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CHAPTER 1

1.1 Introduction

The rapid growth of the internet, which has been observed over the past decade, naturally had a strong impact on the banking sector as well. Due to the high competition between banks and the need for continuous coverage of the claims, banks have fully benefited from the benefits of using the internet. Nowadays, it is clear that banks offering their services directly through the Internet are more likely to reach new customers. These online services or otherwise known as e-banking are the subject of this graduation project.

In the first chapter there is a general presentation of e-banking. In this chapter, we will see its historical evolution up to the present day, the relationship between e-commerce and e-banking as well as its definition. Moving on to the second chapter, we will look at the kinds of e-banking. The services offered by each item will be presented separately. In the third chapter we will look at two examples of banks and their online services offered over the internet. Finally, in the fourth chapter we will mention the risks that e-banking hides and some security ways from them.



CHAPTER 2

2.1 Definition of E-banking

The term e-banking or e-banking describes all those services provided by banks over the Internet, without the physical presence of the client in a bank branch. Alternatively, electronic banking could be defined as the automated provision of new and traditional products and services of a financial nature, directly to customers via electronic, interactive communication channels. The most common online banking services are information about accounts, account transactions, credit card balances and payments, loan installments payments, redemption of all types of accounts and payment orders. In addition, more specialized services such as real-time stock trading and customer portfolio monitoring are available as well as personal customer services such as personal bank messages, transaction receipt printing, and personal offers.

2.2 Historical review and development of e-banking

Stage One: E-banking was created to meet the growing need for online services that will be available to them when and where they want it 24 hours a day. The first step was made some years ago with ATM placement, where the customer went to the bank again but could now carry out his daily transactions 24 hours a day. With electronic banking, the bank can be located wherever the customer, at his/her assistance.

Stage Two: Banks that have already invested in an e-banking infrastructure will move to the stage where their investment over the next few years will focus on improving the usability of the application. As customers become familiar with the application, they will increase their service requirements and seek value-added services, which banks are already offering in the US. The provision of all day-to-day banking will be taken for granted and will no longer be the subject of competition between banks. According to Datamonitor, the bulk of the investment will be about enhancing further functionality, while a significant amount is expected to be spent on personalization applications so that users can create personal pages by customizing the information they provide to their own preferences.

2.3 Forms of e-banking

Types of e banking Depending on the channel used to distribute the services, we distinguish e-Banking into

- Internet Banking
- Mobile Banking
- Phone Banking

2.3.1 Internet banking.

Internet banking, sometimes called Online Banking, uses the Internet as a means of conducting banking. In order for a user to use e-banking services he must have a computer and an internet connection. However, in some cases more security devices are required, such as installing special security software or a digital certificate. The customer of a bank, via Internet banking, has the ability to execute almost all banking transactions and receive the information he desires. Banks now have the know-how and the capabilities to personalize their online services, depending on the type of customer represented by the user, and in this way there are, for example, additional capabilities for corporate users in relation to individuals. Greater investment is also being made in the security issue that is critical to the reliability of electronic banking systems.

2.3.2 Mobile Banking

Mobile banking has not yet been established in relation to the internet and phone banking. In this sense the field of glory of the space is predicted to be bright. Taking into account the penetration of mobile telephony in Greek households, then mobile banking has all the preconditions that in the near future it will become a widely used channel for electronic transactions. The technologies used are different in many cases from those of internet banking. Lately, i-mode, which is quite widespread in Japan, is being introduced in our country, and the Banks also try to gain from it. Great importance is also given in the case of mobile banking to transaction security and user authentication. Mobile transactions are not offered today by all Greek banks that have

e-banking services. Usually the majority of domestic banks have installed services via internet and telephone.

2.3.3 Phone Banking

Phone Banking refers to banking transactions via telephone or other devices that are equipped with WAP (Wireless Access Point) technology. Banking transactions can be made from anywhere the customer is, even abroad, with a single phone call. Through Phone Banking all the usual banking tasks can be done. Also, through the use of the fax machine, the user may have some useful information in writing such as his bank accounts, his portfolio of shares and stock market prices. The first African bank Citibank introduced banking service over the phone about 20 years ago. It did so because Phone Banking's operating costs are much lower than a transaction through the banks' funds. The major difference with Internet Banking is that Phone Banking remains more expensive for the bank and less secure for the customer, since it is not easy to identify client voice over the phone. Since the first adoption of this technology to date, much has changed and it is constantly improving. Now the services through Phone Banking are divided into two categories. Those that are handled through call centers and those that are automatically processed through voice recognition systems and tone pad devices.

