 Types of innovation

Innovation definitions are listed as product innovations, process innovations, organizational innovations and marketing innovations (Oslo Manuel 2006, p.20). We can further elaborate the types of innovation in Table 2.3.

Table 2. 3: Types of innovation

Types of Innovation by Field	
Product Innovation	It is the development of a new product or an existing product being replaced and introduced to the market.
Service Innovation	It is the business providing its customers with a new and different service.
Process Innovation	Process innovation is the development of existing products and services efficiently.
Organizational Innovation	Organizational Innovation covers improvements in business processes.
Marketing Innovation	Marketing Innovation is the introduction of significant changes in product pricing policies.
Types of Innovation by Degree	
Incremental Innovation	It includes a series of step by step improvements, improvement or restructuring activities.
Radical Innovation	In contrast to the incremental innovation, the technology that exists as a result of the intensive R & D studies is different from the methods and products, and it is a differentiating and non-continuous innovation.

Source: Coşkun and oth. 2013, p.107-108

2.3.3 Innovation in financial products

Financial innovation is the product or process that is created in order to make financial markets more effective and to benefit from profit opportunities in the markets. Innovation in financial products is realized through new financial instruments through new financial technologies. Financial innovations can also occur on product basis, in the structure of financial markets, in the depths of financial markets, in the methods of providing financial services. Thanks to the rapid advances in technology and the internet, financial services have been switched from closed networks in private ownership to internet-based networks, and a radical change process has begun (Söylemez 2004, 13 p. 56-73).

Internet banking, electronic money, electronic commerce systems, such as products added to the financial system in the 2000s are important innovations. These financial innovations have changed the functioning of markets and the quality of financial products and financial services. With this automatic payment system, which provides fast electronic funds transfers, large volume transactions with low risk and low cost have started to be realized in international banking payments (Söylemez 2001, 13 p.56).

Treasury bonds, government bonds, foreign currencies, securities and interbank funds belonging to large companies have become available to buy and sell around the world 24 hours a day (Seyidoğlu 2007, p. 573).

With the development of technology, the variety of financial products has increased. Many digital products such as ATM, EFT, credit cards, debit cards, internet banking are widely used. ATM is a multifunctional machine that provides banking services to ATM users anytime and anywhere. Credit cards and debit cards are important financial products that facilitate the life of shopping with ease without having to carry cash. Internet banking is the most important support of banks and is a product that increases service quality and reduces transaction costs. Besides internet banking, mobile banking applications developed by almost all banks allow transactions to be done easily and quickly. Mobile banking applications are an important digital product especially preferred by the new generation. Feature mobile contactless card payment system has been spreading rapidly

in recent years.[24] [25] With the diversification of financial products and technological advances in these products, markets are more integrated and information acquisition and transaction costs are reduced. [26]

2.4 DIGITAL FINANCIAL PRODUCTS AND SERVICES

The process of digitalization of banks in Turkey dates back to the early 2000s. At present, the perception of the digitalization of banks in Turkey is beyond the improvement of the infrastructure and banking systems in which traditional products are offered.

2.4.1 Technological development of digital financial products and digital financial Products

The idea of making payments without cash in history was first mentioned in the book Looking Backward 2000-1887 published in 1888 by Edward Bellamy (Özkan 2015).

That thought which was utopian at that time, was one of the most important ideas of the 20th century. In the card payment systems, we can see the ancestors of similar payment techniques today.

For the first time in 1988 in Turkey Business Bank ATM (Automated Teller Machine) was used. ATM is a technology that enables people to make many transactions instantly without wasting time, without going to banks. Figure 2.6 shows that picture of the Turkey's first ATM (Özkan 2015).

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[24] Webtekno. Babuççuoğlu, Ç. 2018. Temassız ödeme teknolojisi: Türkiye'nin durumu. (Online).

https://www.webtekno.com/anket-temassiz-odeme-teknolojisi-turkiye-nin-durumu-h34427.html [Accesed 10, October,2018].

[25] *Temassız ödeme özelliği nedir. Avantajları nelerdir.*2017. (Online)

https://www.finanskrediler.com/temassiz-odeme-ozelligi-nedir-avantajlari-nelerdir/

[Accessed 12, September, 2018].

[26] *2016 yılı için ödeme trendleri.2015.* (Online)

http://www.teknolo.com/odeme-trendleri-2016/ [Accessed 10, September, 2018].

Figure 2. 2: Turkey's first ATM Picture

Source: Özkan 2015, History of Turkey's card payment systems with memories and photographs

However, the first successful ATM in the modern sense was developed by Don Wetzel in 1968 and this ATM was first used by New York Chemical Bank in 1969 (Kaya 2009, p.15). Card payment systems are one of the important innovations that provide convenience to the markets. This system, which consists of credit cards, debit cards, POS devices ATMs, carries out most of the cash transactions. POS (point of sale) is a technology that enables transactions with credit cards without requiring cash. With this device, payment information received from Credit Cards are transferred to the banks and transactions are completed. Figure 2.3 shows that a Picture of Turkey's first POS.

Figure 2. 3 : The picture of Turkey's first POS

Source: Özkan 2015, History of Turkey's card payment systems with memories and photographs

The years of 2000s indicates that the card payment system became widespread in our country and started to be used intensively. Today, the use of credit card, which is one of the important actors of Turkish financial system, started to be used by tourism sector. Foreigners coming to our country did not want to carry cash, thus accelerating the emergence of credit cards. In our country, the first card acceptance application Diners Club (Carte Blanche) has been used. However, the use of this card does not exceed 10 thousand by 1975 (Özkan ,2015, p.65).

In 1988, Yapı Kredi Bank presented its true credit card to its customers. Previously, the cards offered to customers were the cards that were offered as a credit card but that were not actually credit card features (Özkan, 2015 p. 95).

This card was later added to international systems and named world card, and began to develop and present various products, especially in order to enable middle income consumers to benefit from financial services (Özkan, 2015 p. 95). The first credit card is made of metal. Figure 2.4 shows this.

Figure 2. 4: Picture of first using credit card

Source: Özkan 2015, History of Turkey's card payment systems with memories and photographs

ATM, credit cards, debit cards need to carry cash, increases the level of compliance with technology, prevents time loss, reduces costs. However, the development of payment systems such as VISA and MasterCard used in debit cards and credit cards has brought the world closer to each other and accelerated transactions. The non-contact payment

features of credit cards developed in recent years are also one of the important examples of innovation brought to the world of fintech.[27]

The contactless payment feature of credit cards has been integrated with smart phones to enable mobile contactless card payment system with a brand-new payment system. In this payment method, people are physically using their credit card limits via smart phones without carrying a credit card. [28]

EFT and SWIFT money transfer systems are important innovations in which the cash flow is not used, and transactions are made through electronic systems very quickly. [29] Electronic money, which has been developed in recent years, enables the use of money in electronic environment.[30] Electronic money can be internet based or card based. Internet-based electronic money can be given as an example for digital money. E-money is the digital representation of money or the digital definition of cash (Öztürk and Koç 2006, 6, p.112). One of the most known digital coins is bitcoin. There is a system created with a virtual passbook created with bitcoins from Bitcoin selling Internet sites.[31]

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[27] İpara. *Fintech'in gelecekteki rolünü ortaya koyan 10 önemli tespit.*(Online).

https://ipara.com.tr/Online-Dunyadan-Haberler/Sayfalar/fintech-in-gelecekteki-rolu.aspx[Accesed 1,September,2018].

[28] *Visa contactless. Akıllı telefonları akıllı kartlara dönüştürün.*2018. (Online)

https://www.visa.com.tr/bizimle-isbirligi-yapin/payment-technology/visa-contactless.html [Accessed1, September, 2018).

[29] *Kredi kartı yerine cep telefonu ile ödeme geliyor*.2015

https://www.haberler.com/kredi-karti-yerine-cep-telefonu-ile-odeme-geliyor-6889361-haberi/ [Accessed 10 September 2018].

[30] Fintechtime.com. Karaçallık, D. 2018. Dijital para ile elektronik para arasındaki ayrım.

http://fintechtime.com/tr/2018/08/dijital-para-ile-elektronik-para-arasindaki-ayrim/?doing_wp_cron=1538340201.1427180767059326171875 [Accesed 10, October, 2018].

[31] Fintech İstanbul. *Bitcoin üzerine bir tez ve antitez*.2018. (Online)

https://fintechistanbul.org/2018/08/15/bitcoin-uzerine-bir-tez-ve-antitez/ **[A**ccesed 02, October, 2018].

2.4.2 Digital financial products and the impact of technological development of digital financial products on the economy

With financial innovations and digital products developed, the units in the economy are less affected by unstable economic conditions and higher risks. Interest rates, inflation, equity costs and fluctuations in exchange rates have led to the emergence of financial innovations (Yıldız 2006, p. 8). Financial innovations play a very important role in reducing the risks involved in the economy. The development of digital products in economic relations and the development of innovative innovations prevent the loss of time and money. Productivity and efficiency are provided for the manufacturing enterprises, which are one of the most important elements in the economy.

2.4.3 The impact of technological development of digital financial products on consumer habits

With financial innovations, consumers access to products has been facilitated. The lack of information in the markets has started to disappear quickly. The consumer who wants to use credit can see the individual credit interest rates offered by all institutions and reach the product by comparing. Today, with advances in the payment system and the development of new financial instruments, economic units have begun to choose financial assets that are alternatives to money.

New payment systems such as credit cards, debit cards, ATMs, internet banking, e-money provide consumers with great convenience. It can be provided with additional time creation, alternative payment tools and new digital products that are most needed by the people of our age.[32] Consumers can shop in digital environments with these products and complete their transactions at low cost. [33]

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[32] *Mobil Temassız Ödeme.*2015. (Online)
https://troyodeme.com/urunler-ve-hizmetler/cok-yakinda/ [Accessed 2, September, 2018].

[33] Fortune Turkey . *Temassız ödemede yeni yöntem.* 2015. (Online)
http://www.fortuneturkey.com/temassiz-odemede-yeni-donem-6899 [Accessed1 September 2018].

2.5 FINTECH AND FINTECH PRODUCTS

Fintech, the concept of financial technology, is a general concept that shows the applications and examples of technology in the financial sector.

2.5.1 What is Fintech

Fintech, the concept of financial technology, is a general concept that shows the applications and examples of technology in the financial sector. Fintech combines financial services with technology. Fintech has made fundamental changes in payment habits around the world.[34] In the history of Fintech, the first step of the banking sector is ATMs. Mobile payment systems, money transfer systems, developed financial solutions have been started to be developed thanks to fintech, and the resulting products continue to be the solution to the problems faced by companies and individuals with completely different solutions. The banking crisis in the world in 2008 brought about the insecurity in the system and positive developments took place independently of these negative developments. After this period Fintech technologies began to develop and spread rapidly. Fintech companies are rapidly developing and increasing in our country and all over the world. With this technology, the finance sector is progressing and new opportunities are produced. The countries where Fintech technologies are widely used are USA, UK and China. Countries give great importance to the solutions and studies that come with fintech, and serious research studies are carried out. Many applications developed with Fintech have succeeded in making banks work much less costly. The need for banks for many banking transactions such as personal payments and money transfers has started to decrease. In the future, banks will be able to focus on the exchange of digital values through symbolization rather than the exchange of physical currencies to provide products and services (Skinner 2016, p. 168).

[34] Fintechtime.com. Cengiz, D.D. 2018. Fintech devrim hareketi mi. (Online).

http://fintechtime.com/tr/2018/04/fintech-hareketi-devrim-mi/?doing_wp_cron=1538340652.1371090412139892578125[Accesed 1,October,2018].

Mobile devices that can function not only cards, but POS devices seem to be capable of revolutionizing. Therefore, smart phones and mobile internet are becoming the main factors that play a devastating role here (Birch 2016, p. 125).

It is seen that developed technologies with financial content will be shaped by future payment systems and almost banks and other financial services will be replaced by gradually. The payment sector is becoming more and more innovative and powerful (Birch 2016, p.118). Fintech technology in the banking sector creates digital revolution.[35]

Alternative services, innovative products, new technologies over the last 15 years, the Turkish banking system in the field of Finance has been hosting the most advanced applications in the world, especially in the field of payment solutions (Usta and Doğantekin 2017, p.26).

2.5.2 New payment systems developed with fintech

With the increase in Internet access and the use of smart mobile devices in the world and in our country, developments in the world of fintech are spreading rapidly.[36] Fintech products developed in line with the target cashless society in Turkey will be the most important actors of the progress made on the life of society and economic system.[37] Fintech investments, which produce solutions with destructive innovations in the field of fintech, are popular in our country as well as all over the world.

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[35] Fintech İstanbul. EY Türkiye Danışmanlık. BKM.2018. *Türkiye fintech ekosisteminin sürdürülebilir gelişimi için 23 öneri.* 2018. İstanbul.

https://www.ey.com/Publication/vwLUAssets/Fintech_Donusumu_Raporu/%24FILE/EY_Turkiye_Fintech_Donusumu_raporu.pdf .Rapor. [Accesed 02 June 2018].

[36] Fintech İstanbul. *Rapor: Yeni Kuşak Techfin'e hazır.*2018.(Online)

https://fintechistanbul.org/2018/03/12/rapor-yeni-kusak-techfine-hazir/

[Accessed 15 September 2018].

