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EXPANDING M-COMMERCE POSSIBILITIES THROUGH TECHNOLOGY ENABLED DEVICES

ENGİN ÖZBEY

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Submitted by **: Engin ÖZBEY**

Approval of the Graduate School of Natural and Applied Sciences, Çankaya University

Prof. Dr. Taner ALTUNOK
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science

Prof. Dr. Billur KAYMAKÇALAN
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science

Assist Prof. Dr. Ö. Tolga PUSATLI
Supervisor

Examination Date :

Examining Committee Members

Assist. Prof. Dr. Ö. Tolga PUSATLI (Çankaya Univ.)

Assist. Prof. Dr. Reza Z. Hassanpour (Çankaya Univ.)

Assoc. Prof. Dr. Fahd Jarad (THK Univ.)

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Name, Last Name : Engin ÖZBEY

Signature :

Date : 13.09.2021

ABSTRACT

Expanding M-Commerce Possibilities
Through Technology Enabled Devices

Engin ÖZBEY
M.Sc., Department of Information Technology
Supervisor: Assist. Prof. Dr. Ö. Tolga PUSATLI
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Popular payment systems including asynchronous, online and mobile payments are investigated. Mobile phone payment systems are targeted after finding that m-commerce is projected to rise. With this increase in the market share, mobile devices are found-out to share physical wallets' load as they can merge credit and ATM cards. The possibilities increase with the adoption of new technologies, such as NFC (Near Field Communication), so that the handsets can house loyalty, mass transport cards as well as electronically held money transfer ability. On the other side, the security issues including identity and money theft remain important although the expectations on converging physical wallets into the handsets are strong. However, this is not a definite obstacle and big service providers and vendors give signals to adopt such a technology in their services and products.

As the conclusion, the thesis argues that e-commerce can expand more through additional technologies on the mobile devices.

Keywords: e-commerce, asynchronous payment systems, online payment systems, m-commerce, mobile banking, NFC, online wallet, mobile wallet.

ÖZ

Teknoloji Uyumlu Cihazlar Sayesinde M-Ticaretin Genişletilme Olanakları

Engin ÖZBEY

Yüksek Lisans, Bilgi Teknolojileri Bölümü

Danışman: Y. Doç. Dr. Ö. Tolga PUSATLI

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Popüler ödeme sistemlerinden eş zamanlı olmayan, çevrimiçi ve mobil ödeme sistemleri araştırılmıştır. Mobil ticaretin yükselmesi yönündeki bulgulardan sonra mobil telefon kullanılarak yapılan ödeme sistemleri hedeflenmiştir. Pazar payındaki bu artışla beraber mobil cüzdanlar fiziksel cüzdanların yükünü paylaşmaya başlamıştır. NFC gibi yeni teknolojilerin kabul edilme olasılığının artması ile birlikte mobil telefonlar elektronik para transferleri yapabilir, marka kartları ve toplu taşıma biletlerini saklayabilir. Diğer bir taraftan mobil telefonlar içerisinde fiziksel cüzdan barındırma potansiyeli olmasına rağmen kimlik ve para hırsızlığı da dahil olmak üzere güvenlik sorunları önemini korumaktadır. Diğer taraftan, bu kesin bir engel teşkil etmemekle beraber, büyük servis sağlayıcılar ve satıcılar ürün ve hizmetlerinde böyle bir teknolojiyi benimseme yolunda sinyaller vermektedirler.

Sonuş olarak, bu tez mobil cihazlar üzerinde ek teknolojiler sayesinde e-ticaretin daha fazla büyüyebileceğini savunuyor.

Anahtar Kelimeler: e-ticaret, eş zamanlı olmayan ödeme sistemleri, çevrimiçi ödeme sistemleri, mobil ödeme sistemleri, m-ticaret, mobil bankacılık, NFC, çevrimiçi cüzdan, mobil cüzdan

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CHAPTER I

INTRODUCTION

The Internet was firstly used as a connection tool then is used by all people, companies and states in many different fields. Companies utilized the Internet at first for advertisement and later for their commercial purposes. One of the most striking fields in which companies use the Internet for their commercial purposes is electronic commerce, e-commerce, in short.

In recent years e-commerce has been developing and growing. One of the most important components of electronic commerce is payment systems field. A rapid, easy and reliable payment system is directly connected with development of e-commerce.

Payment systems have important roles in transition from classical face-to-face commerce to e-commerce. Developments in the field of information technology (IT) and payment systems in the direction of consumer demands changed the expectations both in qualitative and quantitative manners. Various payment systems along with applications in these fields emerged. Generally, we can divide payment systems into three categories. These are;

- Asynchronous payment systems
- Online payment systems
- Mobile payment systems

Asynchronous payment systems are the payment systems which payment is not made immediately; and in online payment systems, payments are made through bank card / credit card and online wallets. In online wallets we record our financial data in the system. These are the systems that we can shop without sharing our financial data in the course of shopping by being directed joint payment page of the company. In online wallets providing the safety of the system is responsibility of the related

company. Another one is mobile payment systems. It is defined as commerce type performed by using mobile devices and mobile services. While there is not a sharp shift between online payment systems and mobile payment systems, there are some differences on the basis of platform used in both.

E-commerce has introduced new concepts into our lives; with the mobile financial services, it served mobile banking experiment to our lives. With mobile commerce, it is enabled to commerce at anytime and anywhere. Now, to commerce while hiking on the street, travelling on the public transportation vehicles, at cinemas and parks and in many other places is enabled.

With mobile commerce, we started to know the concept of mobile wallet. It is similar with online wallets in the aspect of operation type. However, mobile wallets offer us a lot more. Inside of mobile wallets, we can define our bank or credit cards, attach our personal identity data, loyalty cards used in markets and other shopping, use wallet for identity controls and some common life spaces such as at public transportation.

An additional benefit is that we do not have to pay the cost of our market or any other shopping through credit card or in cash. We can make payment through our mobile wallet installed in smart phones. We can use same mobile wallet in order to enter workplace and house like a key or identity. We can eliminate the need of buying a ticket for inner city public transportation, separately. We can buy tickets to the concerts to be gone at the weekend through our mobile wallet and we can enter the concert area with the ticket downloaded in our mobile wallets.

In addition to all these, mobile wallets provide many advantages to users at the moment of lost or stolen. For instance, when we lose a physical wallet, we need to remember all cards inside it and cancel them respectively through related institutions. Later, we have to wait the cards to be sent us. We may have problems in the financial aspect, within this duration. However, in the case of lost or stolen for mobile wallets, mobile wallet is blocked immediately and we can get our mobile wallet again in a short time.

For all of these we can utilize Near Field Communication (NFC) technology. NFC is a bi-directional communication standard working in short distance. Through mobile devices supported by NFC, we can use our mobile device for as a mobile wallet.

In this thesis, status of the payment systems is investigated and benefits of mobile devices supported by NFC are mentioned. Mobile wallet samples existing currently in the World and Turkey are examined.

1.1 Purpose and Scope

This thesis aims to investigate the role of mobile phones in the commerce. With this motivation, we have researched payment systems both asynchronous and online payment systems, and looked additional technology enabled devices to expand the possibilities of m-commerce.

Under this frame and target, this thesis is trying to find a reasonable answer to the following research question.

Research Question

"Can e-commerce expand more through additional technologies on the mobile devices?"

1.2 Thesis Outline

Before we introduce the content of the thesis, it is important to make ethical issues clear to the audience.

The literature review is a vital part of this thesis and a variety of materials have been surveyed. Although we are aware that any illegal use of copyrighted material is a serious issue, some coincidences may occur off the researcher's aim. To prevent such incidences, the text is passed through plagiarism detection software, iThenticate, before the final print and review process.

Çankaya University, Graduate School of Natural and Applied Sciences Thesis Manual [1] has been adopted as reference in the compilation of this dissertation.

This chapter has introduced the thesis aim and scope and defined the research question to the audience. The following chapters and the content are as follow:

Chapter 2 gives models of e-commerce both in Turkey and in the World.

Chapter 3 informs the user on the asynchronous payment systems including payment at the door, by EFT / remittance, electronic and postal cheques and automatic payment systems.

Chapter 4 gives necessary background on the online payment systems including bank and credit cards and digital wallet. In this chapter, the reader can find examples on online wallets.

Chapter 5 investigates mobile payment systems and delivers support for the mobile payment systems to rise. The chapter gives information on mobile trading, mobile payment systems including contactless card payments and supporting technology that comes with NFC which is more surveyed in Chapter 6.

Chapter 6 is dedicated for NFC technology enabled mobile devices and possibilities to use that technology in the mobile handsets. The chapter has also trials from Turkey.

Chapter 7 finally lists the findings of the study and discusses them through limitations and how to extend the research by addressing the limitations for future research avenues.

CHAPTER II

INTERNET AND ELECTRONIC COMMERCE

2.1 What is the Internet?

The word of “INTERNET” is composed of words meaning “international network”. Internet is a network formed of computers is connected worldwide. Basic function of it is that it is a means of communication. The information on the Internet, shortly called as the net, is increasing in terms of quantity in every passing day. By the means of being easy accessible, internet’s popularity is made higher among its users.

This network being owned by no one has a compound structure formed by many computers interconnected to each other. In other words, we can say that “internet is a kind of communication tool” [2].

2.2 Importance and Development of Internet

First occurrence of the Internet started with ARPA net in 1969 as a project launched by Defense Advanced Research Project Foundation which was one of the research and development unit of US Ministry of Defense. The goal of this project was to develop a network structure that could survive with no disruption in possible war conditions. In following years, universities and research foundations also linked to this network and made it to grow. In 1978, Transmission Control Protocol (TCP) was developed, which defines the rules of data communication between computers.

Finally, ARPANET Project which was quickly grown by various changes and insertions was terminated in 1990. It was Tim Berners-Lee who developed the first web browser in 1989. In this way, information change among pages on the Internet in a quite comfortable way became possible.

In Turkey, first connection to the Internet was transacted at the Middle East Technical University in 1993; and that action was respectively followed by Ege University, Bilkent University, Boğazici University and Istanbul Technical University. In 1996, TURNET was established within Turk Telecom and development of the Internet accelerated in Turkey.

In 1997, the Internet service provider to academic institutions ULAKNET was started to be operated. Owing to ULAKNET academic circles in Turkey started to benefit digital libraries via the Internet. There is no doubt about it that internet taking place all along in our lives is one the most important development of our era. Furthermore, we will not be mistaken if we call "age of internet" for the time we are in. The internet has changed the face of our lives at massive scale that education communication, entertainment, commerce etc. never be the same as it was a decade ago.

On following table you can find statistical data related to computing and the Internet usage in Turkey between the years of 2004 and 2012 according to Turkish Statistical Institute (TUIK) [3].

Table 2.1 Internet usage in Turkey between the years of 2004 and 2012

		Computer			Internet		
	Year	Total	Male	Female	Total	Male	Female
Turkey	2004	23,6	31,1	16,2	18,8	25,7	12,1
	2005	22,9	30,0	15,9	17,6	24,0	11,1
	2006	-	-	-	-	-	-
	2007	33,4	42,7	23,7	30,1	39,2	20,7
	2008	38,0	47,8	28,5	35,9	45,4	26,6
	2009	40,1	50,5	30,0	38,1	48,6	28,0
	2010	43,2	53,4	33,2	41,6	51,8	31,7
	2011	46,4	56,1	36,9	45,0	54,9	35,3
	2012	48,7	59,0	38,5	47,4	58,1	37,0

Today, in our daily life almost there is hardly a place that Internet is not accessible. Mails from the postal services we used to get drastically replaced by e-mails, TV programs replaced by popular videos on web sites, games we used to play in our childhood now replaced by pc games, printed newspapers now replaced by news on websites and classical shopping activities now switched over to e-commerce transactions. These radical effects gradually increase day by day.

By researches outlines, the intended the Internet is separated into four main categories [4].

- **Information:** to access and share existing audible, visual and video data most efficient and fastest way.

- **Communication:** due to its definition internet is used for communication and data transmission. Communication is an indispensable element of people's lives. In these days, modern life people can communicate verbally and visually over the internet in real-time. People are spending plenty of time for sharing information on social network.

- **Entertainment:** Internet also has changed the people's sense of fun, nowadays we do not come across the group of kids is playing on the streets, they now enjoy playing computer games even when they are not together. Entertainment sector on the Internet offers various alternatives not only to children but also to people in every age.

- **Commerce:** nowadays, people's conduct to commerce in traditional way is on the massive decrease and e-commerce is becoming one essential part of our lives.

As a result, lots of new concepts emerged with the development of IT and communication facilities improved. One of the most important of these concepts is electronic commerce (e-commerce).

2.3 Electronic Trade

2.3.1 Definition of electronic commerce

Traditional way the commerce is exchange of goods and/or services between buyer and seller for certain fees. There is no accepted definite definition of e-commerce that partaking increasingly in our daily lives as result of technologic development. The economy in where e-commerce transactions taking place should be defined as e-economy thereby.