2.4 Advantages - Disadvantages for customers.

Advantages:

Starting with the advantages for customers we will refer to "Ease", as it is available 24 hours a day and 7 days a week. All the services provided by the local bank are available on a website. We will continue with "Speed". One are endless queues in front of the cashiers and in the offices of the banks. The user over the Internet can execute any transaction directly. "Access". Access to bank customers is now out of the narrower geographical boundaries. Internet access also automatically means access to the Bank. "Update". The client has the possibility to immediately update his portfolio, accounts and cards. "Cost". Banks, in their attempt to make e-banking more attractive to their customers, have a lower invoice for online transactions (in many cases commissions for transactions through the banks' websites are nil). Then,

customers have the greatest control over their transactions. They are using the internet to complete their transactions and more easily control their transactions as they have the whole "picture" of the transaction in front of their computer screen. At the same time they are immediately and clearly informed of any transaction costs. There is also a comparison ability of the customer to decide effortlessly and without being brainwashed about what product he or she prefers and what investment he wants to make.

Disadvantages:

We have the following disadvantages: Time-consuming customer registration. In order to register someone in his bank's online program, he / she needs to give his / her identity and sign a form at the bank or if it is a purely electronic bank, the forms will be sent by post to fill in and send back to the bank. There is difficulty in handling this. Banking websites may seem awkward to someone who does not know how to handle the Internet well. Opening an online account or downloading a loan online may scare some because of the lack of knowledge about new technologies. Finally, there is the user's mistrust: Many people do not trust e-banking. They want to see the one who will process their account, and the electronic money transfer gives them doubts.

2.5 Advantages - Disadvantages for Banks.

Advantages:

The advantages for banks are to increase their competitiveness as they offer an additional channel for their services and products, without geographical restrictions 24 hours a day, 365 days a year. Another advantage is the expansion of the clientele as access to online branches is not limited to geographic boundaries. In this way, it is possible to attract remote customers. Also anyone from anywhere in the world is a potential customer. It reinforces customer loyalty, as banks and bank analysts have concluded that a customer who uses the internet to complete his bank transactions is more committed to his bank. In addition, the reduction of operating costs is a significant advantage, since transactions that take place through physical branches cost more than those that take place over the internet. According to research results, each web transaction offers 100 times lower operating costs than the teller transaction.

It collects information for customers through the use of e banking, to promote new banking products and offers. Depending on the transactions made by the user, banks also make the corresponding bids. Finally, it means better customer service in each branch. The endless queues in front of the banks 'funds and at the employees' offices are in the past. The service is now faster and more efficient, as the employee has more time to serve the customer and resolve any questions he may have. Therefore, it is very important for each bank to attract its customers to use these services and in addition to create the appropriate security environment so that the customer feels as comfortable as with traditional transactions. This is why huge sums of money are spent each year to improve the security of banking systems and to research new technologies that make it even more difficult for malicious use of the internet.

Disadvantages:

The disadvantages, now, for the banks are the high initial cost of installation. Creating a website that has many requirements with specialized products and services requires the use of new technologies. As with all new technologies, their original cost is particularly high. The choice of these technologies must be done with great care and be compatible with the Bank's policy and its profile. Security, as electronic attacks and unauthorized access to banking electronic systems are frequent. The main concern of banks is to ensure the greatest possible security of their customers by placing special programs and equipment. Web site maintenance costs, as technology is constantly evolving, new internet spy risks are emerging. No computer system is 100% safe over time. Banks spend enough money to continuously update security programs and monitoring systems. The personnel training costs, which must be able to resolve any user's questions and be informed about the changes they make from time to time in the use of e-banking

CHAPTER 3

3.1 E-banking of Greek Banks

3.1.1 National bank



NATIONAL BANK OF GREECE

In detail, the online banking services offered by the largest bank in Greece are as follows:

1. Accounts

- Updating the balance of the accounts connected to the Internet Banking services.
- Update on the movement of the above accounts on a daily or monthly basis.
- Transfer money between these accounts.
- Analytical information of the clients' financial transactions for a certain period of time.

2. Payments

- Payment of VAT as long as the customer has submitted the relevant statement via "TAXIS net".
- Payment of IKA employers' contributions
- Payment of the insurance contributions of TEVE Payment of PPC accounts.
- Payment of the due personal income tax or payment of the installment according to the "Fiscal Evidence Proof" which is in the client's clearing note.
- Payment of installments of all NBG issuance credit cards
- Payment of credit cards issued by other domestic banks.
- Repayment of life insurance premiums of National Insurance.

3. Remittances in ETE

- Transfers of funds from the customer's account (the ETE) into accounts of third parties within the bank.
- Making up to 50 credits of NBG accounts with an equal amount of linked account charges.

