Spring 2010

Reforming the approach to e-banking in the Middle East

Omer M. Al-Khanchi
James Madison University

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Reforming the Approach to E-banking in the Middle East

Omer Al-Khanchi

A thesis submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

Partial Fulfillment of the Requirements

for the degree of

Master of Science

Integrated Science and Technology

May 2010
Dedication

To Mom & Dad
Acknowledgments

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Abstract

Over the past three decades, electronic banking (e-banking) has witnessed rapid growth and development in some countries like the U.S. and the U.K. This growth has resulted in an increase in banks’ revenues and customers’ savings and convenience. However this is not the case in the Middle East. Although banks do offer electronic services in this region, the technology has not reached the same growth rates as in developed countries. This problem is due to the quality of services banks offer and, more importantly, the level of protection they provide to their customers. It is also related to the people’s culture and acceptance of new and modern technologies, as well as infrastructure and the current banking systems. Using dynamic hypothesis to analyze the problem, it is found that e-banking security and protection are among the factors causing much of the trouble. In order to boost customers’ confidence in adopting e-banking technologies, security issues must be resolved. One possible solution proposed is the use of advanced technologies such as biometric-authentication. Additionally, central banks must set strategies and policies to boost the development of e-banking technologies in order to reap its benefits. Developing e-banking technologies will help improve the economy and increase the convenience of banking. It will also facilitate commerce and business due to cost reduction and increase in efficiency.
Chapter 1

Evolutionary History of E-banking in the U.K., and the U.S.

Introduction

The aim of this research is to study the evolution of electronic banking (e-banking) services and the role they played in forming today’s modern banking system. The research will focus on where the selected region, the Middle East (M.E.) stands in relation to this technology and why it hasn’t witnessed the growth it has in other developed countries like the U.S. and the U.K. In addition the research will study the main factors holding back the development of this technology. It will look for possible policies and solutions that could help expand the electronic banking (e-banking) technology in the Middle East (M.E.) region in order to reach the same levels of acceptance in the developed countries.

Electronic banking (e-banking) is the use of bank services over the automatic teller machine (ATM), Internet or other kinds of telecommunication networks. It gives customers the ability to safely check their account balance and banking activities remotely. It also lets customers execute wired transfers, pay bills, and conduct different kinds of account transactions online while at home or working at the office. E-banking also gives customers the advantage of round-the-clock availability.

The importance of e-banking is to save money, time, and effort for both banks and their patrons. This process saves the banks paperwork, resources, and time. It also facilitates the promotion of new bank services and products by posting commercials and announcements throughout the banks’ websites. For customers, e-banking saves time
and related transportation costs. The economy benefits from a faster circulation of funds and longer retention of cash inside the financial network.

The history of e-banking shows that it was not developed simply for novelty; it was developed to solve existing problems and make banking more convenient. One of the most important issues that banks and their customers in the M.E. need to understand is that e-banking technology is essential rather than accessory; it was invented and developed to boost banking performance and revenues, and to increase their customers’ savings.

**History of ATMs and Plastic Cards**

*Plastic Cards Origins*

The concept of cashless payment, or transaction, was known as early as the 1900s when oil companies and department stores issued their own proprietary cards, which were only accepted at limited locations associated with the issuer of the card. The proprietary cards were not valuable once a card holder traveled outside the limitation area. All these cards were not actual credit cards; they were more like bill cards where customers had to pay the full charge each month (Sienkiewicz, 2001). The first card to work beyond the local geographic area was the Diners Club Card, issued in 1950, that was accepted by several merchants around the U.S. (Figure 1). The story behind Diners Club Cards started in 1949 when a businessman called Frank McNamara had a business dinner at New York's Major's Cabin Grill

![Figure 1: Diners Club Card 1950](source: www.creditcards.com)
restaurant. After the dinner was over Frank realized that he forgot his wallet in his other suit; his wife saved the day and paid but he decided never to face this embarrassment again. By the year 1951, Diners Club customers grew to 20,000 cardholders. Diners Club Card was also a charge card where customers had to pay the bill in full each month (Gerson & Woolsey, 2009).
ATMs Development

The history of ATMs goes back to 1939 when Luther George Simjian built the first mechanical ATM, which was installed in New York City by what is today known as Citicorp (MIT, 2003). The customers’ acceptance of this mechanical ATM was very low at that time, and the machine was removed after only six months. "It seems the only people using the machines were a small number of prostitutes and gamblers who didn't want to deal with tellers face to face," wrote Simjian (MIT, 2003).

Thereafter and for almost three decades the ATMs’ development paused until 1967 when John Shepherd-Barron, a managing director of De La Rue Instruments developed the first electronic ATM. This ATM was installed at a branch of Barclays Bank in London (BBC News, 2004). Barron’s technology took in checks impregnated with Carbon 14 that customers bought from a bank teller; the carbon was used to identify customers and ensure that the proper account was accessed (Figure 2). Shepherd-Barron invented this revolutionary machine because, he said, “It struck me there must be a way I could get my own money, anywhere in the world or the U.K. I hit upon the idea of a chocolate bar dispenser, but replacing chocolate with cash” (Milligan, 2007). Shepherd-Barron also invented the idea of a pin number which at the time he...
thought of having six digits because he could remember his army number. He changed that to four only so that his wife could also remember the number and it has been the practice since then\(^1\).

**History of Online Banking**

Processing accounts electronically started in 1950 when Bank of America’s (the largest bank in the world at the time) senior vice president S. Clark Beise recognized that check handling and customer satisfaction were the major factors hindering the development and growth of the banking industry (SRI International, 2010)\(^2\). The checking accounts at Bank of America were growing at a rate of 23,000 accounts per month; since an experienced bookkeeper could only post approximately 10,000 accounts per week, the need to find an alternative electronic method to deal with the rapidly growing business was critical. In July 1950, Bank of America requested SRI to study the feasibility of developing an electronic bookkeeping machine that would be able to process several tasks like data storage, processing and printing checks, and provide updated balance information to customers (SRI International, 2010).

