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E-banking in Western Macedonia

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ABSTRACT

Rapid and revolutionary changes in technology the last decade transform the internet in a modern and friendly alternative network for banking transactions. Nowadays, all banking transactions can be virtually presented.

The aim of our research is to identify adaptability and satisfaction of client's use of on-line banking services. The collection of primary data took place through a questionnaire that was distributed to a non-random sample consisted of one hundred and three clients of the ten major financial institutions in the region of Western Macedonia in Greece.

The present study is divided into three parts. In the first part the theoretical approach is included to analyze the background of the e-banking user adaptability; in the second part the on-line transactions' statistics and promotion effectiveness to user adaptability are presented. In the third part, we analyze the statistics of the web sites visits of each bank. The last chapter includes the description and the analysis of the results of the questionnaire used for the survey.

The results of the above analysis indicate that internet provides a unique opportunity for distributing banking services in Greece. E-banking provides benefits both for financial institutions and its clients. We finally, concluded, that the banks that are likely to gain more from e-banking, are those that have more attractive and interesting web site pages.

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CONTENTS

LIST OF TABLES

LIST OF DIAGRAMS

1. INTRODUCTION

1.1 Transactions through the internet

Electronic banking, or e-banking, is the term that describes all transactions that take place among companies, organizations, and individuals and their banking institutions. (www.ehow.com)

In the previous years in order for a customer to make a transaction, it may took a lot of time and patience, in contrast to today's situation where you need less time and it's easier to make a transaction by clicking on a button. (Aggelis B., 2005)

Nowadays, banks are on our computer screen. Internet banking is going to play an important role in the banking sector in a national and in an international level. More and more people are going to use e-banking without hesitation in contrast to the previous years. People that use e-banking maybe have some specific demographic characteristics concerning other people who don't use it much.

1.2 On-line Banking in Greece

After Greece has joined the European Union, the Greek banks started seeking growth strategy in the Eastern Europe and Mediterranean region. As every new player in a market, Greek banks are trying to map and penetrate new Balkan markets to offer their services in order to sustain and boost their market share.

The main goal for Greek banks has been to increase their market share and minimize capital sufficiency requirement through the increase of profitability. On-line banking is a method that has been the fundamental service to break into these new markets and get a descent market share very quickly. (Tsami A., 2004)

The fact that on-line banking offered low priced services at 24-hours 7 days a week accessibility, is a major strategic path leading to increase

customer satisfaction and client retention. On-line banking is a cost effective strategy, since financial institutions can offer services directly to customers and increase their market shares while their profitability rises and total costs decreases. Greek banks tend to avoid building new branches in new markets, in order to reduce the risk of incurring investment losses.

In Greece, however only 49% of Greek enterprises using internet services currently receive e-banking. Instead, the worldwide web banking is emerging as one of the strongest incentives for the initial electronic activation of business. (Observatory for the Greek Information Society, 2007)

In Greece, the first bank which set up its own website was Marfin Egnatia Bank in 1997 giving clients the opportunity to conduct transactions via the internet and the service Web Teller. Then its example was followed by other domestic banks so, nowadays all banks have their own website and can be compared to those abroad. (Varelas X., 2000)

2. LITERATURE REVIEW

Academic research has focused in e-banking effectiveness in the last decade, for example, academic scholars have analyzed different e-banking issues devoted as main theme on scholar magazines(e.g. Karjaluotoet al., 2002; Waite and Harrison, 2002; Bradley and Stewart, 2003; Gerrard and Cunningham,2003; Mukherjee and Nath, 2003).

There are two primary issues for analysis underlying online banking growth and adaptability. Primarily, there is significant cost reduction through the efficient use of online banking services. Experts mention that electronic banking channel is the most cost-effective delivery channel supporting interactive banking services (Sathye, 1999;Robinson, 2000; Giglio, 2002).