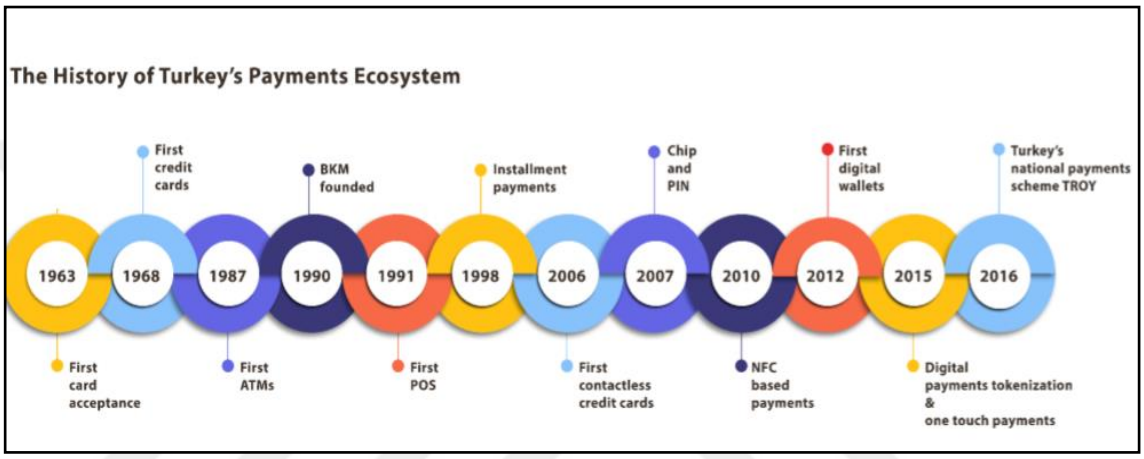
[37] Deloitte Türkiye.2017. Türkiye Fintech Ekosistemi.(Online)

https://www2.deloitte.com/content/dam/Deloitte/tr/Documents/finance/turkiye-fintech-ekosistemi.pdf [Accessed 15, September,2018].

Turkey's young population, geographical location, source of dynamic entrepreneurship, as a country with a strong and innovative financial sector, we draw attention to the fact that we have a great advantage in the field fintech.[38]

The fact that we have a strong banking system, the expansion of card payment systems and the intensive use of mobile technologies offer important opportunities for fintech investments in our country.[39]

Figure 2. 5: The history of Turkey's payments ecosystem



Source: BKM. Cashless Turkey by 2023. 2017.

2.5.2.1 Öde al

Öde al with mobile pos application creates different payment methods with the ability to connect to desktop cash registers. Thanks to its mobile app, it is an efficient payment tool that can also be processed from mobile phone. With this application it turns into mobile phone collection tool.[40]

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[38] Deloitte Türkiye. *Türkiye fintech sektörü umut veriyor.*2017.(Online) https://www2.deloitte.com/tr/tr/pages/about-deloitte/articles/turkiye-fintech-sektoru-umut-veriyor.html [Accessed 15 September 2018].

[39] FinTech İstanbul ve Bankalararası Kart Merkezi.2016. *Türkiye FinTech Ekosistemi*. http://bkm.com.tr/wp-content/uploads/2016/12/TurkiyeFinTech-EkoSistemi-V10.pdf

[Accesed 30, September,2018].

[40] Economist, The Payment Systems News [Online].

2.5.2.2 Paypal

It is an online smart payment system that runs over the internet, sent money via e-mail to the desired person. PayPal can also be considered as online banking. Although it is widely used in the world, the system is not yet implemented in Turkey. Developed by Elon Musk, PayPal was purchased by e-Bay in 2002. This sale has had a serious impact on the spread of electronic payment system in the world. PayPal has become a great player in the world of electronic payments, making it possible to transfer money reliably between people via the internet (Birch 2016, p.87).

2.5.2.3 BKM Express

BKM Express is a payment system developed by banks in the sector and companies in the e-commerce world.[41] It is an effective payment tool that is created to ensure that purchases are safe and fast. Compatible with all technological devices, the system is used for money transfer, shopping and many alternative needs.[42]

2.5.2.4 Lyzico

Lyzico is a payment system that can perform many financial transactions such as virtual POS, e-commerce. [43]Credit card use in Turkey ranks 1st in Europe. 1 of every 2 people use smartphones as the future of digital commerce in Turkey looks bright. lyzico has achieved a revolutionary event in the digital online shopping experience. [44]

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http://www.ekonomist.com.tr/haberler/odeal-2017de-iki-kat-buyuyecek.html,[Accesed: 30,September,2018].

[41] BT Günlüğü.*Temassız ödeme katlanarak büyüyor.*2017. (Online) https://www.btgunlugu.com/temassiz-odeme-katlanarak-buyuyor/ [Accessed 12 September 2018].

[42] Fintech İstanbul.2018. Dünyanın geleceğini belirleyecek 6 eğilim.(Online) https://fintechistanbul.org/2018/08/14/odeme-dunyasinin-gelecegini-belirleyecek-6-egilim/ [Accessed 20, September ,2018].

[43] Media Iyzico. Tanses, B., 2017. *Iyzico ve Paraşüt Fintech 250 listesinde*. İstanbul.(Online) https://media.iyzico.com/b/2017/08/iyzico_CBInsightsFintech250_BB_04072017_ONAYLI.pdf [Accesed 30, September ,2018].

[44] Tanses, B.2017. Iyzico'dan dijital ticaretin önündeki engelleri kaldıran iki yeni ürün [Online] https://media.iyzico.com/b/2017/10/iyzico_iyziEvent_BB.pdf,[Accesed:30, September,2018].

Founded in 2013 in Istanbul Iyzico, as an easy and secure payment services company, produces rational solutions for the e-commerce world with an innovative perspective.[45] Lyzico in the field of alternative payment systems used in Turkey is the first organization that uses artificial intelligence application.

2.5.2.5 Paypad

Paypad is the first cloud-based mobile sales and payment system. It is a software equipped with artificial intelligence that reduces costs. The system is intelligent and decides what to sell with artificial intelligence.[46] As it is cloud based, the requested information is reached instantly. Paypad can be considered as a mobile safe. Mobile cash register is a new generation cash dispenser developed to simplify cash transactions. It is an application that helps customer management.

2.5.2.6 Paraşüt

Paraşüt is an accounting program that allows companies to make financial transactions more easily. With the developed system, businesses can easily follow up the invoice tracking, revenue tracking, stock follow-up and current account tracking.[47] E-invoice is one of the most important assistants of businesses with e-commerce features. Since the system is a web- based recounting program, it has brought convenience and innovation to the financial sector due to its ability to work anywhere without being bound to the office.

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[45] Media Iyzico.Keçeci, D. 2018. Türk finansal hizmetler devi iyzico, Doğu Avrupa açılımını Amsterdam'da duyurdu. (Online). https://media.iyzico.com/b/2018/06/iyzico_Money2020_DoguAvrupa_BB_REV_01062018_final_SS.pdf [Accesed 30, September,2018].

[46] Yerli akıllı ödeme sistemi PayPad ipad'i mobil kasaya çevirdi. (Online). 2016. https://odemeteknolojileri.com/2016/06/01/mobil-odeme-sistemi-paypad/ [Accesed 1, November,2018].

[47] Media Iyzico. Tanses, B., 2017. *Iyzico ve Paraşüt Fintech 250 listesinde*. İstanbul.(Online) https://media.iyzico.com/b/2017/08/iyzico_CBInsightsFintech250_BB_04072017_ONAYLI.pdf [Accesed 30, September ,2018].

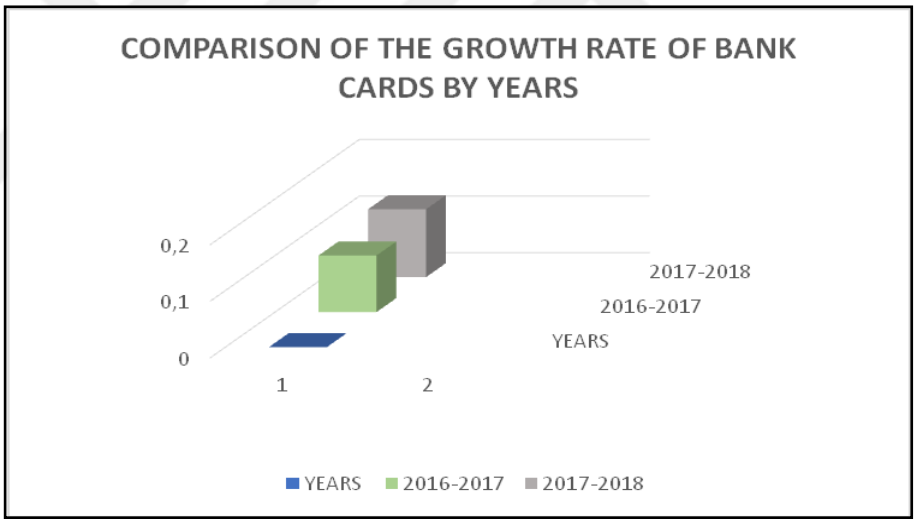
2.5.2.7 Troy

Troy is an internationally valid payment system. Developed in order to catch up with the developments in the world, this system includes bank cards, credit cards and prepaid cards. In addition to being a national payment system, Troy is a cashless payment system, which makes it convenient and fast to use.

Troy is a technologically advanced card payment system developed by BKM. Troy is a technologically advanced card payment system developed by BKM.[48]

In Europe, 13 percent of card transactions are in the form of contactless payments. In many countries, while usage rates are over fifty percent, this ratio is still one percent in our country. As of June 2018, the current data of Turkey's card payments market are shown in the figure 2. 6, figure 2.7, figure 2.8 below.

Figure 2. 6: Comparison of the growth rate bank cards by years



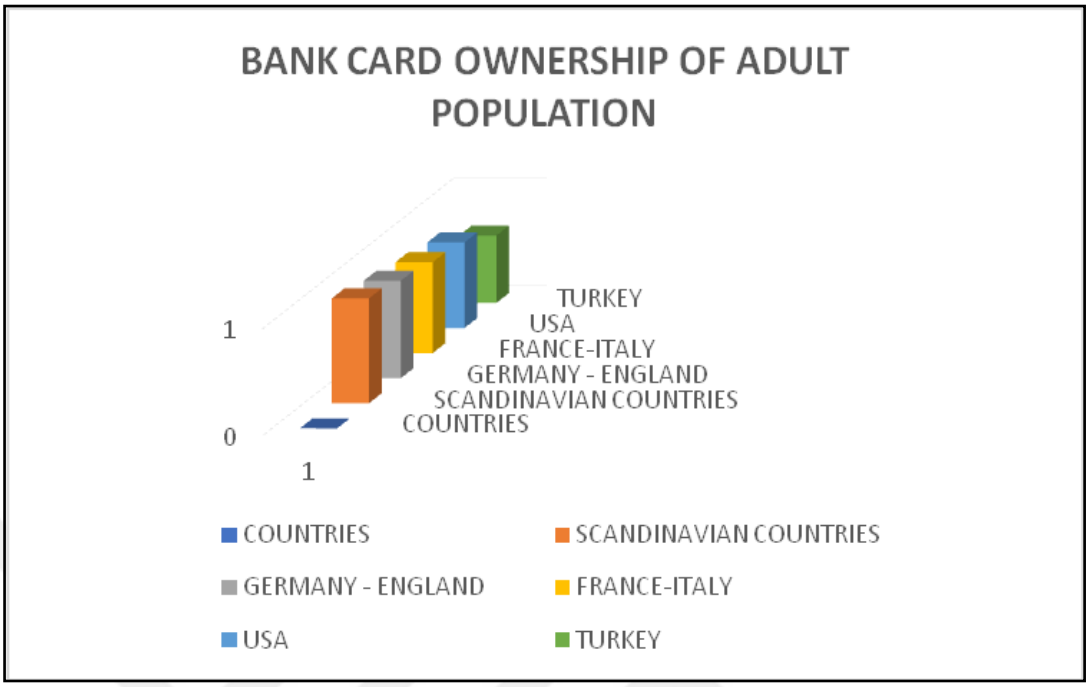
Source: BKM 2018, Turkey card payment report.

As of June 2018, the number of debit cards is 136.4 million[49]

[48] Fintech İstanbul.
Türkiye'nin 28 yıldır devam eden nakitsiz toplum yolculuğu. 2018.(Online). https://fintechistanbul.org/2018/10/03/turkiyenin-28-yildir-devam-eden-nakitsiz-toplum-yolculugu/ [Accesed 04, November, 2018].

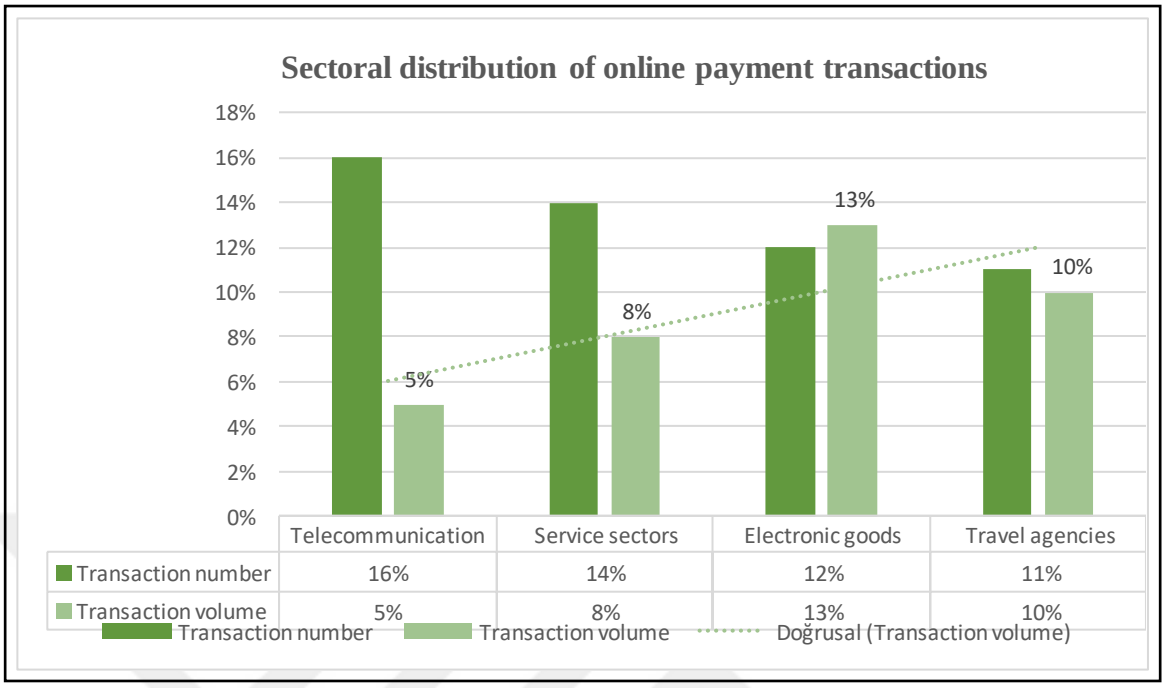
[49] BKM.2018. Turkey card payment report. [Accesed 15, November,2018].