\(^1\) In 2007 there were an estimated 1.6 million cash machines across the globe (BBC News, 2007). Reader, please consult the interesting video “Cash machines mark 40 years” on [http://news.bbc.co.uk/](http://news.bbc.co.uk/) (accessed February 20, 2010)

\(^2\) SRI International “is an independent, nonprofit research institute conducting client-sponsored research and development for government agencies, commercial businesses, foundations, and other organization” (SRI International, 2010).
With the existing technology at that time, it took the SRI team, or the “Whiz Kids” as the bank used to call them, five years to come up with a prototype of Electronic Recording Method of Accounting (ERMA) computer (Figure 3). The ERMA was demonstrated to the public and press in September 1955 and was manufactured by General Electric Corporation (SRI International, 2010). The real test of ERMA started in the fall of 1956. The ERMA machine was capable of processing 33,000 accounts per hour and five-and-half million accounts per week, which is the work of 550 experienced bookkeepers; it was finally installed and put to work at Bank of America in 1959. The U.S. patent number 3,000,000 was issued to SRI for this innovation, which was assigned to General Electric, and because of the importance of this innovation, the U.S. Patent Office delayed the issuance of the patent number so that this unique number could be applied (SRI International, 2010).

The ability to process accounts quickly and electronically due to the development of ERMA made online banking (first known as home banking) possible. Home banking was first introduced in the early 1980s in New York by four major banks (Citibank, Chase Manhattan, Chemical, and Manufacturers Hanover) (Kalakota & Frei, 1997). The services included account balance check, paying bills electronically to the registered businesses, executing transfers between checking accounts to savings, and tracking cleared checks. The service used a special device provided by the banks and the connection was made through a dial-up method. At that time this service was not very
attractive to customers due to the cost and quality. Private customers had to pay as much as $10 per month and business owners paid $50 per month in addition to the dial-up cost (Kalakota & Frei, 1997). Due to cost and lack of convenience, banks were facing a hard time attracting more customers to the services in order to make it financially feasible, and some of them had to abandon the technology before the end of the decade. In addition, there were some issues with the reliability of the service due to the slow response of the servers and software, which created errors and made the process confusing to customers. These problems led to lower adoption rates and lower revenues (Kalakota & Frei, 1997). The real revolution of online banking was in the mid-1990s when the Internet became widely available and online banking services became more reliable and useful. More precisely, it was October 6, 1995 when Presidential Savings Bank first offered its customers an alternative to traditional brick-and-mortar banking (Presidential Online Bank, 2010).
Chapter 2

E-banking in the M.E (Middle East)

Introduction

The acceptance and use of all aspects of e-banking in the M.E. (Figure 4) is relatively low compared to western countries like the U.S. and the U.K. where e-banking is part of people’s daily life. On May 19, 2004, the general manager of VISA International in the M.E., Kamran Sadeeqi, reported that from September 2002 to September 2003, plastic-card holders recorded only 200 million transactions (Asharq Al-Awsat, 2004). In a region with a population of over 202 million (Internet World Stats, 2009), the average was less than a one transaction per person per year. VISA cards are accepted in only 110,000 locations in the entire region of the M.E. (Asharq Al-Awsat, 2004); those locations include merchants and markets, ATMs, and banks’ branches. Those numbers are not very impressive, knowing that VISA and MasterCard are the dominant service providers in this region and almost every place where MasterCards are accepted, VISA cards are accepted too and vice versa.

When it comes to online banking, the Internet penetration in the M.E. gives an indication of the problem in this region. Only 28% of the whole population of the M.E.
has direct access to Internet services (varies from as low as 1% in Iraq up to 74% in U.A.E.), compared to 74% in the U.S. and 76% in the U.K. (Internet World Stats, 2010). Only a few of the 28% who have direct access to Internet services are active users of online banking. This proves that there is a major challenge facing the diffusion of this technology in this region. More specifically, online banking users are mostly limited to a few business owners.

**Factors Hindering the Diffusion of E-banking**

There are many factors affecting the behavior of the people in the M.E. and their limited acceptance of e-banking technology. Some of these factors are physical, related to infrastructure, security, and limited functionality, while the others are non-physical like culture, and M.E. banking system and policies. To reach a better understanding of why the e-banking technology in the M.E. has not yet reached the same acceptance and development levels of the western countries like the U.S. and the U.K., each of the above factors has to be discussed in detail using dynamic hypothesis.

**Infrastructure**

The infrastructure for e-banking includes: Internet, ATMs, electricity, and electronic payment systems. In the M.E., e-banking infrastructure is not as strong and reliable as it is in developed countries. The cost of having Internet service is very high and provides only low band-width compared to the U.S. for example, where high speed Internet is cheap and widely available. The average Internet penetration is only 28% of the population in the M.E. (Internet World Status, 2010), and only 6% of them use the
Internet for electronic commerce (Sifer, 2006). Crowded Internet cafés around the region give an impression of how most of the people do not have direct access to the Internet at home. The technological gap between developed countries and the M.E. is expanding, leaving the countries of this region hopeless in global market competition and hence slowing down the growth of the banking industry and other financial institutions. ATMs are not everywhere and some banks charge customers extra fees for using their ATMs. Also in some countries around the M.E., the electricity is not very reliable and some areas experience frequent blackouts. This forces the banks to install an Uninterruptible Power Supply unit (UPS) that adds to the installation and maintenance cost of ATMs.

The environment adds to the operating cost of ATMs as well. In some areas where temperatures are very high during the summer, it is mandatory to install an AC unit to cool down outdoor ATMs. This requires more electricity and in case of a blackout, the UPS unit cannot comply with the AC unit power requirements. The electronic payment methods of using plastic cards are not available in all stores and markets; even when they are available most of the vendors charge extra fees if the bill is below a certain amount.