There are various systems that e-commerce is conducted on internet. Shortly we can say that e-commerce is just an electronic manner of commercial activities [5].

There are several international or regional institution and organizations carrying out some related studies and making definitions in the scope of e-commerce business.

To exemplify we can list followings:

- **World Trade Organization (WTO):** according to WTO, "e-commerce is operations for production, advertisement sale and delivery of goods and services done on telecommunication networks" [6].

- **Organisation for Economic Co-operation and Development (OECD):** defines the e-commerce as "commercial transactions related to people and institutions occupied with process and transmission of digitized text, sound and visual datum" [7].

- **Elektronik Ticaret Koordinasyon Kurulu (ETKK):** in its May 1998 report, Law Study Group defines e-commerce as "processes and transmissions of commercial transactions targeting to obtain a material value and performed by individuals and institutions within open or limited access network environment" [8].

2.3.2 Development and importance of e-commerce

Developments in e-commerce increased in direct proportion to internet's development. Although telecommunication technologies have been used in trade transactions since 1980, internet usage for e-commerce started some time in 1995. Even if there had been some e-commerce transaction before that date those transactions had carried out on intranet environment.

In the early years, there were some debates as well as the hesitations that if that e-commerce transactions on intranet could be done on internet also. However companies such as Amazon, Dixons and Yahoo fast growing in couple of years has proven that his were at right direction. For example, Amazon.com which had made $16 million worth of book sale in 1996, just one year later managed to increase its sales to $148 million. Another good example is the Dell Computer which made $1 million of computers sale in January 1997 and increased its sales to $6 million in month December in the same year.

With the emerging developments at payment systems, security of personal information, new laws and regulations, globalization, information technologies etc. the e-commerce network is expanding gradually day by day. Thus not only to local or regional markets but by crossing over the borders, trade was made possible to worldwide markets as well. In our days now it is possible to make sale to anywhere in the world. Additionally, spreading of the web technologies lowers the barriers in the international trade. As a result of this state of affairs usage of e-commerce is increasingly expanding in worldwide economy markets.

Customers which are physically coming to their shops no longer satisfactory for the shop owners but they are trying to grab the customers from the people all over the world. Of course sales to physically present customers (traditional sales) are rather important; yet, rapidly expanding e-commerce networks are indicating the importance of new trading arena where is the tremendous amount of e-commerce transactions taking place. Conducting business in this new market is not only a plus but it obviously is an obligation also for retail business owners.

E-commerce allows retailers to create direct and fast relations with potential customers. Customers' demands can be fulfilled in relatively shorter times and all

this operation can be done by lower costs with a help of internet, more specifically, websites.

2.3.3 Advantages of electronic commerce

There are many advantages for both buyers and vendors as well. Involving in e-commerce transactions is not only limited with buyers and sellers but also there are many other factors involved in it as well. For example, banks involve in the aspects of payment systems, logistic firms for the aspects of delivery issues, insurance firms, software firms, government offices etc.

Advantages for the seller:

- Internet provides a virtual shop to vendors that they can reach to buyers globally 7/24 on internet,
- Internet increases the number of sales thus goes up profitability,
- Global markets become reachable with lower costs,
- Internet eliminates the intermediation costs in many sectors, especially in digital products, so it allows vendors to deliver goods and services directly to customers at lower prices,
- Vendors can tune up themselves according to buyers preferences input in to websites in advance so that they can maintain lower inventories without stock-out issues,
- Sale, supply, advertising and marketing cost are significantly lowered at e-commerce; with an effective communication vendors can reach mass group of customers as well as preparing lists for market niche,
- E-commerce transactions carried out in digital environment in shorter time.

Advantages for buyers:

- Customers do no need to travel long distances to find shops instead visit the online shops virtually with a few mouse clicks,

- Customers can browse multiple e-commerce websites and find the best prices and quality by comparison through web tools,
- Buyers can find goods and services at competitive prices much affordable way in minutes,
- Customers can easily find clear information and comments online for the goods and services they are interested to buy.

On the other hand, there are some risks for users wanting to take advantage of these benefits. For example, policing over the identification data, sharing their personal information without consent, acquisition of identity information by the hands of a third party, cases of fraud, etc.

2.3.4 Electronic commerce and security

Security issues are among the most feared and discomforting discussion on e-commerce systems. Both buyers and vendors as well would like to be certain of information exchanging each other.

Because e-commerce is not been a face to face activity unlike the traditional way, it is necessary to take extra measures for maintaining security and preventing abuse of the system. These facts imposed the obligation for taking some security measures such as digital signature and digital security certificates.

One major security risk in e-commerce transactions is falling of buyers' personal information and payment information into hands of unwanted third-party. Protecting personal information and payment information is crucially important for reliable development and sustainability of e-commerce. Necessary security standards shall be binding in the entire process. With these standards, the theft of information becomes harder by unauthorized users. There are two widely used standards to secure e-commerce transactions.

Secure Socket Layer (SSL): It is a security protocol developed by Netscape Communications in 1995 in order to ensure security and privacy between the networks. In SSL, processing requires terminal to have a certificate and server to have a key for communicating. Information must be encrypted before send out and is

decidedly ensured to be decoded at intended address. On data transmission key length is crucial for secure transmission. Key length shows size and degree of difficulty of encryption. SSL protocol uses 40 bit and 128 bit encryptions.

Secure Electronic Transaction (SET): It is established by participation of Visa, MasterCard, Netscape, GTE, IBM, Terisa Systems; SAIC and VeriSign in order to ensure security of bank cards and payment information. It uses 1024 bit encryption.

Security certificates are provided by banks or credit card companies. At the time of transaction copy of the certificates automatically exchanged between the seller and the buyer. These encrypted certificates can be read by only authorized parties. User chooses the product he wanted to buy and place the order with the merchant. Merchant sends its certificate received to customer. Customer sends his certificate with his order details encrypted with merchant's public key and account information encrypted by the bank's public key. Merchant sends these encrypted information to bank and request payment authorization. Bank checks encrypted information that belonging to customer and returns the response. If the respond indicates for confirmation merchant fulfills the order [9].

After giving a short background on the security, we shall return to e-commerce that runs globe wise.

2.3.5 Global outlook of electronic commerce

E-Commerce is overspreading across the globe and rapidly increasing. According to E-Marketer's e-commerce report that based on its market predictions and researches, e-commerce shown 21.1 % increase in 2011. And thus supposedly be thought that global e-commerce volume passed over $1 trillion.

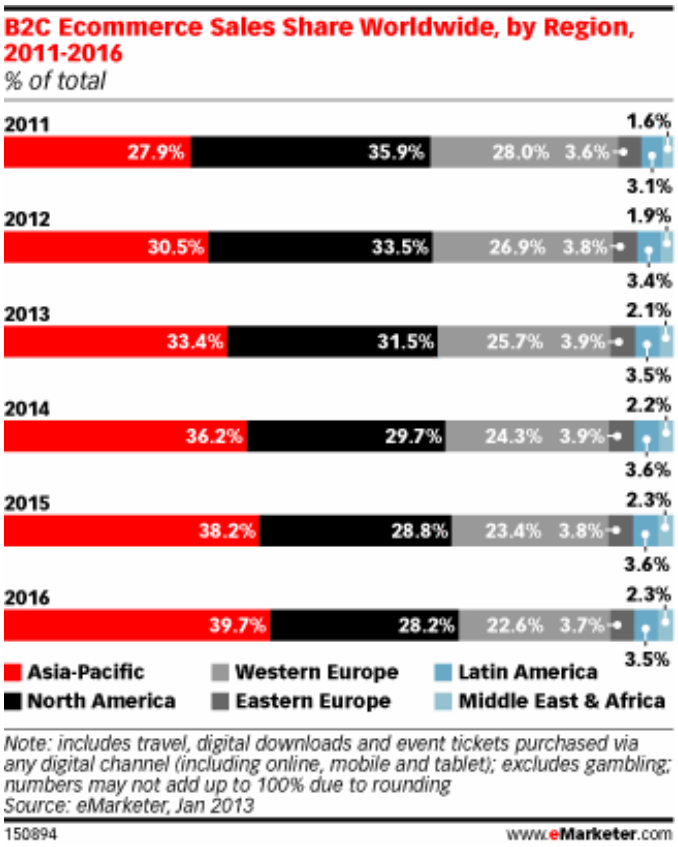

Figure 2.1 E-marketer 2011 – 2016 e-commerce forecast based on regions [10]

Notwithstanding in the recent years Asia Pacific and North America regions are having leading role in this growth, it is predicted that Asia-Pacific region will surpass at this lead in forthcoming years. Indonesia, India and China in this region are among the fastest growing counties in the aspects of e-commerce in recent years.

According to a study number of e-commerce users in China is nearly as 220 million. It is predicted that this number will go up to 423 million by 2016 by means of internet usage increase and new internet users' participation to e-commerce transactions. In spite of the fact that numbers of e-commerce user is been up recently in China, USA is still in leading position at global e-commerce volume. It is estimated in 2012 that there were 150 million e-commerce users in USA and prediction for 2016 is 175 million e-commerce users. With regard to Europe number of e-commerce users by 2012 is 168 million in West Europe and it's expected to reach 197 million by year 2016 (Figure 2.2).

Digital Buyers Worldwide, by Country, 2011-2016
millions

	2011	2012	2013	2014	2015	2016
Asia-Pacific	**334.8**	**391.1**	**457.6**	**523.1**	**591.7**	**653.5**
—China	178.4	219.8	270.9	322.1	374.9	423.4
—Japan	70.2	73.3	75.6	77.0	78.2	79.2
—India	14.5	19.2	24.6	30.0	36.2	41.8
—South Korea	22.2	23.3	24.4	25.4	26.3	26.9
—Australia	9.8	10.2	10.6	10.9	11.2	11.5
—Indonesia	2.0	3.1	4.6	5.9	7.4	8.7
—Other	37.6	42.2	47.0	51.8	57.3	62.1
Western Europe	**156.8**	**168.6**	**178.8**	**186.1**	**192.1**	**197.3**
—Germany	38.2	41.2	43.3	44.4	45.2	45.9
—UK	33.0	34.8	36.5	37.5	38.2	38.9
—France	24.5	26.5	28.1	29.2	29.8	30.4
—Spain	13.4	14.5	15.9	17.2	18.6	19.5
—Italy	10.5	11.7	13.0	14.2	15.4	16.6
—Netherlands	7.3	7.8	8.1	8.3	8.5	8.6
—Sweden	4.1	4.3	4.5	4.6	4.7	4.8
—Denmark	2.5	2.7	2.9	3.0	3.0	3.1
—Finland	2.3	2.4	2.5	2.6	2.7	2.8
—Norway	2.2	2.3	2.4	2.5	2.6	2.7
—Other	18.8	20.3	21.6	22.6	23.4	24.1
North America	**156.7**	**164.2**	**171.3**	**178.8**	**185.8**	**192.6**
—US	143.4	149.8	156.1	162.6	168.7	175.0
—Canada	13.3	14.4	15.2	16.2	17.1	17.6
Eastern Europe	**63.9**	**75.2**	**85.2**	**95.2**	**102.5**	**107.4**
—Russia	19.6	23.1	26.2	29.3	31.4	32.7
—Other	44.3	52.1	59.0	65.9	71.1	74.7
Latin America	**50.3**	**63.6**	**73.0**	**82.5**	**90.6**	**97.5**
—Brazil	19.1	23.7	26.7	29.7	31.9	33.9
—Argentina	6.4	8.1	9.2	10.4	11.3	11.8
—Mexico	5.8	7.2	8.4	9.6	10.9	12.1
—Other	19.1	24.7	28.8	32.8	36.5	39.7
Middle East & Africa	**30.0**	**40.9**	**49.8**	**58.6**	**65.8**	**73.1**
Worldwide	**792.6**	**903.6**	**1,015.8**	**1,124.3**	**1,228.5**	**1,321.4**

Note: ages 14+; internet users who have made at least one purchase via any digital channel within the past year, including online, mobile and tablet purchases; numbers may not add up to total due to rounding
Source: eMarketer, Jan 2013

150023 www.eMarketer.com

Figure 2.2 E-marketer 2011-2016 number of e-commerce user forecast based on regions and countries [10]

Table below indicates the 5 countries in the world with highest e-commerce volume consecutively in 2011, 2012, and 2013 (Figure 2.3).

