

UNIVERSITY OF LJUBLJANA
FACULTY OF ECONOMICS

MASTER'S THESIS

**DEVELOPMENT OF E-BANKING IN CENTRAL ASIA: CASE OF
TAJIKISTAN**

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INTRODUCTION

Electronic banking (hereinafter: e-banking) is the newest delivery channel of banking services (Kelvalkar, 2013). Its definition varies between researchers partially because e-banking refers to several types of services through which a bank's customers can request information and carry out most retail banking via computer or mobile phone. Clarke and Shah (2009) described e-banking as "the provision of information about a bank and its services via a home page on the World Wide Web (hereinafter: WWW)". Keivani, Jouzbarkand, Khodadadi, and Sourkouhi (2012) described it as "an umbrella term for the process by which a customer may perform banking transactions electronically without visiting brick-and-mortar institutions". Burr (1996) described it as "an electronic connection between the bank and customer in order to prepare, manage and control financial transactions". Morten, Niels, and Mie (2004) defined it as "web-based banking". Mobile banking (hereinafter: m-banking) means that users that adopt mobile terminals to conduct payment such as balance inquiry, transference and bill payment at anytime from anywhere (Dahlberg, T., Mallat, N., Ondrus, J., & Zmijewska, A., 2008). It was described in Investopedia (n.d.) as "the act of doing financial transactions on a mobile device (cell phone or tablet)". It was described in investinganswers (n.d.) as "it refers to the use of a smartphone or other cellular device to perform online banking tasks while away from the home computer, such as monitoring account balances, transferring funds between accounts, bill payment and locating an Automated Teller Machine (hereinafter: ATM), etc". Hoehle and Eusebio (2006) defined it as "a channel whereby customers interact with a bank through a mobile device (e.g. cell phone or Personal Digital Assistant (hereinafter: PDA))".

In 1990s banks realized that the rising popularity of the WWW gave them an added opportunity to advertise their services. Initially, they used the Web as another brochure, without interaction with the customer (Mulligan, 2014). Early sites featured images of the bank's officers or buildings and provided customers with maps of branches and ATM locations, phone number to call for further information and simple listings of products (Keivani, F. S., Jouzbarkand, M., Khodadadi, M., & Sourkouhi, Z. K., 2012). According to Goi, C. (2007) banks replace some of their traditional functions to e-banking for two reasons. "First, it was quite expensive to open new branches and maintain with them. Second, e-banking products/services like ATM and electronic fund transfer were a source of diversity for banks that utilized them". With the development of e-banking, banks can concentrate on customers' needs in order to gain the competitive advantage. E-banking must be secure and easy to use (Hertzum, M., Jørgensen, N., & Nørgaard, M., 2004).

Nowadays with the amazing speed e-banking is developing. "Along with international economy development, banks have also made fast changes influenced by technology development that has broken down the geographical borders have introduced new products, services and also market opportunities and hence has developed commercial processes based on innovative information" (Manesh, A. S., Mohamadi, F. S., & Kiani, A., 2013). Increasing using the advanced Information Technology (hereinafter: IT) and communications systems in the banking industry and moving towards e-banking, most of the traditional banking activities have been terminated and this field has been converted to information process industry that its activities are based on new concepts like e-money, ATM machines, sales terminals etc. Every day all over the world and in Tajikistan are particularly increasing the number of computers connected to the internet. However, increase in the number of electronic transactions is limited by significant gaps in the legislation in Tajikistan, especially citizens' mentality, lack of readiness of financial

institutions and other problems of the economy (Lucock, D., Okeefe, G., Fatkullina, G., & Mueffelmann, S., 2013). Furthermore, the commercial banks maintain a certain percentage of distrust of the latest internet technologies. This is largely due to the lack of a clear and generally accepted precise economic impact assessment mechanism of the introduction of new remote maintenance systems. Since the most serious actions in e-banking in Tajikistan are ATM installation, various e-banking services (services using telephone, internet, and cell phone), issuing different e-cards (debit card, credit card, and e-money), and installing sales terminals and branch terminals, therefore the subject to be studied in this research is the effect of each of the mentioned parameters and equipment on Tajikistani Banks' profitability (National Bank of Tajikistan, n.d.).

What are the internet and its role in banking? The internet is the global system of interconnected computer networks that use Transmission control protocol/Internet protocol (hereinafter: TCP/IP) to link billions of devices worldwide (Slevin, 2001). The e-banking services are provided through the internet. **Internet penetration of Tajikistan is 19.5%** which is very low if compared with other Ex-Soviet Union countries. Let's take Russian and Uzbekistan as a sample, internet penetration in **Russian is 71.3%** and in **Uzbekistan 51%** (Internet Live Stats, 2016). I took as samples for checking the internet penetration the countries of Ex-Soviet Union countries because Tajikistan has some similarities in a culture and they also got their independence after collapsing the Soviet Union. However the mobile penetration in Tajikistan is quite high in 2014 it reached 138% (Atoev, A., et. al, 2015).

The majority of the banks in central Asia are just offering the basic e-banking services (ATM, smart card, phone banking, home banking, and internet banking) compared to those of developed countries. Tajikistan is one of the countries in central Asia, and it would be very interesting for me, and also due to my Tajik heritage, to work in a one of the interesting topic – “Development of e-banking in Central Asia: Case of Tajikistan”. Cases of developed and developing countries and banks will be used as a benchmark, and through their examples, I will show the state of existing development of e-banking in Tajikistan.

The purpose of this thesis is to explore “Development of e-banking in Central Asia: Case of Tajikistan”. To achieve this goal I will answer the following research questions:

- What are the current developments of e-banking in Tajikistan? Which are e-banking services more demanding?
- What motivate financial institutions in Tajikistan to offer e-banking? What are the main obstacles for further providing and adoption of e-banking? Which obstacles should be eliminated in order to convince the customers about the advantages of using e-banking?
- Which factors influence the customers' propensity to use e-banking as a primary banking? What are the main characteristics of the heavy users of e-banking? What would encourage customers to use e-banking?

In this master thesis, the descriptive and quantitative research methods will be used together. The descriptive research will be used to better understand and clarify the concept and different approaches about the e-banking, and to show the importance of this service on the literature on/comprising this topic. I will use the quantitative method to find numerical and statistical data and analyze and interpret them.

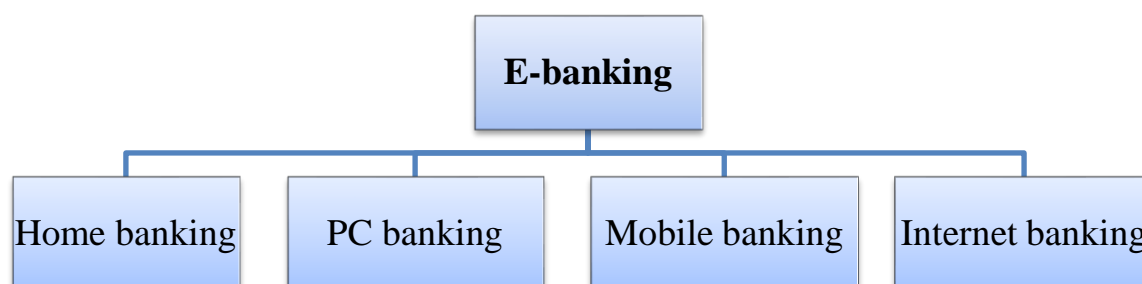
All the data, including answers to the research questions, will be collected from the sources of books, international articles, journals, online databases of international organization such as World Bank, WTO, etc. working, the databases of statistics committees of Tajikistan, e-libraries, different online web pages for financial and economic reports, and other sources and online databases. All of the used sources will be in the international language English.

This master's thesis is structured in five chapters: theoretical, technical, cases, e-banking development in Tajikistan, and recommendation. In the first chapter, I will describe theoretical part of e-banking on existing and professional literature and studies related to the e-banking. The second chapter would deal with e-banking technologies. The third chapter deals the real cases about the implementation of e-banking services and its technologies in developed countries and undeveloped countries. The fourth chapter covers the development of e-banking in Tajikistan. The fifth chapter will cover suggestions and recommendations for further improvement of e-banking services in Tajikistan.

1 BACKGROUND OF E-BANKING

With the development of new technologies, special the internet in the past years, the structure, and nature of banking have been changed. E-banking is the newest delivery channels of banking services (Kelvalkar, 2013). Its definition varies between researchers because it refers to several types of services (cards, home banking, Personal Computer (hereinafter: PC) banking, internet banking and mobile banking) through which a bank's customers can request information and carry out most retail banking via computer or mobile devices. Burr (1996) defined e-banking as “an electronic connection between the bank and customers in order to prepare, manage, and control financial transactions”. Shah and Clarke (2009) defined e-banking as “the provision of information about a bank and its services via a home page on the WWW”. Keivani, Jouzbarkand, Khodadadi, and Sourkouhi (2012) defined it as “an umbrella term for the process by which a customer may perform banking transactions electronically without visiting brick-and-mortar institutions”. Morten, Niels, and Mie (2004) defined e-banking as “web-based electronic banking”. The general definition of e-banking is “the provision of the retailer and small value banking products and services through electronic channels, in addition, large value electronic payments and other wholesale banking services delivered electronically” (Mulholland, J., & Haynes, K., 2003). Today's e-banking includes many different types of services as seen in figure 1 (Driga, I., & Isac, C., 2014).

Figure 1. Types of e-banking services



Source: I. Driga & C. Isac, *E-banking services – features, challenges, and benefits* 2014, p. 52.

Home banking: Liao, Shao, Wang, and Chen (1999) defined home banking as “the conducting of transactions and accessing bank account information via a PC”. It is based on the existence a PC, a modem, and a telephone line and in addition, specific banking application software has to be installed. It enables customers to get information about their accounts, transfer money within their accounts, to pay bills, and other complementary services from home. (Driga, I., & Isac, C., 2014).

PC banking: It is a kind of e-banking that enables customers to do banking transactions from a PC which has access to the internet, in addition, needs a software program. Nowadays most of the banks offer the customer an exclusive software program the customer requires to download a software program from the bank website and runs the program on his/her computer (Garg, 2013).

Internet banking: It’s also known as online banking, web banking, or virtual banking. Teo, Tan, and Thompson (2000) defined internet banking as “service which allows customers to perform a wide range of banking transactions electronically via the bank’s Web site”. Internet banking is more developed service that supports bank customers in accessing to their accounts, general information on bank products or services, and to do activities such as transferring funds, paying bills, viewing account balances, paying mortgages or purchasing financial instruments (Driga, I., & Isac, C., 2014).

Mobile banking: It’s also known as M-banking or SMS banking, this is the newest service that supports bank’s customers to do their financial truncations (transfer funds, pay bills and check account balances and other complementary activities) through the mobile devices (cell phone or tablet). In Investopedia (2016) it described as “the act of doing financial transactions on a mobile device (cell phone or tablet)”. Frist m-banking services were offered through SMS, with the introduction of smartphones and the Apple iOS and Google Android operating systems, m-banking is now mostly offered through applications as different to through text messages or even a mobile browser (Damopoulos, D., Kambourakis, G., & Gritzalis, S., 2013).

(ATM) / Point of sale (hereinafter: POS): ATM is also called automated Banking machine, automatic till machine or remote service unit is “computerized machine that permits bank customers to gain access to their accounts with a magnetically encoded plastic card and a code number. It allows customers to do several banking operations by themselves such as to withdraw cash, make deposits, pay bills, obtain bank statement, and effect cash transfers.” (Business Dictionary, n.d.). “POS is the place where sales are made. On a macro level, a POS may be a mall, a market or a city. On a micro level, retailers consider a POS to be the area where a customer completes a transaction, such as a checkout counter. POS is also called as a point to purchase. Any form of payment can be used like as cash, debit cards, credit card or mobile payments” (Investopedia, n.d.).

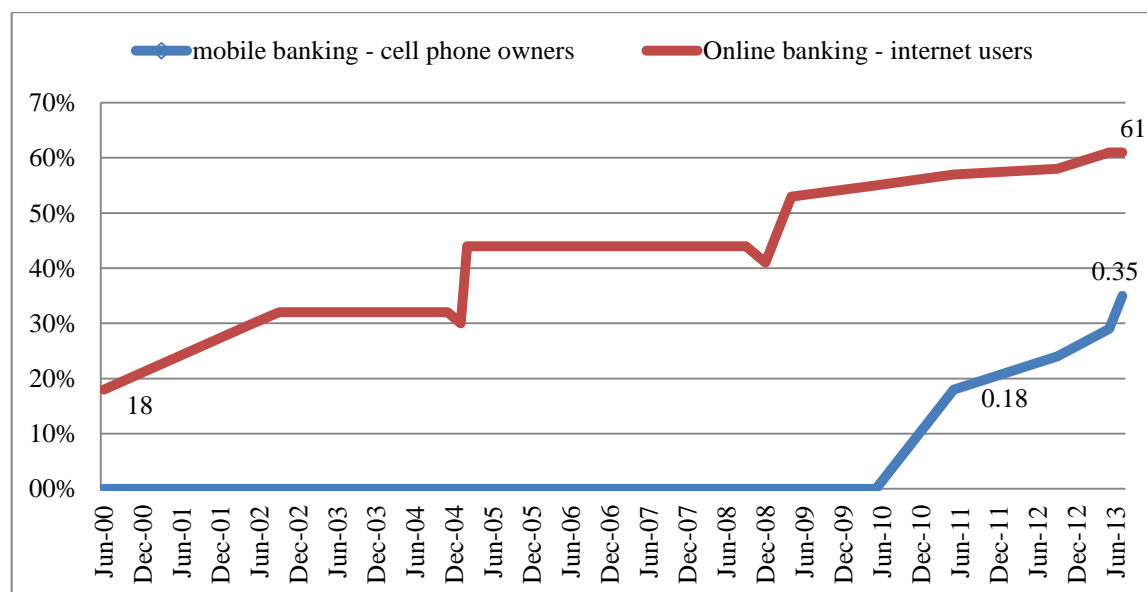
Cards: Debit card, credit card, prepaid card are banking cards enhanced with ATM and POS features which can be used at any location. It is a quick transaction between the holders and their personal account (Adeusi, 2015). A debit card issued by a bank is linked to an individual’s account, allowing funds to be withdrawn at the ATM and POS without writing a cheque. It provides instant access to customer money and is accepted worldwide (Caldwell, 2016). A credit card is borrowing money that is made available to the customer by a bank or other financial institution. The financial institution pays the debt to the

customer, and in turn, the customer pays the money back to the financial institution. Prepaid cards are reloadable cards that allow the customer to only spend up to the amount customer have pre-deposited into the account (Young money, n.d.).

1.1 History of e-banking

The history of e-banking started in the 1980s (Bashuri, 2016). In 1981 four major banks (Citibank, Chase Manhattan, Chemical Bank and Manufactures Hanover) in New York City of U.S. were offer the new way of doing business by providing remote services and gave an opportunity to their customers' available access to home-banking (Sarreal, 2016). In the United of Kingdom, the first home e-banking service is known as "Home link" and it was offered by the Bank of Scotland for customers of the Nottingham Building Society (hereinafter: NBS) in 1983 (Gonzalez, 2014). At first, customers didn't adopt the new methods so well that's way in 1981 the e-banking system failed but in the next innovation in the mid-1990s the customers adopted well. Stanford Federal Credit Union was the first financial institution in the U.S. to develop e-banking website in 1994 (Chang, B., & Dutta, S., 2012). At the beginning the Web was used as a new way of promoting banking services, so on the bank's website were possible only to get basic information like an image of the bank, a map of branches with ATM locations, and contact information (Bashuri, 2016). In 2001, Bank of America made a history to have more than 3 million or 20% online banking users (Sonia, 2016). Nsouli and Schaechter (2002) stated that "in 2001, e-banking was mostly widespread in Austria, Korea, and the Scandinavian countries, Singapore, Spain, and Switzerland, where more than 75% of all banks were offering this service". However in the U.S. e-banking were offering only in the largest banks, most of the consumers had an account in those banks that offered this service, but only about 6% of them were using this service (Havasi, F., Meshkany, F., & Hashemi, R., 2013). According to research by the Pew Research Canter in 2013, fifty-one percent of U.S. adults, or 61% of Internet users, was using online banking. Thirty-two percent of U.S. adults or 35% of cell phone owners were using mobile banking as seen in figure 2 (Fox, 2013).

Figure 2. Online and mobile banking % of internet users who do online banking vs. the % of cell phone owners who use mobile banking



Source: S. Fox, *51% of U.S. Adults Bank Online*, 2013, p. 2.

1.2 Reasons for Implementing E-Banking

E-banking is the newest delivery channel. It delivers information at much higher speed than traditional banking. Lukic (2014), stated that e-banking is “a wave of the future”. Nowadays customers expect new and effective techniques and services, so e-banking would be the best choice to achieve this goal (Havasi, F., Meshkany, F., & Hashemi, R., 2013). E-banking is a significant investment, so the questions must be answered as to what motivates banks to participate and deal with the associated problems and risk (Shah, M., & Clarke, S., 2009). In this subheading, I will summarize some of the reasons often cited by the bank to be their primary motive for implementing e-banking. I identified these reasons during reading several articles, books, posts on the internet, by different authors.

1.2.1 Customers’ demands

Good customer services are one of the best ways for the bank to develop its services. Customers constantly are demanding better services, 24 hours per day and 7 days per week availability, with a good customized to their exact needs, at less cost, and as quickly as possible (Patgar, C. M., & Arundhekar, N. D., 2015). To meet these demands, banks need to develop innovative ways of creating value and e-banking is seen as one of those innovative ways to meet customers’ expectations. According to Kerem (2003), “customer needs at list minimum comparative advantage in order to the changeover”. It means the new innovative services should be better than its predecessor.

1.2.2 Sell more to existing customers

The financial services markets in a lot of developed countries have already developed significantly and there is very limited opportunity for the developing of new markets (Shah, M., & Clarke, S., 2009). This means that the best way to increase sell it would be to sell more to existing customers. Nowadays banking is known as innovative banking. Information technology had given rise to new innovations in the product designing and their delivery in the banking and finance industries, customer service and customer satisfactions are their prime work (Yusuf, 2011). Farshad, Meshkany, and Hashemi (2013) stated that “e-banking determines what can be offered to customers, but only customers determine which of those technologies will be accepted. Customer services delivery may increase based on the want, need, time, the power of buying, and status”. So, the best opportunity to success in e-banking would be to know customers.

1.2.3 Change in the environment

Turk, Kuhndt, Alakeson, Aldrich, and Geibler (2003) stated that, “during 1945-1990s the European retail banking sector was quite stable, it relied largely upon the single channel of the branch network, saw little churn among customers and was able to rest upon the popular perception of banks as inherently reliable, trusted and secure”. For example, if customers had a something to do in a bank they should have to spend a lot of time in a bank branch to wait for their line. If we compare that, with the today’s banking, a multichannel banking environment. New technologies like the internet and mobile telecommunications play a key role in opening new markets and the creation of value. Social changes are also forcing financial institutions to change the way they are doing business with their customers (Shah, M., & Clarke, S., 2009). In business life, the banking sector is one of the main users of information and communication technologies (Khrais, 2013).