To facilitate understanding of the causal loops discussed in this chapter and the next, a simple general example from John D. Sterman’s book (Business Dynamics) is provided as a key to read the diagrams. There are two types of feedback loops in system dynamics, positive (self-reinforcing, or reinforcing) and negative (self-correcting, or balancing) feedback loops. The following example explains these loops (Figure 5) (Sterman, 2000). The arrows indicate the causal relationships while the “+/−” signs at the arrowheads represent the polarity of those relationships. The “+” polarity means that
changes in the cause will result in the effected variable to change in the same direction, all else held equal. While the “-” polarity means that changes in the cause will result in the effected variable to change in the opposite direction, all else held equal. The arrows in the middle represent the feedback loops and the letter “B” refers to a balancing loop while the letter “R” refers to a reinforcing loop. Balancing loops act as a system corrector, meaning they keep the system at a certain level and prevent it from growing or declining. In contrast, reinforcing loops tend to direct the system to either increasingly grow or decline. In the following example, the increases in chickens’ population causes an increase in the number of eggs laid by chickens, leading to greater population and still more eggs. This will result in a reinforcing loop (R) that will cause an exponential growth in chicken population. The speed of this exponential growth will depend on the effect of other factors in the system like road crossing attempts. The increase in chicken population will lead to more chickens attempting road crossing, which will cause the chicken population to decline due to deadly accidents. This loop is a balancing loop that will stabilize the chicken population over time (Figure 5). The general ideas of this example will be applied to explain the interaction between the factors related to the growth of e-banking in the M.E. discussed in this chapter and the next one.
Since Internet is a vital element for online banking (Internet banking), the number of Internet users in the M.E. highly affects the e-banking users. The number of Internet subscribers in the M.E. is driven by the cost and speed of the service: the higher the cost of having Internet, the lower the number of Internet subscribers. Low numbers of Internet users will lead to much lower online banking users since only a small portion of the Internet subscribers are actual users of online banking (Figure 6). The number of e-banking adopters is also driven by two reinforcing loops: the e-banking functionality loop (R2) and the ATMs growth loop (R1). The more widespread ATMs and electronic payment services are among vendors, the more functionality and convenience e-banking will provide to customers. This will lead to more people adopting e-banking technologies. More e-banking adopters will lower the cost of operating ATMs and encourage banks to install even more ATMs; it will encourage more merchants and stores to accept electronic payments. Over time, the two loops (R1 & R2) will reinforce themselves attracting more adopters (Figure 6).
Security

From the time e-banking was introduced, security concerns have been among the biggest issues facing this technology in both the M.E. and the developed countries. Revealing personal information, fraud, and trust are among the challenges facing both banks and their customers. Although identity theft and theft existed before the development of e-banking, what makes e-banking more vulnerable is that all the personal information and assets are on one single plastic card or online, where it can be subject to hacking and pirating. On a network with billions of users from different countries around the world logging on every day, this makes it more difficult to provide solid protection. In spring 2006, the “ATM & Financial Self-Service Executive Summary”\(^3\) reported that

\(^3\) ATM & Financial Self-Service is an industrial group specialized in ATMs (Selfserviceworld, 2010)
experts in the field of ATM security argue that high tech hacks are not the top concern. Rick DuVall, senior products manager at Omaha, Neb.-based ACI Worldwide Inc., said “low-tech stuff,” such as “shoulder-surfing” (looking over another’s shoulder) and the placement of fake fascia, cameras and skimming devices, is causing most of the problems around the globe (Selfserviceworld, 2006).

In 1996, a computer security consultant from Hampshire in the U.K., Andrew Stone, managed to steal £1 million Sterling (at the time equivalent to U.S. $1.6 million) by pointing a high-resolution camera at ATMs from a distance and copying customers’ card information and PINs (Sergiu, 2008). Stone was capable of producing clone cards and stealing as much as £10,000 per hour. He was sentenced to five years and six months in prison. In Jordan, September 2009, a gang of ten members managed to hack debit cards of some Jordanian banks by planting tiny skimming devices on the ATMs to copy the cards’ information when used. They also planted very small cameras on the ATMs, which were connected via Bluetooth to a nearby portable computer. They used the cameras to copy the customers’ pin numbers and then managed to create fake cards using this information to withdraw cash from the ATMs (Mashaqba, 2009).

In order to investigate customers’ concerns regarding security of online banking, a study was conducted by Entrust Inc.4, an information security organization. The study, completed in October 2005, found that 18% of respondents decreased or stopped the use of online banking in the U.S. compared to 13% of European consumers. One-third of the

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4On its website, Entrust Inc. describes itself as providing “affordable solutions to protect the digital identities and information for security-conscious enterprises and governments. More than 2,000 organizations in 60 countries across the globe leverage Entrust’s world-class solutions” (Entrust, 2010)
respondents worried that the banking website might be a fraudulent one set up to steal their identity and account information. The Entrust survey determined that fear of identity theft and security risks are among the biggest concerns of online banking consumers. Since 81% of the respondents refused to pay anything for stronger security in their online banking, banks are facing problems in finding cheap, reliable, and secure solutions to boost customers’ confidence and trust.

When it comes to security and protection in the M.E., e-banking customers are not fully protected as in developed countries. Additionally, the lack of strong and clear laws to stop hacking and pirating makes banks’ customers hesitate more when thinking of adopting e-banking. Taking the U.S. and Bank of America as an example, if a plastic card holder or an online banking user becomes a victim of fraud, one will get a full refund for the lost money. It takes only a single phone call and a short claim form to fill out5. In contrast, in the M.E., customers will get a refund only for the transactions made after calling the bank and reporting the fraud account movements or the lost, stolen, or hacked card. Anything before that is the customers’ responsibility (Kader, 2009). This means until the customer realizes he/she has been a victim of fraud or that one’s card is lost or stolen, the damage will not be reversible. Banks in the M.E. are not willing to fully protect their customers and take the risks of losing some of the extra profits and savings that they will make from the use of e-banking services by their customers. They would rather have fewer profits instead.

5 This is based on the writer’s personal experience as a Bank of America customer and a victim of banking fraud that took place in the U.S., in March 2009.
Current laws and legislation in the M.E. are inadequate or even incapable of covering and protecting e-banking transactions that are in the form of digital numbers transferred from one computer to the other through cyber space. The laws do not yet recognize electronic signatures or contracts, which makes them useless and meaningless (Sifer, 2006). Converting banking information to digits is very similar to converting physical materials to non-physical. This process raises precise legal issues that need to be decoded and reconstructed into strong and reliable legal texts to cover e-banking operations (Sifer, 2006).

One of the top security priorities for financial institutions is to identify their clients and to find out information pertinent to their financial reputation and background. An example of this is the Know Your Customer (KYC) routine. This routine is becoming more and more important globally to prevent identity theft, fraud, money laundering, and financing terrorism. It is the writer’s own experience as an Operations Officer of Byblos Bank, Erbil-Branch-Iraq, that the KYC routine adds further complications and risks to operating electronic banks in the M.E. While KYC routine is becoming a pillar for banks and financial security, it is also problematic for various reasons. In a region that lacks a system like the social security number in the U.S., or any other solid database system for checking people’s backgrounds and history that banks have access to, the risks of crime organizations and money laundering becomes even greater. This holds back the development of electronic banking technologies. In many M.E. countries, there are institutions that collect security related information on a regular basis and a huge amount
of data is saved; what makes these data useful to banks or not depends on how much sharing is allowed and how often these data are updated\textsuperscript{6}.