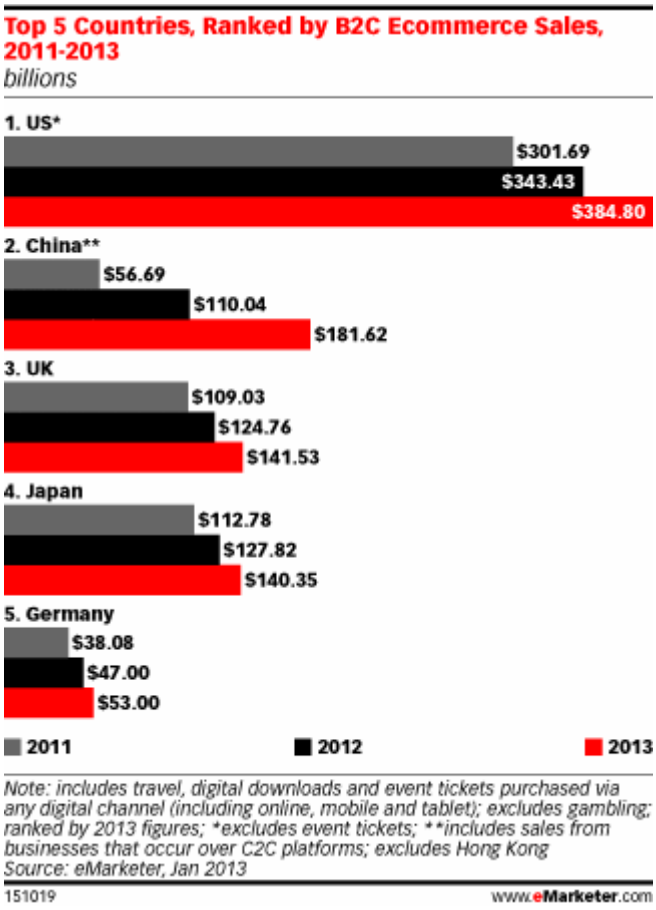

Figure 2.3 First 5 country with the highest giro of the world and endorsement changes between 2011 and 2013 [10]

2.3.6 Electronic commerce outlook in turkey

While some sectors and firms of economy in many countries worldwide struggling with global economic crises by suffering heavy losses end up to be disappear from market or shrink. Nevertheless, the e-commerce sector continues to expand nonstop in Turkey just as rest of the world.

As internet usage rises in Turkey, users are inclined favoring e-commerce usage more and more. The firms seeing this expansion assumed it as obligation to take role in this sector. History of e-commerce in Turkey starts by the year 1998. First instances were Hepsiburada.com, Idefix.com, Varan Tourism and Migros store.

In order to keep up with e-commerce trend in Turkey and to set a course for it corresponding with the rest of the world, on 25 August 1997 “E-Trade Coordination Council (ETHICS)” was established within Undersecretaries of Foreign Trade by Council for Science and Technology. On the other hand, Central Bank of Turkish Republic drafted a proposed law named “Proposed Law in Aspects of Electronic Money Institutions and Payment System Services” aiming promote electronic trade nationwide, protect the consumers and establishing secure lines of payment and constitute alternative payment systems.

According to study named “Internet Entrepreneurship and E-Commerce Axis Current Situation Report”, issued by the Ministry of Development Information Society Department and McKinsey in May 2013, e-commerce in Turkey is expanding in the aspects of business to consumers (B2C) model [11].

While total e-trade in country expanding gradually payments accrued on internet also increases day by day in direct proportion to it. While 2 TL of per 100 TL worth shopping was accrued on internet in 2005 this amount increased to 9 TL in 2012. While amount of card payments by 2005 was 1 billion TL this amount reached to 31 billion TL in 2012. It is foreseen that it will increase to 316 billion TL by 2023 [12]. That also indicates that electronic trade transactions will increasingly continue in forthcoming years.

According to information provided by the Ministry of Customs and Trade in 2011 [13], Turkey took second place proportionately in global ranking after India. In addition, according to Interbank Card Center (BKM) datum total amount spent on e-commerce sites reached 22.8 billion TL in 2012 showing rise of 35% over the year 2011. In 2012 total of 162 million transactions were registered while this number was 125 million in 2011 [14].

By looking at these figures, we can say that sector will continue its rapid growth in forthcoming years also. BKM data for the years 2012 and 2013 are given in figures 2.4 and 2.5.

Dönem	İşlem Tutarı (Milyon TL)					
	Yerli Kartların Yurtiçi ve Yurtdışı Kullanımı			Yerli ve Yabancı Kartların Yurtiçi Kullanımı		
	Yurtiçi	Yurtdışı	Toplam	Yerli Kart	Yabancı Kart	Toplam
01-OCAK	3.196,5	186,57	3.383,06	3.196,5	177,47	3.373,96
02-ŞUBAT	2.007,04	183,86	2.190,89	2.007,04	183,32	2.190,36
03-MART	2.208,89	213,58	2.422,47	2.208,89	223,95	2.432,84
1. DÖNEM	**7.412,42**	**584**	**7.996,43**	**7.412,42**	**584,74**	**7.997,16**
04-NISAN	2.262,63	226,26	2.488,89	2.262,63	238,61	2.501,25
05-MAYIS	2.642,24	223,69	2.865,93	2.642,24	242,34	2.884,58
2013 YILI	**12.317,3**	**1.033,95**	**13.351,25**	**12.317,3**	**1.065,7**	**13.382,99**

Figure 2.4 The card payment systems on the Internet in 2013 in Turkey [14]

Dönem	İşlem Tutarı (Milyon TL)					
	Yerli Kartların Yurtiçi ve Yurtdışı Kullanımı			Yerli ve Yabancı Kartların Yurtiçi Kullanımı		
	Yurtiçi	Yurtdışı	Toplam	Yerli Kart	Yabancı Kart	Toplam
01-OCAK	2.509,77	157,54	2.667,31	2.509,77	127,33	2.637,1
02-ŞUBAT	1.884,27	163,52	2.047,79	1.884,27	132,83	2.017,1
03-MART	2.139,7	158,53	2.298,22	2.139,7	112,75	2.252,45
1. DÖNEM	**6.533,74**	**479,59**	**7.013,33**	**6.533,74**	**372,91**	**6.906,65**
04-NISAN	2.068,69	131,47	2.200,16	2.068,69	201,19	2.269,88
05-MAYIS	2.301,62	137,54	2.439,16	2.301,62	298,9	2.600,52
06-HAZIRAN	2.222,6	127,05	2.349,65	2.222,6	252,34	2.474,94
2. DÖNEM	**6.592,91**	**396,05**	**6.988,96**	**6.592,91**	**752,43**	**7.345,34**
07-TEMMUZ	2.874,91	158,88	3.033,79	2.874,91	311,41	3.186,32
08-AĞUSTOS	2.460,65	174,49	2.635,15	2.534,61	290,66	2.825,28
09-EYLÜL	2.301,02	146,17	2.447,19	2.350,26	155,75	2.506,01
3. DÖNEM	**7.636,58**	**479,54**	**8.116,12**	**7.759,78**	**757,83**	**8.517,61**
10-EKIM	2.306,42	172,1	2.478,53	2.395,71	147,85	2.543,56
11-KASIM	2.310,62	202,98	2.513,6	2.382,95	135,83	2.518,78
12-ARALIK	2.652,07	174,32	2.826,39	2.703,27	128,97	2.832,24
4. DÖNEM	**7.269,11**	**549,4**	**7.818,51**	**7.481,93**	**412,65**	**7.894,58**
2012 YILI	**28.032,34**	**1.904,58**	**29.936,92**	**28.368,36**	**2.295,81**	**30.664,17**

Figure 2.5 The card payment systems on the Internet in 2012 in Turkey [14]

2.4 Electronic Commerce Tools

E-Commerce tools include instruments utilized during e-commerce transactions by involving parties; such instruments include but not limited to the followings. The target is to provide fast, efficient and easy e-commerce transactions [15]. These tools are:

- Landline phone,
- Facsimile machine,
- Internet and Intranet,
- Electronic Data Interchange (EDI),
- Cable and Digital Broadcasting Systems,
- Mobile Systems.

2.5 Electronic Commerce Models

With the spreading of the communication, hence Internet, technologies, expectations in the digital commerce is changing. In addition to face to face shopping activities, today there are various types of e-commerce models in practice.

Rapidly growing e-commerce and the developing IT give rise to the new business models. Borderlines of this business models not outlined precisely however depending on to involving parties these business models can be identified and classified into four major models (but not limited with) as we visit in the following sections.

2.5.1 Business to business (B2B)

In business to business e-commerce model, business transactions subject to e-commerce are carried out between companies. It involves the electronic transactions such as order placing, purchasing tracking, invoicing and payment etc. tasks between companies. Companies conduct this model for its convenience of being fast and cost-effective (Figure 2.6).

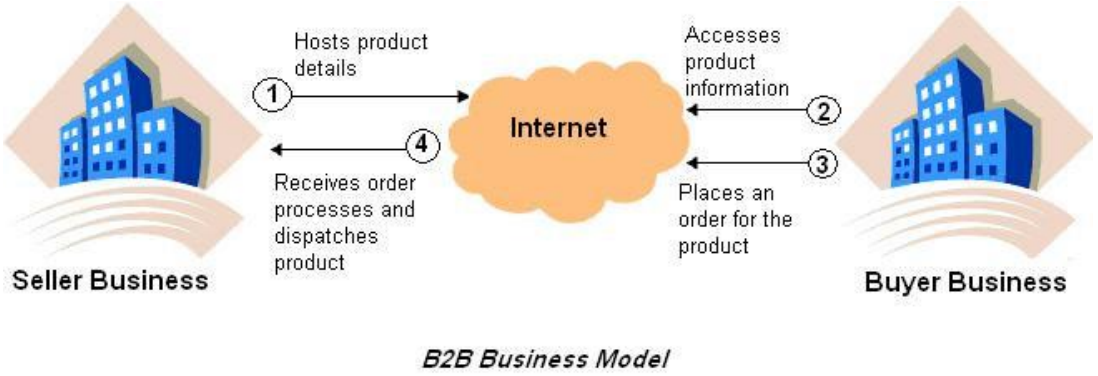

Figure 2.6 E-commerce B2B Business Model

Example: A well-known example of this model is from www.alibaba.com web site.

2.5.2 Business to consumer (B2C)

Business to Consumer model is an e-commerce type in which organizations offer and sell their products or services to end users. Business organizations display the service and product offers to websites and store all information to their databases. Hence, they can reach out to bigger numbers of customers, lower the cost and provide detailed information about good and services on offering. B2C model is a widely accepted activity on the Internet. (Figure 2.7)

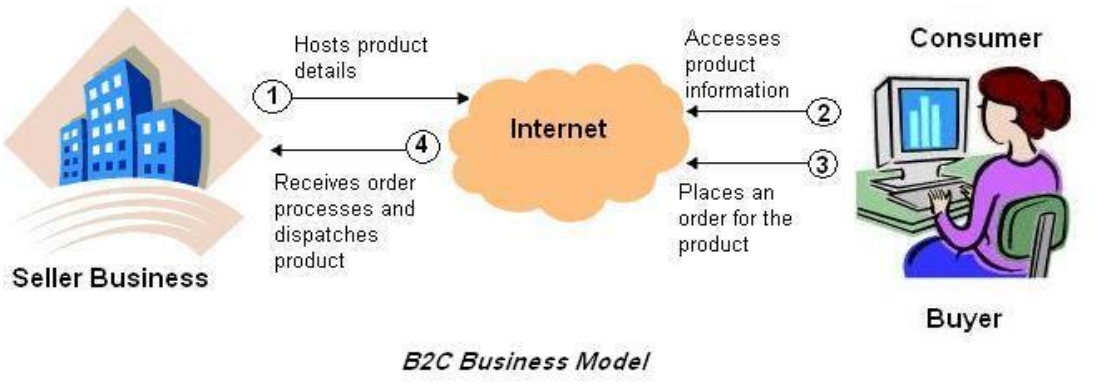

Figure 2.7 E-commerce B2C Business Model

Example: Worldwide example of it is www.amazon.com and domestically known example is www.hepsiburada.com.

2.5.3 Consumer to business (C2B)

Consumer to business model involves these consumers product and service offering and selling to companies and getting paid for it. Posting of a handmade product on forums and blogs can be considerate as an example to C2B model. (Figure 2.8)

Figure 2.8 E-commerce C2B Business Model

Example: www.uzmankirala.com can be shown as a sample to C2B.