1.2.4 Achieving competitive advantage

Porter (1985) defines competitive advantage as “an advantage over competitors gained by offering consumers greater value, either by means of lower prices or by providing greater benefits and services that justify a higher price”. There are a lot of initiatives such as efficiency, core competency advancement, the actualization of customer-centric products and services, and limitation of the fixed costs of doing business can help to achieve a sustainable competitive advantage (Kireru, J., Ombui, K., & Omwenga, J., 2016). The goal of the most companies is to reach competitive advantage, but only a few of them can succeed on it, even if they do, few of them can maintain it. Service quality is one of the keys to achieving competitive advantage, as it's very important in the banking services context and provides a high level of customer satisfaction (Kaur, N., & Kiran, R., 2015). The banking sector is one of the first sectors that have adopted a lot of electronics applications to improve performance and gain a competitive advantage (Omari, H., & Bataineh, T., 2012). Internet and communication technologies develop an innovative connection between customers and vendor of products or services (Havasi, F., Meshkany, F., & Hashemi, R., 2013). Therefore, IT organization of an investment bank can use this opportunity, which can build another level of competitive advantage. In order to achieve competitive advantage in the future, the investment banking IT organization should have a strategy which could help innovation, creativity, simple and straight forward process, recognition, task oriented project team, and decrease hierarchical control (Pramanik, 2014). According to Shah and Clarke (2009), “e-banking is already developed broadly, and it is no longer the main source of competitive advantage on its own, at the list of developed countries”.

1.2.5 To achieve efficiencies

“Efficiency is using the resources at best, brings the saving in money and time, and consequently leads to improve company's performance” (Roghaniana, P., Raslia, A., & Gheysaria, H., 2012). Or “Technical efficiency measure reflects the ability of a bank to maximize outputs with a given set of inputs or to produce a given amount of output with minimum inputs” (Momparler, A., Lassala, C., & Ribeiro, D., 2013). With the offering e-banking service bank can achieve efficiencies whether personal or business, it makes things easier. If we look at the history of e-banking it increased the efficiency of banks such as labours costs were reduced, the quality of transactions and maintenance has been also improved as computer took a place of human, human errors reduced, services and process are now quicker and safe which saves time, money, efforts and decreases costs (Sumra, H., Manzoor, K., & Abbas, M., 2011).

1.2.6 Countries with low penetration of PC

There are still a lot of countries in which IT is developing, and there is very low market penetration of PC but they have very high mobile market penetration for example in Tajikistan mobile penetration was 138 percent in 2014 (Atoev, A., et. al, 2015) or in Sub-Sahara Africa the mobile penetration was 70 percent in 2014 (Schlebusch, 2015). In the countries with low PC penetration, the mobile banking would be the best option to offer. Because m-banking is developed very well now and it's possible to do all activities from Smartphone which are possible to do from PC.

1.3 Benefits of E-Banking

E-banking has a lot benefits for either bank or their customers. For example, customers can access their account and do shopping online 24 hours per day 7 days per week, or do other activities with cost reduction and more convenience. Banks can develop their market penetration internationally or better responsiveness to the market. Like these, there are many others benefits which e-banking has for the bank and their customers. That's way in this subheading I decided to summarize benefits of e-banking a bit widely from bank points of view and customer points of view. I identified these benefits by reading different articles and books, by different authors.

1.3.1 Benefits from the bank point of view

The benefits of e-banking in developed countries are the possibilities to get new customers, widening the customer database, improving bank marketing and communication and having the possibility to retain high profit to the customer (Havasi, F., Meshkany, F., & Hashemi, R., 2013), better branding, better responsiveness to the market, and possible to monetary terms (Bony, S. Z., & Kabir, F., 2012). Those banks that offer e-banking are perceived as leaders in technology implementation, and they enjoy the better brand image. The main goal of all companies are to maximize profits, automated e-banking offers a perfect opportunity for banks to maximizing profits (Luštsik, 2003). The other benefits are allowed to measure in monetary terms. Financial Institutions as other markets are changing to IT to improve business efficiency, service quality, and attract new customers (Salehi, M., & Alipour, M., 2010). General Key benefits from bank point of view are (Himani, 2011).

- E-banking increases the profits of the bank.
- It provides a competitive advantage with the limit network to the banks.
- It reduces the cost of storage of huge stocks of currency notes and coins because mostly e-banking precedes business with plastic money.
- It reduces the risks of cash overdraw: to use ATM credit and debit cards.
- It increases the revenue through the website: a website can perform as promotional activities.
- To invest less on building infrastructures.

1.3.2 Benefits from the customers' point of view

The major benefits from customers' point of view are saving of time by the automation of banking services processing and the introduction of easy handling tools for storing customer's money (Luštsik, 2003). The nature of e-banking means that personal contact between customer and bank is reduced (Shah, M., & Clarke, S., 2009). E-banking makes it easily for customers check their account, online payment, transfer money between accounts, and other activities. These activities of e-banking are very common among the users who are usually short on time to visit the bank physically (Chavan, 2013). General Key benefits of e-banking from a customer point of view are:

- **It's more convenience:** Customers can manage their schedule 24 hours per day and 7 days per week. It's possible for customers to do all activities online without visiting the bank and from the comfort of the home, office or whenever the customer wants to. All

they need are just PC or mobile devices which have access to the internet (Luštsik, 2003).

- **Account aggregation:** It support customers to be presented with all of their account details on a single page (Shah, M., & Clarke, S., 2009)
- **Bank on-the-go:** As nowadays, people travel a lot for them, it's important to know and check their account activities in real-time. M-banking gives this opportunity to customers and allows their everyday banking to be more suitable (Chavan, 2013).
- **To pay the bills:** It reduces the cost of paper statements, checks and stamps and it also reduces the time, now there is no need to go to the bank for the paying bills, it's possible to do it online (Baten, M., & Kamil, A., 2010).
- **Transfer funds between accounts directly:** With e-banking to transferring money between accounts is more quick, secure, and easy (Baten, M., & Kamil, A., 2010).
- **To be informed about balances, new services, news:** to sign up for SMS or email alerts and notified immediately about balances and transactions (Salehi, M., & Alipour, M., 2010).
- **To reduce the cost:** E-banking decreased the costs for accessing and using bank services (Luštsik, 2003).
- **Fast and continuous access to information:** Corporations will have easier access to information as they can check on multiple accounts at the click of a button (Salehi, M., & Alipour, M., 2010).
- **Funds management:** Customers can download their history of different accounts and do a "what-if" analysis on their own PC before affecting any transaction on the web. It will lead to better funds management (Chavan, 2013).

1.4 Barriers to E-Banking

"Today, the amazing speed of development of IT and Information industry, causing major changes in the handling money and resources in areas that are new concepts as e-banking and electronic transmission provide. These two concepts are the creator of a new type of banking under the Banking electronics (Mehdi, 2016)." The purpose of this subheading is to summarize why e-banking is developed well in some countries and in some countries, it may be difficult to implement it, or why a bank may not realize the full benefits from e-banking.

1.4.1 Consumer behaviour

There are still many customers that still don't want to do their financial management online. "As it was found it in the study of consumer habits 10 countries that two-thirds of consumers don't count e-banking important and around 30% of them don't know that their bank offer web-based services" (Shah, M., & Clarke, S., 2009). To change the consumer behavior requires a lot of time, for example, it took 16-years adoption cycle of the computer (Mulligan, 2014). As Davis (1989), developed the "Technology Acceptance Model, according to which 'users' adoption of computer system" depends on their "behavioural intention to use", which in turn depends on "attitude", consisting of two beliefs, namely Perceived Ease of Use and Perceived Usefulness" (Davide, 2003). Sadiq and Shanmugham (2003), argued that age, education, qualifications of electronic and traditional banking don't have the main impact on e-banking adoption. Instead, they argued that accessibility to the internet, awareness of e-banking and customers' resistance to change are the main factors impacting the adoption.

1.4.2 Culture issues

Culture plays the main role in the implementation of e-banking. It is very important to study the customer requirements and need, before any technology transfer. These requirements and needs are deeply influenced by culture, that's way it's important to learn the role of national culture like one of the factors that influence the acceptance or resistance of e-banking. Mohammad (2012) defined culture "as the collective programming of the mind which separates the member of one human group from another".

1.4.3 Security and privacy issues

During online payments or transferring money from one to another account, the online bankers are always worried about the hackers or some other issues. The importance of security and privacy concerns in an online environment has been widely argued and noted in a lot of research. Udo (2001) noted that "privacy and security concerns were found to be the main obstacle to online shopping". In the research between Turkey and UK has been noted that privacy is one of the most important characteristics because of its impact on customer observations (Sayar, C., & Wolfe, S., 2007). Cockburn and Wilson (1996) and Pavlou (2001) discussed that in the e-banking context, the security issue is crucial once, it involves directly the user's actives. Abdulwahed, Yaqoub, and Al-Hajery (2006) stated that security and data privacy are main problems in the adoption of e-banking. Bultum (2014) also noted in his study that security risk and lack of trust on the technological adoption are main barriers for the system. Nowadays the main security issue facing e-banking is Cybercrime. "Cybercrime define as crimes committed on the internet using the computer as either a tool or a targeted victim" (Joseph, 2006).

1.4.4 Access to the internet

E-banking cannot be implemented without direct access to the internet (Aslam, H. D., Khan, M., Tanveer, A., & Amber, T., 2011), with the support of internet, banking is no more related in time or geography (Charkhandaz, 2014). The internet growth very fast but there is still many people don't have access to the internet (Shu, 2014). Lack of computer skills, the high cost of hardware and call charges and various other social and economic factors are some of the reasons cited for this (Walczuch, R., Braven, G. V., & Lundgren, H., 2000). This is changing fast as more and more people connect to the internet, and numbers are expected to grow even with the maturity of mobile communications. According to Spragua et al. (2014), there are four categories of internet barriers facing populations around the world as seen in table 1.

1.4.5 Project management

Project management is "the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements". Project managers shouldn't work only to meet specific scope, time, cost, and quality requirements of projects, they should also support the whole process to meet necessitates and hopes of the people involved in or affected by project activities. (Schwalbe, 2015). Project management is one of the main parts of e-banking adoption. As in some banks, the lack of project management skills impacts the implementation of e-banking. Shah, Branganza, Khan and Xu (2005) stated that "Understanding the Critical Success Factors (hereinafter: CSF) in e-banking is important for senior management of banking related organizations because it helps them improve their strategic planning process".

Table 1. Non-internet users face four categories of barriers

	Incentives	Low incomes and affordability	User capability	Infrastructure
Barriers directly affecting consumers	<ul style="list-style-type: none"> • Lack of awareness of Internet or relevant use cases • Lack of relevant (e.g. local, localized) content and services • Lack of culture or social acceptance 	<ul style="list-style-type: none"> • Low income or consumer purchasing power • Total cost of ownership for device • Cost of data plan • Consumer taxes and fees 	<ul style="list-style-type: none"> • Lack of digital literacy • Lack of language literacy 	<ul style="list-style-type: none"> • Lack of mobile Internet coverage or network access • Lack of adjacent infrastructure (e.g. grid electricity)
Root causes (e.g. providers, government/regulatory, industrial)	<ul style="list-style-type: none"> • High content and service provider costs and business model constraints • Low awareness or interest from brands and advertisers • Lack of a trusted logistics and payments system low ease of doing business • Limited Internet freedom and information security 	<ul style="list-style-type: none"> • Challenging national economic environment • High device manufacturer costs and business model constraints • High network operator costs and business model constraints • High provider taxes and fees • Unfavorable market structure 	<ul style="list-style-type: none"> • Under-resourced educational system 	<ul style="list-style-type: none"> • Limited access to international bandwidth • Underdeveloped national core network, backhaul, and access infrastructure • Limited spectrum availability • National ICT strategy that doesn't effectively address issue of broadband access • Under-resourced infrastructure development (e.g. FDI 'Foreign Direct Investment' limits)

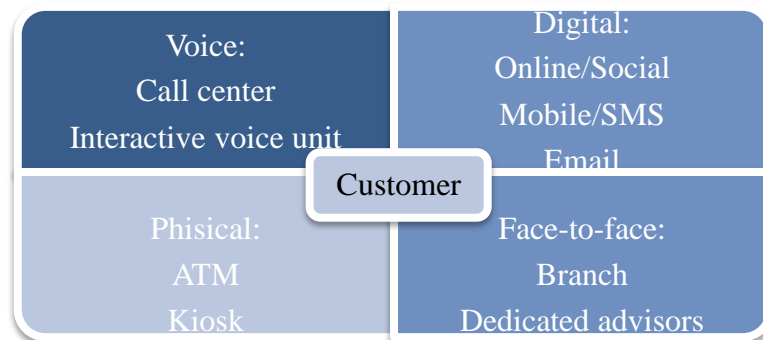
Source: K. Sprague et al. *Offline and falling behind: Barriers to Internet Adoption*, 2014, p. 4.

1.5 Influence of E-Banking on Traditional Banking

E-banking is changing the banking industry and it has the main effect on banking relationship. For example what used to be done in a branch such as to withdraw cash or deposit a cheque or request a statement of account etc. now it's possible anytime and anywhere in the world through any delivery channels. Providing e-banking is frequently becoming a "need to have" than a "nice to have" (Shilpan, 2012). Banks are moving away from "managing branches" and instead are "managing distribution" across the entire bank's

channels. The multi-channel distribution strategy includes all distribution channels such as physical, digital, face-to-face, and voice as seen in figure 3 (Driga, I., & Isac, C., 2014). The risk variables associated with the internet group continues to be lower relative to the non-intern group (Malhotra, P., & Singh, B., 2009).

Figure 3. Channel strategy



Source: I. Driga & C. Isac, *E-banking services – features, challenges and benefits*, 2014, p. 50.

E-banking support with all the functions and has many advantages compared to traditional banking services as seen in table 2 (Vyas, 2012). E-banking transactions are cheaper than branch or even phone transactions. It turns yesterday's competitive advantage – a large branch network, into a comparative disadvantage, allowing e-banking to undercut bricks-and-mortar banks. This is commonly known as the "beached dinosaur" theory (Keivani, F. S., Jouzbarkand, M., Khodadadi, M., & Sourkouhi, Z. K., 2012). It is very easy to set up, so lots of new entrants will arrive (Vyas, 2012). According to Manesh, Mohamadi, and Kiani (2013), the financial banking services can be categorized in two basic theoretical groups traditional and modern. In the traditional the presence of the customer is important but in modern it isn't.

Table 2. Comparison of traditional and e-banking services

Traditional banking	Electronic-banking
<ul style="list-style-type: none"> • The market is limited • There is a big competition between banks • There is a limited service • Services will be provided on the base of specific branches • High cost to make money through margin (facilities) • The services should be done by office hours • Based on the administrative structure and paper-based documents • A lot of human resources will be used 	<ul style="list-style-type: none"> • The market is unlimited • Competing brands • Very wide services based on customer needs • Banks rigs equipped with electronic features • Focus on cost and revenue growth • Emphasis on making money through commissions • Unlimited services • There would be a close relationship between the banks' and customers • Using of manpower will be reduced for computer use

Source: A. S. Manesh, F. S. Mohamadi & A. Kiani, *The Effect of Electronic banking development on Iranian banks' profitability (2005-2010)*, 2013, p. 2593.

2 E-BANKING TECHNOLOGIES

E-banking heavily depends on Information and communication technologies (hereinafter: ICT) for the reaching 24 hours and 7 days per week availability, to reduce error rates and faster delivery of financial services. While studying e-banking, bank websites will come to mind first, however, e-banking needs more than just a good website. It requires back-end applications like account systems, support applications like Customer Relationship Management (hereinafter: CRM systems), communication technologies to link e-banking to the payment systems like LINK, and middleware to integrate these different types of systems usually. In this chapter, I will summarize the main technologies use to support e-banking.

2.1 The Internet

The Internet is a technology with a lot of properties that have the potential to transform the competitive landscape in many industries while at the same time creating whole new industries (Afuah, A., & Tucci, C. L., 2000). Mathur (2012) defined the internet as “the wired or wireless mode of communication through which one can receive, transmit information that can be used for single or multiple operations”. “The development and expansion of computer/communication networks fuelled by enabling technologies such as integrated circuits (hereinafter: ICs), PCs and broadband connections has led some observers to draw parallels between the 21st century digital revolution and the 18th/19th century Industry Revolution which changed the social and economic landscape of the world, as dramatically” (Mulligan, 2014). The history of Internet started in 1950 when Russians had climbed the era with the launch of Sputnik. In 1969, the first ever computer-to-computer link was established on Advanced Research Projects Agency network (hereinafter: ARPANET), it was to be used for projects at Universities and Research Laboratories in the United States (Deffree, 2016). In 1971, Ray Tomlinson created a system to send e-mail and he picked @ symbol for address, it was a big step in the making as this opened gateway for remote computer accessing i.e. Telnet (Mathur, 2012). In 1989, Tim Berners-Lee a British scientist at CERN (European Organization for Nuclear Research known as CERN), invented the WWW, in 1991 people outside of CERN were invited to join this new Web community, and in April 30th 1993 CERN put the WWW software in the public domain (O’Luanaigh, 2014). In 1993, Marc Andreessen with his team invented Mosaic the first popular browser (Andreessen, 1993).

The Internet usage has changed the personal and professional lives of millions of people around the world (Ruzgar, 2005). The most exciting commercial developments are occurring on that portion of the Internet known as the WWW as seen in table 3 (Pew Research Center internet, Science & tech, 2014). The WWW is a sub-network the fastest-growing part of the Internet. Based on the Hypertext Transport Protocol (hereinafter: HTTP), it uses hypertext markup language (hereinafter: HTML) to create “web pages” which can be easily navigated through numerous hypertext links (Cockburn, C., & Wilson, T., 1996). The more recent development is Web 2.0 which may be described as a newer version of web-based applications which aims to enhance creativity, collaboration, and interaction between Internet users (Mitchell, 2016). WWW is a large part of the internet, the internet is not only web pages but it includes instant messaging, chat rooms, email, file transfer, forums, newsgroup, etc.