4. Remittances to other banks

- Make remittances to another bank via the "DIASTRANSFER" system. The customer can choose how to pay the commission either at the expense of OUR, BEN, or SHA.
- Sending remittances to accounts held with European Union Banks or off-shore holdings.
- Making up to 50 credit accounts with other domestic banks or accounts held with European Union Banks or offshore country holdings with equivalent account billing.

5. Investments

- Update on the portfolio of equities and mutual funds held by the client at the bank.
- Holding shares and promptly informing the client about the orders he has given.
- Possibility to apply for participation in public registers on ATHEX.
- Information of the ATHEX meeting and ADEX. for the market image, indexes, company financial data, stock prices, etc.

6. Financing / Loans

- Information on bank balances relating to business financing as well as the movement, installments and interest rate of each client.
- Information on movements and analyzes of customers' housing and consumer loans.

7. Applications

- Order of checks and cancellations.
- Information on historical data of old applications for the issue of check blocks and the number of checks issued to that customer.
- Possibility of applying for the issuance of any credit card of NBG 8. Fixed orders
- Schedule future customer payments by submitting standing or payment orders.

8. Additional services only for Legal Entities (businesses)

- Updating the movements of the issuance cards of NBG via the "POS" of each business.
- Immediate update on current daily transactions through SET-4300.
- Processing the debts of the partners to the company, with the possibility of direct debiting of their account.
- Update on the status of the company's debtors' standing orders.
- Execution of installments of loans of the clients of the company.

Relevant website: <http://www.nbg.gr/>

3.1.2 Piraeus bank



The implementation of Piraeus Bank's alternative electronic banking channel is an autonomous site (website) on the Internet, exclusively designed for e-banking. In 2000, Piraeus Bank introduced the first integrated electronic banking platform (online banking, mobile banking) to the Greek banking market, with the unique name "Winbank". In detail, the offered electronic services for individuals are as follows:

1. Manage accounts

- Show / Analyze Balances and Accounts Movements.
- Sending account and mail transactions (e-mail).
- View account details.
- Show interest rates / deposits
- Update for the International Account Number (IBAN).

2. Managing cards

- Show credit card balances and movements.
- Immediate appearance and printing of monthly accounts.
- Send monthly mail accounts by mail and e-mail.
- Provision of credit card details.
- Possibility of immediate payment or payment at a future date.

3. Management of tasks

- Overview of loans.
- Provision of loan components.
- Possible payment of installments.

4. Management of checks

- Ability to order a booklet.
- Provision of analytical data and monitoring of checks.
- Search by check number / page and time period.
- Data entry and processing of available and unpaid checks.
- Updating the status (eg paid, canceled, revoked, etc.). >
- Withdraw a checkbook.

5. Payments / Transfers

- Transferring money to his own accounts at Piraeus Bank

6. Transfer of funds to Piraeus Bank third parties accounts.

- Transfer amount from Visa card to another card.
- Credit card payment from another bank.

- Third-party payment orders at a future date.
- Remittance orders. > Define periodic payments.
- Save Regular Payments for Instant Repeat. Change stored payment order information.
- Deferred or canceled stored payment orders.
- Fixed or individual payment orders of DEKO (PPC, OTE, EYDAP).
- Fixed or individual payment orders for telephony companies (Cosmote, Vodafone, Wind)
- Fixed payment orders for pay-tv companies (Nova).
- Temporary deactivation and change of standing orders.
- Interruption of standing orders.
- Individual payment orders for insurance agents (ALLIANZ AEGA, AEAZ, ING).
- Individual payment orders (IKA, VAT, TEBE).
- Individual payment of Income Tax for Natural Persons.
- Refresh "Vodafone Refill" talk time.
- Offers to non-governmental organizations by debiting the client's bank account.
- Sending mass remittances through a file (the client).
- History of all payments.

7. Stock trading

- Immediate monitoring of the prices of the shares of the ASE
- Immediate valuation of the client's portfolio.
- Immediate update of the client's stock prices.
- Immediate follow-up of X.A.A.
- Daily and historical stock price chart.
- Immediate update on the prices of international market indices.
- Immediate information on the financial, business and stock market news of the Greek and International markets.
- Exchange rates of foreign currencies.
- Bank mutual fund prices.
- Immediate update of order status.

- Participation in public records.
- Update for execution of orders.
- Orders for the resale of orders purchased on the same day.
- Share purchase orders with account billing.
- Purchase orders with acc 8. Applications
- About a personal consumer loan.
- About a credit card.
- About deposit accounts.
- About transferring balance from another credit card.