Figure 2. 7: Bank card ownership of adult population in 2017



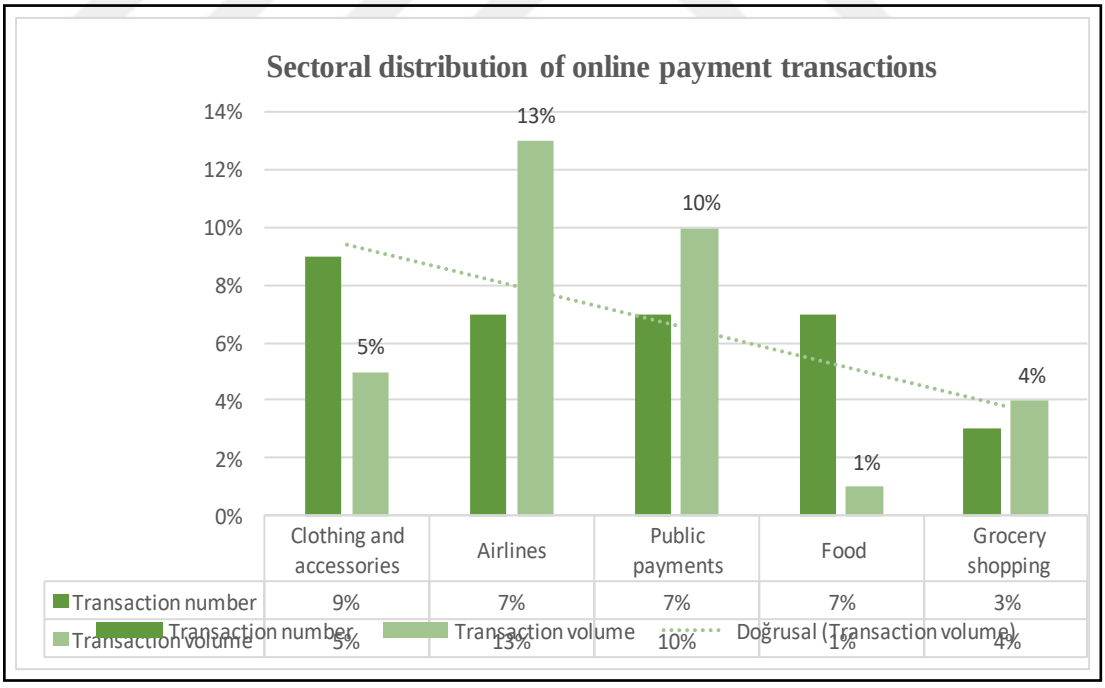
Source: BKM 2018, Turkey card payment report.

Figure 2. 8: First sectoral distribution of online payment transactions in 2017



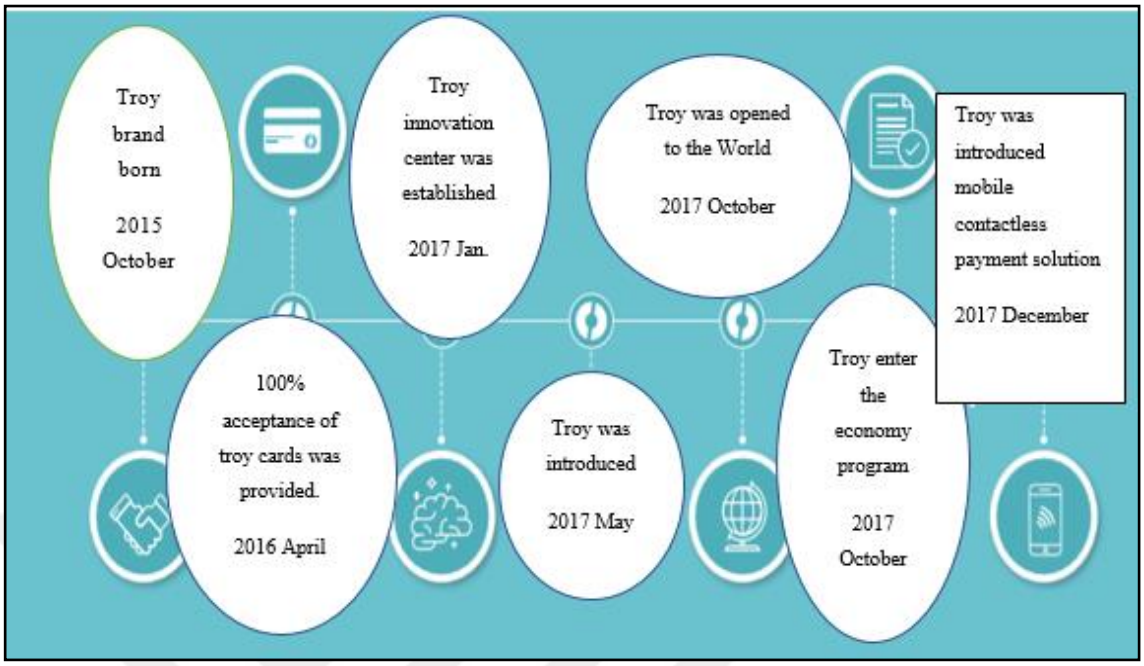
Source: BKM 2018, Turkey card payment report.

Figure 2. 9: Second sectoral distribution of online payment transactions in 2017



Source: BKM. 2018. Turkey card payment report.

Figure 2. 10: Turning points since troy was founded



Source: BKM.2018. Turkey card payment report.

2.5.3 Innovative technologies developed by fintech technology

One of the new technologies developed with fintech and bringing new solutions are blockchain and crypto money systems.

2.5.3.1 Blockchain technology

After the emergence of the world economic crisis in 2008, a study about the Bitcoin system was published. Bitcoin has a structure developed independently from the traditional financial system.[50] It is possible to define this structure as Blockchain technology. Blockchain technology is the biggest revolution after Internet technology.[51] Blockchain technology also benefits from password science.

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[50] Fintech İstanbul. *Finans için Blockchain*. 2018. (Online)

https://fintechistanbul.org/2018/10/07/rapor-finans-icin-blockchain/

[Accesed 30, November, 2018].

[51] Fintech İstanbul.Finans sektörünün bu sıkıntıları Blockchain ile çözülecek.2018.(Online)

https://fintechistanbul.org/2018/06/27/finans-sektorunun-bu-sikintilari-blockchain-ile-cozulecek/
[Accesed 02, October, 2018].

The digital copy used in traditional methods will be replaced by a technology such as blockchain.[52] Blockchain technology provides us with a very basic logic of the digital world, that is, the ability to write and delete the data as we wish, and update it from a different perspective (Usta and Doğantekin 2017, p.46).

Blockchain is a general account system that basically records transactions. The electronic record of each operation performed by everyone in the system is kept accessible (Skinner 2016, p.222).

Blockchain can be used extensively for financial solutions, but beyond that it has many different application areas (Usta and Doğantekin 2017, p.67). Blockchain technology is used in many areas and can also produce solutions.

The banking and finance world will benefit from this technology intensively in the coming years, but these will not be the only industry to benefit from the benefits of this technology (Usta and Doğantekin 2017, p.147).

2.5.3.2 Krypto money systems

One of the most well- known examples in the crypto currency system are bitcoin and ripple.

2.5.3.2.1 Bitcoin

The bitcoin platform includes the Krypto currency[53] Bitcoin and the digital wallets of those involved in the platform. [54] With the mobile digital wallet application, a digital wallet can be opened and the address can be obtained in seconds (Usta and Doğantekin

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[52] PWC Türkiye. *Finansal hizmetler teknolojilerinde 2020 ve sonrası: Değişimi kucaklamak*. (Online).

https://www.pwc.com.tr/tr/sektorler/finansal-hizmetler/yayinlar/finansal-hizmetler-teknolojilerinde-2020-ve-sonrasi.html [Accessed 15, September, 2018].

[53] Fintech İstanbul. *Yılın Önemli FinTech Trendleri.*2018.(Online)

https://fintechistanbul.org/2018/07/31/bu-yilin-onemli-fintech-trendleri/

[Accessed 20, September,2018].

[54] Satoshi Nakamoto. Bitcoin: A Peer-to-Peer Electronic Cash System.(Online)

https://bitcoin.org/bitcoin.pdf [Accesed 05, October, 2018].

2017, p.80). The first time the system was designed, it predicted that the number of users could increase over time and the value of the generated Bitcoin would increase (Usta and Doğantekin 2017, p.82).

2.5.3.2.2 Ripple

Ripple is basically a real time international currency exchange/payment platform. Blockchain based technology is used to eliminate the requirements of intermediary institutions such as swift and the sluggish, high cost of ownership (Usta and Doğantekin 2017, p.88). Blockchain provides significant savings in transaction costs and time usage, but the high investment costs required at the beginning can be a deterrent (Usta and Doğantekin 2017, p.107).

2.5.3.2.3 Separation of digital money and electronic money

Electronic money is a payment instrument that is given to the market as a virtual balance in exchange for a certain amount of funds, which is accepted by all especially by the government. Electronic money does not have costs such as printing and storage.

Payments are made electronically in a comfortable way.[55] Digital money is a money system using blockchain technology created using encryption method. Digital money does not accept centralized authority. The possibility to store on the Internet is very simple.

2.5.3.3 Examples of digital financial products and services developed with fintech technologies in the world

The purpose of fintech initiatives and financial products created using Fintech technology is to reduce the use of cash. Monzo Bank is significant example for explain. A bank that stay on the mobile phone and create the way you live easily. It is a digital bank and Challenger bank. Go Cardless is the application and this application reduces the commission rate by using the method of collection from the account to the account.

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[55] Fintechtime.com. Karaçallık, D. 2018. Dijital para ile elektronik para arasındaki ayrım. http://fintechtime.com/tr/2018/08/dijital-para-ile-elektronik-para-arasindaki-ayrim/?doing_wp_cron=1538340201.1427180767059326171875 [Accesed 10, October, 2018].

2.5.3.4 Examples of digital financial products and services developed with fintech technologies in Turkey

Turkey's efforts to create a non-cash society that does not use cash have been continuing for many years. With the rapid introduction of technology into our lives, the consumer tendency towards alternative payment systems is increasing. Established in 1990, the BKM plays an important role in the development of alternative payment methods and the inclusion of them in public life. In 1991, POS entered the commercial life of the Turkish community.

As of 1998, the expansion of credit cards and the realization of installment transactions have brought speed and confidence to our economy. The contactless credit card which was developed in 2006 was started to use as of this time. In 2012, BKM express, that is, Turkey's first digital wallet was developed.[56]

Our national card payment system, Troy, was brought to our economy in 2016. According to the studies and the data obtained, it shows the fact that Turkish society will use alternative payment methods without the use of cash.[57]

Considering the data published by BKM, it has been seen that the usage of credit card and debit cards of Turkish people has increased at a serious level since 2008. Turkey is located in the first row of the list compared with other countries in the last 5 years about the card payment system. [58] According to Fintech.com data, 13 percent of card transactions in Europe are in the form of contactless payments. In particular, we know that in the Czech Republic 72 percent of in-store payments, 55 percent in Poland, 40 percent in Hungary,

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[56] Para Dergisi. Çetinel, E. 2017.Türkiye'de hangi mobil cüzdanlar öne çıkıyor. (Online).

https://www.akilligundem.com/turkiyede-hangi-mobil-cuzdanlar-one-cikiyor/[Accessed1,September, 2018].

[57] E ticaret çağı. Diçer, B. Türkiye de temassız ödemenin alışkanlığı ve geleceği. 2017. (Online)

http://eticaretcagi.com/2017/03/08/turkiyede-temassiz-odeme-aliskanligi-gelecegi-ozel-haber/[Accessed 10, September ,2018].

[58] Teknoyo. 2017. Türkiye 2016 da günde 123 bin ödemeyi temassız yaptı. (Online)

http://teknoyo.com/bkm-temassiz-odeme-islemi-verileri-2016/ [Accesed 5, October, 2018].

38 percent in Slovakia are contactless. In our country, this ratio is still 1 percent. However, this rate has also increased in our country in recent years.

2.5.4 As a fintech technology mobile contactless card payment system

NFC based mobile payment systems can be defined as contactless payment. Innovations in technology since 2010, this payment system has entered into the domain of our lives.[59] The non-contact payment method that should be explained in the system is done with credit card, debit card or NFC smart phones that have non-contact payment capability without any contact between POS device. The benefit of the system is that it allows you to make quick and easy shopping without entering a password through smart phones in low-limit shopping without a credit card.

Mobile contactless card payment method is most commonly used in the market, food and service sector. Contactless payment method is highly developed in terms of security. Many banks in our country have started to provide mobile contactless payment services.[60] In order to benefit from the service, users must download mobile banking applications to their smart phones with compatible of NFC (near field communications) and add credit card information.

This technology is known as a cloud-based payment method. Google and Microsoft are contributing to create a new operating system in the cloud- based payment systems with support applications that improve the mobile contactless payments and mobile banking applications for banks in Turkey.[61]

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[59] Dünya Gazetesi. *Teb, buluttan mobil temassız mobil ödeme sunuyor.*2015. (Online)

https://www.dunya.com/finans/haberler/teb-buluttan-temassiz-mobil-odeme-sunuyor-haberi-271419 [Accessed 1, September, 2018].