Table 3. World Wide Web Timeline

Years	Finding of WWW
1994	Yahoo created by Stanford University graduate students Jarry Yang & David Filo
1995	Amazon.com opens for business, billing itself as the 'Earth Biggest Bookstore' & Microsoft releases Windows 95 and the first version of Internet Explorer.
1996	Nokia releases the Nokia 9000 Communicator, the first cell phone with internet capabilities & Hotmail launched as one of the world's first Webmail services.
1997	Netflix launches as a company that sends DVDs to homes via mail & Google.com registers as a domain
1998	Oxford Dictionary adds "spam" and "digerati"
1999	MP3 downloading service Napster launched
2000	40 million Americans or 48% of internet users have purchased a product online
2001	Jimmy Wales launched Wikipedia
2002	Social networking site Friendster.com launched but is quickly overtaken by Facebook & Microsoft launched Xbox Live
2003	Apple launched the iTunes Music Store, Skype a voice-over-IP calling and instant messaging service launches, Professional networking site LinkedIn launches, MySpace.com is founded & WordPress blog publishing system created.
2004	Mark Zuckerberg launches the Facebook.com, Social news website Digg launches, Mozilla releases Firefox 1.0 & Massively multiplayer online role-playing game (MMORPG) World of Warcraft launches
2005	YouTube is founded on Valentine's day
2006	Twitter launches and the founder is Jack Dorsey
2007	Apple releases its first iPhone
2008	Google releases the Chrome Web browser & HTML5 is introduced
2009	Microsoft's Bing search engine launches
2010	Social photo-sharing sites Pinterest and Instagram launch
2011	Google+ launches
2012	E-commerce sales top \$1 trillion worldwide & The Internet Society founds the Internet Hall of Fame to 'celebrate people who bring the internet to life'
2013	51% of U.S adults bank online

According to Shah and Clarke (2009), the Internet influences the future services/products distribution channel structure in two ways. "First, the cost of using it are different compared to other available distribution channels, and the service output it provides is often different compared to service output provided by traditional distribution channels. Second, the Internet influence consumers. A lot of them invest more time and resources to learn more computers and to gain familiarity with the internet, and other consumers don't want to gain familiarity to the internet". These two customer segments likely have similar needs. Nowadays it's difficult to image the life without internet mostly in developed countries. The internet technology has a lot of benefits in different fields such as banking, communication, business, study, shopping, etc.

Banking: As mentioned early e-banking has benefits for either bank or their customers. E-banking made it easily for customers check their account, make payment online, transfer money between accounts, and to do banking 24 hours per day and 7 days per week, or to do other activities with cost reduction and more convenience (Chavan, 2013). Banks can develop market penetration internationally or better responsiveness to the market. The benefits of e-banking in developed countries are the possibilities to get new customers,

widening the customer database, improving bank marketing and communication and having the possibility to retain high profit to the customer (Havasi, F., Meshkany, F., & Hashemi, R., 2013).

Communication: The ways how people communicate have been changed dramatically in the last 20 years. Traditionally there were three different ways of communications: face-to-face communication, telephone communication, and snail mail. But now email is a more preferred way of communication. It's an indirect way that most people prefer. In the internet age, there are Voice over Internet Protocol (hereinafter: VoIP – it became popular with the appearance of Skype and Google Voice), instant messaging and texting. The Internet also reduces the cost, in communication with partners or customers (Stern, 2008).

To do business: The benefits of the internet in the business world for small and medium sized companies is that it moves companies beyond the physical constraints of their traditional distribution channels and builds a worldwide virtual community in which small and medium-sized companies can compete with large companies (Kiang, M. Y., & Chi, R. T., 2001). The Internet creates a new economy, Increases Company's image, better customer support, and makes information more easily available for customers, cut costs, ability to do business 24 hours per day and 7 days per week, physical presence could be in any location, and of course it takes business globally (Stewart, D. W., & Zhao, Q., 2000).

Education: The internet has a lot of benefits also in Education as using multimedia, online learning, easy contact, school/college projects, news, and easy education system. The fast and fairly low-cost access is one of the main advantages of the internet to students around the world, as getting access to the internet is easy. Communication and information are the two basic uses of the internet. Information available on websites can be updated or modified at any time and for any number of times, which helps in learning and better understanding (Pandit, 2016).

Shopping: Online shopping very common nowadays and it can be defined as the process of buying goods or services through the internet. The Internet has revolutionized the way of shopping because of it more convenience way of doing shopping. It has a lot benefits as its more convenience, better prices, more items, price comparison, fewer traps, and saves time/money. To make this imaginable, there are at list three important things the Internet, online store, and consumers (Reverchuk, 2015).

Table 4. Internet penetration from 2000 to 2016

Year s	Internet users	Penetrat ion (% of Pop)	World Population	Non-users (Internet less)	1Y user change %	1Y user change	World Pop. Change %
2000	414.794.957	6.8	6.126.622.121	5.711.827.164	47.3	133.257.305	1.28
2005	1.030.101.289	15.8	6.519.635.850	5.489.534.561	12.8	116.773.518	1.24
2010	2.023.202.974	29.2	6.929.725.043	4.906.522.069	14.5	256.799.160	1.22
2015	3.185.996.155	43.4	7.349.472.099	4.163.475.944	7.8	229.610.586	1.15
2016	3.424.971.23	46.1	7.432.663.275	4.007.692.038	7.5	238.975.082	1.13

Source: Internet Live Stats, *Elaboration of data by International Telecommunication Union (ITU), World Bank, and United Nations Population Division*, 2016.

In the table 4 can be seen the best prove for benefits of the Internet. As more people around the world get access to all the tools of the digital age. So far around 40%, people all over the world adopted it compare it to 1995 the Internet penetration has been less than 1% (Internet live stats, 2016). However, as mentioned some benefits of internet technology, it's also important to mention some disadvantage or problem of internet technology. Most common of them are loneliness, internet addiction, security & privacy, rapid technological change, lack of face-to-face communication, poor conflict resolution, overdependence on technology, and high initial cost.

2.2 Backend Systems

The Banking industry is a demanding business and the ICT systems assisting on it are becoming more difficult. This backend system can be separated in several sub-categories and this subheading will cover some of the main general banking related systems.

2.2.1 Product applications

There are a lot of computer applications, used to support e-banking processes like data warehousing (hereinafter: DW) systems or CRM systems. These tools support to manage information, which can be used for product development and marketing purposes. In the growth of e-banking, ICT plays the main role (Shah, M., & Clarke, S., 2009). "The historical paradigm of IT provides useful insights into the 'learning opportunities' that opened the way to endogenous changes in the banking activity such as the reconfiguration of its organizational structure and the diversification of the product line" (Davide, 2003). To deliver services through the e-banking channels, banks need internet technologies for universal connectivity, backend applications such as account systems, support applications such as CRM systems, communication technologies to link e-banking to the payment systems such as Link, and middleware to integrate all these different systems (Shah, M., & Clarke, S., 2009). Most of these systems were developed before the arrival of e-banking, that's why usually there would be a problem to implement them. In order to follow the market, e-banking repeatedly needs an update in the tools or software technologies, and as lack of flexibility in these systems they are very problematic to change quickly, and also the cost would be high. For example, HTML no longer meets today's requirements (iFin.ru, 2000) also the internet is not created originally for e-banking, that's why banks also often face security problems (Adeusi, 2015). Chung and Paynter (2002) stated that "e-banking is a sector that is typified by high interaction and information. A lot of banks offer e-banking services, but most of them have no idea what makes their service offerings unique". Banks need to deal with all the problematic issues such as to improve customer service, product development, submitting information on timely basis, fraud prevention, and to assist new agile business models. One of the solutions could be a replacement, but mostly high costs and unacceptable risks make this option unattractive. Or to re-engineer these systems first and then wrap them with new technology, which can deliver functionality as a service to other systems and allow changes to the core systems without the need to redevelop all systems (Kendler, 2005). If this method implemented good, it may support link a bank's infrastructure with modern business process driven applications. Nevertheless, to implement this, organizations may have at least to partially implement the Service – Oriented Architecture (hereinafter: SOA) (it will describe later in this chapter) (Shah, M., & Clarke, S., 2009).

2.2.2 Data warehouse

Information plays the major role in making good business decisions that way its value is growing very faster. It is important in organizations to find the ways for access, store, maintain, and utilize the huge amount of data efficiently. If this data gathered and processed with the right method, it can give a significant conception in the buying behavior and need for customers. To achieve it, companies need modern technology tools, like DW systems (Shah, M., & Clarke, S., 2009). DW system can be described as “Collecting data from several dispersed sources to build a central data warehouse. Then users can use appropriate data analyzing tools to store and analyze needed data.” The banking industry is categorized as one industry with high information demands. The DW gathers everyday businesses data either internally or externally, and after accumulates, classify, and store data for further analysis (Hwanga, H., Yenb, D., & Cheng, C., 2004). For the implementation of DW a lot of amount of investment and organizational effort need, that's way it's important wisely evaluate and plan ahead. In the implementation process requires skilled personnel, suitable project management, and participation of majority stakeholders. To provide new ideas about suitable technologies and sources of information, information consultants might be used. In a case, the organization doesn't have the necessary knowledge and skills itself outsourcing could be the best option (Shah, M., & Clarke, S., 2009).

2.2.3 Knowledge management systems

A literature review on ICT to help Knowledge Management (hereinafter: KM) reveals to several different words in use, “such as knowledge warehouse, KM software, KM suite, KM (support) system, and KM technology as well as learning management platform, learning management portal, learning management suite, learning management system, or organizational memory (information) system” (Barron, 2011). ICT, together with business policies, become a tool par excellence for supporting the creation of KM platforms that provides access to organization knowledge resources such as workers, technical reports, software applications, and business documents (Telodo, C., Chiott, O., & Galli, M., 2016). It is important before to define Knowledge Management System (hereinafter: KMS), first of all, to define knowledge and KM. “Knowledge is defined as a justified belief that increases as entity's capacity for effective action. It can be view with different perspectives view such as a state of mind, an object, a process, a condition of having access to information, or a capacity” (Leidner, D., & Alavi, M., 2001). “KM refers to a systemic and organizationally specified process for acquiring, organizing and communicating both tacit and explicit knowledge of employees so that other employees may make use of it to be more effective and productive in their work” (Leidner, D., & Alavi, M., 2001). “KMS refer to a technological part of KM or any kind of IT system that store and retrieves knowledge, improves collaboration, locates knowledge sources, mines repositories for hidden knowledge, captures and uses knowledge, or in some other way enhances the KM process” (Frost, 2010) and its goal is to help creation, transfer, and application of knowledge in organization (Leidner, D., & Alavi, M., 2001). A KMS which is well-organized may support the company business increase staff performance, customer satisfaction, and quality of services. Also, in a specific organization, knowledge is the main of operation and innovation, so one of the best valuable assets a company can have (Craciun, 2014). Here are some general benefits of KMS are presented below:

- Every employee in the organization has access to management and business knowledge

- Makes it possible for company to help new technologies easily and capture new knowledge for future use
- Due to the existing knowledge base, the workers can very easily find all the information they need
- Create knowledge base articles using the real-time HTML editing tools
- Facilitates IT staff members stay up to date on various, ever-changing technologies
- Reduces IT costs without having to compromise quality service to internal and external customers (Craciun, 2014)
- Improve staff engagement and communication
- Improving the organization's performance through increased efficiency, productivity, quality and innovation (Tanaji, 2012)
- Support in delivering better measurement and accountability
- Support the company to capture the knowledge they pay for workers and keep it, even when they leave the company or move to another position (Smith, 2013)

The globalization of financial markets forced banks to be more efficient in managing knowledge in their banking operations (Tanaji, 2012). KMSs is one of the main efficient ways of managing, formalizing and automating knowledge in organizations, like banks if they are applied in appropriate areas and to appropriate tasks (Ali, M., & Jalal, A., 2011). The banks work hard to move more toward e-banking solutions, the computerized information systems will be able to manage with explicit knowledge, but the integration of hidden knowledge requires systems which combine technology with human expertise (Shah, M., & Clarke, S., 2009). KMS play a key role in assisting decision-making in banks. The availability of KMS can be great benefits in the practice of bank development through improving the efficiency of different operating activities. So in order to discuss the achievements of each department resulting from using KMS, the banks should hold an annual meeting to build a future strategy based on the previous achievement (Ali, M., & Jalal, A., 2011).

2.2.4 Customer Relationship Management systems

CRM is a combination of people, processes, and technology that seeks to understand a company's customers (Chen, I. J., & Popovich, K., 2003). It comprises a set of processes and enabling systems helping a business strategy to develop long-term, profitable relationships with specific customers (Ling, R., & Yen, D., 2001). Customer data and IT tools form the foundation upon which any successful CRM strategy was developed. As well, the fast growth of the Internet and its tied technologies has enlarged well the possibilities for marketing and has transformed the way relationships between companies and their customers (Ngai, E., Xiu, L., & Chau, D., 2009). CRM defined differently by different authors but the main differences are a relationship and technological aspects. CRM from relationship aspect define as "a combination of business process and technology that seeks to understand a company's customers from the perspective of who they are, what they do, and what they are like" (Couldwell, 1998) or from technological aspect define as "the marketplace of the future is undergoing a technology-driven metamorphosis" (Don, P., & Martha, R., 1995). CRM technology application link front office (e.g. sales, marketing and customer service) and back office (e.g. financial, operations, logistics, and human resources) functions with the company's customer "touch points (include: the Internet, e-mail, sales, direct mail, telemarketing operations, call centres, advertising, fax, pagers, stores, and kiosks)" (Chen, I. J., & Popovich, K., 2003).

CRM in the banking industry is a key part which enables a bank to create its customer base and sales capability. The aim of CRM is to manage all aspect of customer interaction in a manner that allows banks to maximize profitability from each customer (Perwej, 2010). As mentioned in the context of e-banking, with the support of CRM software customers can move from an expensive branch or phone-based services to self-help services over the internet (Shah, M., & Clarke, S., 2009). The benefits of CRM in banking are to support develop brand value, identify, and understand their clients' requirements by providing targeted, timely and relevant information that could add value to their clients. CRM systems offer tools that could segment and deliver the right service, at the right time, by acting on dynamic customer information (Sandor, 2014). The CRM in the banking industry is completely different than other industries, as banking industry mainly related to financial services, which needs to develop the trust between the people (Perwej, 2010). It is a mistake to view CRM project implementation as an IT project. Because implementing a CRM package can cause vast change that needs to be managed carefully to get the full advantage of CRM system. A successful CRM implementation is to meet the business goals such as customer acquisition, customer retention, customer satisfaction, customer loyalty, better customer service or any other goals that are set by the organization (Eid, 2007). The reasons for the falls for the implementation of CRM can be several such as a lack of definition, poor leadership, insufficient help from CRM vendors, large capital investment requirement, meeting customer expectation, not enough customer demand etc. (Eid, 2007).

2.3 Mobile Banking

Nowadays the cell phones are universal, developing in both amount and types. There is a lack of clear difference between a cell phone and a smartphone, commonly smartphone is the following generation, multifunction cell phone that enables voice communication and text messaging capabilities and facilities data processing as well as improved wireless connectivity (Zheng, P., & Ni, L. M., 2006). However, with the development of mobile technologies and devices, banks customers are allowed to do their financial truncations such as transfer funds, pay bills and check account balances and other complementary activities quickly and easily at any place 24 hours per day and 7 days per week. It supports traditional banks improve their service quality and decrease service costs (Zhou, T., Lu, Y., & Wang, B., 2010). M-banking occupies the focal point of growth strategies in both industries banks and mobile carriers (Goswami, D., & Raghavendran, S., 2009). Banks, through m-banking applications, deliver a combination of payments, real-time two-way data transmission, banking, and universal access to financial information and services via a mobile device (Akturan, U., & Tezcan, N., 2012). Recently, a lot of banks around the world have provided mobile access to financial information (Gu, J., Lee, S., & Suh, Y., 2009).

Mobile banking also known as M-banking or SMS banking, it defined as “a channel whereby the consumer interacts with a bank via a mobile device, such as a mobile phone or personal digital assistant. In that sense, it can be seen as a subset of e-banking and an extension of internet banking with its own unique characteristics” (Akturan, U., & Tezcan, N., 2012). Finland is the founder of the first applications of m-banking. In the early 1992 customers of Merita Nordbanken were able to make bill payments and check account balances using a mobile phone (based on Global Standard for Mobile (hereinafter: GSM) – networks) (Barnes, S. J., & Corbitt, B., 2003). In Australia, the first m-banking were offered by the Commonwealth Bank of Australia in late 1999, in the North American four main banks (Bank of America, Harris Bank, Key Corp, and Wachovia) were offering m-

banking services by the end of 2000. The services offered such as access to customers' account balance, funds transfer and bill payment menu (Petrova, 2002). M-banking through mobile devices offers a lot of advantages and also some disadvantages.

2.3.1 Advantages of m-banking

- **Time-saving:** Without having to go or drive to the bank branches and wait in the line, it is possible to check account balances, schedule and receive payments, and transfer money (Sneha, 2016).
- **Convenient:** To be able to do most, if not all of banking on the go such as to access bank accounts, make payments, review recent transaction, pay bills, locate ATMs and bank branches, and even track investments regardless of location is one of the biggest advantages of m-banking (Chandran, 2014), also availability 24 hours per day, 7 days per week and any place convenient to customers (Laukkanen, T., & Lauronen, J., 2005).
- **Secure:** M-banking apps have a security guarantee or send an SMS verification code needs to input to authorize a payment for added security. Secure of m-banking is safer than other channels, including internet banking (Bankrate, n.d.).
- **Easy access to finances:** As it's so easy and convenient, m-banking supports keep the customer in control of his finances. The customer can monitor their balances and always know where they are at financially. To access financial information beyond the bank working hours, it even supports to benefit banking services by making a call to the bank (USBank, 2014).
- **Increased efficiency:** M-banking functions are functional, efficient and competitive. The location free is one of the main attributes to efficiency, because it saves time and money, real-time information, and checks the movements of investment (Laukkanen, T., & Lauronen, J., 2005).
- **Fraud reduction:** Is major advantages to implementing m-banking is customers in real time can watch their account.
- **Offline:** Customers can use mobile connectivity of telecom operators and then they don't require an internet connection (Chandran, 2014).

2.3.2 Disadvantages of m-banking

- **Security:** M-banking is safer than computer banking because there are few viruses and Trojans exist for phones. However, it doesn't mean that m-banking doesn't have any security threats. Users of m-banking can be prone to scam like to phishing termed 'smishing'. It happens when a user gets a fake message asking for bank account details from hackers posing as a financial institution. This trick happens a lot to people and they lose money through this scam. Or in the case when the people lose his mobile phones and they have all application for an m-banking on the mobiles devices. Yes, all banking application needs to enter password or PIN, but most of the people save passwords and PINs on their mobile phones or use insecure passwords and PINs that are very easy to guess (Foster, 2015).
- **Compatibility:** Modern mobile devices like Smartphone and tablets are better matched m-banking applications compare old models of mobile phones and devices. It is not so many big issues in developed countries but in developing countries, it is (Chandran, 2014).
- **Cost:** If the users have compatible devices the cost of m-banking might not matter so much, but their need to pay for the data and the text fee then it might cost users some

amount of money. Also, some of the banks charge also an extra fee for the services, and the users may need to pay a fee for the software too. All these extra charges will add up, mostly when the users access m-banking frequently (Buzz2Fone, 2013).