Another factor that slows down the adoption of e-banking in the M.E. is the awareness of fraud crimes and identity theft risks. The writer’s personal experience as an Operations Officer of Byblos Bank, Erbil-Branch-Iraq, suggests that the adoption and development of e-banking has been slow because e-banking in this region was established long after its development in the U.S. and the U.K. This made customers fully aware of the problems of identity theft and fraud in these developed countries. This is one of the distinguishing reasons that this service has been rejected by the region, compared to early adopters in developed countries who were not fully informed or aware of its disadvantages until it became part of their daily life.

There are two balancing loops that contribute to the stagnancy of e-banking in the M.E. region (Figure 7). The lack of effective electronic laws and legislation is leading to less protection offered by banks against fraud, since banks themselves are not protected. This in turn is leading to fewer adopters of e-banking which reduces the risks of banking fraud and identity theft. These risks are inversely related to stringency of electronic legislation; the stricter the electronic laws, the fewer crimes related to e-banking. Reducing the severity these crimes will encourage banks to give more protection to their customers. Since the number of e-banking adopters is driven by the level of protection banks offer, e-banking adopters will increase as banks offer more protection to their customers. On the other hand, increased numbers of e-banking adopters will lead to an

\textsuperscript{6} This information comes from the writer’s personal experience from being a citizen of Iraq.
increase in crimes linked to e-banking, and hence banks tend to offer less protection to their customers. Over time, this loop (B1) will balance itself, preventing the system from growing and keeping the current levels of e-banking development (Figure 7).

The increase in identity theft and fraud associated with e-banking will raise customers’ awareness of this issue. Fearing to be victims of such crimes, customers unwilling to risk their assets will not adopt unprotected and unsecured e-banking services. This will create another balancing loop (B2), which will also halt the system and keeping it from growing (Figure 7). As we see in figure 7, security methods comes as an important factor that, if improved, will change the behavior of the system by reducing the risks of e-banking fraud and identity theft. Improving security methods will lead to more trust in e-banking services by both banks and their patrons. This factor will be discussed in further detail in the next two chapters.
Most banks in the M.E. developed their websites simply for the novelty of being online; no real efficient banking services are available. Among others things, they do not offer online bill payment services, account opening, or discount offers to encourage customers to use their websites and online services. Although some banks do offer online account opening, customers are still required to go in person to the bank in order to sign the account opening papers and activate the account. The only convenience this process provides is to save some time since all the account forms and papers will be ready to be signed by the customer. This poor state of online services is due to low numbers of Internet users and weak infrastructure. These low numbers give banks less incentive to invest in developing more online services and making them secure. In
addition, M.E. banks have not developed websites for a low band-width Internet to make it easier to be accessed in this region, where high speed Internet is not widely available. ATMs only process cash withdrawals and offer account balance information; no cash or check deposits are allowed.

Among the main applications of e-banking are electronic commerce (e-commerce) and online bill payments, which are not as widely available in the M.E. as in developed countries. Not all stores and facilities offer these services. The US has successfully pursued the use of e-banking for making and receiving payment in all levels of government, including payments to employees, benefit recipients, and vendors. Over the years, the number of checks written by all levels of government has declined (Murphy, 2004), which saves the government money and time to write and process those checks. In contrast, the M.E. continues to lag behind in developing these services, putting them at a disadvantage in the financial market.

Due to the insufficiency of current laws and legislation, most of the banks in the M.E. require their customers to sign for the banking transactions in person; no applications are accepted by e-mail. For instance, if a customer needs to execute a wired transfer through e-mail, a transaction form needs to be signed, scanned, and attached to the e-mail and one must return to the bank later to sign the actual execution form; otherwise, the bank will keep the transaction in hold and does not execute it. This defeats the purpose of using the service, which is expected to bring more convenience, and save time and effort.
The development of e-banking services is driven by the number of e-banking adopters. More adopters will encourage banks to develop a wider range of e-banking services. These augmented services will boost the functionality of e-banking and make customers more confident in embracing the technology. This, in turn, will prompt banks to develop even more services to make e-banking more convenient to their customers. Over time, this loop of development (R3) will reinforce itself, bringing more growth to the system (Figure 8).

Figure 8: Limited functionality causal loops diagram

Culture

Cultural values also play a big role in the diffusion of online banking. Fear of cultural imperialism and the will to maintain moral values hinders the diffusion of the Internet and many other modern technologies, including online banking (Ferran & Salim, 2004). Many people in Middle Eastern countries think of the Internet as an image of American culture and perceive the danger of being influenced by it (Kamel, 2004). The
fact that a large portion of the population in the M.E. tend to keep their old-fashioned lifestyle, and regard new technologies with suspicion places another challenge in the diffusion of new technologies. As a result, e-banking has not witnessed widespread acceptance and adoption around most areas in the M.E.

Furthermore, the banking culture in the M.E. has traditionally depended on direct contact with its customers to maintain their loyalty, and there is an element of fear that this historic relationship will be lost with increased use of e-banking services. The fundamental idea of e-banking – that it is online and therefore requires a third-party to provide IT service – is the very characteristic that increases security risks and introduces new challenges. These challenges include the expectations of the banks’ customers, since customers would be anticipating for institutions to provide modern services. In a region that lacks IT standardization such as the M.E., this could have a negative impact on the customers’ satisfaction and loyalty. Thus, traditional relations with customers are affected and the institution is at increased risk for losing their business. E-banking lessens face-to-face interaction between the institution and customer. In a culture and environment where personal relations and interactions rule many activities and service sectors, institutions who consider carefully the customers satisfaction, such as banks, will have to consider processing channels other than e-banking.

Most, if not all of the governments in the M.E. have a control obsession over the flow of information and see the Internet as a dangerous tool that might suppress that control. Additionally, many of the countries in the M.E. have not adopted free market policies and they still control the flow of currency and market prices. Since e-banking does not recognize borders, controlling currency will be harder. M.E. governments also
have concerns of losing their income due to electronic commerce over borders. Therefore banks and governments in the M.E. would prefer to slow down the launch of electronic technologies.

Language plays a role in the diffusion of the Internet and therefore online banking. In 2004, 70% of the Internet content was in English, while 93% of the world’s populations, including the M.E., are not native English speakers (Kamel, 2004). Although some of the people in these countries do speak English as a second language, they are a minority in a majority that does not speak English. This gap makes the Internet less beneficial to the people in this region since they cannot understand most of its content. With no widespread Internet use, online banking faces a challenge to grow, and banks do not sense the need to develop it and make it more attractive.