[60] *Mobil temassız ödeme*. 2018. (Online)

https://www.vakifkart.com.tr/ayricaliklar/firsatlar/mobil-temassiz-odeme

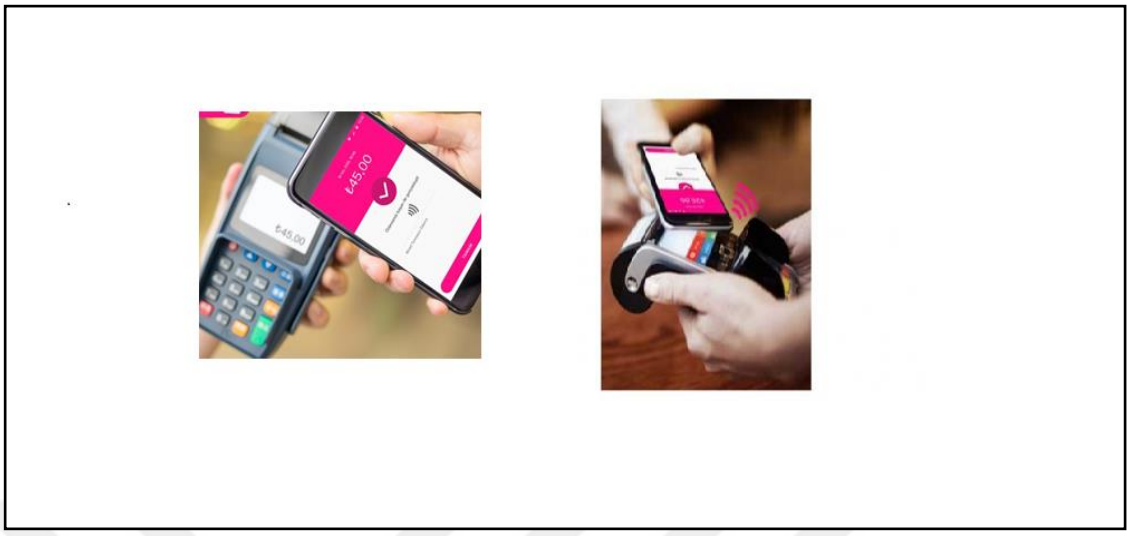
[Accessed 10, September, 2018].

[61] Chip.Dergisi. *Maksimum mobil uygulamasını inceledik.*2017. (Online)

https://www.chip.com.tr/haber/maximum-mobil-uygulamasini-inceledik_68570.html

[Accessed 10, September, 2018].

Figure 2. 11: Images of İş Bank's Mobile Contactless Card Payment Application



Source: Maximum.com.tr

Research shows that mobile contactless payment is 7 seconds faster than cash payment and is reliable and easy. Thanks to this application, mobile phones can turn into contactless payment tools.

Contactless payment is currently being used in our country for low-limit purchases, but in the following years it is understood that due to its qualified structure it will be a technology that can be used in large volume shopping and other areas. We see that this system will prepare the ground for the disappearance of plastic cards.

According to 2016 data BKM announced that, in 2016 Turkey 45 million contactless payment transactions were carried out. These figures are further increased in 2020 and the share of payment methods is expected to be increased. This payment method is seen to be of significant contribution to Turkey's 2023 vision cashless society. It is used mainly in non-contact payment shopping in many countries, especially in the USA. Researches are ongoing on this subject. Britain is the most common country where contactless payment is most common. The contactless payment method is also used in the transportation service in London, England.

In 2020, Mastercard works to ensure that contactless payment is used throughout Europe[62]. POS devices that can receive contactless payments are being extended. In the coming years, it is among the goals to make a payment technique widely and efficiently used.

According to the studies, mobile contactless payment may result in the emergence of alternatives where credit card transactions can be made without the plastic card in the coming years.

Considering the use of smart phones and the rates of widespread use in today's conditions, it is concluded that mobile contactless payment method is a rapidly used application, and that every smart phone is also a payment tool. This situation shows the fact that the credit card and debit cards that we have not separated from next to us will gradually be replaced by virtual versions of the digital mobile application on the smart phone. Turkey has started to digitize more and more day by day. This situation is shown in the data published by BKM. The tables below contain these information's.

Table 2. 4: Total sums in product numbers by years

Years	Pos numbers	Atm numbers	Credit card numbers	Bank card numbers
2017	**1.656.999**	**49.847**	**62.453.610**	**131.593.443**
2016	**1.746.220**	**48.421**	**58.795.476**	**117.011.685**
2015	**2.158.328**	**48.277**	**58.215.318**	**112.383.854**
2014	**2.191.382**	**45.576**	**57.005.902**	**105.513.424**
2013	**2.293.695**	**42.011**	**56.835.221**	**100.164.954**

Source: BKM,2018.

[62] MasterCard. Mobil ödemelere hız vererek 2020'de Avrupalıların her noktada temassız ödeme kullanabilmesini mümkün kılacak. Mastercard. (Online).

https://newsroom.mastercard.com/eu/tr/press-releases/mastercard-mobil-odemelere-hiz-vererek-2020de-avrupalilarin-her-noktada-temassiz-odeme-kullanabilmesini-mumkun-kilacak/ [Accesed 1 October 2018].

Table 2. 5: Domestic credit card and debit card usage by years

Years	Number of domestic transactions of domestic credit card	Domestic transaction amount of domestic credit card (TL million)	Years	Number of domestic transactions of domestic bank card	Domestic transaction amount of domestic bank card (TL million)
2017	3.439.398.203	657.692,21	2017	2.646.729.716	667.407,64
2016	3.161.481.185	588.486,11	2016	2.257.087.782	578.313,72
2015	2.978.106.358	531.748,66	2015	1.962.464.360	482.497,59
2014	2.768.376.296	464.995,07	2014	1.726.779.351	417.195,37
2013	2.682.369.601	416.094,79	2013	1.504.236.988	362.786,67

Source: BKM

Table 2. 6: Card payments made online by years

Years	Number of domestic and foreign transactions of domestic card	Domestic and foreign transaction amount of domestic card (TL million)	Years	Number of domestic and foreign transactions of domestic and foreign card	Domestic And foreign transaction amount of domestic and foreign card (TL million)
2017	386.145.059	98.255,97	2017	329.883.931	99.069,52
2016	306.851.459	68.883,49	2016	263.969.971	68.368,52
2015	260.927.719	55.284,00	2015	227.161.419	55.389,00
2014	218.145.696	40.848,68	2014	190.524.288	41.883,44
2013	193.324.855	34.508,91	2013	168.061.356	34.606,04

Source: BKM

Table 2.4, table 2.5, table 2.6 which are shared by BKM show according the years the transactions made with credit cards, transactions made with the bank card and card transactions made through internet banking. According to these data, it is understood that mobile contactless card payment method, which is one of alternative payment techniques in the following years, will be widely used, because of increasing the amount of card transactions made through the internet banking channels in the World and Turkey.

3. RESEARCH METHODOLOGY

3.1 DEFINITION OF PROBLEM

In recent years, our country has adopted rapidly digitized payment systems. With the rapid development of technology, the methods of payment that people pay for their expenditures have started to digitize rapidly.

According to the data published by BKM, there has been a significant increase in the number of card payments and the volume of payments made through internet banking between 2013 and 2017. In Table 2.5, these data are explained in detail. In table 2.4 The table shows the credit card, debit card, ATM and POS numbers used in Turkey between 2013 and 2017. In table 2.6 card payment made over the Internet and volume information is shared. The data mentioned in the tables are continuously increasing from 2013 to 2017. So, in Turkey the use of products such as internet banking, credit card, debit card, are increasing. The feature of the mobile contactless card payment product includes a credit card with a feature and internet banking. Due to these characteristics of the product, credit card and debit card users shared in the tables may also be potential users for this product.

Banks, which is one of the most important financial institutions in the country's economy, assume the role of the engine of the economy. By adding developing technologies and innovations, they aim to make their service levels more efficient and high quality. Mobile contactless card payment, which has become an effective product in our country's banks in recent years, is becoming a unique experience for bank customers. However, the method of mobile contactless card payment can be considered as a new product in the financial field. Mobile contactless card payment, which has started to be implemented in Turkey through mobile banking which is used in smart phones since 2015, is a payment method with smart phones without the physical use of credit card. The problem in this study is that it is not predictable how this payment method can be evaluated by bank customers in terms of e-service quality and customer satisfaction.

The study will examine this new fintech product in terms of customer satisfaction and e-service quality. Based on this context the problem of statement question in this research

is as follows. What is the level of e-service quality evaluations of bank customers for payment of mobile contactless card payment as specified as a fintech product?

3.2 PURPOSE AND IMPORTANCE OF RESEARCH

One of the sectors in which technology is rapidly integrated in the economy is the banking sector. Due to its dynamic structure, the banking sector must adapt rapidly to developments. As a result, it is observed that the society has changed and become dynamic with its developing banking structure. Technological advances in financial technology have been rapidly reflected in banks ' services in recent years. This situation affects the bank's customers who actively use the banks in a positive way.

Developed fintech products are offered to the customers of the bank and aimed to bring the understanding of service to a higher quality, faster and more effective stage. The aim of this study is to measure the customer satisfaction within the framework of the service quality of various bank customers, especially for mobile contactless card payment which is a new fintech product. With the customer satisfaction measured, the approach of the bank customer to this innovative product is observed.

In addition, the importance of e-service quality in the provision of customer satisfaction within the scope of financial innovations, through mobile contactless card payment is to investigate. For this reason, the effects of efficiency, system availability, fulfillment and privacy service quality content on customer satisfaction in terms of mobile contactless card payment have been surveyed. The study covers individuals who can use digital bank products in various banks.

This research is expected to give a complementary information about fintech products. The importance of the research is that fintech products developed can provide insight into customer approach for newly developed products by increasing the satisfaction of bank customers and e service quality in a positive way.

3.3 RESEARCH UNIVERSE AND SAMPLE

Research universe and sample will be explained first. Then the data collection method will be specified.

3.3.1 Research Universe

According to Smith, the research universe is an accessible universe. Studies are conducted on the working universe and the results can only be generalized to this limited universe (Smith 1975). Since the research hypothesis have been tested with the results of the survey that the bank customers have answered, the focus of research Turkish bank customers who have live in İstanbul. All customers in this universe are people who have accounts in banks and who are actively using banks. But our research must include bank customers who use products with slightly more specific characteristics, the sampling are consists of people using internet banking, mobile banking, and mobile contactless card payment products.

3.3.2 Sampling of The Study

In this study the targets are bank customers who use internet banking, mobile banking, mobile contactless card payment in Turkey. In this study, convenience sampling method was used.

A convenience sample is one that is simply available to the researcher by virtue of its accessibility. Social research is also frequently based on convenience sampling (Bryman 2012, p.201-202). The method of convenience sampling is a non-probabilistic sampling method which is obtained by means of collecting data from the appropriate persons for the study.

3.3.3 Sample Size

Sample, the segment of the population that is selected for investigation. Sampling frame: the listing of all units in the population from which the sample will be selected. Non-probability sample: a sample that has not been selected using a random selection method (Bryman 2012, p.187). Bryman in his book explains that if the method used to select the sample is not random, there is a possibility that human judgement will affect the selection

process, making some members of the population more likely to be selected than others (Bryman 2012, p.187).

In this context, although there is no absolute standard for sampling size in literature, it is suggested that the number of subjects in the descriptive and confirmatory factor analysis techniques to be applied in the study should be between 10:1 and 5:1 ratio of the variables observed in the survey (Floyd and Widaman, 1995, p.286-299).

In this study, it is very important to reach people who use this product or even use it consciously. In this study 280 questionnaires were applied in İstanbul of Turkey**.** Among them, only 200 questionnaires have been we evaluated and added in this study. The questionnaire was developed based on the literature of the study**.**

3.3.4 Data Collection Method

From customers of various banks answers have been added to this study. This data has collected through questionnaire in İstanbul from various banks of Turkey. The purpose of the study is to find correct conclusion about mobile contactless card payment in Turkey.

3.3.5 Limitations of The Study

The survey has been conducted by face to face method to bank customers who only have come to bank branch in the study. Since the survey has been applied by the convenience sampling method and the questionnaire, the participation has been generally from Istanbul. Therefore, it would not be very accurate to interpret that the result is totally compatible with Turkey in general.

3.4 METHODOLOGY OF THE STUDY

In this study, convenience sample method is used. The prepared questionnaire has been applied to the persons who meet the criteria specified in the bank branches. This survey was applied to customers 18 years of age and older who can legally transact in the bank. Sample size has been calculated as 200 people by using. Questions have been asked about whether they have information about the product as a preliminary interview. Then the questionnaires have been given and asked to be filled.