2.5.4 Consumer to consumer (C2C)

In Consumer to Consumer model consumers communicate each other and involves in to a commercial transaction electronically. In this model a mediating web site must be in place. That mediating site owner targets to make earnings by charging membership fee and commission over the sales etc. (Figure 2.9)

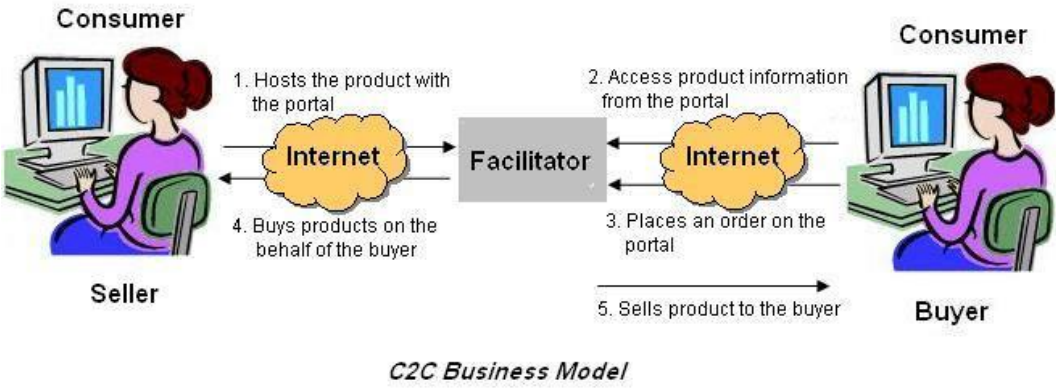

Figure 2.9 E-commerce C2C Business Model

Example: www.ebay.com is best known example for the C2C model.

Related to C2C model, a new term Peer to Peer e-commerce model is getting spoken in the literature. Basically, P2P involves the transactions between the end users as well; example: www.paypal.com.

2.5.5 Governments to citizen (G2C)

G2C model is e-commerce type taking place between government and the citizens. Motor Vehicle Tax Payment transactions are done on www.gib.gov.tr can be shown as an example of this model e-commerce.

2.5.6 Business to government (B2G)

Business to Government (B2G) model involves the e commerce between government offices and organizations. For example government requests for tenders and contractors' good service offers to government. Also similar to individual consumers organizations' tax payments on the net can be shown as example for this model.

Example: Public Procurement Authority web site, www.ihale.gov.tr.

2.5.7 Business to machine (B2M)

Business to Machine e-commerce model involves the transactions, organizations sale activities thru the machines they are directly linked to.

Example: Vending machines can be shown in this category. Inventory is automated in vending machines. If a product running short machine sends the related data to organization thus organization can replenish the stock in the machine and maintains the service continuance.

2.6 Payment Systems in Electronic Commerce

E-Payments are one of the most important components of the e-commerce transaction. Without payment system in a structure e-commerce cannot be mentioned. There are set of factors in e-commerce supporting e-payments to develop, to grow and to be used more widely in efficient and secure ways. The necessity for seller and the buyer point of view is that system must be secure, fast and practical.

It is a requirement that both vendors and the consumers are well grounded in aspects of payment systems. Consumers must be acknowledging of existing payment

systems and vendors must choose most the conforming payment system for their customers.

Presently, there are various payment systems in the market. At the same time, we can classify the payment systems into major categories as follow:

- Asynchronous Payment systems,
- Online Payment Systems,
- Mobile Payment Systems.

2.7 Summary and Comments

In this section we examined online effects of internet and emerging web technologies. Advantages arising from e-commerce are mentioned. We saw that changing and expanding technology have created new expectations for the companies, consumers and governments. New business models formed through e-commerce were shortly visited. Especially electronic commerce and payment systems were emphasized. The next chapter, Chapter 3, addresses asynchronous payment systems.

CHAPTER III

ASYNCHRONOUS PAYMENT SYSTEMS

Asynchronous payment systems are meant for payment systems that are not realized instantaneously. There is a matter of time being passed between the time of payment made by buyer and the time of being received it by seller. Therefore payment confirmation is not received instantly.

Such systems do not require buyers to share personal information such as bank account and credit card information. To this respect, asynchronous payment systems can be preferred by buyers over other systems due to their less vulnerability to fraud risks. Besides, they are less complex and low-cost payment systems for merchants as well.

3.1 Payment at the Door (Payment on Delivery)

Collect on delivery is a payment system where consumers pay for a good they buy online, thru shipping agent on the time of receiving it. It is usually preferred by customers who do not want to share their credit card information or do not want to pay by electronic fund transfer or remittance order.

Logistic firms play key role at this payment method because they are responsible for both mission of delivering the product to consumer and for collection of cost and freight from consumer on behalf of seller as well. Usually, payments are accepted in cash, however, there are some firms accepting credit cards also. It is a secure payment method in customers' aspect. However some merchants may require extra costs or minimum order quantity. If you were not present at the address on time of delivery, you can go back to shipping firm's local place and pay for the product and claim it. Yemek Sepeti (www.yemeksepeti.com) is a particularly accepted firm among food companies can be a relevant example. In many cases it is not required to present any credit card or bank card when you are placing your order. You can make the payment at your door when your order is delivered to you. Along the same line

with some others online retailer company Amazon.com also have COD payment option. Except that custom and legal regulations is been determinant and restrictive barriers in international deliveries.

3.2 Payments by Eft / Remittance

Electronic Fund Transfer system is an electronic exchange system which allows transferring the money one bank account to another bank account [16]. We adopt the term remittance to mean transfer of money between separate branches of a bank.

Both EFT and remittance payments are not finalized instantaneously; they need time. In EFT transactions, time needed may be varying depending on to bank or time of transaction.

Any maintenance and commission fees are not be occurred in this type of payment systems. Thus, it provides low cost; or consumer may receive discounts on the purchase. In addition to that, fraud risks in this type of payments are lower when compared to payments by credit card.

3.3 Electronic Cheque

Some payment methods similar to cheques developed in USA in order to use for e-commerce transactions. Three parties are involved in this method as follows:

- The Buyer,
- The Seller,
- The Bank.

E-cheques are a mode of electronic payment digitally signed and legally binding promise to pay through an issuing bank. E-cheque has similar properties as regular paper cheques indicating the account number and digital signature of drawer, name of payee, date of payment, amount of payment and type of currency.

Customer conveys the cheque to seller electronically; seller (merchant) can collect the amount electronically transferred to his/her account. A financial institution controls transactions regularly every day to ensure in and out transactions are

working without problems and informs the merchant as coded information. This system is not in use in Turkey yet, to our knowledge.

3.4 Automatic Payment Systems

This payment system is preferably used for payments occurring at certain time intervals. System works for making the payments on settled dates in previously determined amounts or variable amounts. This service is usually utilized in mobile and online banking environments. Because of its various benefits, banks are often promoting it.

For instance; monthly rent payments, utility bills (electricity, water, natural gas) payments etc. most common and regularly done payments are. By means of this preferred system, delays and failures of payments, and cut off services are avoided and provide benefits to all parties.

3.5 Payment by Postal Cheques

This is frequently used in the past for transactions in the e-commerce. It works similar as bank accounts. Postal cheque account can be established in any currency (TL, USD and Euro) by simply walking in to any Post Office in Turkey. Money transfers or withdrawals can be carried out from these accounts in anytime that on account holder request or automatic payment orders can be placed through these accounts [17].

Postal cheques usage is declined due to development on online and mobile options. However for its low commission fees, it is still used in not frequently today.

3.6 Summary and Comments

Involvements for asynchronous payment systems declined in recent years since new developments and innovations are in stake at payment transactions fields. However, there are still some parties unable to benefit the technology in the e-commerce field. There are also considerable amount of people who do not trust on technology and do not want to share their personal information for security reasons.

These groups are also involved in e-commerce by means of asynchronous payment systems. In this respect of this payment, system still has quiet a large group of participants despite its decline along the years. In the following chapter, Chapter 3, we shall study major online payment systems so that we can compare online payment systems.

CHAPTER IV

ONLINE PAYMENT SYSTEMS

Online payment systems differentiate from asynchronous payment systems for their speed of confirmation received for payment as it is realized instantaneously at the same time of payment is made. Owing to its instant realization no further controls needed to be performed. As in global markets adopting various online payment systems, some modes of online payment systems are started to be in use in Turkey as well such as credit card.

4.1 Bank Card and Credit Card

Credit cards take first place in the line among the most commonly used consumer's financial instruments in Turkey. Credit card is a payment tool given by a bank or authorized financial institution to its customers allowing them making retail transaction without carrying cash on them within a specific line of credit. It has three basic functions: cash withdrawals, usage on purchase of service and goods and functions to provide a constant credit source for its holders.

Bank cards differentiate from credit cards for not having any line of credit limit description to it. A bank card is used by its holder like a currency in retail transactions or to withdraw money from the bank just as much as holder has in his account.

4.2 Digital Wallet

Despite not having a common name agreed on by everyone, digital wallet is actually a sort of software that works on computers and mobile devices which provide possibility of money being spent or saved in digital environments. Digital wallet is been encrypted can be kept in a safe just like credit cards, bank cards, id cards and loyalty cards have kept in physical wallets [18].

In USA, comScore published a survey result [19] regarding Digital Wallets. According to this survey PayPal is decided to be as most known digital wallet by 72% of participants and followed by Google Wallet with 48% MasterCard Pay Pass with 13% and Square with 8%. As for digital wallet usage ratio specified as 48% PayPal, 8% Google Wallet, 4% Pay Pass and 2% Square.

Just as it is in credit card usage, there are some security issues in digital wallet usage also in daily life. As time progresses many studies are carried out in order to make digital wallet systems more secure. These are secure networks, PIN protection and various security software.

On the other hand, digital wallet usage has many advantages. For instance, imagine that you lost your physical wallet. Firstly, you must remember which bank and credit cards, ID cards, insurance cards and loyalty cards you had in your wallet; then you must cancel all these from respective firms and institutions and have reinstated to you again. Besides, you will have to do this action for all respective cards repeatedly. Plus, you would be losing your cash.

Furthermore, you will have to allow some time until you get your renewals and this may cause to some limitations to your daily life. All of these mean a call for back breaking efforts and loss of considerable time period. On top of that, this can be happened to you one more time and you may have to go through all these processes again.

This was only a scenario. This entire tiresome works are made simply quick and easy with digital wallet. While you having much personal information stored in your digital wallet none of these, you have to share or give to merchant.

4.3 Online Payment Types

4.3.1 Card payment systems

It is usually first thought and utilized payment system in e-commerce transactions. However, it is also most vulnerable payment system to internet scam. Still 3D secure system can be a solution for increasing security on e-commerce transactions.

This system is developed by two major payment system operators Visa and MasterCard in order to bring down security issues in virtual POS transactions performed on internet. This system basically aims to reduce frauds and transaction disputes in e-commerce transactions. In retail events on the web sites with 3D secure support card holder must enter the specific password provided for ending the transaction successfully.

Worldwide known forecasting and consulting company Global Insight carried out a research in 2003 [20]; according to this research card payment systems contributing economic advancement and development significantly. Beside that condition helps to reduce grey-economy entities. As of end of March 2013, 55.74 million credit cards, 93.79 million bank cards and 2.13 million physical and virtual POS machines are available in Turkey [21].

Credit Card/Bank Card Payment Systems: usage of credit cards and bank cards given by banks provides many benefits and advantages for both economy and individual card holders. In card holders' case, such cards reduce the obligation of cash carrying in wallets, and individuals may get opportunity of installment plan and they may win usable points on their goods and services purchases. On the economy side, these cards reduce grey-economy questions, thus contribute positively to country' economy.

As a result of constant high inflation situation in past years credit card usage gradually increased in Turkey. On account of credit cards we can spend the money we do not actually have them physically; and we can use it as short term financial loan tool.

Additionally, credit card usage is rather often in the e-commerce shopping transactions. For the transaction process it is required to give name and last name of the card holder, card number, validation date and 3 digit of Credit Card Verification (CCV) code when demanded to conclude the purchase action. In addition to that financial institutions allow customers to create virtual credit cards on online banking and use it for shopping. In that case customer receives a virtual credit card with certain line of credit and shares only limited personal information at usage.

This provides safer shopping opportunity to customers because they do not have to share whole personal information to merchant.

Figure 4.1 Status of card payment systems in Turkey, in the first half of 2012 [22]

Prepaid Cards: it is a payment system mostly preferred by individuals not wanting to use credit card or bank card. The person does not necessarily require to be a bank customer or bank account holder, not required to submit any income information, application approval, there is no interest charge or validation date; the person can just load credits and spend it. Card holder may assign credit limit as much as he wants within limits and control his payments. Risk limited by only loaded amount therefore it is not considerable much.

Prepaid Cards are promising payment tools for future market structures. It is expected to become much more well-liked especially in the countries not using credit cards widely.

Example: Ininal Card. You can purchase this card for 5 TL at PTT, Migros and Tansas stores or on internet and load credit in amount of 25, 50, 75, 100, 150, 200, 250, 300 TL. Then you can use this credits and spend on e-commerce transactions supported by MasterCard. When you run out of credits you can refill again or you can terminate the card and throw it.

With this type of cards, we can do shopping online without sharing entire personal information thus we can keep the risk minimized level. We can even shop from a website never been heard of before with prepaid cards. By means of these convenient potentials of these prepaid cards individuals with some reservations for online transactions can be included into e-commerce system as well. That also enables companies to reach to mass buyer groups and increase their revenues.

4.3.2 Payment by online wallets and examples

BKM Express: BKM Express has been launched with an initial introduction on 21st of June in 2012. BKM Express is an online payment system which you can set up your credit cards in and shop online without even share your card information with merchants [23].