The cultural acceptance of new technologies is negatively affected by two factors: personal relations and contact importance, and awareness of e-banking fraud and identity theft risks. More awareness of fraud and identity theft risks will impact cultural acceptance of new technologies, including e-banking. Customers who are aware of these risks are less likely to accept such technologies and therefore less likely to adopt them. On the other hand, the importance of the personal relations and contacts to both banks and their customers will reduce the acceptance of these technologies and therefore will lead to less adoption. Furthermore, the number of Internet users is driven by the cultural acceptance of new technologies in general. Low acceptance of new technologies will

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7 The average Internet penetration is only 28% of the population in the M.E. compared to 74% in the U.S. and 76% in the U.K. (Internet World Stats, 2010).
result in low number of Internet users, and as a consequence online banking adopters will drop as well (Figure 9).

Governmental control over the flow of information and currency plays an important role in the system because it influences the central banks’ actions. The more governments are willing to exercise control, the less central banks will be compelled to impose development of e-banking technologies. (The role of central banks will be addressed in greater detail in the next part of this chapter.) Hence, central banks are unlikely to foster development of e-banking because it will be met with barriers set by governments. The interaction of these two factors further balances the development loop (R3), explained previously, and prevents it from reinforcing itself (Figure 9).

Figure 9: Culture causal loops diagram
Banking in the M.E. region is guided and ruled by central banks; each country has its own central bank (ex: Central Bank of Iraq, Central Bank of Jordan, etc). It is the central banks’ responsibility to maintain a stable economy by formulating and executing the monetary policies of the country. Another means of controlling and maintaining economic stability is holding the country’s reserves, both cash and gold. Central banks also control the currency value against global currencies, like the U.S. dollar and Euro. They do that by balancing the markets' supply and demand levels for those currencies. Central banks are also responsible for issuing and printing currencies, and in some cases, they also cover the budget deficit of governments from the reserves they hold if necessary and help fight inflation (Toukan, 2005). They also go as far as lending other banks cash in case banks suffer from the lack of cash liquidity. This happened in U.A.E. (United Arab Emirates) in 2008, when the Central Bank of the Emirates had to lend the commercial banks the equivalent of U.S. $18 billion, to help banks survive a heavy shortage of cash liquidity (Al-Khalidi, 2008).

After World War Two and until the late 1970s, due the shattered economies around the world and the massive capital needed to recover those economies, central banks around the world expanded their scope of responsibilities from issuing currencies and organizing the banking industry to a much broader role influencing the private-sector banks’ business policies (Toukan, 2005). After three decades, this policy failed and led to an increase of inflation and slowed down the economic growth. Because of this, central banks in Europe and many other countries abandoned this strategy and went back to their original responsibilities of issuing currency and maintaining economic stability.
In the M.E., the case is different. Central banks still play a role in regulating the banking industry and controlling their policies. From the reserves that banks need to maintain with the central banks to the check clearing process that has to be done through central banks, the effect of those central banks on how the banking system functions and private-sector banks run their business cannot be neglected.

Central banks in the M.E. even play a big role in influencing the interest rates on deposits. They also force the private sector banks to increase their capital if it is necessary to raise the banks’ credibility in the market. In most of the countries in the M.E., central banks issue regulations that banks must follow to fight money laundering and terrorism. For example, in 2005, the Central Bank of Jordan required all the Jordanian banks to increase their minimum capital from 20 million Jordanian Dinars to 40 million, and raised the Capital to Risk (Weighted) Assets Ratio (CRAR) to 12% compared to the 8% ratio reported by the Basel Committee. It also issued instructions that banks must follow to fight money laundering (Toukan, 2005).

In the M.E., electronic business in general has not yet reached the growth levels it has in developed countries. Even banks that are investing in this technological field have not yet reached the desired return from that investment. This is mainly due to the lack of an organized development framework and the absence of central banks’ legislation, which negatively affect the reliability and trust of e-banking. Central banks in the M.E. have not yet issued regulations forcing the banks to provide 100% or at least minimum

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8 The Basel Committee “provides a forum for regular cooperation on banking supervisory matters. Its objective is to enhance understanding of key supervisory issues and improve the quality of banking supervision worldwide”. The committee members come from different countries around the world and meet at the Banks for International Settlements (BIS) in Basel, Switzerland (BIS, 2010).
security and protection to their e-banking customers, nor the electronic services and quality of service they must provide. They have not imposed a certain e-banking growth rate that banks must meet in order to keep their license and stay in business.

Since banks in the M.E. are guided and regulated by central banks, the level of protection offered by banks to their customers will increase if central banks raise the required protection levels. This, in turn, will positively impact the system bringing more adopters of e-banking technologies (Figure 10). Central banks’ regulations will also bring about more development of e-banking services if they raise e-banking required growth rates. The authority of central banks is powerful enough to boost the reinforcement of the development loop (R3) or to hold it back and keep the current levels of development. It is also capable of affecting the level of protection offered by banks, which if increased will enhance the reinforcement of the development loop (R3) by encouraging more customers to adopt e-banking technologies and services (Figure 10).
Figure 10: M.E. banking system and policies causal loops diagram
Chapter 3

Dynamic Hypothesis for Trends in E-banking in the M.E

Introduction

To better understand the problematic behavior of the e-banking system in the M.E., all the causal loops discussed in the previous chapter will be connected in one diagram. This diagram represents the interaction between the loops which creates the dynamic hypothesis for trends in e-banking in this region. This hypothesis will help the reader to better recognize what factors and loops are dominant throughout the system, causing it to behave the way it does.

Dynamic Hypothesis

Although the previous discussion about the infrastructure causal loops shows two reinforcing feedback loops which should lead to a growth in e-banking in the M.E. region. Those two loops (R1 & R2) are not operating in a vacuum and hence are affected by other feedback loops in the system. The infrastructure causal loops diagram shows a growth in the e-banking system (Figure 11). This growth is a result of the improvement in e-banking functionality and the increase in the number of ATMs, which should attract more customers to adopt the technologies and therefore boost the system. The increase in adopters will also bring about more improvement to the system and therefore the system will take a reinforcing pattern, if not affected by additional factors.