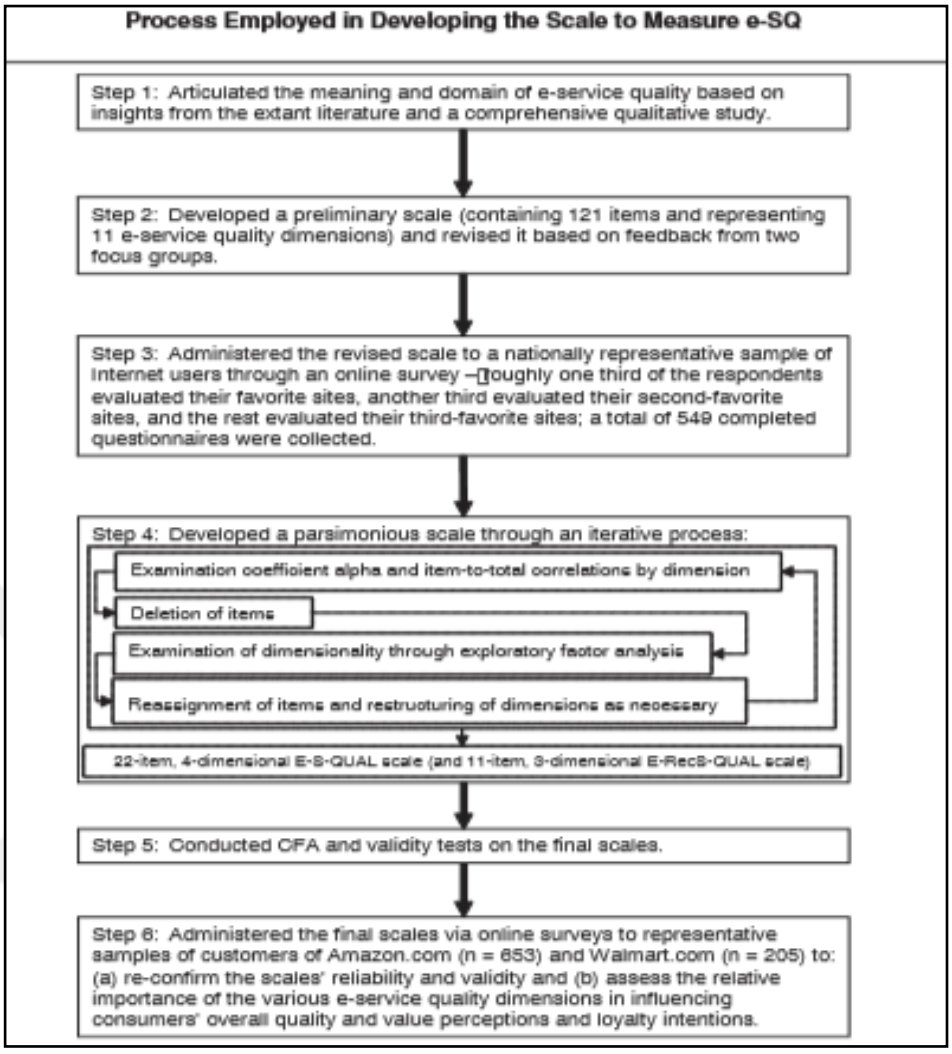
In the questionnaire there are three parts. The first part contains personal information. In the second part, there are 18 expressions consisting of E-S Qual measure improved by Parasuraman and Zeithaml, Malhotra. Its name is Electronic Service Quality Scale. Although there are 22 expressions with E-S Qual, Questionnaire have been used by subtracting the parts that are not related to the product. 18 expressions have been taken exactly from E-S Qual. In the second part of questionnaire, there are 7 items about efficiency, 4 items about system availability, 4 items about fulfillment and 3 items about privacy. In the third part, there are 5 items about customer satisfaction. These items which are about customer satisfaction are taken from (Özer and oth. 2013). The 5- point Likert scale has been used. In questionnaire, totally disagree, disagree, neither agree nor disagree, agree and totally agree expressions have been used.

3.5 RESEARCH MODEL and HYPOTHESIS OF THE STUDY

The concept of E-service quality is very important in terms of competition and prestige. The concept of e service quality developed by Parasuraman and Zeithaml, Malhotra has worked on effective and efficient online shopping criteria. As e-service quality increases, the fact that companies that offer e-services are more effective is evident. Increasing e-service quality also increases customer satisfaction and customer loyalty. The results of the researches show that increasing customer satisfaction and customer loyalty increase the market share and profitability level of online service providers. The study of the quality of e-service which have been done by Parasuraman and Zeithaml, Malhotra (2005) is shown in figure 3.1.

In the study, the quality of service quality was determined based on quantitative studies. A 121-item scale including 11 e-service dimensions was developed (Parasuraman and Zeithaml, Malhotra 2005). This scale was used to represent the internet users in the USA via the online survey. A scale consisting of 22 expressions and 4 dimensions was developed. CFA and validity tests were then applied. The last version of the scale was applied to amazon.com and wallmart.com users by creating an online questionnaire. After this stage, the service quality of the users was evaluated.

Figure 3. 1: Process in development of electronic service quality scale



Source: Parasuraman, Zeithaml and Malhotra, 2005. E-s-qual: A multiple item scale for assessing electronic service quality.

As a result of the researches, they developed the E-S-Qual scale consisting of 22 expressions and 4 basic dimensions. The resulting 4 dimensions are sorted as follows.

1- Efficiency

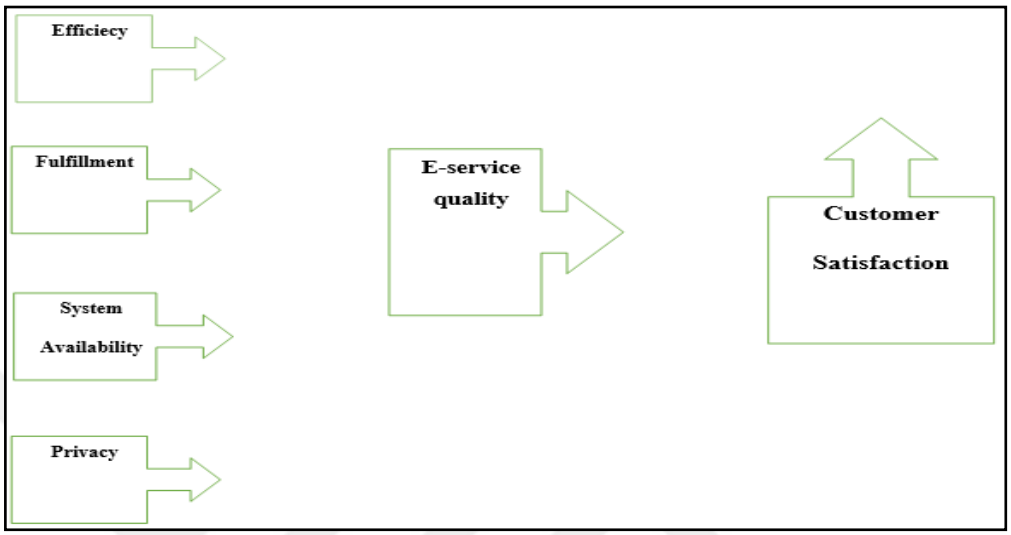
2- Fulfillment

3- System Availability

4- Privacy

In this study the concept of customer satisfaction was examined over e-service quality by taking into consideration these 4 dimensions. The research model of the study is shown in Figure 3.2. The hypothesis of the research is as follows.

Figure 3. 2: Research model



H1: There are statistically significant differences between the groups according to gender in the sub-dimensions of E-Service Quality concept.

H2: There is a statistically significant difference between the groups according to age variable in the sub-dimension of E-Service Quality concept.

H3: There is a statistically significant difference between the groups according to the education level variable in the sub-dimension of E-Service Quality concept.

H4: There is a statistically significant relationship between the subscales of the E-Service Quality scale and the customer satisfaction scale.

3.6 DATA ANALYSIS METHOD OF RESEARCH

In this study, the effect of e-service quality on customer satisfaction was investigated by the analysis methods described below.

3.6.1 Confirmatory factor analysis (CFA)

Factor analysis is a multivariate statistic that is used to obtain a significant number of meaningful variables from a large number of variables measuring the same structure (Büyüköztürk 2002, p.470). Factor analysis can be defined as multivariate statistic that aims to explore a number of conceptually meaningful new variables by combining a wide range of interrelated variables (Büyüköztürk 2002, p.472). Confirmatory factor analysis is generally performed with structural modeling software programs.

Factor analysis assumes that all variables and all linear combinations are normally distributed (Büyüköztürk 2002, p.480). Confirmatory factor analysis is a type of structural equation model for determining the relationship between observed and latent variables and has an important value in scale adaptation studies (Çapık 2014, p.196).

3.6.2 Reliability and validity analyzes of scales

Development and use of a scale to ensure that a scale is valid and reliable it is necessary to work in accordance with many criteria and standards and to make comments (Karakoç and oth. 2014, p.39). Reliability analysis is also called Cronbach's Alpha.

Validity is the degree at which a measurement tool can accurately measure the property it aims to measure. The reliability of a measurement instrument is the degree in which the instrument measures the variable it wants to measure in consistency, or the measurement results are free from errors (Bademci 2006).

3.6.3 Independent t-test

The t-test is a parametric test technique which examines the difference between the mean of two samples. [63] A mathematical difference between the two samples does not mean that there will never be a statistical difference, in most cases the mathematical difference

[63] Ekonomik analiz.2013. t-test .

http://www.ekonomianaliz.com/t-test-students-t-test/ [Accesed 5, October, 2018].

is not significant. The data should follow normal distribution, so the normal distribution tests of the data are done first and the t-test can be done if it is normally distributed.

3.6.4 ANOVA analysis

It is used if the group average to be compared is more than two. Also known as the F test. One-way analysis of variance is applied to test whether the difference between two or more unrelated mean samples is significantly different from zero (Büyüköztürk 2018, p.48). In this study, the reason for using Anova analysis is to find out whether there is a statistically significant relationship between electronic service quality sub-dimensions and age, gender and education variables.

3.6.5 Correlation analysis

Correlation analysis is a statistical analysis that shows the relationship between two or more variables, if there is a relationship, the severity of this relationship.

3.7 ANALYZE AND RESULTS

In this study, confirmatory factor analysis, ti test, Anova analysis and correlation analysis have been used to perform customer satisfaction analysis with electronic service quality scale. As a result of the tests I examined before I started to work reliability test (Cronbach's alpha), validity test (confirmatory factor analysis) values have been determined to have a consistent structure in terms of validity and reliability. Research question is this. What is the level of e-service quality evaluations of bank customers for payment of mobile contactless card as specified as a fintech product? The sub questions are as follows.

1. Is there a statistically significant difference between groups in the sub-dimensions of the concept of e-service quality compared to gender.
2. Is there statistically significant difference between groups in terms of age variables in the sub-dimension of e-service quality concept.
3. Is there a statistically significant difference between groups in terms of the educational level variable in the sub-dimension of e-service quality concept.

4. Is there a statistically significant correlation between the sub-dimensions of the E-service quality scale and the customer satisfaction.

3.7.1 Analysis of scale validity and reliability

It has been observed as a result of the tests in which the scales are generally within the limits of validity and reliability. The results are shown in Table 3.1. Whether the scale used in the study was consistent was tested by this analysis. Using the IBM SPSS 23 program, the statistical reliability of the responses of 200 people was investigated.

Table 3. 1: Reliability analysis of scale

	Cronbach's Alpha Coefficient
1. General scale	0.984
2. Efficiency subscale	0.965
3. System availability subscale	0.928
4. Fulfillment subscale	0.934
5. Privacy subscale	0.949
5. Consumer satisfaction scale	0.939

In Table 3.1, the results of the reliability analysis carried out based on the data obtained from the scales are generally accepted as the results of the α values. It was seen that it was above the 70 (Cortina, 1993) limit.

3.7.2 Confirmatory factor analysis (CFA)

The results of confirmatory factor analysis with lisrel program are shown in Figure 3.3 and Table 3.2.

Figure 3. 3: Confirmatory factor analysis

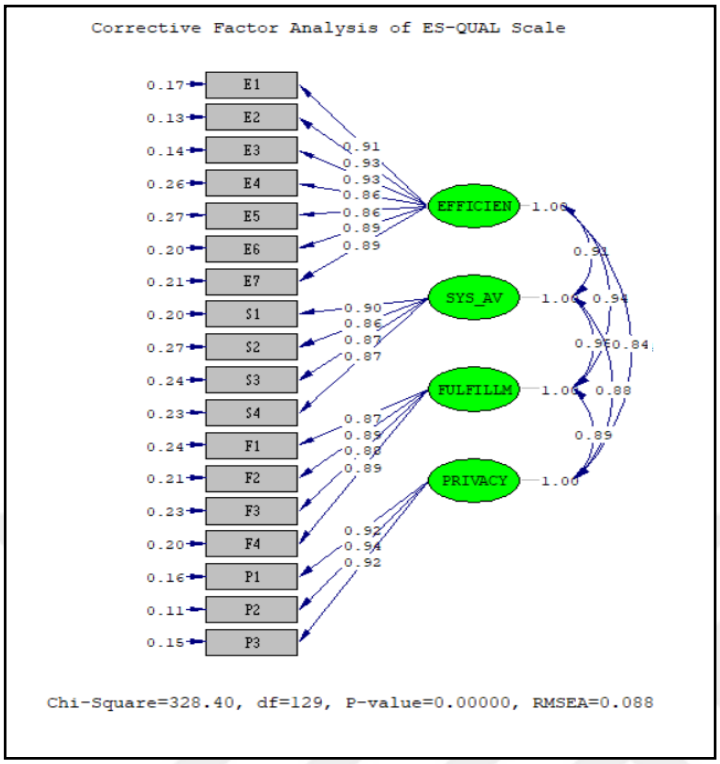


Table 3. 2: Confirmatory factor analysis results of E-S QUAL scale

χ^2	df	p	χ^2/ df	RMSEA	RMR	SRMR	GFI	AGFI	NFI	NNFI	CFI	IFI
328.40	129	.00	2.55	.088	.04	.030	.85	.79	.98	.99	.99	.99

Confirmatory factor analysis was performed to analyze the relationship of 23 items to 4 sub-dimensions. The results have been shown in Table 3.2. The results of the analysis were compared with the compatibility index values in Table 3.3. They which mentioned in Table 3.3 can be explained as follows.

Table 3. 3: Table of acceptable compliance values by literature

Compliance measures	Good concordance	Acceptable concordance	References
χ^2/ df	χ^2/ df ≤ 2 (Perfect)	χ^2/ df ≤ 5	(Hooper, Coughlan and Mullen, 2008)
RMSEA	0 < RMSEA < 0.05	0.05 ≤ RMSEA ≤ 0.10	(MacCallum, Browne and Sugawara, 1996; Kline, 2011; Çelik and Yılmaz, 2016).
NFI	0.95 ≤ NFI ≤ 1	0.90 ≤ NFI ≤ 0.95	(Çelik and Yılmaz, 2016).
NNFI	0.97 ≤ NNFI ≤ 1	0.95 ≤ NNFI ≤ 0.97	(Hu and Bentler, 1999; Harrington, 2009; Çelik and Yılmaz, 2016).
CFI	0.97 ≤ CFI ≤ 1	0.95 ≤ CFI ≤ 0.97	(Brown, 2006; Çelik and Yılmaz, 2016).
GFI	0.95 ≤ GFI ≤ 1	GFI ≥ 0.80	(Shevlin and Miles, 1998; Hu and Bentler, 1999; Hooper and Dığ. 2008;).
AGFI	0.90 ≤ AGFI ≤ 1	0.80 ≤ AGFI ≤ 0.90	(Hu and Bentler, 1999; Çelik and Yılmaz, 2016).
RMR	≤ .05 (Perfect)	.08 ≤	(Brown, 2006; Harrington, 2009)
SRMR	0 ≤ SRMR ≤ 0.5	0.5 < SRMR < 1	(Hu and Bentler, 1999; Brown, 2006)

GFI (Goodness of fit index), developed to evaluate model compliance independently of sample size. GFI is usually between 0 and 1 (Shevlin and Miles, 1998).