System is easy, fast, secure and free of charge. Currently, there are 12 banks (Akbank, Bank Asya, Finansbank, Garanti Bank, ING Bank, TEB Bank, Isbank, Turkey Finance, Vakıfbank, YapiKredi Bank, Ziraat Bank), 149 merchants and more than 100,000 individual card holders are involved in the system.

BKM Express surpassed many financial institutions in Europe and won the MPE Award of Merchant Payment Ecosystems Awards in category of “Best Channel” in Berlin on 13 February 2013 so has shown it is success in international level [24]. BKM Express offers many advantages to both member merchants and the card holders as well.

Advantages for Card Holders:

- BKM Express membership is free of charge no usage fee applied,
- Credit Cards and the Bank Cards are already registered to the system therefore you do not have to carry none of them,
- Easy to use. You can just enter your email address and password and you can choose any of your cards that has been registered already when you log on to system; and make your payment fast and easy,
- BKM Express is secure. When you are setting up your account you do not have to give full number of your card, transactions confirmation is done with SMS messaging to your phone number,
- You can be confident of security to use it owing to no information shared with any e-commerce transactions.

Advantages for member merchants:

- BKM Express is free of charge. Merchants pay no commission at all. If you are already using a virtual POS you do not need to get a new POS application,
- If you are new to e-commerce you get opportunity to gain new customers who are not willing to enter card information in to web sites. Thus you can increase your revenue,
- Because you have registered your cards in to the system you do not have to carry them physically on you,

- It is rather easy to use. You can just enter your e-mail address and password and you can choose any of your card has been registered already when you log on to system, and make your payment fast and easy,
- BKM Express has improved security policies because you do not have to enter your card numbers when you are logging on and transaction concludes with SMS message confirmation to your phone,
- You can be confident of security to use it owing to no information shared with any e-commerce transactions.

PayPal: PayPal is an online payment system established in 1998 serves consumers and merchants are registered by help of just an e-mail and given them opportunity to send and receive payments online [25].

PayPal which was bought by eBay in 2002 is operating in 190 countries. PayPal supports payment in 25 different currencies including TL, USD and Euro currencies.

Once you have registered to PayPal and your credit card is configured, you do not have to share your card information with the seller. Buyers will not pay any fee on purchases however merchant will pay the fee and also fee is applied for money transfers.

PayU: as an Naspers associate PayU is operating worldwide in 16 countries. The firm having more than 25,000 employees has been launched its activities in Turkey as well since 2011. PayU provide support to e-commerce firms for their payment systems as an business partner. In this payment system, merchant do not have to get virtual POS service for each bank. You can use 6 banks virtual POS services on one single PayU mutual payment page in Turkey [26].

iPara: launched on 14 November 2011, iPara is a secure and practical online payment system for consumers and e-commerce firms benefiting online shopping without credit card use.

You can add credit cards and bank cards as many as you like into iPara account. During your online transactions with iPara system credit cards information which you have enter the system will come automatically and you can choose any of these cards to perform your payment. Owing to its fraud filters in B2C and C2C e-commerce types chargeback risk is substantially eliminated. This system does not require monthly fee however transaction fee is applied for per transaction. iPara system works as follows [27].

- Customer pays for purchased item on iPara system, merchant ships the item,
- Paid amount is held by iPara,
- Customer receives the item and checks if it is all right,
- Upon customers confirmation paid amount is transferred to merchant's account.

4.4 Summary and Comments

In this chapter, online payment systems were examined. Information about digital wallet was mentioned. Types of online payment systems were investigated. By giving detailed examples of sub-headings, we tried to form a general idea about online payment systems. It was seen that the share of online payment systems in the payment systems is increasing. The next chapter, Chapter 4, addresses mobile payment systems arising from online payment systems.

CHAPTER V

MOBILE PAYMENT SYSTEMS

The term of mobile payments stands for payments executed thru the mobile devices. These transactions most of the time can be done thru cellular phones or in some cases can be by various mobile devices also. Similar to online payment systems paid amount instantly transferred to vendor in mobile payment systems. Hence, payment process between buyer and vendor is wrapped up fast and easy manner. In addition, mobile payment systems led emergence of mobile trading into our lives by changing conventional trading styles.

5.1 Mobile Trading

Many commercial customs have been utilized in world history. Oldest payment method renowned is payment in kind in other word is swap goods for goods. Having Lydian's found the money, people start conventional commerce transactions in time. These ongoing practices have been changed in 90's with the emergence of the internet into our lives and we have been acquainted with electronic commerce. In time as the result of increase of mobile devices and people's mobile device usage for internet connection led people start buying more staff thru mobile devices and internet. Mobile devices become an instrument for new commercial transactions thus we have been introduced to a new concept called Mobile Trading.

People find out that they do not need to go to a physical store or even to sit at the computer to shop but they can enjoy the privileges of mobile trading and shop while they are travelling on public transportation, while they are walking or while they are in cinema etc.

Apparently, as both IT and mobile payment systems continuous expanding mobile trading will influence our lives in forthcoming days. This may not be occurred in coming couple of years. However most probably mobile trading will dominate the market in the future. To give an example number of user Starbucks's mobile

payment system currently reaches to 10,000,000 active users. As for weekly number of transactions, these are clarified as 4,000,000 according to [28].

Mobile trading is an extension and expanded form of electronic commerce. Independently on a stationary location you can perform financial transactions thru mobile devices in any time and in anywhere; and that is called mobile trading [29].

According to report issued by Kiss metrics in 2012, 20% of overall web traffic occurs by mobile devices. It is 14. 6 % portion thru cellular phones and 5. 6 % is thru mobile pads [30]. Mobile device usage ratio in Turkey is around 89.5% of the population. In the first quarter of 2013 internet connections rate thru mobile devices is 55% [31]. These figures show that half of the mobile devices are plugging to internet. This will help us to understand potential for mobile trading that Turkey has.

5.2 Status of Mobile Payments

In the recent years, mobile payment systems are becoming more and more well-liked. In parallel with this inclination, mobile payment systems usage rate is expanding day after day. According to Gartner's report [32], worldwide mobile payments in 2013 will increase 44% compare to $163 billion USD accrued total amount in 2012 and will reach to $235 billion USD. It is supposed that this expansion will continue in the years ahead also. According to the report, average rate of increase will be 35% between the years of 2012 and 2017. When it comes to worldwide rate of mobile payments expansion it is highest in Asia-Pacific region and respectively North America and Europe comes after.

In GlobalWebIndex research targeting to observe fourth quarter of 2012, China is with highest mobile penetration in across the world. In the Asia-Pacific region, Chinese internet users are conducting mobile trading transactions with the percentage of 55% which is highest in general. In this region China followed by South Korea with 37%, Indonesia and India with 26% respectively; and list goes on in order as Vietnam with 24%, Malaysia and Thailand with 23%, Japan with 22%, Australia with 17% and Philippines with 15% users' rate to general population [33]. This statistics shows that we can say Asia-Pacific region especially China will have a strong hold at mobile trading in the future. (Figure 5.1)

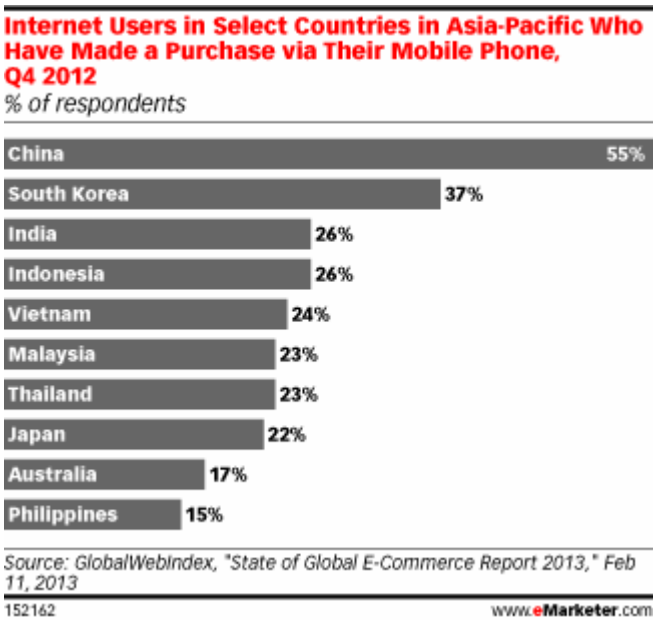

Figure 5.1 Mobile Commerce Adoption in Asia-Pacific [33]

For the same period research data for North American region relatively stays low. Mobile shoppers' rate in USA appears to be 19% in total population. When it comes to Canada this rate goes down to 13%. That is also shows that both USA and Canada total rate of mobile trading is almost equivalent to half of China's mobile trading rate. Besides not only China but 8 out of 10 countries in Asia-Pacific region are ahead of USA.

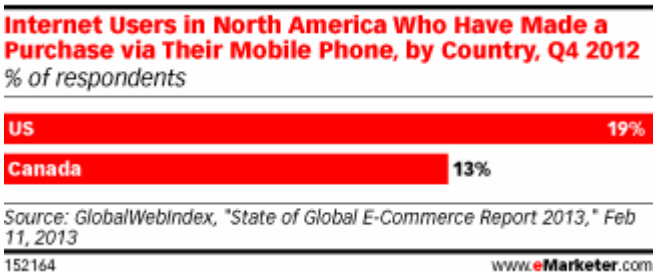

Figure 5.2 Mobile Commerce Adoption in North America [33]

In the research done by Nielsen, datum of mobile trading transactions executed by smartphone owners is indicated on its report. On this report, Mobile trading transactions were evaluated in for category as follows:

- Barcode/QR Scanning,
- Mobile Shopping,

- Near Field Communication (NFC Section 5.4.5) /Mobile Wallet,
- Mobile Banking.

In the ratings of these categories South Korea is in the first place in three categories excluding NFC/Mobile Wallet category. China is ranking in the first place at NFC/Mobile Wallet category. Interestingly shown in the report that USA is appears in lower levels in the ranking regarding NFC/Mobile Wallet category. Then again India as it is in leading position in IT field, contrarily it is not even showing any existence in Barcode/QR Scanning and NFC/Mobile Wallet categories.

Among other countries, Turkey is also given an attention on this report. However Turkey is in low levels in the ranking in all four categories in regards to 2012 datum Figure 5.3. We can have two inferences of this circumstance: firstly, Turkey must lead the existing consumer groups to this course in order to close the gap with other countries in mobile trading arena. These arises the necessity of finding new methods for masses which cannot be reached by current payment methods and also necessity of improving current payment systems. Second conclusion is if the market in this field is at low levels that also show that there is plenty of room for expansion in the course. We can say that there will be many innovations and liveliness in forthcoming years.

Mcommerce Activities of Smartphone Users in Select Countries, 2012
% of respondents

	Barcode/ QR scanning	Mobile shopping	NFC/mobile wallet	Mobile banking
South Korea	38%	43%	15%	51%
China	30%	43%	20%	42%
Australia	14%	25%	4%	40%
US	24%	30%	3%	38%
Russia	12%	17%	11%	33%
Brazil	22%	17%	11%	28%
UK	18%	26%	4%	28%
Italy	14%	15%	3%	22%
India	-	7%	-	7%
Turkey	2%	3%	1%	4%

Source: Nielsen, "The Mobile Consumer: A Global Snapshot," Feb 25, 2013
152775 www.eMarketer.com

Figure 5.3 Mobile commerce activities of smartphone users in some countries in 2012 [33]

5.3 Future of Mobile Payments

Amenity and convenience of mobile payment systems is not only captivating the consumers' attention. It also attracting many companies and whetting their appetite. Leading companies across the world are investing on mobile payment systems. Besides PayPal, Google, Walmart, Apple, Samsung etc. there are also small scale companies among these companies investing in the field. In the initial surveys done by CB Insights [34], mobile payments show an overweight portion. (Figure 5.4)

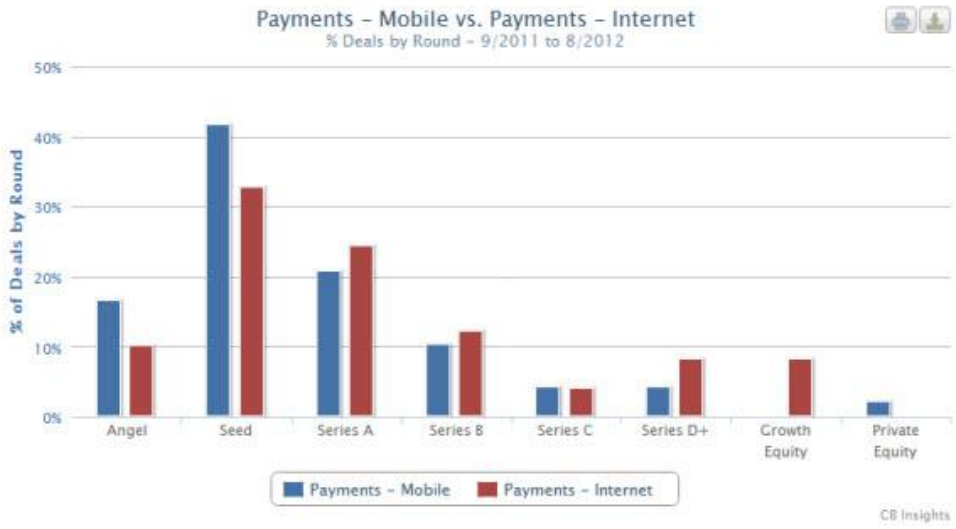

Figure 5.4 Mobile payments – Internet Payments [34]

Much as mobile payment systems share in overall payments is at the least level for the time being, it is expected that this share will increase dominantly in the future. According to research done by Adyen, it is operating in online payment systems 15% of product sale orders come from mobile devices [35].