When connecting the infrastructure and security causal loops together, two strong balancing or negative feedback loops (B1 & B2) dominate through the system. More adopters will add to the severity of banking fraud and identity theft if the current e-
banking security procedures stay at the same levels. The increase in e-banking fraud will hinder the adoption of e-banking, as customers unwilling to risk their assets and personal information are less likely to sign for these services with the current levels of protection offered by banks. On the other hand, the awareness of fraud risks linked to e-banking will slow down the adoption of these technologies as well. The strong effects of the two security-related balancing loops (B1 & B2) significantly outweigh the reinforcing loops (R1 & R3), thereby stabilizing the number of adopters.

This effect is illustrated by the current relatively low development levels of e-banking in the M.E. region. My estimates suggest that less than 2% of the M.E. population are active users of e-commerce as of 2006\(^9\). A mere 200 million plastic card transactions took place in 2002-2003, and plastic cards were accepted in only 110,000 locations in the entire region of the M.E. (including merchants, markets and ATMs) (Asharq Al-Awsat, 2004). As a consequence of those two security-related balancing loops (B1 & B2), the adoption and growth of e-banking will be much slower (Figure 11). The low number of Internet users due to high cost and low speed is another factor that effects online banking adoption, as it limits the effect of the reinforcing loops (R1 & R2) and hinders the growth of e-banking (Figure 11).

Combining the limited functionality causal loops to the diagram shows another reinforcing loop (R3). In this loop, banks sense the need to develop more e-banking services based on the increasing numbers of adopters. Consequently, this development

\(^9\) The number is calculated by multiplying the average percentage of Internet users of the M.E. population, 28% (Internet World Status, 2010), by the percentage of the Internet subscribers who use the Internet for e-commerce, 6% (Sifer, 2006). The result is not 100% accurate due to the fact that data are not from the same year and source; however it gives a good estimate to reality.
will bring about more adopters to the system due to the expansion of e-banking functionality (Figure 11). This will result in more development, and over time e-banking should witness increasing growth if not held back by other factors. The impact of this loop (R3) is limited by the strong influence of the two security related balancing, or negative feedback, loops (B1 & B2) that were previously discussed. It is limited as well by the fact that central banks have not yet imposed growth rates and protection levels to be met by banks (Figure 11).

Although central banks in the M.E. have some level of independence from their governments, they are still strongly influenced by the governments’ policies and control. If central banks are willing to boost the growth of e-banking by regulating banks to certain growth rates and protection levels, their determination will still collide with governments’ need and resolve to control the flow of currency and information. This control will lessen the convenience and functionality of e-banking, leading to fewer adopters and as a result the growth effect of the reinforcing loop (R3) will be limited (Figure 11). Adding the factor of cultural acceptance of new technologies to the causal loops diagram reveals another balancing loop (B3), which shows some domination throughout the system. This suggests that increased cultural acceptance of e-banking would lead to more adopters. This increase in the number of adopters would result in more fraud and identity theft crimes, and thus would raise the awareness of such crimes, leading to lower acceptance of e-banking technologies and forming a negative feedback loop (Figure 11). This loop (B3) would limit the growth of e-banking adoption and development, especially when combined with the other two balancing loops (B1 & B2) as shown in Figure 11.
Due to the lack of clear data, it is difficult to determine if the personal relations and contact importance factor has a stronger influence on the balancing loop (B3) or the awareness of e-banking fraud and identity theft risks. If personal relations importance is resolved and brought to a minimum, the awareness of banking fraud will still negatively affect the cultural acceptance of new technologies. On the other hand, if e-banking security is improved it will lead to less fraud risks associated with this technology and thus reduce the awareness of such crimes; the personal relations and contact importance factor will still negatively impact the cultural acceptance for e-banking. Resolving one factor at any of the three balancing loops (B1, B2, & B3) will not cancel the effect of those loops but it will reduce their negative impact on the growth of the system.

The level of protection offered by banks to their customers is influenced by the central banks’ regulations, electronic laws and legislation effectiveness, and banking fraud and identity theft severity. If central banks require the banks in the M.E. to provide higher levels of protection on e-banking transactions, more customers will adopt the technologies and the system will witness increasing growth over time (Figure 11). The dynamic hypothesis shows three balancing loops (B1, B2, & B3) that dominate the behavior of the system causing it to remain stabilized at the current levels (Figure 11).
Figure 11: Infrastructure, security, limited functionality, culture, and M.E. banking system and policies causal loops connected together.
Chapter 4

Methods and Policies to Improve E-banking in the M.E

Introduction

From the previous chapters, it is clear that security is one of the major factors affecting the growth of e-banking technologies in the M.E. region. Since security affects both banks and their customers, tackling this problem would significantly affect the development of e-banking in a positive manner. It will also change the customers’ behavior towards e-banking. Banks in the M.E. avoid providing 100% protection to their e-banking customers, and customers are unwilling to put their assets at risk due to unprotected banking services. Between banks and their customers, security concerns stand as one of the barriers slowing down the growth of e-banking technologies. It hinders the adoption of the technology and prevents banks from providing more protection at the same time.

Central banks’ and governments’ rules are also among the factors that hold back the adoption and development of e-banking technologies and services. Governments and central banks must analyze market statistics and banking systems in general to set goals and expectations for e-banking. Since they have a powerful influence on how banks run their business, governments and central banks need to take steps into regulating banks to have a certain e-banking growth rate and provide more protection to their customers. This is necessary if banks are unwilling to take steps into developing and solving problems that are slowing down the development of this technology.

From the previous chapter we understand that the three balancing loops (B1, B2, & B3) are limiting the growth of e-banking in the M.E. region. The balancing loops (B1
& B2) are both security related and their effect can be reduced to lower levels if security issues are resolved. Although it is difficult to determine without detailed current data if culture-related issues have a stronger effect on the system than security, the fact that cultural acceptance is affected by security means that resolving security will reduce its influence. This will make it more likely that the growth reinforcing loops (R1, R2, & R3) will take over, leading to more growth and development of e-banking systems and technologies.

Tackling any causal factor in the three previously discussed balancing loops will not cancel their effect, but will minimize it. Over time, as the system grows much larger, the effect of those factors, hindering the growth of the system, will be unnoticeable. As e-banking becomes more widespread, additional reinforcing loops may appear in the system due to the increase in convenience and savings. These new reinforcing loops, in conjunction with the existing reinforcing loops, may outweigh the factors and barriers preventing the development of the technology. All the above demonstrate that standing idly by waiting for the technology to grow will not solve the problem. Banks and countries in the M.E. need to take steps and invest in providing logical and practical solutions to develop e-banking in order to benefit most from this technology.