8. An additional service provided to the users of electronic banking is that of alerts, through which they can be informed immediately and validly about banking transactions of interest to them. Customers can be notified wherever they are, through

(a) e-mail,

(b) a text message (sms),

(c) a telephone call from a service representative:

- ✓ Changes in their balance.
- ✓ Credits and charges for specific movements of their accounts.
- ✓ Deferred and periodic payment orders.
- ✓ Stock trading and valuation of their portfolio.

Relevant website www.piraeusbank.gr credit.

CHAPTER 4th

4.1 E-banking risks

As banks that provide their customers with electronic banking services grow, electronic attacks will increase as well. The rise in electronic attacks is not enormous, but it is a "headache" for banking groups who are trying to save their own interests and the interests of their clients at all costs. (McDowell, 2013) The risks we may face are:

➤ Sniffers

A sniffer is a program or device that secretly tracks a network's traffic in order to grab information that is transmitted through it. Sniffers are data encryption technology. The majority of networks use broadcast technology, enabling messages from a computer to be read by another computer on this network. Virtually all other computers in the network ignore the message, except for the recipient. However, computers can be configured to receive messages even if they are not for them. This is done using a sniffer. (Vincentas, 2013)

➤ Key Loggers

Key loggers occur when the user's keystrokes are logged, without him or her knowing or allowing it. This method is used by insiders to steal credit card, bank transaction and personal code information. It is one of the most serious threats to leak personal and corporate data. The recording and storage of keystrokes is made by special hardware, which is easy to install and difficult to locate at the same time. Key loggers record and store keystrokes and mouse clicks in a special file, which they also send over to the spy on the user (Cedric Angler, 2015)

➤ Social engineering

Social engineering is defined as a non-technical type of illegal invasion based primarily on human communication and often involves tricks that force people to abolish the specified security procedures. (Cedric Angler, 2015)

➤ Trojan Horses

Trojan horse is a seemingly useful program for the computer containing camouflaged commands, which when executed create unfair or damaging actions (eg file destruction). Trojan horses are spread when users open a program because they think it comes from a legitimate source. Trojan horses cannot create identical copies automatically. Their installation is dependent on users, or by attackers who have gained unauthorized access to the computer in some way. Trojan horses can do anything that can be done by the user who installed them, such as:

- Delete files
- Transmitting any file to the attacker
- Changing files that the user can change.
- Install programs with the computer user rights that provide unauthorized access to the network.
- Virus installation.
- Installation of other Trojan horses. (Cedric Angler, 2015)
- Phishing

Phishing is an email to a user, pretending to be from a legitimate business, especially a bank or telecom provider, to deceive the user and get private information to be used to steal their identity. This e-mail prompts the user to visit a web site. He is asked to update his personal information, such as password and credit card numbers, bank account numbers that the company is supposed to already own. This web site, however, is counterfeit and has been created for the sole purpose of stealing the requested information. At the same time, those hiding behind the false message gain access to these elements and then can make electronic fraud at the expense of their victims. Phishing attacks are growing rapidly and intelligently. According to surveys, their spread rate doubled in just one half-year (Vincentas, 2013)

Alternative forms of phishing

Vishing: In this version of phishing, in order to convince the victim more easily, he or she is given a telephone number, or his own phone is requested so that the alleged representatives of the company can contact them. (Vincentas, 2013)

Social Networking Phishing: Scammers initially collect information and personal information about their victims from social networking sites and then send them personalized messages. (Vincentas, 2013)

4.1.1 E-banking and risks from hackers

E-banking has been good for our lives in recent years and more and more people prefer it for its transactions as it avoids long-standing queues in shops and hassle. But cyber threats also multiply at a rapid pace. In 2014 they made a record, according to Kaspersky, which specializes in online protection programs.

In January, a Swiss company lost one million euros in an online transaction as it was attacked by hackers. The victim was the accountant of the company, who did not understand how it happened. It all started when an email containing an attachment that had a virus opened. Once they entered the computer, all they had to do was wait for an online transaction. "When he tried to connect online with his bank, the virus was activated. A message asked him to wait. For 20 to 30 minutes, he could not use his computer at all. During this time, hackers took control and executed several transfers of funds to foreign accounts," said Frederick Marson, a spokesman for the Freiburg canton. There are many viruses on the internet that allow this. Their latest versions are available for 1000 Euros.

Stoker Anschler, computer technician, explains how he works: "I can watch all the computers I've managed to hack. I can see who is doing online banking right now, so they are very vulnerable. Because Switzerland faces an increasing number of cyber-attacks, it has set up an action center to find and analyze these attacks. But they can't provide numbers and names.