2.3.3 M-banking technologies

M-banking technologies options can be categorized into two environments: Server Side Technologies and Client-Side Technologies. Server-Side Technologies application developed on a server, away from the customer's Subscriber Identity Module (hereinafter: SIM) or Mobile phone as Short Message Service (hereinafter: SMS), Interactive Voice Response (hereinafter: IVR), Unstructured Supplementary Service Data 2 (hereinafter: USSD), and Wireless Application Protocol (hereinafter: WAP). Client-Side Technologies are developed and implanted on a customer's SIM or mobile phone, as Java. Every of these technologies has different features and processes, and customer required to register them or activate the application in the bank offering this service (Krugel, 2007).

SMS: SMS is now used widely as a business tool, it is mobile technologies that enable the customers to request and receive banking information from their bank on their mobile phone via SMS. There is a limitation on SMS character, it should be 160 characters. (Rotimi, E., Awodele, O., & Bamidele, O., 2007). With SMS banking there is no need to download any application. It's available in all kind phones whether java or no-java, with or without General Packet Radio Service (hereinafter: GPRS) connectivity. To register SMS banking customers need to register phone number in banks. When the registered done, the users will receive instant alerts via SMS on their mobile devices (Anyasi, F., & Otubu, P., 2009). Individuals or corporate bodies can do their SMS banking services such as (Barnes, S. J., & Corbitt, B., 2003):

1. Check the balance account
2. Check the status of a cheque number/book
3. Transfer money from one to another account
4. Request a transaction statement
5. Change the password
6. Pay utility bills

There are two types of SMS applications widely used: First is **push** SMS is sending a message from an application (i.e. SMS server) to the mobile phone. It is a one-way transaction, for example, to withdraw money from the ATM. Second is **pull** SMS is sending a request and getting a reply. It is a two-way transaction where the user sends a request to the SMS banking application and the application replies with the requested information, for example when the user requests his/her account balance or transfers between user's own accounts (Ashraf, 2015).

IVR: It is a phone technology that enables customers to interact with the company host system through configurable voice menus, in real time, using Dual Tone – Multi-Frequency (hereinafter: DTMF) tones. The customers have a choice to select right options by pressing digits. The press of the digit on the phone keypad sends a DTMF tone to the company host system which then selects the required response according to the digit pressed. It contains phone equipment, software applications, a database, and a supporting infrastructure (Krugel, 2007).

USSD: It is a technology unique to GSM. It is a capability built into the GSM standard for support of transmitting information over the signaling channels of the GSM network (Dabas, A., & Dabas, C., 2009). Unlike the asynchronous SMS service, a USSD demand opens a session that may induce other network operation or a USSD response before releasing the connection. Mobile-originated USSD may be thought of as activate for a network operation. USSD works with any mobile phone as the coded commands are entered in the same way as a phone number (Schwidorski-Grosche, S., & Knospe, H., 2002). As SMS, it transports small messages of up to 160 characters between the mobile user and the network. USSD work in two ways: USSD1 and USSD2. USSD1 is one-way communication to the network, while USSD2 two ways communications between the user and the network. USSD2 is several times faster than mobile originated SMS (hereinafter: MO-SMS). It doesn't have the mechanism to store and forward the message (Saxena, N., & Chaudhari, N. S., 2013).

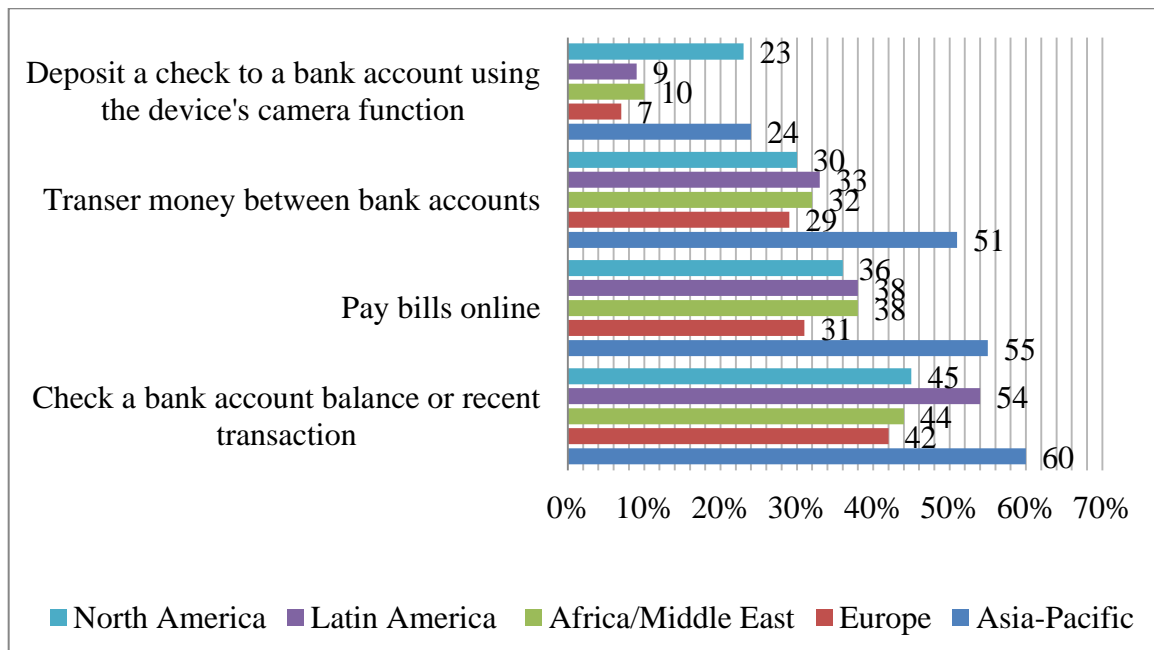
WAP / GPRS: WAP is a set of application communication protocols that allows wireless and handheld communication devices such as mobile phones, pagers, personal digital assistants (hereinafter: PDAs) and other wireless devices to access the Internet (Melzer, 2000). A WAP browser allows all of the basic services of a computer based web browser but is simplified to operate within the restrictions of a mobile phone (Krugel, 2007). The main difference between web and WAP sites is the application environment. While a website is coded mainly using HTML, WAP sites use wireless markup language (hereinafter: WML), based on an extensible markup language (hereinafter: XML) (Barnes, S. J., & Corbitt, B., 2003). GPRS is a mobile data service accessible to GSM users. It provides packet-switched data for GSM networks. GPRS allows services like WAP access, Multimedia Messaging Service (hereinafter: MMS), and for Internet communication services as e-mail and WWW access in mobile phones (Carr, 2007).

Java: Java is a computer programming language. It was originally designed for use on digital mobile devices, like cell phones (Leahy, 2016). Java 2 Micro Edition (hereinafter: J2ME) is a technology that allows the device to run small, user-installable software applications written mainly for mobile devices. J2ME is only the mini version of JAVA. J2ME needs a phone which can assist the GPRS download of the original application, and should have enough memory capability to support or house the application, and enough graphic capacity to display the application (Krugel, 2007).

SIM based application: The SIM Application Toolkit (hereinafter: SAT/S@T) supports for the service provider or bank to house the consumer's mobile banking menu within the SIM card. SAT is a standard of the GSM system which allows the SIM to initiate actions which can be used for various value-added services (Petrova, 2002). SAT contains a set of commands programmed into the SIM card which defines how the SIM should interact directly with the outside world and initiates commands independently of the handset and the network. It allows the SIM to create up on communicating exchange between a network application and the end user, and access or control access to the network (Krugel, 2007).

The research by the Nielsen Company (2016) about m-banking activities, during the six months (from 18.04.2016 to 18.10.2016) shows that checked an account balance or a recent transaction 47%, paid bills 42%, transferred money between the own accounts 36%, and checked a deposited 10% have been done globally (Nielsen, 2016).

Figure 4. Mobile banking activity usage and intentions by region in %



Source: Nielsen, *Digital Deposits: Mobile Banking around the World*, 2016.

Nowadays it is possible to access m-banking using either mobile data services (2G, 3G or even 4G in certain regions) or Wi-Fi. M-banking applications are optimized for all kind of smartphones. It's allowed to download an m-banking application, via bank website which is free on smartphone store, the services which available via m-banking application are (It's all about the money, 2016):

- To access bank account and related services at any time
- All inquiry services like account statements/mini statements/loan statements, it is also allowed to download and print these statements
- Transfer funds between various bank accounts
- Make instant payments
- To pay utility bills like electricity/water or telephone bills, it's also possible to set automatic payments pre-schedules where the payments are automatically disbursed before the due date arrives
- To view the credit/debit card statements
- Request the cheque books/loans/stop payment orders
- To find the nearest location of bank branches or ATMs

2.4 Middleware

One of the main reasons for the fail in the early discussed technologies is a lack of integration with other technologies. There are a lot of solutions for this problem, like re-coding parts of existing systems or replacing them altogether, however, the use of middleware technologies ("Middleware is essentially a layer between two systems that makes it easy for the two to communicate. It can be considered the glue that holds together applications, making seamless connectivity possible without requiring the two applications to communicate directly" (Mule Soft, n.d.)), has attracted many attention and widespread implementation. These technologies allow a different type of systems to interact with each

other, and make it easier to integrate new systems. There are a lot of type middleware technologies such as Object Middleware, Remote Procedure Call (hereinafter: RPC) Middleware, Database Middleware, Transaction Middleware, Portals, Embedded Middleware, and etc. (Apprenda, n.d.), but one which is becoming more dominant is SOA. SOA is at the heart of a revolutionary computing platform that is being adopted worldwide and has earned the support of every major software provider (Erl, 2009). However, the potential benefits of reduced IT costs and greater business agility have motivated many organizations to adopt SOA (Knorr, E., & Rist, O., 2005). SOA is different from other computer applications development paradigms like object oriented software development. Externalizing functionality into reusable components and organizing them into a logical framework that minimizes two of the greatest cause of delay – the necessity for exhaustive communication among the business and IT, and the need for IT to write code is the advantage of SOA over other software development technologies (Shah, M., & Clarke, S., 2009). SOA is the fundamental architectural model that supports the overall paradigm of Services Computing from architecture perspective (Zhang, J., Zhang, L., & Cai, H., 2007). Knorr and Rist (2005), defined it as “a broad, standards-based framework in which services are built, deployed, managed, and orchestrated in pursuit of new and much agiler IT infrastructures that respond swiftly to shifting business demands”. The SOA has major elements such as:

SOA Driver: SOA Driver or enterprise business drivers consist of things such as competition, strategy, regulatory forces and market forces. These combine to drive the business architecture (model) and to shape the measurement and feedback for business-wide performance management (Martin, 2015).

SOA enablers: The main SOA enablers are Enterprise business model, Business performance optimization, Portfolio Rationalization, Enterprise Semantics definition and Key performance indicators (hereinafter: KPI). To have a business model is important for the exact alignment of services with the aims and objectives, and consequently to the overall SOA implementation's success. The semantic information model gives the main and broad business related information for a given enterprise. Portfolio rationalization makes possible consolidation and simplification of applications, data, and infrastructure. KPI make the assessment of the influence of SOA possible and allow measurement of business processes and services to be easier (Rosen, M., Lublinsky, B., Smith, K., & Balcer, M., 2008).

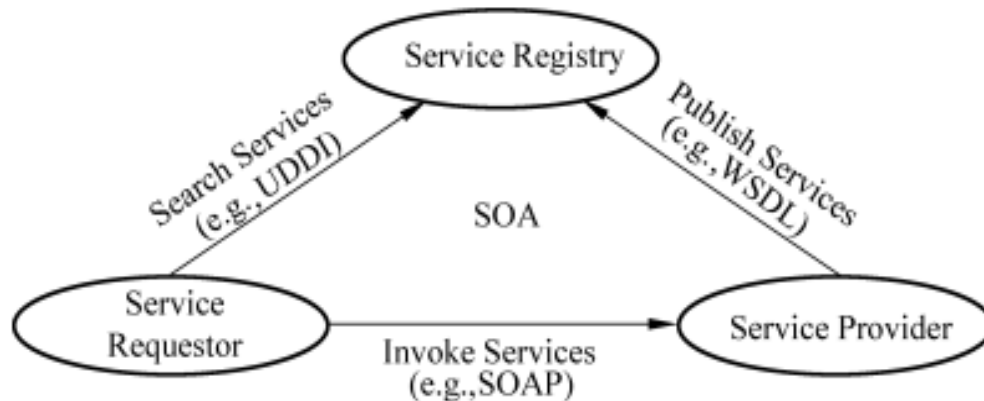
SOA implementation: In an implementation, the main aspects are business services and processes. Business processes are mainly associated with business aims and objectives of operations while, business services should be well aligned and are critical to flexible and successful SOA implementation (Rosen, M., Lublinsky, B., Smith, K., & Balcer, M., 2008).

SOA support: All the functions and elements of the existing applications and systems are made available and usable to the services with the support of some integration services that take off covers from the existing functions via new service interfaces (Martin, 2015).

SOA and web services are two different things, SOA is a conceptual-level architecture model's, meaning that it needs to be implemented and embodied by an IT technology. The Web services are the preferred standards-based way to realize SOA (Mahmood, 2005). Nevertheless, it should be noted that SOA can be implemented by other technologies, such as component engineering and distributed objects. The Web services community has

developed a set of standards to allow standardized communication between the entities in the SOA model (Zhang, J., Zhang, L., & Cai, H., 2007). Universal Description, Discovery, and Integration (hereinafter: UDDI), Web Services Description Language (hereinafter: WSDL), and Simple Object Access Protocol (hereinafter: SOAP) are adopted for Web services.

Figure 5. A simplified Web services-based SOA



Source: L. Zhang, J. Zhang & H. Cai, *Services computing*, 2007.

As shown in Figure 5 a service provider publishes services at a service registry using UDDI. The public interfaces and binding information of the registered services are clearly defined in a standard WSDL. A service requestor communicates with a service provider through a lightweight messaging protocol, SOAP (Zhang, J., Zhang, L., & Cai, H., 2007). It is possible to implement SOA across different projects, both internally and externally, removing the need to rebuild similar services for every project. To support implement SOA, a lot of retailers now offer SOA similar products as messaging solutions or business process management (hereinafter: BPM) tools (Shah, M., & Clarke, S., 2009). Most of the companies are adopting SOA because of the benefits such as:

- **Integrating legacy systems:** With an only architecture, SOA makes easier to integrate modern systems to old legacy systems. As the IT department need to develop an interface to make the legacy application's data available in a standardized format that other SOA compliant systems may understand (Shah, M., & Clarke, S., 2009). Narter and Analyst (2007) noted that "a lot of retailer banks are now focusing on understanding their clients and deepening relationships". In order to understand clients need, they should achieve a single view of the client, so SOA is the most appropriate way to achieve this goal.
- **Better return on investment:** The process involves the creation of robust layers each of these services offers a better return on the investment that was done to create the software (Stevens, 2002).
- **Code mobility:** Location transparency means that the consumer of the service doesn't care where the implementation of the services resides. Companies using SOA can move services to different machines or move it to external service providers (Martin, 2015).
- **The reusability:** An application in SOA is developed by assembling small, self-contained, and loosely coupled pieces of functionality. So the services and codes can be reused several times. To fully benefits from it, companies have to train, encourage

and reward programmers to reuse existing services (Kobielus, 2005). For example, banks are unable to decouple the process, and the services held within each process need to be rebuilt to get the same services in other channels. However, SOA allows banks to decouple services and make them modular so they can be reused across channels (Feig, 2007).

- **Loose coupling:** In SOA is how the services are implemented without influencing other services or applications. The only interaction among the services and application is the publish interfaces. It means the application doesn't interest how the services been implemented (Kumar, 2013).
- **Flexibility:** Compare to other architectures the SOA offer more flexibility. It becomes easier to add or replace a part without moving the other parts when a company has built its systems using SOA. It means in a very short period of time a lot of business processes can be re-engineered or amended (Shah, M., & Clarke, S., 2009).
- **Shorter development cycle:** Kobielus (2005) noted that "the greater service reuse often translates into accelerated development cycles". It means IT departments have greater capability to faster answer to dynamic business needs. Also, the development cycle is decreased, by the decreasing the need for coding (Shah, M., & Clarke, S., 2009).

However these benefits will motivate many businesses to implement SOA, but there are also barriers to its adoption.

- **High investment cost:** For the implementation of SOA need a larger upfront investment by means of technology, development, and human resource. This issue is fewer problems for large organizations with high IT budgets, but for the medium and small-sized organizations, it can be more problematic (Takale, 2016).
- **Complexity:** The implementation of SOA is not easy. According to Erlanger (2005), "the implementing SOA is one of the most daunting projects that an enterprise IT organization can undertake". It represents a whole new way of thinking and doing, one that changes the way developers operate and interact with the business (Erlanger, 2005).
- **Lack of testing space:** Martin (2015) stated that "one of the biggest challenges in SOA is the lack of testing space". In a typical architecture, there are no well-formed or sophisticated tools or methods to test a headless service such as message or database services. The major objective of SOA is to offer agility to organizations. But due to lack of horizontal trust, one needs to invest in a testing framework that would make the challenge easier (Martin, 2015).
- **Choosing a vendor:** As other IT technologies, it is a main question in the SOA context too. Should a company buy SOA similar technologies from one vendor or should company implement a best-of-breed solution? According to Knorr and Rist (2005), "in order to fully benefit from the SOA, the company should best-of-breed solution". Nevertheless, lack of standards in services description can mean that companies have to use significant financial and human resources just to assess the numerous services on offer (Shah, M., & Clarke, S., 2009).

2.5 Website Development Issues

Nowadays the website (e-banking) has a main role in banking it performs as a bank's branch in front of customers. The major difference is that when customers login in their account, they do most of the work by themselves. For this reason, it is very significant to

create a user-friendly and functionality rich website in e-banking environment. (Shah, M., & Clarke, S., 2009). “The Web is more important for retail financial services than for many other industries.” (Mukherjee, A., & Nath, P., 2003). To develop a nice website is not an easy task. It takes a lot of creativity, uniqueness and brainstorming sessions to develop a nice website. But there are several issues which are faced by web developers. Here are some main issues most website developers meet during web design and development.