**Possible Solutions to Improve E-banking in the M.E.**

Because security and central banks’ rules are so central to the limitation of the system growth, and due to their effect on all the other factors hindering the development of the system, this research will highlight potential solutions for those two issues. To help reduce security risks associated with e-banking, biometric identification
technologies are proposed. For governments’ and banks’ rules, possible strategies to improve the development of the system are also suggested.

**Biometric Authentication Technologies**

One of the solutions that might significantly reduce the risks associated with e-banking is biometric identification technologies, which include: fingerprints sensors, iris biometric scanners, and palm vein scanners. Among those three technologies, the palm vein scanners are the most advanced and secure, which if implemented in e-banking could help reduce banking fraud significantly. Meanwhile the iris biometric technology can be implemented in phones with high enough resolution cameras to serve as a portable secure payment method. The biometric security specialist Global Rainmakers Inc.\(^\text{10}\) is targeting the U.S. banks with their HBOX iris scanning system, offering to reduce fraud and risks associated with identity theft (Palmer, 2009). Jeff Carter, a former Bank of America executive who is now sitting on the board of Global Rainmakers Inc., predicted that in 2010 the company will have the HBOX iris scanning technology deployed in mobile phones allowing secure remote authentication (Palmer, 2009).

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\(^{10}\) Established in Puerto Rico in 2006 “GRI (Global Rainmakers Inc.) serves international industries of Government, Pharmaceuticals, Education, Hospitals and Health Care Facilities, Airports and Transportation, Banks and Financial Institutions, Manufacturers and Retail Customers in six countries” (GRI, 2010)
In their attempt to provide more protection and convenience to their customers, some banks started using the biometric identification technologies on their ATMs and branches. One of the most interesting biometric identification technologies is the Palm Vein Authentication System developed by Fujitsu.

The Fujitsu palm vein scanner captures the hand's vein pattern using near-infrared light to create a "vein map" (Figure 12). Over 140,000 palm vein patterns have been tested, and the results were fascinating with a false acceptance rate of less than 0.00008% and a false rejection rate of 0.01% (Fujitsu, 2010). Fujitsu claims that this method of authentication is more secure than any other known method, because it is very hard to recreate since the veins are inside the hand and blood needs to flow to register the image (Figure 13). In other words, to recreate the veins pattern, a living hand must be created which is nearly impossible.

Figure 12: Palm Vein Image (source www.fujitsu.com)
According to IDG news service\(^\text{11}\), the Fujitsu Palm Vein Scanners are already in use in more than 18,000 bank ATMs in Japan. Several major Japanese banks’ officials have been discussing standardizing two biometric technologies, the palm vein scanner and the fingertip vein reader. Their goal is to provide customers convenience and reduce fraud crimes committed using forged or stolen cards (BR staff writer, 2005). This technology is said to provide a higher level of security than the iris biometric scanner, a

\(^{11}\) IDG (International Data Group) “is the world’s leading technology media, events and research company. Since its founding in 1964, IDG has been committed to helping people acquire and use technology successfully” (IDG, 2010).
technology that has been in use since 2001 to control and secure airports and illegal immigration in some countries like the UAE (United Arab Emirates) (BBC World, 2008). The Iris Guard system developed in the U.K. by Iris Guard Incorporated was tried by one of the British banks back in 1998 but was not adopted due to high implementation cost and critical privacy issues. This has been changed now; in 2008, Cairo Amman Bank in Jordan installed the IrisGuard system into their ATMs and branches to provide more security to their customers. It also makes banking more convenient, allowing card-less ATMs and ID-less branches where it is not a problem if one have forgotten his/her plastic card or ID.

Biometric technology can open new doors to the future of banking industry, as banks around the world are already trying and piloting biometric-based authentication systems for different banking methods. Biometric technologies make card-less transactions possible and more secure. It even makes it more convenient, as there will be no more stolen, lost, or forgotten cards. With palm vein scanners, the technology is even more promising than the iris scanners; the fact that it can be imbedded in a device as small as a computer mouse or even smaller (Figure 14) makes it possible to be used even in stores, shopping centers, or restaurants. In the future it might be possible that a server at a restaurant could bring a small wireless device to the table and the customers must simply scan their hands to make a payment. The cost might be a little high today but it pays back in terms of security and business expansion. Also as it becomes more widely

Figure 14: Fujitsu Palm Secure mouse (source www.fujitsu.com)
adopted and more companies start manufacturing it, the cost will decrease to a more acceptable rate.

Biometric authentication technologies can also solve problems related to cultural acceptance, both in the e-banking world and in traditional banking. Banks in the M.E. can learn from the microfinance projects in over a 100 countries worldwide (The Nobel Peace Prize, 2006). The idea of microfinance was established by Muhammad Yunus, an economics professor and a 2006 Nobel Peace Prize winner. Yunus is the founder of Grameen Bank which is 90% owned by its borrowers and the other 10% is owned by the Central Bank of Bangladesh (The Nobel Peace Prize, 2006). The concept of microfinance projects is to give unsecured loans to poor people to help them start their own small businesses and rise from poverty. In India and Indonesia, banks have been taking steps in deploying biometric technologies to develop their microfinance business and expand their regular business targeting under-served customer segments (Financial Insights12, 2008).

According to Abhishek Kumar, a senior research analyst at Asia/Pacific Banking Advisory Service, banks in India and Indonesia have disproven the myth that biometric authentication systems are expensive to be used in financial services. Banks such as Danamon Bank in Indonesia and ICIC Bank in India are developing biometric authenticated ATMs to target areas with high illiteracy and no banking services. Their goal is to expand their business and bring down the high cost of microfinance

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12 According to their website, Financial Insights “is an IDC Company formed in November, 2002 by combining Meridien Research and IDC’s Financial Services Advisory Business. They provide industry business leaders with informed opinions on the technologies required to create a competitive advantage.” (Financial Insights, 2010)
administrations. Customers no longer need to sign papers or provide signatures; they only need to scan their fingerprints and have the account ready to be used (Financial Insights, 2008). Also according, to i4d magazine, the State Bank of India (SBI) installed 150 biometric authenticated ATMs in the Indian state of Gujarat targeting the rural population who can withdraw cash using their fingerprint (i4d news, 2009). Since deployment of this technology in these areas, biometric-authenticated finance projects have witnessed rapid growth, success, and high acceptance rates in the most rural areas of India and Indonesia. The installation of biometric-enabled ATMs in villages lacking the simplest infrastructure such as roads and electricity, and with high illiteracy levels, was successful and accepted by the majority of the microfinance beneficiaries (Financial Insights, 2008).