For Reno Kenig, Professor of Applied Sciences at the University of Bern, there is another big problem with these attacks. Mobile apps, cricket motors that connect with encrypts and we use them to access our accounts online are very easy to hack: "From

an electronic point of view, e-banking is safe. We use a secure channel with the help of the SSL encryption system. The problem occurs when the client's computer no longer uses a secure connection. Whether it is a computer or a smartphone, hackers can take control and security is at stake. "

Swiss banks warn their customers about Internet-related security issues in the general terms of the contract they sign. Usually this warning is accompanied by a clause, which relieves the bank of any liability in the event of an attack on its client. "The customer is twice a victim. First, he is the victim of a crook and then he can defend himself with great difficulty because of the general terms of the banks. Sometimes there are agreements between banks and customers, but unfortunately most of the time they are hidden. They are confidential. So, it's hard to see what's going on in this area, which is of course detrimental to the customer, "says Maite Fleri of the Consumer Union. A coordinated online security action group on small and medium-sized businesses in Europe has begun to operate recently, starting in Great Britain, the Netherlands and Belgium.

The European Union is particularly concerned about the increase in incidents and the inability of businesses to deal with such phenomena.

4.2 Security - ways to protect against online fraud



As we mentioned above, the risks faced by e-banking customers are many. For their part, banks, in order to minimize risks, take all necessary steps to maintain the highest possible level of security during trading. In general, the security requirements to be met in all e-business transactions are:

- confidentiality
- the integrity of the transaction
- Authentication of the participants (authentication)
- the non-cancellation of the transaction after non-repudiation confirmation

It is certain that in order to ensure all this, both participants in the e-banking (bank and customers) must take the necessary measures

Most banks follow Secure Electronic Transaction (SET)

This protocol is supported by the two major financial institutions, MasterCard and Visa, as well as by companies such as IBM, Microsoft and Netscape.

The SET protocol is based on cryptography. (Cedric Angler, 2015)

Encryption

By cryptography we mean the method by which privacy is protected in electronic banking and, more generally, in the personal data of each Internet user.

Encryption is entirely based on mathematics and has as its object the encoding and then the decoding of the data. In this way only authorized users have access to sensitive personal data.

The original message is called plain text, while the incomprehensible message resulting from the encryption of plain text is called cipher text. A reverse algorithm is used to decipher a text. The more complex the algorithm used for encryption is, the more difficult it is to "break" the code used by the user.

This encryption algorithm works in conjunction with a key to encrypt plain text.

Based on the number of keys used in encryption, we distinguish two main encryption methods

- symmetric (the recipient uses the same key to decipher the message sent by the sender)

- asymmetric (two keys are used: one (shared key) to encode the message and another (private key) to decode it (McDowell, 2013))

Electronic signature

An electronic signature defines the data in electronic form that is attached to, or reasonably related to, other electronic data and is used to prove its authenticity. The electronic signature uses this public-private key as a method of encryption. Digital signatures are indelible, unique to each transaction and are almost unlikely to be copied or transferred. (McDowell, 2013)

E-token

E token is also another method used in order to ensure security of on-line banking transactions. By e token we define a special device that is the size of one key and is provided by the bank to its clients. On this device there is a cryptographic mechanism where the owner can create and then save his electronic signature in order to safely handle its online banking transactions on any computer, he desires each time. Advantages are high level of security as copying is of e token is impossible, is easy to use because of the size of it the user can have it with him and connect it to his USB port of the computer every time he wants to use it without having to use his codes as they are contained in the e token, and finally can be used for a variety of tasks such as digitization, digital signature, etc.

CONCLUSION

Hellenic Banks have managed in a relatively small time to make proper use of the Internet, and by extension the promotion of their products through it. Things could not be different, since banks are always pioneering and keep pace with technology. E-banking is a tool that serves many people every day, but this is something that not everyone uses and therefore does not apply to everyone. From the fact that not everyone is using e-banking it is clear that there aren't enough information to the consumer, which means that the banks have not paid due attention to be able to promote this service, informing consumers through the various means of communication.

In order to be able to promote this service better banks would be better to advertise this service. In order to be more effective to advertise this service banks could use the various social media networking and to inform consumers about the value of the service e-banking. Emphasizing the benefits that the consumer can enjoy e-banking, such as its savings time, banks have the ability to attract consumers and to manage to increase the number of those they serve.

Finally, customers are in front of a huge range of products, services but above all prices and so they can choose the best for them. They also can complete bill payments, transfer money at any time they want and from any place if they have internet access. Summing up, the positive conclusions outweigh the negative ones, and this justifies the rapid growth of e-banking worldwide.

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