- **Web site accessibility:** The website mostly designed to work for all people, regardless of the culture, language, location, or physical or mental ability. Yet, one of the main obstacles a web designer faces it to improve the accessibility of the website. The developer should ensure that the website is not the only convenience universally but its various features also work normally (Zorzini, 2013).
- **Compatibility with browsers:** Designers are facing with an issue of creating a website which is compatibility with all main browsers. To avoid such issue, after designing the website, it should be tested on all browsers to be secure that the website is functional totally (Hooton, 2014).
- **Readability:** Readability is also one of the major issues in the developing website. It refers to the practice of delivering the write up in a way that enhances of reading. During developing a great website it is very important to focus on making it readable for all users, regardless of their backgrounds or age groups. According to Haque (2010), a website’s readability includes three essential aspects: typeface, layout or design, and colors.
- **Navigational structure:** It is one of the vital aspects of any website, as the usability of the website is based on an excellent navigational structure. To avoid such issues, designers have to ensure that they provide a proper navigational structure to the customer (Nayanathara, 2015).
- **User experience:** Expectations for simple browser experiences are higher than ever. With the union of the digital and real world, users are expecting to have each application unique to their own consumer experience. With this in mind, developing a foundation dedicated to a simple, personalized experience can be daunting. If done improperly, the company will lose the customer. To avoid this issue, web development must be centered on building a new level of personalization so that each customer believes he/she is an only customer (Glow Touch Technologies, 2015).
- **Security:** To safeguard website against malware, hackers, and delusion. If the customers are not sure about the security of the website, they will not use it (Zorzini, 2013).

As it is presented in table 5, there are a lot of different kinds of website and a common classification. Shah and Clarke (2009) stated that “e-banking and other similar systems, without the benefits of human guidance, are expected to communicate effectively and enhance knowledge and understanding of the sometimes voluminous, and often technical, the information involved in the financial transaction”.

Table 5. Website design strategy

Website design	Definition/characteristic	Promotion measures/ways	Merits
Informational/communication design	This approach is for companies to use the Web as a supplement to traditional marketing, delivering additional benefits to customers and building relationships with them.	<ul style="list-style-type: none"> • Putting banking services on-line • Building broad awareness and image • Using the Web as a cost-effective way to augment their core products with related information and service function • Obtaining cost savings from automating routine customer services 	<ul style="list-style-type: none"> • Providing large quantities of information to customers • Giving a company an instant global presence and attracting people to one's ad, some of them are not the company's target market, but potentially will be • Opening a new communication channel enabling enrichment of relationships with customers • All at a reasonable cost
On-line transactional design	This approach is for companies to use the Web to construct "virtual Business" – independent, profitable ventures that exist only on the Internet	<ul style="list-style-type: none"> • Creating a retail presence larger than any physical presence cloud • Creating a virtual business providing extra information in a form competitors cannot imitate • Creating a virtual business that takes a special product or collectible and sells it worldwide • Creating a virtual business that uses the Internet to produce superior economic benefits to customers that competitors cannot imitate • Creating a virtual business providing convenience to customers that companies cannot match 	<ul style="list-style-type: none"> • Providing a large or more specialized selection of products than competitors can offer • Providing higher quality and higher quantity information, more economic benefits, and more convenience than competitors can offer • Providing a sense of community for customers

Source: C. L. Goi, *A review of existing website models for e-commerce*, 2007.

2.6 E-Banking Systems as a Whole

The banking sector plays the main role in the economy. It has been subjected to a lot of external and internal forces. From external forces, the technological change mostly has the main far-achieving influence in the sector. Technology, especially the Internet, is a key driver of these changes (Shah, M., & Clarke, S., 2009). Commonly computer systems in this sector, either back-end or front-end systems have mostly stayed centralized due to the nature of the business and high-security needs. This to some extent supported banks to automate main business processes by integrating their systems (Achraf, 2006). As noted early systems integration is important for delivering the similar information throughout all distribution channels like e-banking, m-banking, and branch banking. Diniz (1998) introduced "two different classifications of e-banking systems. Both classifications are

created on the level of interactivity of the site (Basic, Intermediary, and advanced) and on the type of opportunities pursued by the bank (Informational, transactional, and customer relationship) as seen in table 6. He found that the kind of technology being used develops with the interactivity and functionality of the bank's website". For example, an informational site is mainly created on a brochure-ware model, but an e-banking website which is oriented towards the management of customer relationships needs more sophisticated technologies like CRM.

Table 6. Framework for classifications

	Basic (Incremental)	Intermediary (Improvement)	Advanced (Transformation)
Information delivery	<ul style="list-style-type: none"> • Electronic brochure • Institutional • Promotional • Contact • Offers 	<ul style="list-style-type: none"> • Search engine • Report download • Recruitment forms • Hot links 	<ul style="list-style-type: none"> • Customize • Subscription • Advertisement • Discussion groups
Transaction	<ul style="list-style-type: none"> • Open account • Product and service request • Investment and credit application 	<ul style="list-style-type: none"> • Balance • Statement • Fund transfer • Bill payment 	<ul style="list-style-type: none"> • Non-branch bank • Banking by service
Customer relationship	<ul style="list-style-type: none"> • E-mail • Suggestion forms 	<ul style="list-style-type: none"> • Calculator • Investment advisor • Software download 	<ul style="list-style-type: none"> • Product and services development • Videoconference

Source: E. Diniz, *Web Banking in the USA*, 1998, p. 58.

24/7 availability of systems and security of data always was the primary challenge perhaps it was more critical in e-commerce. Every unauthorized access to data or unexpected 'downtime' of systems may effect in a public relations disaster. Also, threats from computer viruses, frauds and terrorism are growing (Shah, M., & Clarke, S., 2009). It all means that most of the budget of IT is spent for the avoidance of fraud and disaster recovery systems.

3 KEY TO SUCCESS: CASES AND PRACTICAL SOLUTIONS

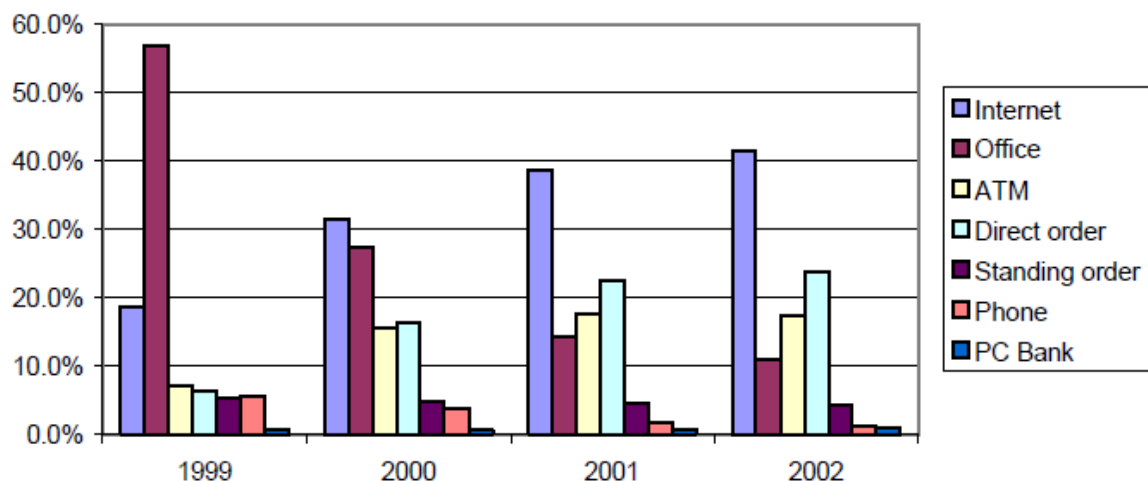
The chapter three is based on earlier chapters and brings together the technical, managerial and social problems argued in this thesis, to provide practical solutions to the e-banking related obstacles and cover detailed e-banking case studies. It includes a number of practical dimensions like tools used to assess e-banking action, practical motives for banks to implement e-banking, factors that drive to their success also the ones which made significant obstacles, for example, the first three cases are based on the different countries how to implement e-banking to be more successful or what are the main factors that make the adoption of e-banking more difficult and the next three cases are based on the implementation of e-banking projects, which methods to use, which tools to use etc. for successful implementation of e-banking in different banks.

3.1 Case 1: Adoption of E-banking: Underlying Consumer Behavior and Critical Success Factors. Case of Estonia

This case based e-banking development in Estonia by Kerem (2003). The reason I chose the case of e-banking development in Estonia is that Estonia is one the country in Europe which was very successful for the adoption of e-banking in the early years of e-banking development. Through this case, I would like to show what was the motivation that population of Estonia adopted e-banking so well in the early years and which methods banks in Estonia used in order to be so much successful.

The background of e-banking in Estonian: In the Estonia market, there are two leading banks Eesti Foreksbank and Eesti Hoiupank whose decision in the field of e-banking are followed by smaller players and they introduced e-banking in 1996. Fast adoption of new technologies has supported the Estonian banks to leapfrog some of the traps that have slowed down the process of development in countries with the better starting position.

Figure 6. Usage dynamics of different transaction methods in Eesti Uhisbank from 1999 to 2002 in %



Source: K. Kerem, *Adoption of electronic banking: underlying consumer behavior and critical success factors. Case of Estonia*, 2003, p. 5.

As seen in figure 6 the e-banking has been successful with respect to both supply of services and number of active customers in Estonia. The functionality development of e-banking is from the general and simple services towards more sophisticated ones. Banks also use their sites successfully to promote and cross-sell their services and products to existing customers.

Motivational aspects of e-banking usage: In Estonia, the e-banking reach via two strategies added convenience and price incentives. One of the main reasons the e-banking in Estonia is successful is that the transaction in e-banking are either considerably lower priced or without any fee at all but for the transactions in branches the fees are very high according to the Estonian standard as the result can be seen in figure 6 that the number of customers visiting branches reduced a lot during 1999-2002. In the beginning, the Internet services were introduced totally free of charge and after acquiring a critical mass of customers the fees was introduced. Two of the leading e-banking have run TV spots and

reminders both in the launch phase and after that and Nordea has promoted solo in print media.

Critical environmental Factors Contributing to the Success of the Estonian e-banking: Estonia is very small country but it has its own remote areas where e-banking is the only possibility to offer banking services at all. The main reason of successful e-banking in Estonia is they enjoy a wide demographic appeal to different age segments.

Enabling environment: The Internet connection costs in Estonia very low. One of the explanations is free telecom market in Estonia, with two big competitors on Integrated Services Digital Network (hereinafter: ISDN) market, for example, the monthly fee for ISDN connection in Netherland is 30 euro, in Finland 65 euros, and in Estonia 15 euros. ICT development of Estonia is in the 23rd place in the world among 75 countries surveyed and in Central and Eastern Europe (hereinafter: CEE) country, Estonia is the only among the top 25.

Management aspects: The Estonian banks accept a long-term perspective. Estonia experience recommends that multi-channels strategy is main viable with different channels complementing each other and catering to different needs of the customers. Also, Estonia e-banking had simple and clear user interfaces and the pricing policy prefers using electronic channels. Estonian banks are successful in delivering user-friendly solutions that are secure and are also perceived to be secure. In general, Estonians are very technology prone and the small size of the market gives excellent conditions to experiment with new solutions (Kerem, 2003).

3.2 Case 2: Practice of E-Banking in Commercial Bank; an Empirical Study in Bangladesh

This case is based e-banking development in Bangladesh by Shakila and Kabir (2012). The reason I chose the case of e-banking in Bangladesh is that e-banking is still in developing level in a country like Tajikistan, for example, the internet penetration in Bangladesh is 13.2% which is less than Tajikistan (Internet Live Stats, 2016).

E-banking in Bangladesh: In Bangladesh, since the mid-nineties, the German banks have been offering e-banking. In 2013, only 7 out of 48 banks were offering basic e-banking. Only a few banks are adopted m-banking in the last years. In 2013, Dutch-Bangla Bank Limited (hereinafter: DBBL) had several hundreds of ATMs in the country. Also, in the past year commercial banks of Bangladesh have become the member of Belgium-based Society for Worldwide Interbank Financial Telecommunication (hereinafter: SWIFT). In a country, the e-banking services vary between the banks, for example, some of them are offering ATM, some are offering m-banking, some offering debit card, etc. (Bony, S. Z., & Kabir, F., 2012).

The result of responding about e-banking: The influence of e-banking has a mixed result in Bangladesh. The result shows that most of the customer answered that it provides better customer services but the problem is that technologies improved but the quality of services is worsening off. Also, the result shows that customers have sufficient knowledge about e-banking services. E-business, especially with the support of e-banking, can develop the economy of Bangladesh in a far better way as customer relationship management growth.

Table 7. Electronic Banking Services in Bangladesh (% of Banks) from 2009 to 2012

Product	2009	2010	2011	2012
M-banking	39	43	45	47
Online banking	30	33	35	40
Electronic fund transfer	36	39	45	48
ATM	52	59	65	69
Debit card	51	58	62	69
Credit card	30	32	38	40
Internet banking	56	60	65	67

Source: S. Z. Bony, & F. Kabir, *Practice of e-banking in the commercial bank: An empirical study in Bangladesh*, 2013, p. 172.

ICT sector: On May 20th, 2006 the Bangladesh has been connected with the information super highway and it is a landmark of ICT sector. The cable network covering around 786 miles across the Bangladesh from the Bay of Bengal provide a fiber optic link with a data transfer capacity of 10 gigabits per second basing on the ICT facilities of e-banking in established. The overall computer density in the banking sector is 1.64 for foreign commercial banks (hereinafter: FCBs) the computer density is 45.34, whereas for National commercial banks (hereinafter: NCBs) 0.43. However, the private commercial banks have a comparatively higher ratio 4.94. In total 81.81%, banks don't have any local area network (hereinafter: LAN), 30% have wide area network (hereinafter: WAN) most of the branches are outside of WAN connectivity.

The advantage of e-banking in Bangladesh: As seen in table 8 the Bangladesh will have the following advantage in the short and long term from the e-banking.

Table 8. Advantage of e-banking in Bangladesh in short and long term

Short-term advantages	Long term advantages
<ul style="list-style-type: none"> • Reduce extra time • Increase productivity and efficiency • Duplication and wastage • Cut down maintenance and shortage cost • Curtail security cost 	<ul style="list-style-type: none"> • Create new job for jobless people • Participate in the country's economic health • Proper planning and monitoring • Proper use resources

Constraints of e-banking in Bangladesh: Development and growth of e-banking in Bangladesh depends on the following factors;

- Availability and development of telecommunication instructors
- ICT operation in e-banking
- Culture of using e-banking
- Legal and regularity framework
- The users of e-banking are in urban areas
- Infrastructure of villages is not suitable for e-banking

Also in some cases, people are facing the following issues

- ATMs fall short of money

- The slow bandwidth of internet may delay the transfer rate. Banks may delay providing PIN number whenever customers loses their Credit or Debit card
- Power failure in the outlets
- Changes are higher for the card
- Password fraud
- Risk of debit or credit card forgery
- Traditional habits of common individuals

3.3 Case 3: Factors Affecting Adoption of E-Banking System in Ethiopian Banking Industry

The case is based on e-banking development in Ethiopia by Bultum (2014). The reason I chose the case of Ethiopia is that Ethiopia is also one of the countries which are on the way of developing e-banking, for example, the internet penetration in Ethiopia is 4.2% (Internet live stats, 2016) which quite low. Based on this case I would like to show that what are the main reasons or main factors affecting adoption of e-banking in Ethiopian banks (Bultum, 2014).

Table 9. E-banking services provided by four Ethiopian Banks

Banks	Services
CBE	ATM, Telephone bill payments, and POS terminal
Dashen Bank	ATM, M-banking, and POS terminals
Wegagen Bank	ATM, POS terminals, and m-banking services
Zemen Bank	ATM, e-banking, POS terminals, and m-banking

Source: A. G. Bultum, *Factor Affecting Adoption of Electronic Banking System in Ethiopian Banking Industry*, 2014, p. 5.

E-banking system in Ethiopian Banking Industry: E-banking launched in Ethiopia in late 2001, when the largest state-owned, commercial bank of Ethiopia (hereinafter: CBE) introduced ATM to delivery services to the local users. The Dashen Bank introduced e-banking in Ethiopia in 2006 and has installed 40 ATMs at convenient locations for its own cardholders at the end 2009. Till 2011 the Dashen bank increased its ATMs to 70 and POS terminals to 704. In February 2009 the three private commercial banks – Awash International Bank S.C., Nib International Bank S.C., and United Bank S.C. has signed an agreement to launch ATM and POS terminal network which called Fettan ATM network. The plan of Fettan ATM agreement was included to install over 140 ATM machine and 340 POSs across Ethiopia. The agreement was the first significant cooperation between competing banks in Ethiopia. Table 9 provides the e-banking services, which are available in the Ethiopia banking industry in 2012.

Factors influencing banks to adopt e-banking system: The main obstacle to the development of e-payments is the lack of customers trust in the initiatives, unavailability of payment laws and regulations particularly for e-payment, lack of skilled manpower and frequent power disruption.

Perceived risk: According to the result of the survey, one of the main obstacles is fear of risk is the hinder adoption of e-banking system in the country. Also, the lack of confidence with the security issue is considered as a barrier for the adoption e-banking system. The

lack of trust on the use of a technological facility provided by the bank is another factor that can hinder adoption of technological innovation by Ethiopian banking industries.

Organizational factor: One of the basic obstacles related with organizational factor is the availability of financial as a well skilled human resource to implement the system. However the general using of e-banking service like e-banking, m-banking and other is not expensive when compared with the traditional banking system. On the other hand lack of social awareness/lack of familiarity with different technology and lack of sufficient skills to use and implement e-banking system were considered as barriers to adopting e-banking system in Ethiopia.

Lack of legal and regulatory Framework: The result of a survey in case study shows that legal framework on the implementation of e-banking system revealed that lack of legal frameworks, cross country legally, and regulatory difference are considered as barriers faced by banking industries for the adoption of e-banking system in Ethiopia.

Lack of adequate ICT infrastructure: The ICT infrastructure in Ethiopia remains inadequate. Card-based payment systems in Ethiopia have been growing fast in recent years. Commercial banks also cited plan to use new technologies for remittance transfers, including mobile phone transfers and remittance-linked financial products like prepaid cards. However, the lack of sufficient telecommunication infrastructure is one of the basic challenges in the development of e-payment in Ethiopia. Also, as noted the e-payment manager from CBE “the poor quality of telecommunication network services is a major obstacle for all banks in Ethiopia to effectively deliver some services such as e-banking, m-banking, etc.”

Lack of competition: Lack of competition in Ethiopia between local and foreign bank hinders Ethiopian banking industries to adopt e-banking system. Ethiopian government doesn't allow foreign banks to operate in the country because they want to protect local banks from the well-developed foreign bank competition.

Government support: Lack of government support is an inhibiting factor for the adoption of e-banking in Ethiopia.