AGFI (Adjusted goodness of fit index) is a regulated type of GFI for the number of parameter estimates (Yılmaz and Çelik 2009, p.44).

RMSEA (Root mean square error of approximation) is a measure of the approximate fit in the body. A RMSEA value of less than or equal to 0.05 indicates a good fit. Between 0.08 and 0.10 shows a mediocre fit and between 0.05 and 0.08 shows sufficient fit (MacCallum, Browne and Sugawara, 1996).

RMR (Root mean square residuals) and SRMR (Standardized root mean square residuals) are the covariance averages between the covariance matrix of the universe and the predictive covariance matrix (Brown 2006).

NFI (Normed fit index) and NNFI (Non-normed fit index) In small samples, NFI may show less compatibility than is available for the model. In this case, NFI is recalculated by adding the degree of freedom and this value is called NNFI (Çelik and Yılmaz 2016).

CFI (Comparative fit index) index is a good indicator of good values (Çelik and Yılmaz 2016). χ^2 is Chi-Square goodness of fit, df (degree of freedom). It can be used as a criterion for qualification (Hooper, Coughlan and Mullen, 2008).

When the conformity indices of the model for ES-QUAL scale are examined in accordance with the criteria specified in Table 3.3., the values of χ^2/ df, RMSEA, RMR, SRMR, GFI, AGFI, NFI, NNFI, CFI, IFI were respectively 2.55, .088, .04, .03, .85, .79, .98, .99,.99,. 99. Compliance is generally considered to be good.

It was determined in the study whether the groups showed normal distribution. This is shown in Table 3.4.

Table 3. 4: Descriptive data about distribution structure of scales

	N	**Min**	**Max**	**M**	**SD**	**Kurtosis**	**Skewness**
Efficiency	200	1,00	5,00	3,51	1.06	-0.71	-0.74
System Availability	200	1,00	5,00	3,42	0.98	-0.90	-0.42
Fulfillment	200	1,00	5,00	3,48	1.00	-0.72	-0.46
Privacy	200	1,00	5,00	3,31	1.06	-0.91	-0.25
Customer Satisfaction	200	1,00	5,00	3,37	1.01	-0.95	-0.35

N represents the sample size. ***Min*** is the minimum value that each data can take, ***Max*** is the maximum value that each data can take. ***M*** was used to express the average of the answers to the questions asked in the research. ***SD*** was used to express whether the answers to the data were moving away from the average.

Kurtosis is the value of the headiness. ***Skewness*** is the value of irregularity.

For normal test, skewness and Kurtosis values were checked. It was observed that skewness values ranged from-0.74 to -0.25 and Kurtosis values ranged from-0.95 to-0.71. Skewness and Kurtosis to test normality of the data by examining the values of the appropriate references (Tabachnick and Fidell, 2013, from -1.5 to +1.5) and (George and Mallery, 2010: from-2.0 to +2.0) located within the boundaries of the examined data set, it has been seen that have a normal distribution. At the same time, when the Q- Q Plus graph was examined, the distribution curves were examined visually. As a result of the normal assumption of the distribution structure, the data set has a normal structure as a result of the visual and analytical examination of the data structure as a normal result.

3.7.3 Descriptive Statistics

The frequency distribution gives data in numbers and percentages to describe the properties of the distribution of values or scores of one or more variables (Büyüköztürk 2018, p.21).

If the data is selected as a continuous variable, values such as central tendency (mean) and standard deviation can be reached while describing the data. Other factors that can be found are the skewness and kurtosis, percentages. The frequency distribution table is used to describe the data collected in experimental and screening researches (Büyüköztürk 2018, p.21).

In this study, based on the questionnaire applied to 200 people who are living in Istanbul, who use mobile banking, internet banking and mobile contactless card payment products in various age and education levels, the information about the participants is as follows. Table 3.5 provides information on the age, gender, and education levels of the participants.

Table 3. 5: Informations about participants

Graduation status	**N**	**%**
1. Primary school	23	11.5
2. High school	51	25.5
3. University	83	41.5
4. post graduate	43	21.5
Gender	**N**	**%**
1. Female	101	50.5
2. Male	99	49.5
Age	**N**	**%**
1) 18-24	30	15.0
2) 25-34	40	20.0
3) 36-44	68	34.0
4) 45-54	47	23.5
5) 55+	15	7.5
Total	**200**	**100.0**

Table 3. 6:Mobile banking using time

Mobile banking using time	**N**	**%**
1) Less than 6 months	35	17,5
2) 6 months - 1 year	26	13
3) Between 1-3 years	56	28
4) Between 3-5 years	81	40,5
5) 5 and 5+ years	2	1
Total	**200**	**100**

Table 3. 7: Mobil banking using frequency

Mobile banking using frequency	N	%
1) Most of the time	25	12,5
2) frequently	78	39
3) sometimes	44	22
4) rarely	38	19
5) hardly	15	7,5
Total	**200**	**100**

Table 3. 8: Mobile contactless card payment using time

Mobile contactless card payment using time	N	%
1) less than 6 months	60	30
2) 6 months - 1 year	51	25,5
3) Between 1 and 3 years	59	29,5
4) Between 3 and 5 years	30	15
Total	**200**	**100**

***Table 3. 9*: Mobile contactless card payment using frequency**

Mobile contactless card payment using frequency	N	%
1) Most of the time	11	5,5
2) Frequently	60	30
3) Sometimes	68	34
4) Rarely	31	15,5
5) Hardly	30	15
Total	**200**	**100**

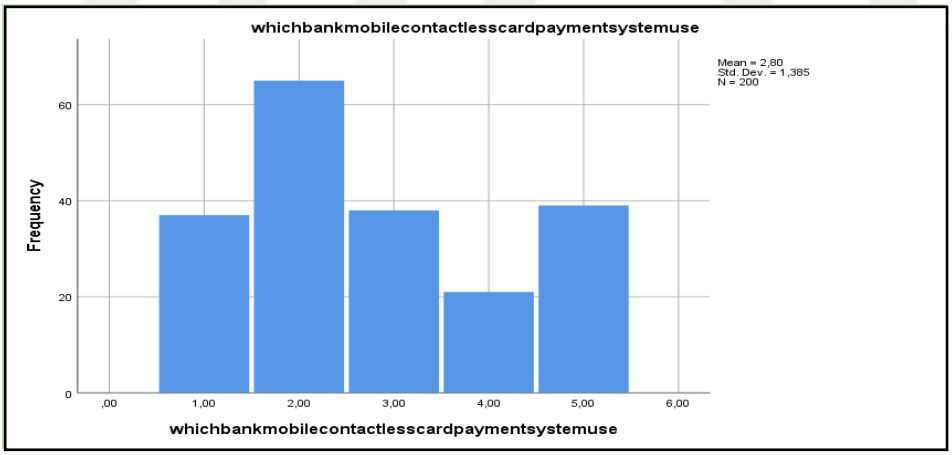
Table 3. 10: Which bank mobile application use

Which bank mobile application use	N	%
1) TR Garanti Bank	37	18,5
2) TR Is Bank	65	32,5
3) TR Ziraat Bank	38	19
4) TR Economy Bank (TEB)	21	10,5
5) Other Banks	39	19,5
Total	**200**	**100**

Table 3. 11: Which bank mobile contactless card payment system use

Which bank mobile contactless card payment system use	N	%
1) TR Garanti Bank	37	18,5
2) TR Is Bank	65	32,5
3) TR Ziraat Bank	38	19
4) TR Economy Bank (TEB)	21	10,5
5) Other Banks	39	19,5
Total	**200**	**100**

Figure 3. 4: Which bank mobile contactless card payment system use



1-Garanti Bank

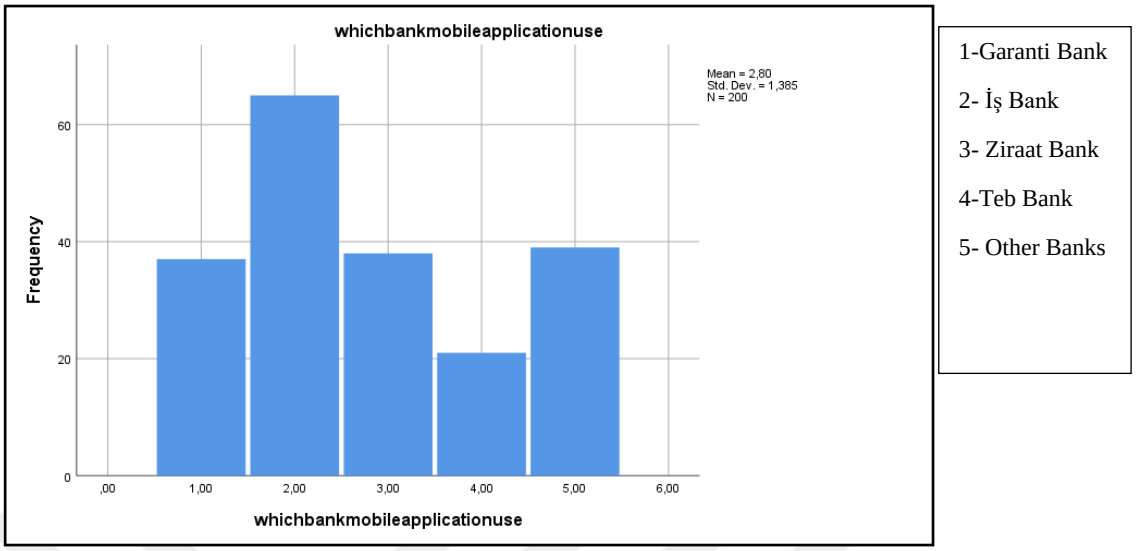
2- İş Bank

3- Ziraat Bank

4-Teb Bank

5- Other Banks

Figure 3. 5: Which bank mobile application use



3.7.4 Independent t-test

In the sub-dimensions of the ES-QUAL scale, independent t-test performed according to gender variable showed no statistically significant difference in the Efficiency, System Availability, Fulfillment and Privacy sub-dimensions (p> 0.05). The resulting table is shown in 3.12.

Table 3. 12: Results of t-test by gender in terms of sub-dimensions of ES-QUAL scale

Subdimension	Gender	N	$\bar{X}$	SD	df	t	p
Efficiency	**Female**	101	3.436	1.059	198	-0.996	0.321
	Male	99	3.590	1.075			
System Availability	**Female**	101	3.327	1.020	198	-1.440	0.152
	Male	99	3.530	0.940			
Fulfillment	**Female**	101	3.433	0.993	198	-0.800	0.428
	Male	99	3.550	1.010			
Privacy	**Female**	101	3.200	1.100	198	-1.524	0.129
	Male	99	3.430	1.050			

3.7.5 ANOVA analysis

As a result of the one-way analysis of variance (ANOVA) performed according to age variable in Efficiency sub-dimension in Table 3.13, no statistically significant difference was found between the averages ($p > 0.05$).

Table 3. 13: ANOVA analysis based on age variable in efficiency sub dimension

Source of Variance	Sum of Squares	Sd	Squares Mean	F	P	Meaningful Difference
Between groups	8.682	4	2.170	1.944	0.105	Not
In groups	217.717	195	1.116			
Total	226.388	199				

As a result of the one-way variance analysis (ANOVA) performed according to the age variable in the System Availability sub-dimension in Table 3.14, there was no statistically significant difference between the averages ($p > 0.05$).

Table 3. 14: ANOVA analysis based on age variable in system availability sub dimension

Source of Variance	Sum of Squares	Sd	Squares Mean	F	P	Meaningful Difference
Between groups	5.602	4	1.401	1.475	0.211	Not
In groups	185.148	195	0.949			
Total	190.750	199				

Table 3.15 shows that there is no statistically significant difference between the means of variance analysis (ANOVA) according to age variable in Fulfillment sub-dimension (p > 0.05).

Table 3. 15: ANOVA analysis based on age variable in fulfillment sub dimension

Source of Variance	Sum of Squares	Sd	Squares Mean	F	p	Meaningful Difference
Between groups	7.950	4	1.987	2.032	0.91	Not
In groups	190.173	195	0.978			
Total	198.662	199				

Table 3.16 shows that there is no statistically significant difference between the means of the variance analysis (ANOVA) according to age variable in Privacy sub-dimension (p > 0.05).

Table 3. 16: ANOVA analysis based on age variable in privacy sub dimension

Source of Variance	Sum of Squares	Sd	Squares Mean	F	p	Meaningful Difference
Between groups	6.709	4	1.677	1.482	0.209	Not
In groups	220.641	195	1.131			
Total	227.351	199				

In Table 3.17 there was no statistically significant difference between the means of Anova (one-way variance analysis) which was performed in terms of age variable in ES-QUAL scale (p >0.05).