Central Banks’ Rules and Strategies

In order to reach a reasonable growth rate for e-banking, central banks need to bring all the operating banks in the market to exchange all the information available about the behavior of their customers towards electronic services. This will help banks to better understand the technological culture development of their customers and the rate of their e-banking acceptance. It will help banks set the best strategy to make e-banking more advanced. Countries in the M.E. allocate only about 0.4% of their Gross Domestic Product (GDP) for research and development in the technological field, which is a vital element for e-banking to perform (Sifer, 2006). To reach a more advanced level of technological development, they need to increase spending related to research and development in the technological field to higher levels depending on the economic needs
and capabilities. Due to their significant funding resources (Sifer, 2006), banks in the M.E. should help to fund investments in the field of information technologies. This would direct some research and development in the information technology field to serve banks’ interest of creating a safe and reliable infrastructure environment for e-banking to grow. The development of information technologies will significantly boost the economy by helping small corporations find their way to the market and by reducing the cost of commerce by 20% as well as improving e-banking services and technologies (Sifer, 2006). This is why central banks need to direct banks to invest more into funding this field.

Central banks need to enforce the growth and development of e-banking which will help improve the economy and the development of the countries in the region. E-banking transaction cost is much lower than traditional banking; the cost of a banking transaction made through ATMs is U.S. 27¢, and an Internet-based transaction costs only U.S. 1¢, compared to a transaction involving a teller which costs U.S. $1.07 (Luštšik, 2004). This means that banks can save up to 75% of the transaction cost if a customer uses an ATM, and 99% if a transaction is made online using the Internet. In other words, when e-banking reaches higher development and adoption rates, banks will increase their savings and make more revenues. Those savings and revenues will increase the banks’ assets and lead to more investments in different fields which will create more jobs, boost the economy, and improve the countries’ development. Due to the nature of e-banking, more adopters will help facilitate the circulation of funds among the financial institutions, and will also keep the currency inside the financial network longer, which will help fight economic inflation.
It is part of central banks’ responsibilities to reach and maintain economic stability and growth as well as support banking system sustainability. For this reason, forcing the development of e-banking services should be among their priorities. E-banking significantly cuts the cost of banking transactions and increases banks’ revenues and savings. The amount of savings and revenues a bank will achieve from the use of e-banking services could easily be handed back to customers by protecting against fraud, or by raising interest rates on savings, or even providing discounts on certain products sponsored by the bank.
Chapter 5

Conclusion

E-banking has become very important for the financial industries around the world. Cost reduction, customers’ convenience, business expansion, and global competition puts e-banking among banks’ top priorities in the developed world. While electronic services have witnessed rapid growth in these regions during the past five decades, in the M.E. traditional banking and commerce are still dominating business style and strategies. This problem leaves M.E. countries lagging behind in a competitive world where the pace of economic change is rapidly increasing. It limits the expansion of their business, making it harder for institutions including banks to compete internationally. It also deprives customers in the M.E. from all the advantages and conveniences of electronic banking and commerce, limiting their access and choices to local stores and markets only.

With the current globalization situation, banks in the M.E. are at risk of becoming less competitive in the market against foreign banks investing in the region. Since those foreign banks already have the required experience, services, and technologies, domestic banks will not be able to compete with them unless they take steps in providing and developing modern and reliable services. It is clear today that modern communications technologies have become the key to successfully participate in the current global market. They are among the most important factors affecting the future and growth of financial industries. Information technologies and electronic services give smaller institutions a chance to find their way to the market. It also helps banks track their customers’ shipments and payments and make the needed connections to facilitate their business.
Many institutions around the globe are developing their businesses online. In this way, the Internet has become the new sphere of business competition for all different kinds of institutions. In order to perform in these online markets, banks developed electronic services and technologies to serve their customers’ needs and increase their level of convenience. Without developed electronic services, banks that continue to rely on traditional banking will still have to depend on a third party for overseas or across-borders business. This will increase the cost of business on both banks and their customers, putting banks at risk of losing the loyalty of customers looking for a better deal and profits. They also risk losing their business to the non-financial institutions who take the opportunities that the Internet provides by developing online banking services for their customers (Abu-Jraish & Rashwan, 2004).

E-banking in the M.E. faces many challenges that stand against its diffusion, adoption, and development in the region. Some of those factors are related to culture and people’s life style where no direct solution can be provided. Others are related to countries' and banks’ policies in the area where setting strategies and providing solutions could solve the problem. This study focuses primarily on the problems related to security and protection. E-banking security and customer protection have been determined to be the major factors causing the problem in the system. Providing secure technical solutions such as biometric authentication technologies could possibly have a positive impact on the growth of the system. They will also encourage banks and governments to set the needed strategies to grow and develop e-banking technologies. The increase in customers’ demand for safe, reliable, and convenient electronic services will force
governments and central banks to issue the required laws and legislation to cover electronic businesses.

One of the major problems facing this study is the lack of sufficient research conducted on the electronic banking and business fields in the M.E. region. This makes determining the roots of the problem difficult. The amount of published research on electronic technologies in the M.E. region is inadequate. Not enough data about the actual size of the e-banking market are available in the region. Banks hesitate to publish information about their customers’ habits and reactions towards new technologies and services. Most of the books and studies, including this one, rely on foreign sources and data from different regions, which makes them less reliable. This situation results from competition and the will to maintain secrecy, which forces banks in the M.E. region to release only the minimum information required by law in their annual reports. The lack of cooperation between banks makes it harder to understand the customers’ habits towards electronic technologies. This sets an obstacle to any individual or institution looking to provide better understanding and solutions to current problems facing the financial sector in the M.E. region.

Despite these limitations, this research suggests that security and central banks’ rules are critical to developing e-banking in the M.E. region. Future work in this field might help shed more light on the roots of the problem. In particular, more and better data about the size of the e-banking market and adoption rates could help clarify the problem. In addition, more research and data about the banking business culture and attitude towards electronic technologies could help with setting better business strategies to change this behavior. Central banks in the M.E. could play a big role in collecting and
providing these data due to their power over private-sector banks. Better understanding of the problem might help to develop additional strategies for promoting e-banking in the M.E.
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