3.4 Case 4: Organizational Critical Success Factors (hereinafter: CSF) in Adoption of E-Banking at the Woolwich Bank

This case based on the Woolwich bank by Shah and Siddiqui (2006). The reason I chose the case of the Woolwich bank because I would like to show that in order to successfully implement e-banking which tools should be used or which methods should be used for the success of the project. I see the case Woolwich bank one of the successful ways that's way I decided to choose this case. The Woolwich bank is one of the leading banks in the United Kingdom provider of personal financial services and products founded in 1897. In 1997, it floated on the London Stock Exchange as Woolwich plc, converting from a mutual building society to a public limited company. In 2000 it was taken over by the Barclays group and makes Woolwich a subsidiary. However, The Woolwich has retained its brand name and continues to offer its own products and services to customers (Shah, M. H., & Siddiqui, F. A., 2006).

E-banking in Woolwich bank: At the Woolwich, all the financial services are design to be available through a variety of different channels like branches, the internet, digital television, or mobile phones. It means the customers have access all-time to their accounts. To enables such kind of access and flexibility, the Woolwich bank continuously invests heavily in technology and has gone through many organization changes.

The reason for Participating in E-Commerce: Since 1997, the Woolwich bank strategy has been focused on adapting to the new world of various delivery outlets beyond the traditional branches network. The main reason was that top management's belief that the winners will be those organizations which combine new technologies with traditional business to provide integrated solutions which meet the customer needs. Another reason was the fast changing environment in the retail banking industry with new entrants, like Smile or Egg, providing financial services using innovative business models and technologies. Also, relative maturity of Internet technologies meant provision of convenient services (via the Internet, WAP phones, and iTV, etc.) to the customer was possible, with a promise of much lower transaction costs.

CSFs in e-Commerce at the Woolwich: E-Commerce is a very successful initiative for the Woolwich, winning the approval of existing customers and attracting new ones.

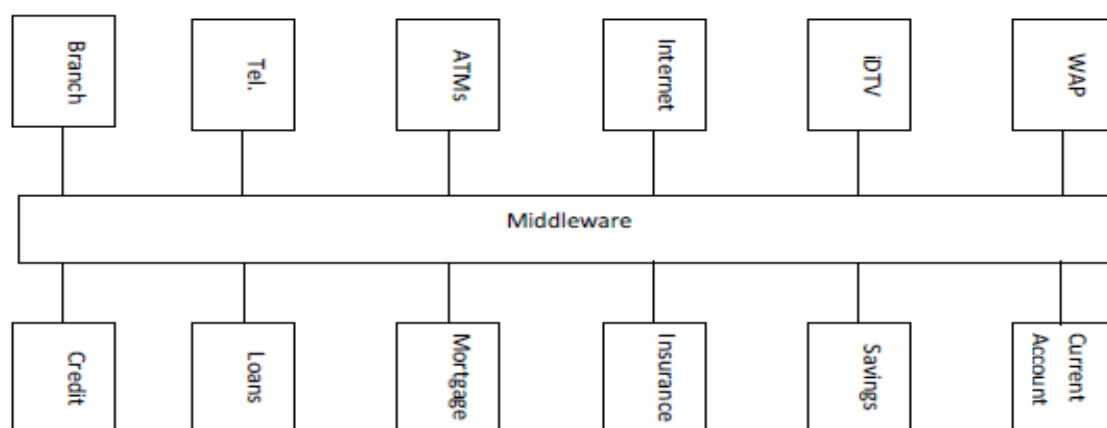
Understanding the customer: This factor is the key to success at The Woolwich. Bank invested heavily in technologies, which allow them to gather and analyze extensive customer information. At a basic level, The Woolwich bank uses a system called 'Quick Stream' which helps them to analyze customer's behavior during his/her visit in bank's website (by proving record of customer's clicks in the form of a stream). Another software tool they use called 'Web trends', which records where people enter the home page, how they navigate through it and how they leave the site. The Woolwich bank also uses a software tool call a 'web-collaboration tool'. It is a call agent that can see where a customer is on the bank website, it can record how long they have been on each individual page. Viewing this information on the screen in real time, a sales agent can type in a message on the customers' screen and offer help and advice.

Organizational flexibility: Improved significantly in term of department structures and business processes in order web could enable itself. The Woolwich bank had a new team such as e-Commerce and other new business processes beyond this team. The Woolwich bank made the potential change to make sure that processes don't inhibit or restrict intersection in term of re-engineering business processes and pre-plan. They integrated and automated processes such as delivering cheque and deposit books at the customer's request. The Woolwich bank didn't decrease the number of staff instead changed their role and geared towards sales.

E-Channel specific marketing: The Woolwich has changed the way the marketing department works in order to cope with new ways of marketing. Now the focus is on understanding customers and using that understanding to enrich relationships with them.

Systems and channels integration: As seen in figure 7 The Woolwich bank use a middleware layer for integration of different systems and channels. It provides a host of different customers (front end systems) to access whole many backend systems. This made the channels interchangeable and allows the bank to add new channels or services without disrupting core services.

Figure 7. Channels and services integration at The Woolwich Bank



Source: M. H. Shah, & F. A. Siddiqui, *Organisational critical success factors in the adoption of e-banking at the Woolwich bank*, 2016, p. 452.

Availability of resources: The Woolwich created a team for solving this issue, selected carefully members of the existing staff and provided a training program for them. For example, when they implemented WAP, there was no one in the country who knew about the implementation of WAP technology for financial services so the bank decided to send seven of their people to Helsinki for training. Also, people from other organizations like Unisys were brought in.

Support from the top management: John Stewart the chief executive of The Woolwich during the implementation of the project worked out the Open Plan came up with the finances and participated in the everyday running of the project.

Security: The Woolwich bank uses encryption in all areas of their front end and back end system. For WAP the Woolwich only support Nokia sets which are the only company in the United Kingdom, offering the same level of encryption as they use. The Woolwich also use secure layer technology which encrypts all of the information, from a customer logging in or filling in an application form to storage and feedback to the customer.

Mixed strategy selection of vendors: The Woolwich has adopted a mixed strategy. They try to get most of the components from Microsoft, but where requirements dictate, they also get some components from other vendors or develop themselves.

System change management: In the Woolwich bank for the main decision, they consulted most of the staffs. E-commerce is very aggressively developed within the organization in several ways. "First, they make sure that every employee has access to the Internet. Second, they encourage them to open 'Open Plan' accounts by putting £100 in the accounts of those who do, so they could actually experience the new e-Channels. Third, when WAP was launched, they provided a WAP phone to those who wanted one. Fourth, they put Internet booths in branches so staff could experiment with it and promote it to the customers". Weekly and monthly the Woolwich staff gather to have a chance to discuss all aspects of a change. Also, the company's internet and monthly newspapers are used for this purpose. This strategy supports to make the staff to feel an important part of the change and ease resistance to change. The main benefit of this strategy is useful feedback, which is important for improving services and systems interface.

3.5 Case 5: A Decision-Making Framework for SOA Adoption in E-Banking; a Case Study Approach

This case based about the Lambank by Basias, Themistocleous, and Morabito (2015). The reason I chose this case because through this case I would like to show for the adoption of e-banking which tools would be a better option and to make the best decision before starting the project. Lambank is one of the large banks in America with more than 4,500 branches and more than 250,000 employees. It is one of the leading global financial services company with 200 million customer accounts and does business in more than 100 countries, providing customers, corporations, governments, and institution with a broad range of financial products and services, such as consumer banking and credit, corporate and investment banking, securities brokerage, wealth management and e-banking (Basias, N., Themistocleous, M., & Morabito, V., 2015).

E-banking in Lambank: E-banking is very important for Lambank. It offers online clean pages and clear menus to make it easier for customers to find exactly what they need. The bank also, rewrote all product and services information on the site, replacing technical, industry-specific terminology in a clearer picture. Also for successful e-banking services the Lambank established and configured new systems to ensure that sufficient, meaningful and clear information is generated.

Problems / Solutions: Lambank as the large bank faced with integration issue that's why in the last several years Lambank invested the multi-billion dollar in IT to integrate its customer branches and product around the world. The Lambank as solution implemented SOA.

Top management: Lambank made a clear strategy driven from the top management. Their strategy took into account the effect of e-banking and should be clearly disseminated across business, supported by a clear business plan with an effective monitoring of performance.

IT infrastructure: Lambank used a complex IT infrastructure to run its operations and IT infrastructure complexity is frequently cited as a reason for failure in SOA projects.

Security: Lambank used firewalls and highest levels of encryption to secure e-banking. It also used secure layer technology which encrypts all of the information, from a customer logging into feedback to the customer.

Cost/benefits of SOA adoption: The bank tried to measure possible benefits from reduced downtime, improved time to market, improved customer services and reduced IT costs since SOA adoption and the total possible investment for SOA adoption in hardware, software, requirements, annual maintenance, customization, training and consulting. So far Lambank was spending \$950 million and as result, expenses have increased by 9% and are expected to be high until the end of the project.

3.6 Case 6: Customer Relationship Management in Banking Sector and a Model Design for Banking Performance Enhancement

This case based on Garanti Bank by Onut, Erdem, and Hosver (2008). The reason I chose the case of Garanti Bank is that because the bank wanted to be more profitable and to be

more competitive compared to other banks in Turkey. They decided to implement several projects and I would like to show that Garanti bank which methods used or how they implement different projects for making itself more modern bank in Turkey compare to its competitors.

A model Design for CRM at Garanti Bank: Garanti Bank is one of the leading banks with 2 million customers in Turkey wanted to improve its service quality and increase the number of its customers. E-banking in Garanti bank has been proved an achievement in getting new customers until the end of 2001. After that, the bank decided to re-engineer its main business process. To meet the requirement of large Turkish and multinational corporate customers, to increase commercial banking business and etc. were given strategic lines. Since 1992, Garanti Bank has implemented many projects regarding branch organization, processes and information systems to help this strategy. As a result, the administration work has been decreased a lot and modernized as much as possible. Business process reengineering (hereinafter: BPR) projects have been done by rationalizing and modernizing the operational systems and subsequently by the introduction of innovative channels like e-banking, call center, and self-servicing.

CRM development: Garanti Bank developed a CRM system to change economic conditions and in individually to decrease the inflation rate scenario. The importance for the bank of managing the relationship with their customers has been the drive of the joint projects that have been developed by International Business Machines (hereinafter: IBM) in the last three years. During the projects, several crucial technological and architecture choices have been made to implement the entire process. The project has been undertaken by the bank with the spirit that has characterized the complete CRM development. The project has supported a huge involvement of the branches, especially of the portfolio managers and campaigns have been launched for popularizing between branch staff the importance of gathering and maintaining reliable customer data. Another set of approaches has been tried for the customer not included in portfolios (pool customers), like mailing or distributing questionnaires in the branches or ATM and the call center. Methods for data examination and testing have been created to be regularly employed by the bank's staff. The result was very good for portfolio customers, data available are respectively 98% for the commercial ones and 85% for the retail ones. For pool customers' availability was reduced to 65%.

Data warehouse: Garanti Bank has chosen an incremental method for implementing its DW, where the development of information systems is integrated with the business strategy. Instead of developing a whole design of a corporate DW before implementing it, the bank has decided to create a portion of the DW to be utilized for customer relationship management and for the production of accurate and consistent management reports. The Garanti Bank DW is commonly populated both from operational systems and from intermediate source obtained by partial pre-processing of the same raw data such as customers' demographic data, product ownership data, and transaction data or more generally product usage data as well as risk and profitability data.

Marketing Campaigns: The Garanti Bank has utilized the Marketing Campaigns to test the early described analyses and techniques. Different kind of experimental campaigns has been designed and carried out to test the soundness of the approach before trying a huge scale roll-out. The product utilized customer data stored in the DW and at the same time manages itself a smaller local database, where campaign data are temporarily stored. The data must be copied manually into the DW when the campaign has been finished. The

results achieved by extensive usage of customer data to develop and apply Relational Marketing have convinced the Garanti Bank to proceed along the line undertaken (Onut, S., Erdem, I., & Hosver, B., 2008).

4 DEVELOPMENT E-BANKING IN TAJIKISTAN

Chapter four is based on e-banking development in Tajikistan in order to find out the level of development of e-banking in the country. It will cover the general overview of the country (education, economy, insurance sector) and banking sector mainly e-banking development in Tajikistan. The goal of this chapter is to cover all the main factor which influence the adoption of e-banking or development of e-banking in Tajikistan

4.1 General overview of Tajikistan

Tajikistan, officially the Republic of Tajikistan is a country in the heart of Central Asia. After the breakup of the Soviet Union on September 9th, 1991 Tajikistan announces its independent, however, the beginning of a new life was marked by the beginning of the civil war between regional groups during 1992-1997 (Advantour, n.d.). The country is surrounded by Afghanistan on the south 1,357km, China on the east 477km, Kyrgyzstan on the north 984km, and Uzbekistan on the west 1.312km (Infoplease, n.d.). Tajikistan is divided into 4 administrative divisions. These divisions are the provinces of Sughd (capital: Khujand), Khatlon (capital: Qurghonteppa), the autonomous province of Gorny-Badakhshan (capital: Khorugh), and the Region of Republican Subordination. Dushanbe is capital and largest city in Tajikistan (Nationsonline, n.d.). The total area is 144,100sq km, 141,510sq km of it is land, and 2,590sq km is water. 93% of Tajikistan is mountains the highest point is Qullai Ismoili Somoni and peaks at 24,589 ft. (7,495m) (World Atlas, n.d.). The current population is 8.782.467 and 27.5% or 2.434.616 of the population is urban, the median age is 22.7 years (Worldometers, 2017). The official language is the Tajik language is very close to Persian, spoken in Iran, and to Dari, spoken in Afghanistan (BBC, 2015), Russian widely used in government and business. Ethical groups, 84.3% is Tajik, 13.8% is Uzbek (includes Lakai, Kongrat, Katagan, Barlos, and Yuz) 2% is the rest (includes Kyrgyz, Russian, Turkmen, Tatar, Arab, and etc.). The main religion is Islam, 85% Sunni Muslim, 5% Shia Muslim, and 10% is another religion (Central Intelligence Agency, 2017).

4.1.1 Education

After the civil war, a system of Education of Tajikistan was devastated like other national infrastructure. One out of five schools was destroyed during the civil war. For example in 1982, there were 1,498 kindergartens with coverage by a preschool system of 228,773 children in the country, however, there is only 460 of them is working and mainly in the urban areas with limited facilitates and staff (Unicef, n.d.). Education consists of four years of primary school followed by two stage of secondary school, lasting five and two years. Attendance at school is mandatory from age seven to seventeen (Class Base, n.d.). According to the Law on Higher Education and Professional Postgraduate Education and National Standards for Higher Professional Education in Tajikistan, there are three types of higher education institutions; Universities, academies, and institutes. Universities provide higher education in a wide range of specializations and carry out fundamental and applied research. Institutes offer only Bachelor and Specialist degrees and it provides education in one or several fields. Academies concentrate on a limited number of fields in which they

provide education and carry out research (Tempus, 2012). The total number of high school growth from 13 in 1991 to 30 in 2012. Education in high schools and Universities conducted in Tajik and Russian languages. In some cases, there is a practice of teaching individual courses in English (The Embassy of the Republic of Tajikistan to the United Kingdom of Great Britain and Northern Ireland, n.d.).

4.1.2 Economy

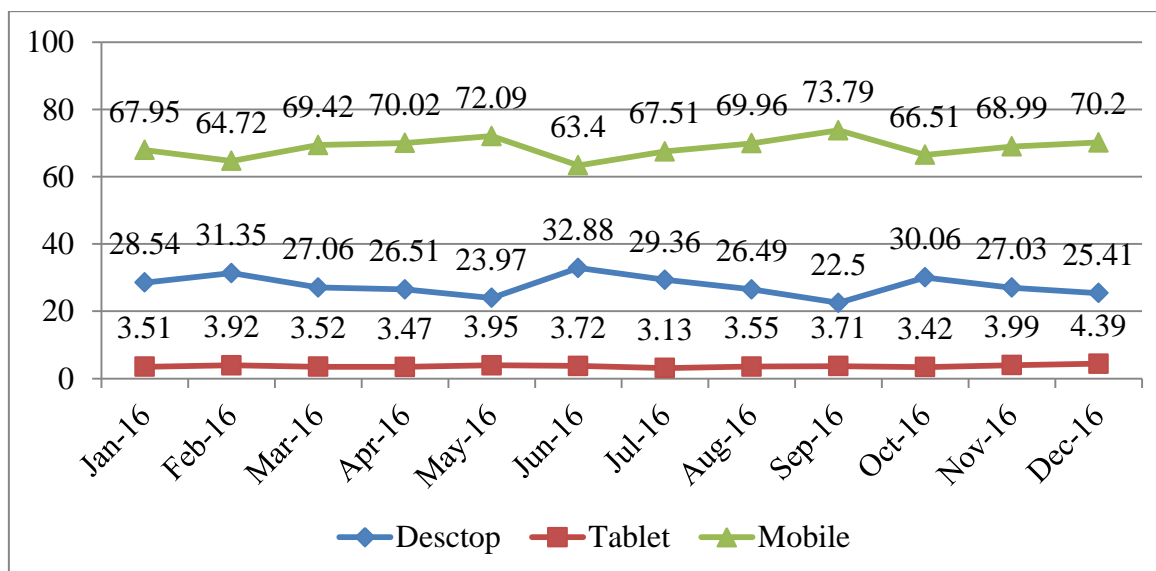
During early 2015-2016, Gross Domestic Product (hereinafter: GDP) grew from 6.4% to 6.6%, Industry expanded by 12.1% vs. 14.2%, reflecting increases of 50.0% in extracting, 8.1% in processing, and 3.4% in electricity. Aluminum exports reached 73,500 tons, construction increased by 18.9%, fuelled by public and foreign investment, while trade and services expanded by 3.4%. Good weather contributed to a 9.9% increase in agriculture (Asian Development Bank, 2016). The economy of the country is dependent on agriculture and livestock raising. Two-thirds of the population is engaged in subsistence agriculture, and around half of the workforce has been employed in Russia or other foreign countries, and the remittances of workers about forms a significant portion (40% to 50%) of country's GDP (Infoplease, n.d.). During 1999-2014 the poverty reduced from 80% to about 31.3%. However, the non-monetary poverty didn't reduce so much. Lately available micro-data propose that limited or no access to education (secondary and tertiary), heating, and sanitation are the major contributors to non-monetary poverty. Also during the winter time, around 70% of the population suffers from electricity deficits (World Bank, 2016). The Public investment is 12% of GDP, and private investment is only 3% of GDP which is much lower than the average of the Europe and Central Asia developing country (World Bank, 2016). The rule of law is very weak, and corruption and bribery are widespread. State interference limits investment and development in the private sector. State-owned enterprises dominated many sectors of the economy, stifling entrepreneurialism (Miller, T., & Kim, A. B., 2016). The main imports of the country are aluminum production, energy (electricity, natural gas, petroleum and petroleum products), consumer and capital goods, grain, and flour. The main partners for imports are Russia, Kazakhstan, the European Union, China, and Ukraine. During the November to December 2016 imports increased from 254 USD Million to 285.30 United State Dollar (hereinafter: USD) Million (Trading Economics, 2017). Over 75% of export in Tajikistan are the aluminum and cotton. Electricity is the third most important export, a by-product of the country's hydroelectric dams. The main export partners are China, Turkey, Russia, Iran, and Afghanistan. During the November to December 2016, the exports increased from 66 USD Million to 89.30 USD Million (Trading Economics, 2017).