Table 3. 17: Anova analysis based on age variability across the ES-qual scale

Source of Variance	Sum of Squares	Sd	Squares Mean	F	p	Meaningful Difference
Between groups	6.543	4	1.636	1.793	0.132	Not
In groups	177.871	195	0.912			
Total	184.414	199				

Table 3. 18: ANOVA analysis by level of education in the efficiency sub-dimension

Source of Variance	Sum of Squares	Sd	Squares Mean	F	p	Meaningful Difference
Between groups	19.652	3	6.551	6.210	*0.000	There is
In groups	206.737	196	1.055			
Total	226.388	199				

Table 3. 19: ANOVA analysis by education group in the efficiency sub-dimension

Groups	N	$\bar{X}$	SD	Meaningful Difference
1. Primary School [a]	23	3.180	1.210	b-c
2. High School [b]	51	3.072	1.118	b-d
3. University [c]	83	3.783	0.932	
4. Post Graduate [d]	43	3.680	0.986	

As a result of one-way analysis of variance according to education level in Efficiency sub-dimension in Table 3.18, a statistically significant difference was found between the means ($p < 0.05$). Variances were found to be equal in order to determine the source of

the difference. Depending on this situation (p> 0.05 for Levene Statistic), the data obtained from the Tukey HSD test as a result of the post-hoc (multiple comparison) tests showed that the difference between the groups in terms of averages was between the high school and university groups and the high school and graduate education level groups (b <c and b <d).

In the analysis, the source of the significant difference was found to be due to the relationship between these groups. Multiple comparisons were made as a result of one-way analysis of variance. Among the people who participated in the study, the Education Level Group who believes in the efficiency of the system is university graduates. There is a significant difference between high school and post graduate.

Table 3. 20: ANOVA analysis by level of education in the System availability sub-dimension

Source of Variance	**Sum of Squares**	**Sd**	**Squares Mean**	**F**	**p**	**Meaningful Difference**
Between groups	16.376	3	5.459	6.136	*0.001	There is
In groups	174.374	196	0.890			
Total	190.750	199				

Table 3. 21: ANOVA analysis by education group in the System availability

Groups	**N**	$\bar{X}$		**SD**	**Meaningful Difference**
1. Primary School [a]	23	3.1739	0	1.088	b-c
2. High School [b]	51	3.0196		1.012	
3. University [c]	83	3.6988		0.876	
4. Post Graduate [d]	43	3.5116		0.903	

As a result of the one-way variance analysis performed according to the education level in the System availability sub-dimension in Table 3.20, a statistically significant difference was found between the means (p <0.05). Depending on this situation (p> 0.05 for Levene Statistic) post-hoc (multiple comparison) tests Tukey HSD test with the data obtained in terms of the average difference between the groups of high school and university groups were observed (b < c).

Table 3. 22: ANOVA analysis by level of education in the fulfillment sub-dimension

Source of Variance	Sum of Squares	Sd	Squares Mean	F	p	Meaningful Difference
Between groups	16.474	3	5.491	5.908	* 0.001	There is
In groups	182.189	196	0.930			
Total	198.662	199				

Table 3. 23: ANOVA analysis by education group in the fulfillment sub-dimension

Groups	N	$\bar{X}$	SD	Meaningful Difference
1. Primary School [a]	23	3.1304	1.130	a-c
2. High School [b]	51	3.1127	0.990	b-c
3. University [c]	83	3.7440	0.923	b-d
4. Post Graduate [d]	43	3.6337	0.913	

As a result of the one-way analysis of variance according to the education level in Fulfillment sub-dimension in Table 3.22, a statistically significant difference was found between the means (p < 0.05). In order to determine the source of the difference, it was

seen that the variances were equal, and depending on this situation (p> 0.05 for Levene Statistic), the data obtained from the post-hoc (multiple comparison) tests as a result of the Tukey HSD test and the mean difference between the groups in terms of averages were determined as university and high school-graduate education groups.

Table 3. 24: ANOVA analysis by level of education in the privacy sub-dimension

Source of Variance	Sum of Squares	Sd	Squares Mean	F	p	Meaningful Difference
Between groups	25.794	3	8.598	8.361	* 0.00	There is
In groups	201.557	196	1.028			
Total	227.351	199				

Table 3. 25: ANOVA analysis by education group in the privacy sub-dimension

Groups	N	$\bar{X}$	SD	Meaningful Difference
1. Primary School [a]	23	2.957	1,300	a-c
2. High School [b]	51	2.843	1,016	b-c
3. University [c]	83	3.687	0,910	
4. Post Graduate [d]	43	3.333	1,041	

As a result of the one-way analysis of variance according to the education level of the privacy subscale in Table 3.24, a statistically significant difference was found between the means (p <0.05). To determine the source of the difference, it was seen that the variances are equal, depending on the situation (p >0.05 for Revenue Statistics) post-hoc

multiple comparison test) from the data obtained from the HSD Turkey test result averages between groups in terms of the source of the primary current difference between groups of university and high school and college with were observed.

Table 3. 26: ANOVA Test According to Education Level across ES-QUAL Scale

Source of Variance	Sum of Squares	Sd	Squares Mean	F	p	Meaningful Difference
Between groups	17.573	3	5.858	6.881	* 0.00	There is
In groups	166.841	196	0.851			
Total	184.414	199				

Table 3. 27: ANOVA analysis by education group level across ES-QUAL Scale

Groups	N	$\bar{X}$	SD	Meaningful Difference
1. Primary School [a]	23	3.1056	1.126	a-c
2. High School [b]	51	3.0230	0.957	b-c
3. University [c]	83	3.7093	0.847	
4. Post Graduate [d]	43	3.5057	0.904	

As a result of the one-way analysis of variance based on the level of education across the ES-QUAL scale, a statistically significant difference was found between the averages ($p < 0.05$). In order to determine the source of the difference, Tukey HSD test was examined from post-hoc tests due to homogeneity of the variances. According to this, it is observed that the difference between the groups is between primary-university and high school-university groups.

3.7.6 Correlation analysis

In the study, as a result of the correlation analysis conducted to test whether there is a statistically significant difference between the customer satisfaction scale and the sub-dimensions of the ES-QUAL scale, the customer satisfaction scale, respectively; efficiency ($r = 0.826$, $p < 0.05$), system availability ($r = 0.859$, $p < 0.05$), fulfillment ($r = 0.870$, $p < 0.05$) and privacy ($r = 0.825$, $p < 0.05$) have strong and positive relationships. Table 3.23 also illustrates this situation.

Table 3. 28: Sub-dimensions of the ES-QUAL scale Pearson Correlation table

	Efficiency	**System Availability**	**Fulfillment**	**Customer Satisfaction**	**Privacy**
Efficiency	1	.873**	.898**	.826**	.815**
System Availability	.919**	1	.886**	.859**	.834**
Fulfillment	.898**	.886**	1	.870**	.847**
Customer Satisfaction	.826**	.859**	.870**	1	.825**
Privacy	.815**	.834**	.847**	.825**	1

Table 3. 29: Hypotheses and results

Hypotheses			
			Result
	H1	There are statistically significant differences between the groups according to gender in the sub-dimensions of E-Service Quality concept.	**Rejected**
	H2	There is a statistically significant difference between the groups according to age variable in the sub-dimension of E-Service Quality concept.	**Rejected**
	H3	There is a statistically significant difference between the groups according to the education level variable in the sub-dimension of E-Service Quality concept.	**Accepted**
	H4	There is a statistically significant relationship between the subscales of the E-Service Quality scale and the customer satisfaction scale.	**Accepted**

In this research, in the sub-dimensions of the ES-QUAL scale, independent t-test and ANOVA analysis performed according to gender variable and age variable showed no

statistically significant difference in the efficiency, system availability, fulfillment and privacy sub-dimensions. For this reason, H1 and H2 are rejected.

It was found that there was a statistically significant difference between education level and the efficiency, system availability, fulfillment and privacy sub-dimensions as a result of one-way variance analysis based on. As a result, H3 is accepted.

Pearson Correlation analysis showed that there was a statistically significant and positive relationship between the customer satisfaction and the sub-dimensions of the E-S-Qual scale. Consequently, H4 is accepted.

4. DISCUSSION

In this study, mobile contactless card payment, a new product of banks, was examined in terms of customer satisfaction. This product was developed in a form we can call a digital version of the credit card offered to the user through mobile banking. The most important feature of the product is that it has a structure in which people can use the credit card via mobile banking, which they do not physically need to use the credit card with the smart mobile phone. The most important feature of this product is the presentation via electronic medium. It can be said that this product is more important for customer habit and customer satisfaction. For this reason, in this study in order to measure the quality of electronic service, which is one of the factors affecting customer satisfaction, E-S-Qual scale was used. A significant relationship has been reached between the level of education and the quality of electronic service and it has been observed that there is a strong and positive relationship between customer satisfaction and the quality of electronic service. It can be asserted that as the electronic service quality of this product ascend, customer satisfaction of people who use the product may increase. In this regard, it can be concluded that this product can be an important fintech solution in the field of fintech.

Akıncı (2006) adapted the electronic service quality and service compensation quality to internet banking services, and obtained high quality results by adapting the electronic service quality scale developed by Parasuraman and Zeithaml, Malhotra (2005) to internet banking. Akıncı stated that the size of the activity and the realization of the process were higher than the other dimensions. According to Akıncı's study stated that E-S-qual scale is one of the most comprehensive scales in order to measure electronic service quality as a result of his work. The results obtained in this study for mobile contactless card payment product coincide with Akıncı's work and the size of fulfillment sub dimension has a high value.

Another study that emphasizes the quality of electronic service was applied by the instructors of Anadolu University, by Özer, to examine customer loyalty and customer satisfaction. Özer (2011) The effect of e-service quality on e-customer loyalty: In a study on teaching faculty members of Anadolu University, it was concluded that the share of privacy and effectiveness factors in electronic service quality is higher than other factors.

In particular, Özer found that the privacy dimension had the highest effect. In addition, it has been concluded that electronic service quality is a factor that directly determines customer satisfaction in Özer's study.

Another important study emphasizing that E-S-qual scale has been tested in different languages in 11 countries is the assessment E-service quality: the current state of E-S-qual (2012) by done Yaya and others (2012).

Other study, which drew attention to the importance of the level of education in the quality of electronic service, was carried out by Kayık. Analysis of the relationship between e-service quality, e- customer satisfaction and e- customer loyalty within the context of relational marketing Kayık (2013) stated that there were statistically significant differences in terms of activity, process completion, e-customer satisfaction and e-customer loyalty factors as a result of Anova analysis according to the educational status in a field survey. The results of the analysis carried out by Kayık and the results of the study are partially consistent with the educational status. In our study, statistically significant differences were observed when the educational status item was taken into consideration.

Another study, developed by Parasuraman and Zeithaml, Malhotra, indicated that the quality of electronic service scale was widely used in scientific studies, was made by Goel. In his study titled application of ES-qual: Assessment of studies across globe, Goel (2017) states that the scale is widely used in studies by emphasizing the ability to measure the quality of Service, one of the main features of the E-Qual scale. He states that Akıncı (2006) uses this model and obtains positive results.

From the assumption that the way shopping has changed, the Düger and the Kahraman say that consumers are beginning to prefer to shop online rather than go around shopping. Düger and Kahraman (2017) in his studies titled the effect of service quality and perceived value on customer satisfaction and the intention to buy again in online shopping, they say that customer habits have changed in parallel with the rapid development of modern technology and people have become more prone to shop online rather than go around shopping. It is emphasized that the rapid increase in online shopping sites and stores is the result of consumers ' orientation to this area.

The emergence of this situation reflects the importance of electronic service quality. In order for businesses to survive in this competitive environment and increase their market share, they must provide high quality of service to consumers and give them a positive image. It is emphasized that the quality service offered to the customers results in customer satisfaction. As stated by Düger and Kahraman, the same results can be obtained for the mobile contactless payment method in which we examine customer satisfaction in terms of electronic service quality. Similar studies have shown similar results in the study conducted for mobile contactless card payment. In the study which Akıncı internet banking product is examined in terms of electronic service quality, it is concluded that there is a high significant difference between customer satisfaction and especially fulfillment sub-dimensions. Similarly, the criteria in mobile contactless card payment product, that affect the customer satisfaction of the electronic service quality were determined by the system availability and fulfillment sub-dimensions.

The conclusion that Özer's privacy dimension had a high effect was not obtained in this study. In this study, it is concluded that the share of confidentiality factor in electronic service quality is not higher than other factors. The results of the study are similar to the research done for the mobile contactless card payment product. 41.5 percent of the respondents reported that they used mobile banking for more than 3 years, 44.5 percent said they used mobile contactless card payment method for nearly 3 years. It can be concluded that the use of these two products is close to each other in terms of the total duration of use. It is seen that the participants preferred the bank for mobile banking and also preferred it in payment with a mobile contactless card.

When the average value of the answers given to gender, efficiency, service level and confidentiality items have been examined in the study, it has been seen that the answers of men were higher than the answers given by women. This can be concluded that the perspective of the mobile contactless card payment product is more positive for men than women in terms of effectiveness, system suitability, fulfillment and privacy.

It is important to note that the level of education of the people who use the product in terms of their approach to the product can be expressed as a positive change in the approach towards this product, which has digital and innovative features as the level of education increases. The study is important in terms of different studies that can be done with this subject in terms of the relationship of education with the product. This study for mobile contactless card payment product has concluded that there is a meaningful relationship between efficiency, system suitability, fulfillment and privacy items and customer satisfaction. It can be concluded that the development of the system in terms of efficiency, system suitability, fulfillment and privacy may be a factor that increases customer satisfaction.

It is thought that successful results of the study on mobile contactless card payment product, which is a new part of the electronic services offered by banks, can make a serious contribution to the literature. In this study, participants' ability to perform the process and find the criteria of system suitability more important may contribute to further develop the characteristics of the product. In addition to these two features, work can be done to increase the level of customer satisfaction by considering the efficiency and privacy features. It is thought that the research will contribute to the literature by being the first study on mobile contactless card payment system. After this study, it can be concluded that research can be done by expanding the number of samples in other research universes related to this payment method. It is believed that the customers perceive the quality of electronic service with the basic dimensions of efficiency, privacy, system availability and fulfillment and provide important information for this product to be used in the future. In the products with similar qualifications, the quality of electronic service can be measured and the development of products in a different and qualified way can be realized.