To provide an increment for mobile payments, players are a side of m-commerce should generate convenient pricing and improve progressive products. [36].

A part of report regarding near future of mobile payment systems which are published on by Gplus.com [37] is presented in Figure 5.5.

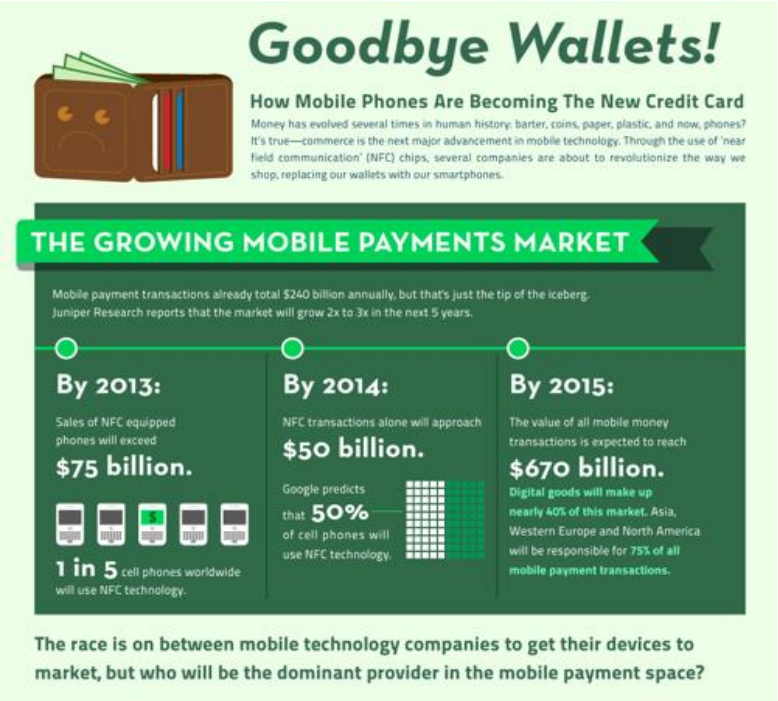

Figure 5.5 The growing mobile payments market – Goodbye Wallets [37]

There are many similar studies indicating that mobile payments expansion is coming into prominence. Among these studies eye-catching ones are the one made by credit card companies which are movers and shakers of the current shopping and payment activities. VISA Europa issued a report in 2012. According to this report, mobile payment volume and amount in it will override the relevant numbers in credit card transactions [38]. From this point on we can say mobile payments promise to dominate the markets in the future. Through the help of technologic advancement it can be indispensable instruments of our lives may be sooner than predicted.

All these facts show that mobile payments and mobile trading will have much importance in our lives. By the time, conventional commerce will give its place to e-commerce and later to mobile trading. Secure shopping concept will settle in our lives.

5.4 Mobile Payment Systems

One of the integral parts of the mobile trading is mobile payments. One of the first known mobile payments is service that has been received from soft drink vending machines by SMS in Helsinki. Both in worldwide and in Turkey as well many

technological studies are carried out in the field of mobile payments. Even so we can distinguish it precisely still we can evaluate mobile payment systems in 5 categories.

- Software based systems,
- Invoicing to network operator,
- Card reading systems,
- Contactless card payments,
- NFC (Section 5.4.5) Supported mobile device payments.

It appears to be a competition will be on the ground in the aspects of mobile payment systems between banks and GSM operators in Turkey in the future. In 2013 a bill is drafted in TBMM [39] for allowing GSM operators to become market players in payment systems. Although banks objection nevertheless payment transactions executed thru cellular phones will be secured by passing this law; and GSM operators will be important players in mobile payments. By this means it appears to be mobile payment systems market also will quite expand.

5.4.1 Software based system

In software based payment systems shopping opportunity is provided between shopper and vendor through applications installed onto mobile devices. Due to fact that these applications is been installed on mobile devices they can be operated offline as well.

Advantages:

- Usage is practical because they work thru mobile devices,
- Puts away the posting repeated information and led you gain time (information such as name, last name, address, tax info etc.),
- They can be used offline thru mobile devices.

Disadvantage:

- Areas of usage are rather limited still.

Homeplus: Tesco Homeplus operating in South Korea is started to be used in Subway system in order to increase number of customers. You can shop at virtual market stands located in subway stations. You can buy and pay for it by getting read QR codes of products thru using applications installed on your cellular phones. Products you have bought will be delivered on the day and at the hour you have been decided [40].

PayPal: (Section 4.3.2) It can work on mobile devices have been installed IOs, Android and Windows Phone operation systems. By installing PayPal mobile application on your current mobile device, you are free to go and conduct or demand money transfers thru the system. Turkish Language support is also available for application. Beside that even you do not have PayPal Mobile installed on your mobile device you can still carry out your shopping activity by using payment pages customized for mobile devices [41].

5.4.2 Invoicing to network operators

This fast, easy and secure mobile payment system is provided by GSM operators and allows you to make your payments for services and products you have been buying over your GSM invoice or credits left on your GSM line. Considering there is 6 billion cellular phones subscribers globally that it appeals to a huge market.

In this type of payment systems customer forwards his invoice for his shopping activities to his contracted GSM operator. Customer make his payment by a SMS confirmation sent in to his cellular phone regardless he has postpaid line contract or prepaid line with his GSM operator. For customers with postpaid line contract amount for shopping activity reflects onto monthly invoice. If it is prepaid line amount deducted from valid credit on line. For security reasons it is usually set for a higher limit. This limit can be set for each transaction or on monthly total amount.

This type of payment systems mostly is preferred to use on betting sites, gaming sites, file downloading sites or dating and cheating sites. Also it is utilized often in the sectors selling cheaper products and services as well.

Advantages:

- To get into the system current cellular phone is good enough. There is no need for additional cost for a new generation phone,
- Usage is rather easy and fraud risk is minimized so it is more secure,
- Puts away the necessity for carrying a wallet for shopping activities. It also eliminates the necessity of having change money on.

Disadvantages:

- Difficulties may occur in reimbursing false transactions or return services and products already have bought,
- Fixed deductions may be applied by network operators and confirmation messages thru SMS are not free, either.

Micro Pay/3Pay: Micro Pay which is operating in Turkey is serving to mobile device users wanting to make their payments thru cellular phones. Micro pay works with all GSM operators in Turkey, recently.

There is no need to be member or conducting any other necessary procedure for enrolling into system. This feature makes the system practical for small amount of payments. One other advantage of the system is due to high cellular phone usage in Turkey so its potential customer group is rather high [42].

Boku: it is one of the largest companies globally in the aspects of charging to operator system. System is quite easy, fast and practical. In buying procedure choose Boku pay by mobile. Cellular phone number must be entered in designated area. In reply to incoming SMS message answered as "Y" and thus payment process is been finalized. Payment reflects on your cellular phone bill [43].

5.4.3 Card reader systems

In this type of payment system, an external card reader apparatus is installed on mobile device. Thru this apparatus credit card or bank card is read and thus money transfer is ensured.

This system is useful for small companies which do not have a POS machine to use for their sales. Beside that system also can be used for Money transfer between individuals.

Advantages:

- It is practical and easy to use system for vendor without POS machines,
- Can be used in anywhere and it is secure.

Disadvantages:

- It is not much suitable for large amount payments and large companies,
- Vendors may apply deductions at varying rates and these deductions may be quite high.

Square: this firm was established in May 2010 grew in time at mobile payment field. The firm has been grown considerably with Starbucks' investments in 2012 and opens an easy and practical path for mobile payments on mobile devices with its newly developed apparatus in the field.

The apparatus (Figure 5.6) newly brought in to use plugged into earphone socket on iPad, iPhone and mobile devices with Android operation system and make this devices function as POS device. In transaction process, you can enter a PIN number or you can sign by touching mobile device if you like for safety reasons. Square company collects 2. 75% for per transaction in that recently used system in USA [44].

Figure 5.6 Square Card Reader Apparatus

PayPal Here: it is mobile payment system launched by PayPal (Section 3.3.2) to compete Square system in the market. Having seen Square's success in the market PayPal also has brought a similar apparatus (Figure 5.7) in use for money transfers between companies and individuals. It can work on Android and iOs based devices. We may see this apparatus in Turkey in the future considering PayPal has operation Office in our country. For the record, PayPal Here for Europe differs from US version. Reason for that may be the better advancement of chip and PIN systems in Europe [45].

Figure 5.7 PayPal Card Reader Apparatus

5.4.4 Contactless card payments

Contactless card payments are accrued by establishing an encrypted communication between the chip on card and reader apparatus. Transaction time is rather short. It may be featured on bank cards or credit cards as a function. Besides that different versions that can be used at taxi, schools or at ticket counter in daily life as well.

Advantages:

- Chips on cards are protected against cloning by superior level of technology,
- Usage is quite easy and fast,
- Areas of usage are quite in wide range and it is suitable for small amount of payments.

Disadvantages:

- It is not suitable in full payment of balance of payments in large amount. Usually requires spending limits,
- All cards administered separately; no centralization exits.

Octopus Card: it is the worlds' first contactless smart card to our knowledge. Its first usage goes back to 1979. Initially, it started as full automatic wage collection system in the beginning. Later on five shipping company in Hong Kong, it was established Creative Star LLC in 1994. It is officially announced in 1997. Later it took the name of Octopus Card in 2002.

Only one card allowed the users getting service thru multiple transportation companies. In time Octopus Card grew to be able to be used in every aspect of life. At schools, in parking lots, in transportation, food markets, in vending machines, fast food restaurants, are clothing shops, on public phones etc [46].

Figure 5.8 Octopus Card Types

5.4.5 Mobile device payments with NFC technologies

NFC is a hardware type that it may be already integrated to mobile devices or can be used as add-on later. It is possible to send out and receive payments thru NFC installed on cellular phones. It is accepted that NFC technology is a promising type of mobile payments of the close future.

Advantages:

- Expedites the payment process and shortens the time for it, thus it eliminates the necessity of waiting in line for multiple transactions,
- Opportunity of quick response in the case of cards theft,

- Fast and easy processing for obtaining backup copies,
- Benefiting from advantages of keeping all credit cards, bank cards and loyalty cards in the same portfolio thus convenience payment management is enabled.

Disadvantages:

- NFC Network is not widely known in terms of usable pay points, cellular phones and other mobile devices.

Google Wallet: It is a NFC supported mobile payment system that issued by Google in May 2011. It is necessary to have NFC specific cellular phone in order to be able to use Google Wallet [47].

5.5 Summary and Comments

In this chapter mobile commerce and mobile payment systems were surveyed. Status of mobile commerce in the world and in Turkey was investigated. Some predictions about future were generated from the studies about the future of mobile payments.

Types of mobile payment systems were examined and illustrated through examples for all categories from the World and Turkey. Advantages and disadvantages of each category were listed. In the next chapter, Chapter 5, NFC technology and mobile wallets will be addressed.

CHAPTER VI

NFC-SUPPORTED MOBILE WALLETS

When mobile phones were released in the earlier stages, they were used in order to establish voice and text communication. Over time, applications running on smartphones were begun to develop. However, mobile phones have already been started to be used in many areas of daily life. One of these areas is the payment systems.

With increasing technological advancements and innovations, mobile devices have been started to be used for mobile financial transactions including sending money, taking money, paying bills, etc. In short, thanks to mobile devices, we are able to shop and make payments without the need to carry cash, credit card or debit card to make payments and shop.

6.1 Mobile Wallet

For many years people have used physical wallets. They put their cash money, credit cards, identity cards, etc. a lot of personal cards in these wallets. However, as technology evolves, storing all possessed cards in a single place become harder in the aspect of management them for most people. Instead, a need for a structure that enables you to store all cards in a central place and using them conveniently, fast and comfortably when there is need. Mobile wallets are applications that are worked on mobile devices for mobile financial transactions [48].