4.2 Telecommunications Sector

The telecommunication sector, or in general term, the ICT sector of Tajikistan, is one of the fastest growing sectors of the national economy. Compare to all the former Soviet republics, in Tajikistan ICT was arguably the least developed. The mobile market is growing strongly in Tajikistan but the fixed broadband penetration remains very low. Mobile penetration in 2014, reached 138% of the total population (Atoev, A., et. al, 2015). In the mobile market of Tajikistan, there are four main operators; **Tcell** is a mobile network brand in Tajikistan, created by the merger of two big national companies Indigo Tajikistan and Somoncom. From 2007 is a part of the TeliaSonera group, one of the world's major telecom operators. Tcell is leading operator in Tajikistan with 3.2 million subscribers (Tcell, n.d.). **Babilon-mobile** is the largest operator of mobile communication services of Tajikistan. The Babilon-m provides the widest range of up to date services in standards

GSM 900/1800, 3G-UMTS/3.5 HSDPA/4G-LTE. Its commercial launching was implemented on January 1st, 2003 today the Babilon-m have 3.3 million subscribers (Babilon-mobile, n.d.). **MegaFon** is joint Russian-Tajik enterprise. The list of company shareholders includes the national operator Tajik Telecom and Megafon, the first all-Russian mobile operator. On September 3rd, 2001 launched and began providing services in GSM900/1800 MHz to Tajik users, today has 1.9 million subscribers (Megafon, n.d.). **Tacom/Beeline** is a telecom operator with a license for providing cellular services in GSM 900/1800, UMTS, telematics services and data services, as well as services and international long distance services in Tajikistan. 80% shares of Tacom owned by Russia's VimpelCom (Beeline, n.d.). In 2016, some operator started to offer 4G, but still, the connection speed stays poor (Eurasianet, 2016). During 2016, according to the Global Stats (2016), the market share of mobile phones was higher compared to the desktop and tablet as seen in figure 8 (Stat Counter Global Stats, 2017).

Figure 8. Desktop vs Mobile vs Tablet Market Share in Tajikistan 2016 in %



Source: Stat Counter Global Stats, *Desktop vs Mobile vs Tablet Market Share in Tajikistan January to December 2016*, 2016.

4.2.1 Internet

The Internet was available in Dushanbe, Tajikistan in 1999 with a single service provider. The number of providers increased from 7 in 2004 to 1,158 hosts in 2008. There are four Internet companies; Babilon-T, Telecomm Technology, Eastera, and Intercom delivery via fiber optic cable (Silkproject, 2012). Internet access technologies in the market include traditional dial-up, digital subscriber line (hereinafter: DSL), Wi-Fi and Worldwide interoperability for Microwave Access (hereinafter: WiMAX) (Atoev, A., & Ibodova, P., 2008), though mobile technologies include GSM, third generation services (hereinafter: 3G), code division multiple access (hereinafter: CDMA), and fourth generation services (4G) networks (Export.gov, 2016). There are a lot of Internet cafes mostly in the cities however some of them offer only computer games only. On June 30, 2016, the Internet users were 1,622,924 as seen in table 10 (Internet Live Stats, 2016).

Table 10. Central Asia internet users, population data, and Facebook statistics – June 2016

Countries	Population (2016)	Internet users, (Y 2000)	Internet users 30.06.2016	Penetration (% Population)	Users % Central Asia	Facebook 30.06.2016
Kazakhstan	18,360,353	70,000	9,966,444	54.3	0.5	1,500,000
Kyrgyzstan	5,727,553	51,600	2,076,220	36.2	0.1	360,000
Tajikistan	8,330,946	2,000	1,622,924	19.5	0.1	84,000
Turkmenistan	5,291,317	2,000	789,151	14.9	0.0	15,000
Uzbekistan	29,473,614	7,500	15,453,227	52.4	0.8	530,000

Source: Internet World Stats 29,907,966 *Internet users in Central Asia*, 2016.

4.3 Banking Sector

The banking sector remains small compared to other Caucasus and Central Asia (hereinafter: CCA) countries and is concentrated in the five largest banks Amonatbank, Tajiksodirotbank, Agroinvestbank, Orienbank, and The Frist Micro Finance Bank (Lucock, D., Okeefe, G., Fatkullina, G., & Mueffelmann, S., 2013) as seen in table 12. These banks held more than 75% of banking system assets, more than 90% of household deposits, and 75% of loans (Lucock, D., Okeefe, G., Fatkullina, G., & Mueffelmann, S., 2013). The banking structure in Tajikistan is two-tiered; the National Bank of Tajikistan (hereinafter: NBT) performs central bank functions, while commercial banks represent the second level. In 2011, NBT selected the global payment software provider “Compass Plus” to combine the existing infrastructure of bank card acceptance in Tajikistan on a single national platform, enabling secure card operations in the country and delivering access to the advanced payment technologies such as internet banking and m-banking (Compass Plus; Infusing Tradition with innovation, 2012). As on January 2016, there are 104 credit institutions, including 18 banks, 38 microcredit deposit organizations, 14 microcredit organizations and 34 microcredit funds function in Tajikistan as seen in table 11 (National Bank of Tajikistan, n.d.).

Table 11. Structure of banking system of Republic of Tajikistan

Structure	31.12.2015	31.12.2016	Change (+/-)
1. Credit organizations (total)	123	104	-19
1.1.Banks	17	18	1
1.2.Microfinance organizations	106	86	-20
1.2.1. Microcredit deposit organizations	39	38	-1
1.2.2. Microcredit organizations	31	14	-17
1.2.3. Microcredit funds	36	34	-2
2. Structural division of CO (total)	1671	1857	186
2.1.Branches	432	437	5
2.2.Centers of banking service	1239	1420	181
2.3.Remittance offices	-	4	4

Source: National Bank of Tajikistan, *Review of Banking System of the Republic of Tajikistan on December 31, 2016*, 2016, p. 1.

National Bank of Tajikistan: NBT is the central issuance reserve bank of Tajikistan and its ownership of the Tajikistan. NBT by its decision can open departments and representatives in the country and abroad. It can provide banking services to foreign, government, financial and banking institutions and also to international institutions where the NBT or Tajikistan has a membership (National Bank of Tajikistan, n.d.). It develops and implements state monetary and exchange policies to help the stability of the national currency's purchasing power. One of the major goals of NBT is to provide an efficient and reliable national payment system (Compass Plus; Infusing Tradition with innovation, 2012).

Amonatbank: It was founded in 1885, given a status of State Bank in 1998. From 2004 a member of the World Savings Banks Institute (hereinafter: WSBI), a member of SWIFT and connected up to it, and from 2008 a member of Interbank Consortium of Shanghai Cooperation Organization (hereinafter: SCO) and an Associated member of International Pay System Visa International (Nurmahmadzoda, 2015).

Tojiksodirotbank: It is the second largest bank in Tajikistan was founded in 1990 (Asia-Plus, 2017). The policy of Bank is absorbed on maintenance of high rates in the growth of the volume of bank services, an increase of the bank stock, minimization of risks, an increase of the level of customer services, and an establishment of long-term partner attitudes. It holds the leading position in the basic segments of the financial market, about 20% of the equity of 12 banks of Tajikistan falls to Tojiksodirotbank. In 16th, November 2016 Tojiksodirotbank released the first chip Union Pay International payment system in Tajikistan (Tojiksodirotbank, n.d.).

Agroinvestbank: It was founded in 1992, is one of the largest and most stable financial institutes of Tajikistan. The informational strategy of Bank is based on the principles of transparency, timeliness, maximum accessibility and unfailing adherence to the principles of business ethics. The capital stock of the Bank is formed by individuals and legal entities – residents of the Republic of Tajikistan and European Bank for Reconstruction and Development. From 1st July 2016, Agroinvestbank made the connection to SMS and internet banking services free of charge (OJSC «Agroinvestbank», n.d.).

Orienbank: It was founded in 1925, is one of the oldest and largest banks in Tajikistan. In terms of assets and capital is among the largest financial institutions. The Bank provides a wide range of financial products and services such as deposits, payment cards, customer loans, travel loan, pawn loans, business account, cash collection services, and etc. (Asadullozoda, 2016). Orienbank was the first bank in Tajikistan to join SWIFT code, Visa international, Europay and Set-Top Box (hereinafter: STB), and the first partners in Tajikistan with money transfer companies, such as “Western Union, Migom” and others in 2002. In 2004, became an associate member of Visa international. Also, in 2006 Orienbank was the first bank in Tajikistan to offer the Internet Banking to its customers (Orienbank, n.d.).

The First MicroFinance Bank (hereinafter: FMFB): It was founded in August 2003 and was officially registered with the Ministry of Justice of the Republic of Tajikistan. The vision of bank in Tajikistan is to be the most trusted bank, operating to international standards of ethics, prudence, and customer service, through the reliable delivery of high-quality banking services in all regions of Tajikistan to its Small and Medium-sized Enterprises, Micro Finance, Retail and Corporate. The Mission of the bank is to contribute to the improvement of the quality of life of the population in Tajikistan by providing

access to finance and banking services and contribute to the economic development of the country. The Shareholders of FMFB are Aga Khan Agency for Microfinance since 2007, KfW banking group since 2004, Aga Khan Foundation Tajikistan since 2003, and The Aga Khan Fund for Economic Development since 2015 (First MicroFinance bank, n.d.).

Table 12. Banks products and services in five big banks in Tajikistan

Name	Products & services
Amonatbank	75 branches, 513 banking centers, 221 money transfer points, and 54 exchange points, 2,748 employees, offers services to more than 6,000 public sector institutions, 11,000 non-public organizations, 622,000 pensioners, 748,000 depositors, e-banking, cards (Korti Milli, Korti Nafakavi, Visa Electron), ATMs, and POS http://www.amonatbank.tj/tj/
Tojiksodirotbank	43 branches, POS, e-banking, cards (Visa electron, Visa Classic, Visa Gold, Maestro Electron, Maestro Classic, Maestro Gold), transfer systems (Western Union, Inter Express, Contact, and Unistream). http://www.tsb.tj/tj/
Agroinvestbank	61 branches, 2 operational departments, 126 centers of bank services, 267 money transfer points, 163 ATMs, 287 POS, types of cards (Maestro, Maestro Gold, Standard, Business, Visa Gold, Business, Classic, Electronic and 'Korti Avvalini Dohili' (hereinafter: KAD) the first international card), internet banking, m-banking, SMS banking, transfer systems (Western Union, Zolotoi karon, UNI stream, Contact, Anelik, MoneyGram international, Blizko, Inter express, begom, Lider). http://www.agroinvestbank.tj/en/index.php
Orienbank	32 branches, 8,923 shareholders, more than 16 correspondent banks, more than 1,200 employees, and over 75,000 customers, e-banking, 60 ATMs, 32 POS terminals, card (Visa Electron, Visa Classic and Visa Gold), money transfer systems (By requisites, Contact, Unistream, Inter express, Anelik, Zolotaya Korona, Money Gram, Faster, Blizko, Western Union, and Lider). http://www.orienbank.com/en/
The First Micro Finance Bank	7 full-scale branches, 28 banking service centers (hereinafter: BSCs), 17 ATMs, 18 cash-in Terminals, e-banking, SMS banking, individuals cards and gift cards, Payroll services, Web Portal for individual Card Account management, Web Portal for Institutional customers, more than 100,000 customers, and over 400 million TJS, money transfer systems (Western Union, MoneyGram, Leader, Zolotaya Korona, Contact, Unistream) http://fmfb.com.tj/en/

4.4 Electronic Banking

E-banking in Tajikistan is mainly focused on the card and payment terminal channels as seen in table 13, instead of the internet or mobile systems. Nevertheless, there are good an opportunity to spread it, mostly through mobile phones. Whereas the internet banking is an option too, however for the sake of the low online access for those financial institutions which are in the rural area it would be difficult to implement it (Lucock, D., Okeefe, G., Fatkullina, G., & Mueffelmann, S., 2013). Tajikistan is one of the first countries in Central

Asia region to implement electronic government-to-consumer (hereinafter: G2C) payments in 2009 (Chun, 2013).

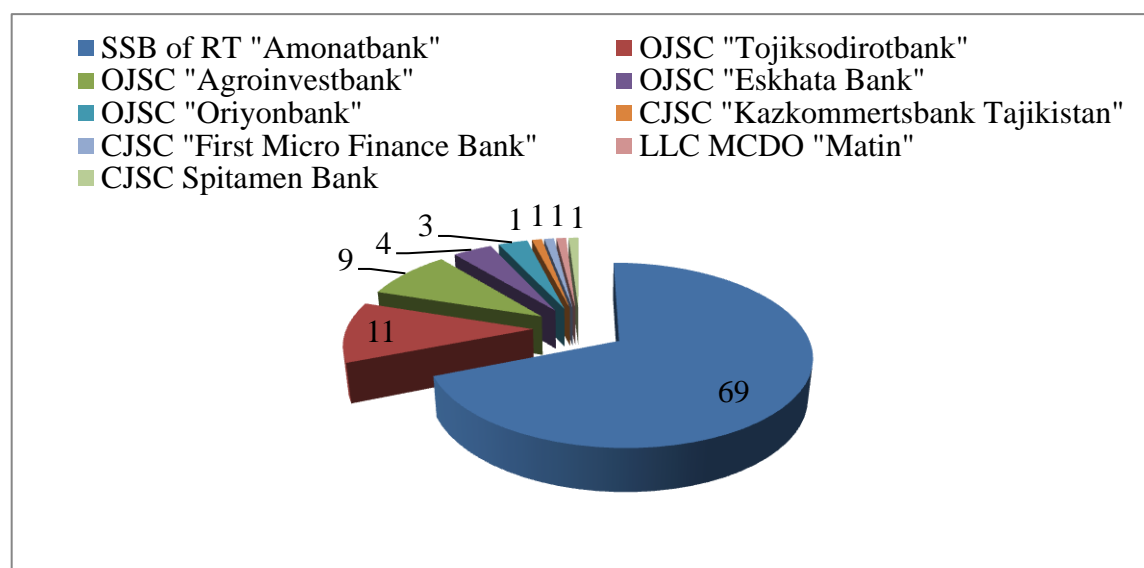
Table 13. Available e-banking services

Type of E-banking Payment	Description
Government to consumer (G2C)	Pension via plastic card accounts held by Amonatbank launched in January 2011. Salary payments for government employees.
Consumer to consumer (hereinafter: C2C)	Available to e-banking customers at the commercial banks Agroinvestbank and Tojik Sodiro Bank. The majority of international remittances transmitted on a cash basis using a money transfer organization. Significant interest from banks, money transfer organizations, and payment service providers to offer these services electronically.
Business to consumer (hereinafter: B2C)	Four options: <ul style="list-style-type: none"> • Payment service provider's payment terminals and dealer networks provide payments to utilities, mobile network operators, and other businesses, either via the terminal or agent use of a mobile application or web interface. Note that these are only partially electronic, in that they rely on cash deposited to the terminal and/or agent and are not linked to existing deposit accounts or electronic funds. These payments can also be made from the Russia Federation, where payment service provider networks operate cross-border. • E-banking services offered by commercial banks. • Bill payments via ATM networks. • Card payments via the point-to-sale network at the merchant. Very small network available.
Business to business (hereinafter: B2B)	Payment-service-provider networks also available for business-to-business payments, but, again, they rely on cash deposit.

Source: D. Luckock, G. O'Keefe, G. Fatkullina, & S. Mueffelmann. *Regional: Financial Sector Development in Central and West Asia*, 2013, p. 23.

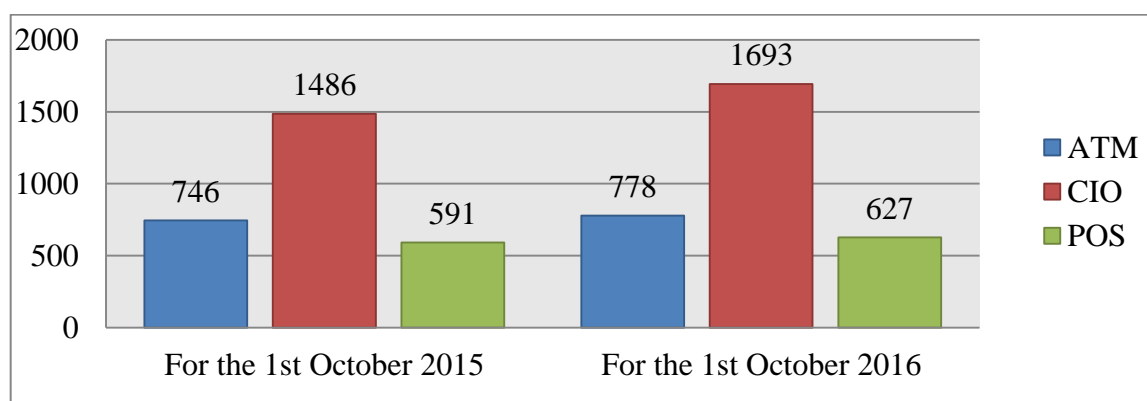
The majority of the population in Tajikistan don't use formal financial services. They rely instead on cash and informal services for transactions, savings, and credit which is very costly and very risky. To decrease the cash settlements and development of clearing settlements in the filled with retail payment, development of payments cards market are a key solution. In 2015, the Tajikistan National Net Settlement System (hereinafter: TJ NNSS) was launched in the territory of the Tajikistan that has made possible to effect payments in national currency (TJS) on operations by Visa cards. The number of issued payments cards by credit institutions consist 1 607 304 units, that are more for 21.2% in comparing a year before. Out of this quantity of issued payment cards, 73.1% are cards of National Payment System "Korti Milli", 20.2% are cards of the international payment systems (Visa and MasterCard), 6.6% are payment cards of local systems of the credit organizations and 0.5% are the combined payment cards (Union Pay-NPS "Korti Milli"). According to the data from the NBT Amonatbank is a leader in share of a payment card in Tajikistan it shares 69% of the total market as seen in figure 9. (National Bank of Tajikistan, n.d.).

Figure 9. Share of payments card issued by credit organizations of Republic of Tajikistan in %



Source: National Bank of Tajikistan, *Payment Cards Market*, n.d.