5. CONCLUSION

In this study, it is aimed to measure the quality of the electronic service of the product presented to the user in electronic environment through mobile banking, E-s-qual electronic service quality scale developed by Parasuraman and Zeithaml, Malhotra have been used in 2005. This scale is adapted for mobile contactless card payment used in the banking sector. Parasuraman et al. (2005) have been proven in terms of efficiency, system availability, fulfillment and privacy, reliability and validity which are sub-dimensions of electronic service quality theories. In the study conducted for mobile contactless card payment product, it has been concluded that customer satisfaction will increase with electronic service quality.

Ingle and Connolly (2006) examined the customers who received online services in the study named ES-QUAL to Measure Online Service Quality in Irish SMEs by using the electronic service quality scale developed by Parasuraman and Zeithaml, Malhotra (2005). They concluded that electronic service quality is very important for customer satisfaction to be established and maintained. Ingle and Connolly (2006) have found that the relationship between customer satisfaction and the quality of electronic service it can be accepted within the mobile contactless card payment product.

This measurement model has been used in order to reach customer satisfaction by taking a conceptual framework and understanding from the current literature and measuring the quality of the electronic service offered by the banks. Increasing customer satisfaction is important as it increases the widespread use of the product.

The mobile contactless card payment product, which we can call fintech product, is the electronic service quality of bank customers in Turkey, and we try to find whether customer satisfaction is achieved, as a result of the fact that people using internet banking and mobile banking may be more inclined to use this product. Based on the data used in the study, it can be concluded that credit card, internet banking and mobile banking customers are able to be potential customers for mobile contactless card payment. Customer satisfaction in finance and service sector is more important today. At the same time, we think that the successful results of the application for the mobile contactless card

payment product, which is a new part of the electronic services provided by the banks, can make a serious contribution to the literature. In order to provide an effective service quality in electronic environment, it is important to evaluate how consumers perceive and evaluate electronic service quality.

In this study, participants' finding more important in terms of system availability and fulfillment may contribute to further develop the characteristics of the product in this direction. In addition to these two features, efforts can be made to increase the level of customer satisfaction by considering efficiency and privacy features. We believe that the customers perceive electronic service quality, efficiency, system suitability, operation and confidentiality with their basic dimensions, and provide important information for this product to be used in future years. In the coming years, we believe that we have made important contributions to this project in order to develop the features that can be added to the product and to achieve successful results.

In terms of many valuable criteria such as quality, efficiency, speed within the new technological financial products developed in fintech ecosystem, in the rapidly globalizing world economies, mobile contactless card payment product one of the important products can be reached with our study.

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APPENDIXES

APPENDIX 1

APPLICATION SURVEY FORM

Dear participants, this survey is carried out within the scope of the research carried out for Bahçeşehir University Master's thesis. We would like to thank you for your contribution to this survey regarding the mobile contactless card payment method that has been implemented by mobile banking in Turkey since 2015. The information you will share will only be used within the scope of academic work and will not be shared with any other person or entity. Thank you for your contributions and participation.

1. Gender
   - ☐ Female
   - ☐ Male

2. Age
   - ☐ 18-24
   - ☐ 25-34
   - ☐ 35-44
   - ☐ 45-54
   - ☐ 55 Years and older

3. Level of education
   - ☐ Primary school
   - ☐ High school
   - ☐ University
   - ☐ Post graduate

4. Since when do you use mobile banking

- ☐ Less than 6 months
- ☐ 6 months - 1 year
- ☐ Between 1-3 years
- ☐ Between 3-5 years
- ☐ 5 and 5+ years

5. Mobile banking using frequency

- ☐ Most of the time
- ☐ Frequently
- ☐ Sometimes
- ☐ Rarely
- ☐ Hardly

6. Mobile contactless card payment using time

- ☐ Less than 6 months
- ☐ 6 months
- ☐ Between 1-3 years
- ☐ Between 3-5 years

7. Mobile contactless card payment using frequency

- ☐ Most of the time
- ☐ Frequently
- ☐ Sometimes
- ☐ Rarely
- ☐ Hardly

8. Which bank mobile application use

- ☐ Türkiye Garanti Bankası A.Ş.
- ☐ Türkiye İş Bankası A.Ş.
- ☐ Türkiye Cumhuriyeti Ziraat Bankası A.Ş.
- ☐ Türk Ekonomi Bankası A.Ş.
- ☐ Diğer

9. Which bank mobile contactless card payment system use

- ☐ Türkiye Garanti Bankası A.Ş.
- ☐ Türkiye İş Bankası A.Ş.
- ☐ Türkiye Cumhuriyeti Ziraat Bankası A.Ş.
- ☐ Türk Ekonomi Bankası A.Ş.
- ☐ Diğer

Evaluate the following statements regarding the mobile contactless payment method in terms of efficiency.

	Totally disagree	disagree	neither agree nor disagree	agree	totally agree
1. This payment method meets the service I need	☐	☐	☐	☐	☐
2. This payment method allows to me easily make payments	☐	☐	☐	☐	☐
3. This payment method quickly finalizes transactions	☐	☐	☐	☐	☐
4. When using this payment System information Has been enabled	☐	☐	☐	☐	☐
5. This payment method Was simple to use	☐	☐	☐	☐	☐
6. This payment method Swift	☐	☐	☐	☐	☐
7. This payment method Successful , efficient	☐	☐	☐	☐	☐

Evaluate the following statements regarding the mobile contactless payment method in terms of system availability

	Totally disagree	disagree	neither agree nor disagree	agree	totally agree
1. This payment method is always available For use	☐	☐	☐	☐	☐
2. This payment method is compatible with and mobile banking POS	☐	☐	☐	☐	☐
3. This payment method Does not have A slowdown problem	☐	☐	☐	☐	☐
4. With this payment method I can always carry out transactions	☐	☐	☐	☐	☐

Evaluate the following statements regarding the mobile contactless payment method in terms of fulfillment.

	Totally disagree	disagree	neither agree nor disagree	agree	totally agree
1. Transaction can be performed within the specified time period	☐	☐	☐	☐	☐
2. This payment method Completes the Transaction in the Appropriate time frame	☐	☐	☐	☐	☐
3. With this payment method Transaction is Made without error	☐	☐	☐	☐	☐
4. With this payment method The accuracy of transactions is assured	☐	☐	☐	☐	☐

Evaluate the following statements regarding the mobile contactless payment method in terms of system privacy.

	Totally disagree	disagree	neither agree nor disagree	agree	totally agree
1. This payment method Protects the transaction information	☐	☐	☐	☐	☐
2. The transaction information Which made with this Payment method is not shared with other institutions.	☐	☐	☐	☐	☐
3. My credit card information is protected when using this method payment	☐	☐	☐	☐	☐

Evaluate the following statements.

	Totally disagree	disagree	neither agree nor disagree	agree	totally agree
1. I'm pleased with contactless Card payment method	☐	☐	☐	☐	☐
2. I enjoy using this payment method	☐	☐	☐	☐	☐
3. I strongly recommend this payment method to my social environment	☐	☐	☐	☐	☐
4. I have been using This payment method for a long time.	☐	☐	☐	☐	☐
5. I don't want to find An alternative to this payment method.	☐	☐	☐	☐	☐

APPENDIX 2

UYGULANAN ANKET FORMU

Değerli Katılımcı, bu anket çalışması Bahçeşehir Üniversitesi yüksek lisans tezi için yapılan araştırma kapsamında gerçekleştirilmektedir. Türkiye'de 2015 yılından itibaren, akıllı telefonlarda kullanılan mobil bankacılık aracılığı ile uygulanmaya başlayan mobil temassız kartlı ödeme yöntemi ile ilgili olan bu ankete vereceğiniz cevaplar için bulunduğunuz katkılardan dolayı teşekkür ederiz. Paylaşacağınız bilgiler sadece akademik çalışma kapsamında kullanılacak ve başka kişi ya da kurumlar ile paylaşılmayacaktır. Katkılarınız ve katılımınız için teşekkür ederiz.

1. Cinsiyet
   - ☐ Kadın
   - ☐ Erkek

2. Yaşınız
   - ☐ 18-25 Yaş altı
   - ☐ 25-34
   - ☐ 35-44
   - ☐ 45-54
   - ☐ 55 Yaş ve üzeri

3. Eğitim düzeyiniz
   - ☐ İlköğretim
   - ☐ Lise
   - ☐ Üniversite
   - ☐ Yüksek Lisans

4. Mobil bankacılık ne zamandan beri kullanıyorsunuz.

☐ 6 aydan az

☐ 6 ay ile 1 yıl

☐ 1 sene ile 3 yıl

☐ 3 yıl ile 5 yıl

☐ 5 yıl ve 5 yıldan fazla

5. Mobil bankacılık kullanma sıklığınız

☐ Çoğu zaman

☐ Sık sık

☐ Ara sıra

☐ Nadiren

☐ Neredeyse hiç

6. Mobil temassız kartlı ödeme yöntemini ne zamandan beri kullanılıyorsunuz

☐ 6 aydan az

☐ 6 ay

☐ 1 ile 3 yıl arası

☐ 3 – 5 yıl arası

☐ 3 yıl

7. Mobil temassız kartlı ödeme yöntemini kullanma sıklığınız

☐ Çoğu zaman

☐ Sık sık

☐ Ara sıra

☐ Nadiren

☐ Neredeyse hiç

8. Hangi bankanın mobil uygulamasını sıklıkla kullanıyorsunuz

☐ Türkiye Garanti Bankası A.Ş.

☐ Türkiye İş Bankası A.Ş.

☐ Türkiye Cumhuriyeti Ziraat Bankası A.Ş.

☐ Türk Ekonomi Bankası A.Ş.

☐ Diğer

9. Hangi bankanın mobil temassız kartlı ödeme uygulamasını sıklıkla kullanıyorsunuz

☐ Türkiye Garanti Bankası A.Ş.

☐ Türkiye İş Bankası A.Ş.

☐ Türkiye Cumhuriyeti Ziraat Bankası A.Ş.

☐ Türk Ekonomi Bankası A.Ş.

☐ Diğer

Mobil temassız kartlı ödeme yöntemi ile ilgili aşağıdaki ifadeleri verimlilik açısından değerlendiriniz.

	kesinlikle katılmıyorum	**katılmıyorum**	**kararsızım**	**katılıyorum**	**kesinlikle katılıyorum**
1. Bu ödeme yöntemi ihtiyacım olan hizmeti karşılamaktadır.	☐	☐	☐	☐	☐
2. Bu ödeme yöntemi kolaylıkla ödeme yapmamı sağlar	☐	☐	☐	☐	☐
3. Bu ödeme yöntemi işlemleri hızlı bir şekilde sonuçlandırır	☐	☐	☐	☐	☐
4. Bu ödeme yöntemini kullanılırken, sistem bilgilendirilmesi etkin yapılmıştır	☐	☐	☐	☐	☐
5. Bu ödeme yöntemini kullanmak basittir	☐	☐	☐	☐	☐
6. Bu ödeme yöntemi hızlıdır	☐	☐	☐	☐	☐
7. Bu ödeme yöntemi başarılı ve etkilidir	☐	☐	☐	☐	☐

Mobil temassız kartlı ödeme yöntemi ile ilgili aşağıdaki ifadeleri sistem uygunluğu açısından değerlendiriniz.

	kesinlikle katılmıyorum	**katılmıyorum**	**kararsızım**	**katılıyorum**	**kesinlikle katılıyorum**
1. Bu ödeme yöntemi her zaman kullanılmaya elverişlidir	☐	☐	☐	☐	☐
2. Bu ödeme yöntemi mobil bankacılık ve ödeme terminali (POS) ile uyumludur	☐	☐	☐	☐	☐
3. Bu ödeme yönteminin yavaşlama problemi yoktur	☐	☐	☐	☐	☐
4. Bu ödeme yöntemi ile işlem yapmayı her zaman gerçekleştirebilirim	☐	☐	☐	☐	☐

Mobil temassız kartlı ödeme yöntemi ile ilgili aşağıdaki ifadeleri hizmet düzeyi açısından değerlendiriniz.

	kesinlikle katılmıyorum	**katılmıyorum**	**kararsızım**	**katılıyorum**	**kesinlikle katılıyorum**
1. İşlemler belirtildiği sürede gerçekleştirilir	☐	☐	☐	☐	☐
2. Bu ödeme yöntemi uygun zaman diliminde işlemi tamamlar	☐	☐	☐	☐	☐
3. Bu ödeme yöntemi ile işlem hatasız yapılır	☐	☐	☐	☐	☐
4. Bu ödeme yöntemi ile işlemlerin doğruluğu güvence altındadır	☐	☐	☐	☐	☐

Mobil temassız kartlı ödeme yöntemi ile ilgili aşağıdaki ifadeleri gizlilik açısından değerlendiriniz.

	kesinlikle katılmıyorum	**katılmıyorum**	**kararsızım**	**katılıyorum**	**kesinlikle katılıyorum**
1. Bu ödeme yöntemi ile yaptığım işlem bilgileri korunmaktadır	☐	☐	☐	☐	☐
2. Bu ödeme yöntemi ile yaptığım işlem bilgileri başka kurumlarla paylaşılmamaktadır	☐	☐	☐	☐	☐
3. Bu ödeme yöntemini kullanırken kredi kartı bilgilerim korunmaktadır	☐	☐	☐	☐	☐

Aşağıdaki ifadeleri değerlendiriniz.

	kesinlikle katılmıyorum	**katılmıyorum**	**kararsızım**	**katılıyorum**	**kesinlikle katılıyorum**
1. Mobil temassız kartlı Ödeme yönteminden memnunum	☐	☐	☐	☐	☐
2. Bu ödeme yöntemini kulanırken keyiflenirim	☐	☐	☐	☐	☐
3. Bu ödeme yöntemini çevreme şiddetle tavsiye ederim	☐	☐	☐	☐	☐
4. Bu ödeme yöntemini uzun zamandır kullanıyorum	☐	☐	☐	☐	☐
5. Bu ödeme yönteminin alternatifini bulmak istemiyorum	☐	☐	☐	☐	☐