Mobile wallets and digital wallets are quite similar. However, as a difference in mobile wallets, we can carry mobile wallet in our pockets as integrated into a mobile phone similar to a physical wallet. We can use loyalty cards given by the companies when shopping. They have given companies use loyalty cards when shopping. Likewise, we can make payment through bank or credit card which one we prefer at the sale point. You can use your mobile wallet for entering the workplace, the car park entrance, metro, public transport and the places where id controls are

performed. You can buy concert tickets through your mobile wallet and you can check your concert tickets via your mobile wallet at the entrance of the concert. Mobile wallets continue to enter more rapidly in many areas of the daily life.

Mobile wallet is a new generation mobile payment application and such kind of usage is more functional in comparison with using a traditional wallet. Mobile devices can be used for mobile financial systems with their hardware and software included in them.

Advantages of using mobile wallet:

- Decreases usage of cash,
- Provides comfort of use and rapidness,
- Is in a more manageable structure in comparison with a physical wallet,
- Reduces problems encountered due to lost or stolen. Mobile wallet can be blocked immediately being noticed early on.
- Can be used not only in the field of payment systems, but also for electronic entry and exit systems.

Disadvantage of using mobile wallet:

- Concerns about using mobile wallet for consumers,
- Existence of a common standard for mobile wallets prevents rivalry among GSM operators and financial institutions.

The first known applications of mobile wallets are occurred by Bank of Penjab in India in 2002 and NTT DoCoMo companies in Japan in 2004 to our knowledge.

NTT DoCoMo started to distribute devices including FeliCa contactless IC chip, in cooperation with Sony. With this chip, it enabled to addition of mobile wallet feature to mobile devices in Japan [49]. In the survey that Jupiter Research has made in 2008, NTT DoCoMo played a leading role in the Asia continent by reaching the figure of 15 million subscribers.

There are many concerns about mobile wallets because of privacy and security. Stakeholders in this system can access personal data including privacy. Precautions taken against the scams and fraud in this system will be important. Some precautions must be taken for safety. For example, entering a pin code to open the phone and every single shopping may be made compulsory; also, it is necessary to determine the limits of the responsibility of the consumer [50].

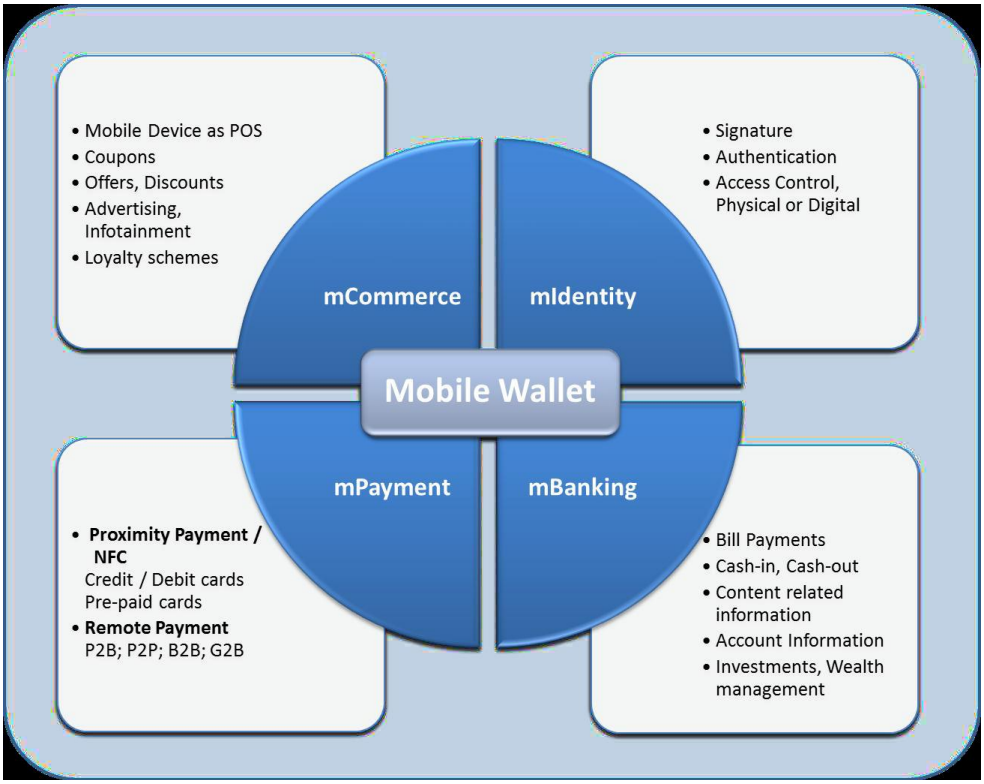

Figure 6.1 Mobile Wallet: Content and Visualization [51]

6.2 Mobile Banking

Banking has an important role in payment system and financial systems. In the first years that internet begun to develop, a new service occurred in the Banking sector with the name of Internet Banking. Increasing usage of computer, some problems existing in the bank branches sped up the process. With Internet Banking, customers started to be able to get service without being limited within certain hours. The name of the service model that customers can utilize banking services 24 x 7 is the Internet Banking. In mobile banking, customers get financial services such as internet banking services by way of mobile devices [52].

In the past, Banks used mobile devices in order to inform customers through SMS-style ways and for phone branches. With developments in the field of technology, Internet Banking has given rise to a new service from inside of itself. It is one step further of Internet Banking. It is unique not only in order to reduce transaction costs but also offer the possibility of a different easy usage to customer group.

With this new financial service, banking transactions became accessible from anywhere and at any time. Service of accessing and transacting banking and financial services by using mobile devices (mobile phone, tablet etc.) are defined as mobile banking [53].

Reasons for development of Mobile Banking:

- Increasing usage of mobile devices,
- Demand of people to communicate from everywhere and at any time,
- Developments of software in the field.

Mobile banking in Turkey is developing rapidly. According to report published by the Banks Association of Turkey (TBB) [54], number of customers using mobile banking in Turkey is closer to 3 million (Table 6.1). As it can be understood from the report that number will increase further in parallel with the increase of usage of mobile channels and banks using these channels will increase further.

Table 6.1 Turkey mobile banking data from TBB [54]

	Number of Turkey Mobile Banking Customers		
Period	Number of customers that login least one time in system	Number of customers that login least one time in system in the last one year	Number of active customers
March 2012	1.444.835	778.603	554.982
June 2012	1.717.298	998.857	693.262
September 2012	2.003.909	1.260.177	889.292
December 2012	2.513.666	1.815.022	1.402.938
March 2013	2.930.437	2.134.541	1.582.503

6.3 RFID

History of RFID (radio frequency identification) technology extends over 1960s. It is a technology that was used in the U.S. Defense Industry. Reason for that has not been used until recent years is its relatively expensive costs and lack of a common reader standard.

RFID technology is a type of wireless data transmission. It reads data from RFID tags by capturing radio waves [55]. It is used in diagnosing and monitoring objects from a certain distance without touching. For example, Rapid Passing System (HGS) which is used for collection of fees and diagnosis of objects in the freeway lanes in Turkey utilizes RFID technology.

RFID structure consists of 4 parts. These are RFID Tags, RFID Antenna, RFID Reader and Middleware.

RFID Tags is the place where information about the product or object it is attached is stored. Such tags are used for warehousing and sending data stored electronically. They can be in different shapes and sizes. They can be used for long term. They are divided into 3 groups according to energy sources [56].

Passive Tag: there is no energy source on it. It provides required energy source from the magnetic field coming from the reader. As well as its communication distance with reader is short, generally they are used in product tracing in ware-house style places.

Active Tag: as a difference from the passive tag, it has a settled power supply on it. They perform data interactions with each other by using the power supply. Despite its high cost, they are preferred in the applications requiring performance.

Semi-Active Tag: this type of tag also has a power supply on it likewise active tag. Although it is less than active tag, it enables to run faster in comparison with passive tag.

RFID antennas enable communication between reader and tag by means of radio frequencies they issued. These antennas may change according to distance and type of application they run in.

RFID Reader and Writer. They are used for the purpose of communication. RFID readers take information about the tag by reading signals coming from antennas located on RFID tag. RFID writers are used to write the requested data requested in the tags.

Middleware**.** In order to run projects in which RFID is used, there is need for middleware software. With this software, firms make the necessary reports and studies. This software is often designed specifically for firms because they are determined in accordance with company-specific needs.

6.4 NFC

NFC is not a physical product alone; it is a name given to a technology standard. NFC standards are developed by an organization named NFC Forum in 2004. This institution is an organization without any profit motive. NFC standards are open to general public. Anyone who wants to have them can reach these standards. Although it was established by only three firms, in time some other large firms such as Microsoft, NTT DoCoMo, Intel Corporation, Google, Corporation, MasterCard, Visa, etc. has joined to this organization.

Technology of NCF provides the electronic devices to communicate each other safely and quickly at close distances. NFC is a short-distance non-contact technology standard designed for two electronic devices developed by NXP, Sony and Nokia in 2004 at first place to communicate in an easier and safer way. It was developed with the help of the RFID technology [57].

Figure 6.2 NFC Technology

NFC is a safe and contactless communication standard between electronic devices in a 0 – 10 cm distance. Maximum data transfer rate is 424 kb/s. It works on a direct electromagnetic field induction between two devices [58]. Two-way communication is feasible. It is compatible with ISO 14443 standards. Within this standard, it is generally included in the group that defined as contact-free over radio waves which is known as RFID (Section 6.3).

6.5 Application of NFC Technology

Application areas of NFC technology are quite wide. In addition, the number of mobile devices that supports NFC is increasing day by day. On the other hand, there is not an extensity desired.

Safe element is a place on NFC devices in which payment and other sensitive information is kept and hence requires safety. There was an argument about the place to where the safe element should be installed. Mobile device manufacturers argued that this should be in a built-in device while GSM firms insisted on mounting this in the Subscriber Identity Module (SIM) card. Even though the GSM firms seem to be one step ahead, there are examples of it that are kept in Micro SD cards. There are three phase in the NFC transition process [59].

6.5.1 Embedded in mobile phone

There is no built-in NFC support in all of the mobile devices in the market for now. The reason can be said as that the argument about the place to where the safe element should be installed has a negative effect on this topic [60]. According to a research conducted by BERG Insights, there will be a built-in NFC support in the period from 2012 to 2017 in the on third of the mobile phones in use [61].

6.5.2 Sim card based NFC

In case there is no NFC support on the mobile phone used, this technology can be acquired by using a NFC compatible SIM card. SIM cards are smart cards that can be used on phones. In these SIM cards, there a memory space which is reserved for NFC. SIM cars establish the connection via NFC controller [62].

It can be used with a SIMPlus 64 or a higher version provided by Turkcell which is a leading firm in the field of NFC in Turkey. Similarly, there is a NFC supported SIM card of AVEA in the Turkish market.

6.5.3 Micro sd card based NFC

Even if there is no NFC support on the mobile phone and NFC supported SIM card, NFC technology can be used with mobile phones. This can be done by using a NFC supported Micro SD card installed on the mobile phone. Similarly, there is a space for NFC in these Micro SD cards as NFC supported SIM cards (Figure 6.3).

Figure 6.3 The Mobile Security Card features integrated NFC capability [63]

6.6 Advantages and Disadvantages of NFC

The aim of developing the NFC technology is to transfer small amount of data with a high level of security. In recent years, NFC technology is becoming more popular. One of the motivations for this is that NFC technology offers a number of improvements and advantages that can change daily life. These advantages apply not only to the customers, but also traders and other financial intermediaries. The advantages and disadvantages of NFC technology are listed as follow [64].

Advantages:

- **Easy use:** a NFC-enabled mobile wallet increases shopping pleasure and saves time. It provides for the user a fast and easy to use. Processing speed is 100ms,
- **Safety:** NFC provides a transaction safety with two-way and short-range operating range. It works with a frequency of 13.56 MHz which is reserved for only NFC technology products; this is specified on standard ISO14443. It supports additional security measures such as optional pin codes for transactions,
- **Mobile Wallet Feature:** NFC supported mobile devices can be used as physical wallet in a scale. ID cards, credit and debit cards, tickets and coupons, transportation cards, etc. can be added in this mobile wallet,
- **Versatility:** NFC has the potential for widespread use in various industry areas,
- **Being Open Standards-Based:** NFC standards are developed by organizations without any profit motive. Anyone who wants to acquire these standards can have them,
- **Interoperable:** It is compatible with the current contactless card technologies.

Disadvantages:

- **High Power Consumption:** It causes the battery life to be consumed more quickly. There is assertion that Apple does not prefer this technology on its mobile wallet application for this reason,

- **Low Penetration Rate:** It still has not reached the desired level especially in mobile cell phones.