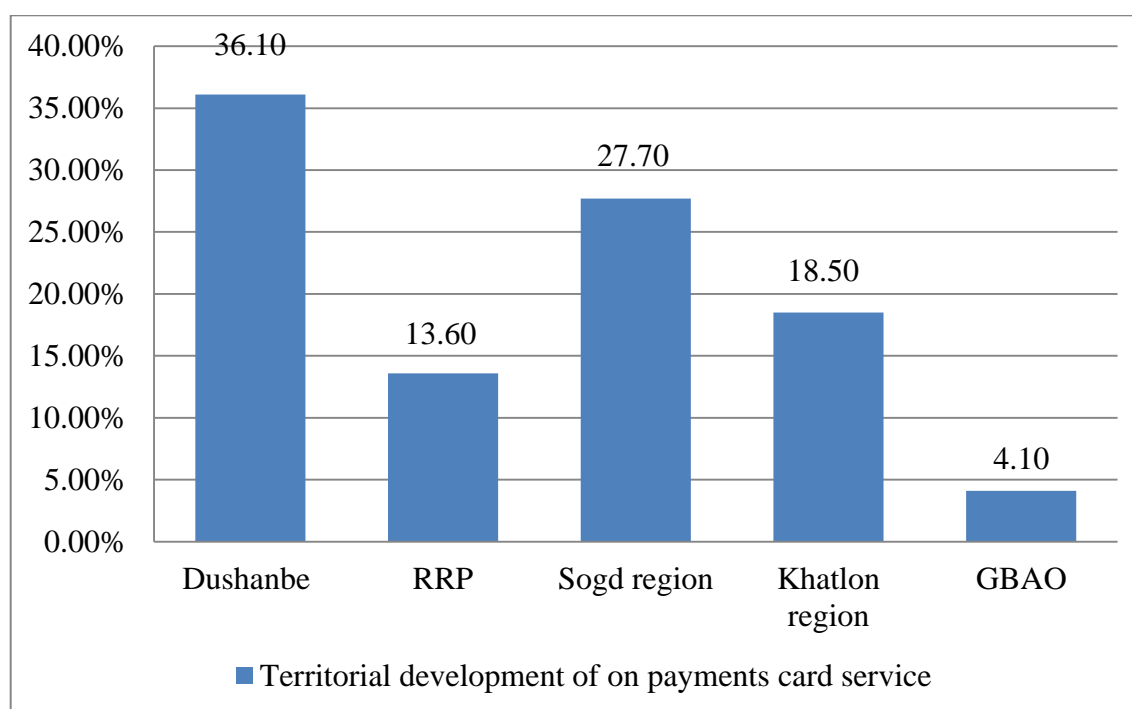
Figure 10. Dynamics of Infrastructure development intended for implementation of operations by using of payment card (units)



Source: National Bank of Tajikistan, *Payment Cards Market*, n.d.

The main function of plastic cards is to withdraw funds from bank accounts at ATMs, this represented 93.9% of all transaction reported on October 1st, 2016. The rest 6.1% of the transaction were made for payments with plastic cards, representing that merchant networks accepting card payments are largely undeveloped. The low number of POS (627) and the national network of ATMs (778) are only marginally better as seen in figure 10. The infrastructure of payments card services basically is focused in Dushanbe and is under-developed in the country's regions as seen in figure 11 (National Bank of Tajikistan, n.d.).

Figure 11. Territorial development of on payments card service in %



Source: National Bank of Tajikistan, *Payment Cards Market*, n.d.

M-banking: On July 21st, 2014, with the lead of the NBT and with a help of European Bank for Reconstruction and Development, German Agency for Cooperation (hereinafter: GIZ), and International Financial Corporation m-banking were introduced, with the participation of the ministries, agencies, and credit institution of the Tajikistan. M-banking is offering by four largest financial institutions Argoinvestbank, Micro Lending Organization Avfar, Micro Lending Organization Samar, Imon IMON International (National Bank of Tajikistan, n.d.). Asia-Plus (2016) noted that in September 2016 “the World Bank Group launched a wide-ranging project to support the development of m-banking. Institution support regulatory reforms related to electronic and digital payment services help raise awareness among the population in benefits of such services and advise private firms on rolling out mobile financial services products. The project designed to extend crucial financial services to small business, entrepreneurs, and savers” (Asia-Plus, 2016).

5 SUGGESTIONS AND RECOMMENDATIONS TO FURTHER IMPROVE THE E-BANKING IN TAJIKISTAN

Based on the four early chapters in chapter five I will make recommendations and suggestions for further improvement and development of e-banking in Tajikistan.

5.1 To motivate financial institutions to offer e-banking

E-banking is the newest delivery channel. It delivers information at much high speed than traditional banking. Also, customers are demanding new and effective techniques and services, so e-banking is the best choice to achieve this goal. There are several reasons

which can motivate the banks in Tajikistan to offer e-banking here are some of the main reasons such as:

Customers' demand: Customers daily are demanding better services, 24 hours per day and 7 days per week availability, with a good customized to their exact needs at less cost and as quickly as possible. To meet these demands banks should develop innovative ways for creating value and e-banking is one of the innovative ways to meet customers' demand. For example, the Woolwich bank changed the way the marketing department, this department worked in order to cope with new ways of marketing they focused on understanding customers and used that understanding to enrich relationship with customers.

To sell more to existing customers: The financial services markets in Tajikistan are not developed so well which mean there are a lot of opportunities for the developing of new markets. It means that the best way to increase sell it would be to sell more to existing customers. For example, e-banking determines what can be offered to customers, but only customers determine which of those technologies will be accepted. Customer services delivery may increase based on the want, need, time, the power of buying and status which means the best way to success in e-banking is to know the customer.

Change in the environment: In the business world, the banking sector is one of the main users of ICT. New technologies such as the Internet and mobile telecommunications play a key role in opening new markets and the creation of value. Also, social changes are forcing banks to change the way they are doing business with their customers. As noted in the case of Woolwich bank the winners will be those organizations which combine new technologies with traditional business to provide an integrated solution which meets the customer needs.

Achieving competitive advantage: There are a lot of initiatives like efficiency, core competency advancement, the actualization of customer-centric products and services, and limitation of the fixed costs of doing business which can help to achieve a sustainable competitive advantage. In order, to achieve a competitive advantage in the banking sector of Tajikistan they should have a strategy which could help innovation, creativity, simple and straight forward process, recognition, task oriented project team, and decrease hierarchical control.

To achieve efficiencies: With the offering e-banking services bank can achieve efficiencies whether personal or business. It increases the efficiency of banks and also it reduces the labors costs, the quality of transactions and maintenance will improve as computer take a place of human, human errors decrease, services and process will be quicker and safe which will save time, money, efforts and decrease cost. For example, the best prove is a case of e-banking in Estonia as seen in figure 6 when the banks in Estonia offered the e-banking they branch banking decreased a lot during 1999-2002.

5.2 The main obstacles for further providing and adoption of e-banking and which obstacles should be eliminated in order to convince the customers about the advantage of using e-banking

Financial institutions in Tajikistan like Bangladesh and Ethiopia particular have not yet experienced the full potential of electronic commerce, due in part to the weakness and

instability of the country's financial system. Here are some of the main obstacles for further providing and adoption of e-banking and obstacles which should be eliminated in order to convince the customers about the advantage of using e-banking in Tajikistan.

Education: As shown in table 13 in Tajikistan the main e-banking services focused on the cards and payment terminal channels and most of the customers are old people. That's way banks need to offer more financial knowledge to their customer about e-banking transactions and privacy security to increase the trust of using the web system, customers point view and their suggestions should be considered. For example, the Woolwich bank invested heavily in technology which allowed the bank to gather and analyze extensive customer information. One of the basic levels the bank used a system called 'Quick Stream' which supported bank to analyze customers' behavior during their visit in bank's website etc. To benefits from the solution, customers need to understand;

- **How to use the cards?** It would be the wrong decision just increase the number of card holders. First of all, it may be more important to ensure customers are familiar with multiple ways in which a card may be used than to simply increase the number of card holders.
- **Where to use the cards?** Clear branding that is easily communicated to both educated and non-educated customers is a necessity to informing customers where the cards can be used.
- **What to do when things go wrong?** When service delivery fails, clear instructions need to be given on how the expected service can be obtained, for example, through the provision of a call center number or a location guide to ATMs in a particular area.

Also, the knowledge of staff should be increased because e-banking is still developing in Tajikistan and to get full benefits of it first of all the staff should have enough knowledge as it was shown in the case of the Woolwich bank. For example, the best methods were used by Woolwich bank first of all the bank made sure that every employee has access to the Internet. Second, the bank encouraged them to open 'Open Plan' accounts by putting £100 in the accounts of those employees who did, so they could actually experience the new e-Channels. Third, when WAP was launched, the bank provided a WAP phone to those who wanted one. The fourth bank put the Internet booths in branches so staff could experiment with it and promote it to customers.

Low internet penetration: As it is shown in the case of Bangladesh and Ethiopia the internet penetration is one of the main obstacles to the development of e-banking in countries however it is same in Tajikistan. The internet penetration should increase in very high standard and the cost of it should be low in order the customers could try it and experienced by themselves. For example, the internet connection costs in Estonia were very low and it helped the banking sector for successful implementation of e-banking. As mentioned in chapter four the number of internet user in Tajikistan is very low if the cost will be low this number will increase in a very short time. As mentioned in chapter two the internet is an important alternative delivery channel for banking services and products. Financial institutions are now able to start new businesses and market their services and products around the world through the internet without having any particular location and direct contact with the customers.

Culture: The culture is another issue in the adoption of e-banking in Tajikistan because people mostly like to have cash rather than to keep it in the bank. It's due to their bad experience from the bank and crisis.

Electricity: As it was noted in chapter four in Tajikistan still there is a problem with electricity mostly in the winter time and I think it is also one of the obstacles, however just now there solar technologies which can help overcome issues related to poor electrical supply. Solar powered ATMs are available and could be deployed in those areas where lack of electricity hampers the ability of financial institutions to expand their ATM network. Additionally, agents using mobile phones to extend services could use solar chargers to ensure their continuity.

ICT: As it mentioned in chapter two financial institutions depend on of ICT and there are several applications use to support e-banking such as a back-end, CRM, DW etc. However, as it was shown in a case of Bangladesh and Ethiopia the ICT in those countries is still developing and every day's financial institutions are trying new applications in order to success in e-banking. In a case of Tajikistan, the telecommunications sector is growing very fast but the e-banking is not so well for example during my visit in the website of Amontbank I had an issue. The website of the bank doesn't work probably it works very slow and you can't find enough information from it. But I think it not so big issue because of, first of all, it is a new way of doing banking at the list in developing countries and also as I mentioned in chapter three every bank which will be offer the e-banking they will face such kind issues. For example, a case of Lambank they faced integration issue and they invested a lot on IT. As a solution they implemented SOA. Or the case of Garanti Bank they wanted to increase the quality of service and the number of customers. The Bank decided to re-engineer its main business process in order to meet this they used CRM. To widen e-banking in Tajikistan areas with low cost, I would recommend financial institutions in Tajikistan to use such kind technology which I mentioned in chapter two and in cases and they should decrease branch banking in order they could improve the quality of the services and increase the number of their customers. It is possible to do it with partnership payment services providers allowing the use of their networks for enlargement and further development of card-based payment systems as a low-cost way for customers' services in the country.

- E-banking should be more flexible for example one of the main reasons for success in a case of e-banking in Estonia was the transactions in e-banking were either considerably lower priced or without any fee at all.
- The establishment of ATMs should be increased not only in urban areas but also in rural areas too, with sufficient fund.
- E-banking services should be according to the customer expectation and satisfaction.
- The issue which customer face during online transaction should be solved very quickly, for example, the Woolwich bank used a software tool 'web-collaboration tool' the application can record how long the customer has been on each individual page. Viewing this information on the screen in real time, a sales agent can type in a message on the customer screen and offer help and advice.

5.3 To encourage customers to use e-banking

E-banking systems offer certain advantages over traditional banking methods. Its nature means that personal contact between customer and bank will reduce. Here are the main benefits of e-banking which I think will make the population of Tajikistan to use e-banking more in their daily life.

- **E-banking is more convenient:** Population of Tajikistan can manage their schedule 24 hours per day and 7 days per week. It is possible for them to make all activities online without visiting the bank and from the place comfort for them. All they need are just PC or mobile devices which have access to the internet.
- **Account aggregation:** It helps them to be presented with all of their account detail on a single page.
- **To pay the bills:** It allows them to pay a bill online without going to the banks and spend a lot of time there.
- **Transfer money between accounts directly:** With e-banking to transfer money between accounts would be more quick, secure and easy for them.
- **To be informed about balances, new services, and news:** They can sign up for SMS or email alerts and notified immediately about balances and transactions etc.
- **To reduce the cost/time:** E-banking reduces they costs and time for accessing and using bank services.
- **Funds management:** They can download their history of different accounts and do ‘what-if’ analysis on their PC or mobile devices before affecting any truncation on the web which is lead them to better funds management.

5.4 The main characteristics of the heavy users of e-banking and the factors influencing the customers’ propensity to use e-banking as a primary banking

As it shown in chapter four the increase in the number of electronic transactions is limited by significant gaps in the legislation in Tajikistan, especially citizens’ mentality, lack of readiness of financial institutions and other problems of the economy. The commercial banks maintain a certain percentage of distrust of the latest internet technologies. This is largely due to the lack of a clear and generally accepted precise economic impact assessment mechanism of the introduction of new remote maintenance systems. Here are some of the main factors of the heavy users of e-banking and suggestions for the improve of e-banking in order the population could use e-banking as their primary banking.

Card-based payments and transfer markets are not so well develop: Further development of card-based payments and transfer markets could improve payment system efficiency for example transfer payments to cards could encompass both social benefits and remittances to ensure these transactions are recorded in the banking sector and potentially remain as deposits after transfer.

M-banking: As it shown in the early chapter the mobile penetration in Tajikistan is high compared to tablet and PC penetration. It would be the best opportunity for banks to offer e-banking mostly through mobile devices than PC. Because nowadays it is possible to do all activities through the mobile phone which before possible only through PC.

High commission: Also, one of the main reason of heavy use of e-banking is high commission between banks for example according to EurasiaNet.com (2016) interviewed a holder of account about her experiences and her respond “I am health worker in the State’s National Medical Canter, I have four shifts of work per month, and I am paid 50 somoni (\$6.35) per shift. If I withdraw money from another bank ATM, I will charge a 35 somoni commission” (EurasiaNet.org, 2016).

CONCLUSION

So far e-banking spreads rapidly all over the globe mostly in developed countries in terms of customers' adoption, functionality, and profitability for banks. But it's still facing some issues like security and privacy which will have to be dealt with to ensure long-term survival. There are some important technologies such as back-end systems, DW, CRM systems, SOA, and etc. which are important for successful implementation of e-banking. DW system support financial institutions to gather, organize, store, and analyze data for different operational and marketing utilizations. CRM systems are mostly utilized to enrich relationships with customers and to use wisely targeted marketing strategies. In order to use systems more usefully, they should work together. Integration is one of the main issues and the introduction of technologies like SOA is supporting to find a solution for some of the issues. This is important to mention that technology is one of the obstacles but success in e-banking needs careful management of social, managerial and strategic issues too.

Banks need heavily to invest in the Internet but the return usually wouldn't be as expected. This is mostly due to inexperience with e-banking. E-banking needs an integrated ICT infrastructure using powerful co-operative technology that integrates all the different channels instead promoting one over the other. It is important for staff from branch and call center to have better information about customers and more powerful real-time analysis and advice tools in order it could support them match products and services to the right customers. In order to win the customers trust a proper e-branding strategy needs. One of the best marketing strategies is creating a positive experience for customers and implementing strategies to get recommendations from customers. Another best strategy is to promote innovation in organizations such as building room for experiments, tolerance to the failure of good ideas, implementing a reward system to encourage individuals and teams to innovate.

E-banking in Tajikistan is mostly focused on the card and payment terminal channels instead of the internet or mobile systems. There are also opportunities to spread them too, mostly through mobile phone as its penetration is high than PC and Internet penetrations. Whereas the internet banking is also an option, however for the sake of the low online access for some banks which are in the rural area it would be a bit more difficult to implement it. The major function of plastic cards is to withdraw funds from bank accounts at ATMs. The developments of POS represent 627 units and ATMs 778 units in the whole country and there are mostly focused in urban. Also, the majority of the population in Tajikistan don't use formal financial services. Instead, they rely on cash and informal services for transactions, savings, and credit which is very expensive and risky.

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APPENDIX

Appendix

Appendix: Abbreviations	1
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Appendix: List of Abbreviations

E-banking	Electronic banking
WWW	World Wide Web
ATM	Automated Teller Machine
PDA	Personal Digital Assistant
IT	Information Technology
PC	Personal Computer
ICT	Information Communication Technologies
CRM	Customer Relationship Management
IC	Integrated Circuits
ARPANET	Advanced Research Project Agency Network
HTTP	Hypertext Transport Protocol
HTML	Hypertext Markup Language
M-banking	Mobile banking
SIM	Subscriber Identity Module
SMS	Short Message Service
IVR	Interactive Voice Response
USSD	Unstructured Supplementary Service Data
WAP	Wireless Application Protocol
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
WML	Wireless Markup Language
EML	Extensible Markup Language
MMS	Multimedia Messaging Service
J2ME	Java 2 Micro Edition
SAT/S@T	SIM Application Toolkit
RPC	Remote Procedure Call
SOA	Service – Oriented Architecture
KPI	Key Performance Indicators
UDDI	Universal Description, Discovery, and Integration
WSDL	Web Services Description Language
SOAP	Simple Object Access Protocol
BPM	Business Process Management
DW	Data Warehouse
KM	Knowledge Management
KMS	Knowledge Management System
ISDN	Integrated Services Digital Network
CEE	Central and Eastern Europe
DBBL	Dutch – Bangla Bank Limited
SWIFT	Society for World Interbank Financial Telecommunication
FCBs	Foreign Commercial Bank
NCB	National Commercial Bank
WAN	Wide Area Network
LAN	Local Area Network
CBE	Commercial Bank of Ethiopia
SCF	Critical Success Factors
BPR	Business Process Reengineering
IBM	International Business Machines
FMFB	Frist Microfinance Bank
GDP	Gross Domestic Product

USD	United State Dollar
DSL	Digital Subscriber Line
WiMAX	Worldwide Interoperability for Microwave Access
3G	Third Generation Services
CDMA	Code Division Multiple Access
4G	Fourth Generation Services
CCA	Caucasus and Central Asia
NBT	National Bank of Tajikistan
WSBI	World Savings Banks Institute
SCO	Shanghai Cooperation Organisation
STB	Set – Top Box
KAD	Korti Avvalini Dohili
BSCs	Banking Service Canters
G2C	Government – to – Consumer
C2C	Consumer – to – Consumer
B2C	Business – to – Consumer