6.7 NFC Ecosystem

NFC applications and products offer a wide range of potential usage. NFC forum [65] refers this wide range as "ecosystem" term. The growth of this ecosystem and satisfaction of the expectations can be achieved by co-operation of all the system actors. NFC ecosystem involves mobile operators, retailers, banks, mobile device manufacturers, software developers, individuals who have NFC supported smartphones, etc. Followings are some of the areas of use:

- Access control systems,
- Logistic systems,
- Payment and financial systems,
- Customer electronics,
- Retail trade, (as loyalty cards and gift vouchers)
- Information gathering and information-processing, data transfer.

Among this entire NFC ecosystem, payment and financial systems are the one that attract people's attention at most. However, feeling safe and practicing transactions without taking any financial responsibility give the signals of that some other fields such as online ticket purchasing will develop faster in this ecosystem.

In order to increase the efficiency of different units in the NFC ecosystem within their associations with each other, there is TSM (Trusted Service Manager) service provider to maintain communication. In Turkey, BKM acquired the TSM certificate in 2012 after meeting the infrastructure requirements. TSM service provider provides this service aerial safely [66].

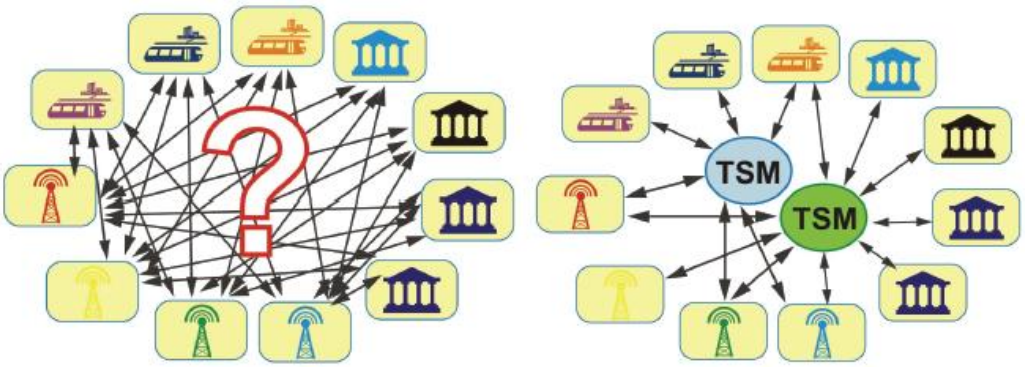

Figure 6.4 The main TSM-goal. [67]

6.8 NFC Supported Mobile Wallets

Many companies are investing on mobile wallets; examples include Google and Isis. There are numerous studies carried out regarding contactless payment by utilizing NFC technology in particular.

However, these studies alone are not sufficient for the development of NFC supported mobile wallets. Many stakeholders in the NFC ecosystem are obliged to be involved and support transactions as maintained by TSM. At the same time technology companies are optimistic about NFC technology. Information about major companies which support this technology all over the world and their products are given as follow:

Google Wallet: it should not be surprising that the world giant, the Google Company is involved in this area the way it is involved in other areas. Google Company has produced a mobile wallet in order to take physical shopping into a mobile realm. This service became available in the USA on the 19th of September 2011. At the moment, the service is free of charges and although it is only available in the USA, it is expected to become available to other countries, soon.

Figure 6.5 Google Wallet Logo

It is operable on Android operation system and NFC supported smartphones. It is possible to supplement it with bank and credit cards and discounts and offers are viewable.

Visa PayWave Mobile: one of the major companies' in this area is the Visa Company. Visa PayWave has been already on the market with its contactless technology before the NFC. With PayWave Mobile it has launched a new product which is operable with NFC supported mobile equipment [68].

The Visa Company has a serious cooperation with Samsung, world leader in the manufacture of smartphones. This cooperation resulted in some smart Samsung trademark devices being equipped with PayWave or the 2012 London Olympics. Awareness was created by establishing 140.000 contactless shopping points in London [69].

Figure 6.6 Visa PayWave mobile wallet sample payment image

Actually, the Samsung Company already owns a mobile wallet supported by NFC in this area: the Samsung Wallet. However, competition in the sector enabled Visa Company with its expertise in terms of payments and Samsung Company with its expertise in mobile devices and NFC technology to come together.

In addition, the Samsung Company also manufactures programmable NFC labels for supplementing NFC support to devices without NFC support. It is believed that more mobile devices will adopt NFC technology with these labels which are marketed under the name TecTiles for approximately $15 [70].

Isis Mobile Wallet: this application emerged in November 2010 with the cooperation of Isis Company Verizon, AT&T and T-Mobile companies. It enables the use of smartphones in the manner of a mobile wallet by providing NFC support service at payment points.

Figure 6.7 Isis Wallet Logo

6.9 NFC Trials in Turkey

Studies related to NFC are also carried out in Turkey as they are in the world. Although NFC technology enabled devices can work without SIM cards, the GSM companies in Turkey have a pioneering role in this area; Turkcell is notable among these companies.

Turkcell Wallet: Turkcell Wallet is a product of Turkcell Company in this sector. The service which incepted its services in April 2011 under the name CepT Wallet later renewed its name as Turkcell Wallet. You can start to use the Turkcell Wallet with a 256KB SIM card and NFC supported mobile phone. If your SIM card has less than 256 KB capacity, you can upgrade it to a 256 KB NFC supported SIM card for 30 and 40 TL [71].

Figure 6.8 Turkcell Wallet Illustration

The activities which can be performed with the Turkcell wallet:

- You can introduce your bank and credit cards to your mobile wallet and shop,
- You can transfer money, supplement your phone balance and pay bills,
- You can exploit location based discounts and opportunities,
- Purchased coupons and tickets can be carried in the wallet and used without contact when necessary,
- You can shop by using your phone number even if you do not have a defined credit card, because you can upload money onto your Turkcell wallet.

Avea Wallet: this is the mobile wallet application of the Avea Company. It requires a 356 KB SIM card. A postpaid Avea Wallet for an Avea Wallet with a 356K SIM card can be purchased for 19TL, a prepaid one for 35TL, an Avea NFC Antenna for 29 TL while a SIM card and antenna can be bought for 39TL. It is possible to pay with an Avea Wallet defined credit cards in places of business with MasterCard PayPass and Visa PayWave logos in Turkey and the rest of the world.

Figure 6.9 Avea Wallet Logo

BKM Express Mobile: this service has been introduced in July 2013 and can be downloaded from Apple Store at the moment. It features money transfers and iOS based mobile payment options.

Actually, it is not considered a comprehensive mobile wallet application. It can be considered to be the first step in the mobile transition process of the existing BKM digital wallet. At the moment it benefits NFC technology. However, it has the potential to generate numerous innovations during the future years for the benefit of "the national wallet" which is one of the targets of BKM [72].

Urfa Card: since April 2013 Turkcell Wallet users – via the municipality in Şanlıurfa, have introduced the Urfa Card to their NFC supported mobile phones and load a balance and use it on public transport vehicles. This is another example of a GSM company being a business partner.

CHAPTER VII

CONCLUSION AND FUTURE STUDIES

7.1 Findings

(1) Adopting e-commerce is becoming an expectation rather than a luxurious and risky attempt in the business

Naturally, the companies are competing to survive on the market; with the convincing widespread of e-commerce adoption in the business, the companies can hardy avoid this change. Similar inclination is commonly observed in Turkey (Section 2.3.6) as well as in countries such as EU members, USA and Asia Pacific Countries; as a strong part of the e-commerce, card based payment systems prove themselves in the sector at Turkey (Section 4.3.1). This change, rather than a transformation, requires not only software but hardware, network and legislative infrastructure.

(2) Payment systems show considerable changes in e-commerce

Payment systems are getting more electronical especially in the last two decades. With the changing expectation stated in finding (1), the payment systems gain more importance while face-to-face commerce is no longer the only way to shop. Apparently, authentication and security save their places through discussions to secure transactions.

We found out that there are many options in the payment systems (Section 2.6); the variety gets more with the wide spreading of the electronic payments (Sections 4, 5).

(3) A relatively new type of commerce platform, m-commerce, is on the rise.

With the mobile phones getting more accepted by the society and improvements in the connectivity coverage and speed, m-commerce is born. With this new change, new financial services emerged, apparently.

As we have found in sections 6.8 and 6.9, there are lots of considerable works pointing the huge potential in the sector both in Turkey and the rest of the world. This type of commerce is not the dominating one among the others; however, the projections show that m-commerce will improve in the close future; recent marks include Asia-Pacific region (Section 6.2).

(4) Mobile wallet is taking its share from physical wallet, seriously.

We have found out that there are considerable commercial activities that we can conduct with your mobile phones (Section 6.1); hence, mobile phones can share the load of physical wallets, easily. A remarkable example is that, the variety of credit and ATM cards that we carry in our wallets can be merged into our mobile phones; the example becomes more considerable with the addition of mass transport, loyalty and smart cards.

(5) SIM cards are not enough for every mobile commercial transaction.

The finding (4) informs strong inclinations in the m-commerce; however, SIM cards and regular mobile phones which are not smartphone have limitations in further transaction varieties; hence, a new technology, NFC (Section 6.4), promises improvements in the contactless payment systems and increasing usage area of mobile phones in the m-commerce.

7.2 Limitations

(1) Collecting data from companies

As a limitation to findings (1), (2) and (3), we have excluded any data collection that requires unstructured/semi-structured and/or structured interviews, surveys from the market to monitor daily comments of the GSM, bank, and financial organizations.

(2) Adopting NFC technology in mobile devices

The technological and organizational requirements to adopt NFC technology are not investigated in depth. The limitation also includes embedding NFC technology into SIM and micro cards so that the technology becomes more available with the older mobile handsets. This is a limitation of the finding (5).

(3) Business modeling

The findings (3), (4) and (5) point the rise of the m-commerce; however, we exclude recommendation of any business process modeling and engineering in such a change. For example, the parties in the NFC technology enabled transactions are not investigated in the NFC ecosystem.

(4) Acceptance of NFC technology enabled m-commerce by the society

The finding (5) remains valid as long as NFC technology enabled devices are adopted on the market; hence, a limitation that market research will be beneficial, exists.

7.3 Future Studies

(1) Conducting surveys

To overcome limitation (1), we recommend data collection through semi-structured interviews with key informants. Such a work would complement the current thesis and inform the audience on the close future of electronic payment systems.

(2) Investigation of the NFC technology

As limitation (2) states, the integrity of the NFC technology into the mobile handsets is a further research avenue. A supplementary study in the electronics engineering would strengthen the research. By this way, the reluctance of companies such as Apple, against adopting NFC technology can be understood better.

(3) Investigating business cases

In parallel to the future work (2), investigating NFC technology adoption on the business side would add project and business management to the research to address limitation (3). Seeking answer to the Apple's reluctance only on the technology side can be easily a big mistake. For example, the company is heard to apply for patent enquiries for similar technology.

Hence, a business modeling and management research can be a potential follow-up study. Such studies can reveal more on the market potential of m-commerce.

(4) Social investigation

NFC is a rather new technology; hence, it is not so clear about its future. To be more certain that the devices that adopt this technology will take their shares on the market, detailed technology acceptance model [73] and diffusion of innovations [74] can be drawn to investigate marketing opportunities and potential problems. Such a work can address the limitations (3) and (4).

(5) Other technological tools in the electronic payment systems

This thesis does not investigate all the payment systems in the world; it is limited to most commonly used ones. There are also other tools used in the area; examples include biometric devices such as facial, finger print and palm recognition systems. Such systems are still in try-and-see stages when compared to the payment systems we have mentioned in this thesis. Still, it must not be surprising to see such applications in the future; hence, adopting such technologies can be a potential future work to encourage research-and-development projects

7.4 Conclusion

As findings (3) and (4) show, asynchronous payment systems are getting smaller share in the payments but they are still too alive to disappear. Meanwhile, we will observe more variety in the online payment systems hence in m-commerce.

With the current capabilities, SIM cards are not enough for a larger variety of applications; however, NFC technology is still cutting edge hence it is not so commonly used either.

We still are careful that it is still too early to claim the mobile phones as 100% substitute of physical wallets as discussed in finding (5) and limitation (4).

With such limitations and findings, we can confidently approach the research question,

“Can e-commerce expand more through additional technologies on the mobile devices?”

Mobile wallet and NFC similar technologies will be adopted in the mobile phones as the expectations of the society is getting more on the mobile and converged technologies.

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APPENDIX A

CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name : ÖZBEY, Engin
Nationality : Turkish (TC)
Date and Place of Birth : 25 November 1977, Kars
Marital Status : Married
Phone : 0505 826 99 49
Email : enginozbey@cankaya.edu.tr

EDUCATION

Degree	Institution	Year of Graduation
MS	Çankaya Univ. Information Technology	2013
BS	Anadolu Univ. Faculty of Business Administration	2005
High School	Sorgun Lisesi	1994

WORK EXPERIENCE

Year	Place	Enrollment
2003- Present	Çankaya University	Technical Staff

FOREIGN LANGUAGES

Intermediate English

HOBBIES

Table Tennis, Travel, Internet