Secondly, financial institutions decreased the number of branches and cut back the service payroll cost, since many clients believe that visiting a branch is time consuming. (Karjaluoto et al., 2003)

Recent studies point out that online bankers are the most profitable and wealthiest segment to banks (Mols, 1998; Robinson, 2000; Sheshunoff,2000). Luxman (1999) estimates that in the near future the online channel reinforces its importance especially in the countryside, where banks have closed many branches. However, there is no supporting evidence on this regional issue.

The main reason for slow growth is that first majority of people have not access to world wide web, which is a requirement for e-banking use. Furthermore, new online users require education to use e-banking service (Mols et al., 1999).

Secondly, there are still a wide range of people that believe e-banking causes social isolation (Mattila et al., 2003). Moreover, security and privacy have been a major concern (Sathye, 1999; Hamlet and Strube, 2000; Howcroft et al., 2002). Enos (2001) acknowledged several achievement factors for e-banking including:

Enhance trust and safety, make simpler and incorporate basic services, such as commercial banking and mortgages, insurance, investment and bill-

payments, personalization and customization competence in order to offer each customer with exceptional offers.

He also stated that, in the fierce battle over customers, providing a unique experience is the compelling element that will retain customers. Importance of trust in success of e-banking was also emphasized by Yoursfzai et al. (2003 & 3005).

However, theoretically the online banking channel operates very well with the absence of supporting a branch network. Recently on-line banks without physical branches have dramatically grown, but with minimal impact on the financial service sector. Pure online banks frequently support other channels, for instance phone inbound and outbound centers, and with physical attendance.

Several online players have experience difficulties to accomplish satisfactory market share fundamentals, leading to the business bankruptcy (Orr, 2001; Schneider, 2001). Sievewright (2002) predicts that in the USA, online banking will shut down their busineses in the next five years.

To thrive in the e-banking market, financial institutions have to alter their fundamentals to be efficient. Recent business model and organizational structure are inadequate to fulfill requirements, generated by challenges dealing with on-line business (El Sawy et al., 1999).

Re-engineering of the business processes in addition to technological factors will be a focus area for the next decade (El Sawy et al., 1999).

The development of integrated, customized financial services is becoming an active area of competition between financial sector organizations. Consumers do not want to navigate from website to website to keep track of their finances. Web based services have to be more convenient, easier to use, and less expensive than the alternative, to win the loyalty of consumers (Cronin, 1998). This type of real-time integration of distributed resources is one of the greatest potential advantages of e-banking.

The interactive nature of e-banking creates an opportunity for gaining a much deeper understanding of the customers. The data gathered about the customer during their interaction with the bank can be analyzed using data

mining techniques and this marketing decision support capability will ultimately determine the success of the bank's electronic channel (Franco and Klein, 1999). The idea of channel integration was also supported by many others, see for example, King and Liou (2004).

Regan and Macaluso (2000) and Storey et al. (2000) see excellent customer services as a key factor in the success of e-banking. Their reason for this is that the Internet transfers power from supplier to the customer and superior customer service is absolutely essential for keeping customers loyal.

The provision of a pleasant experience on this channel, according to Orr (2004), is one of the key requirements for success of the channel. This level of integration however, needs very good technological infrastructure.

Franco and Klein (1999) stress the importance of upgrading current technological infrastructure (which still largely depends on slow and fragmented legacy systems) to bring it up to the speed with the Internet trade.

The richness of the medium's content has been a critical success factor in attracting a sharply growing number of websites visitors and commercial users (Stamoulis, 2000). Banks usually feed their websites with content such as corporate profile, product and pricing information, interest rates, and application forms etc. However they need to look beyond the usual contents and make their websites far richer in terms of functionality, to attract a larger number of visitors.

Stamoulis (2000) sees a re-drawing of the Internet market map as a vital prerequisite for the e-banking strategy, because the Internet requires different marketing methods than other service distribution channels. He suggested identification of a niche market and focus on exploiting it is very important for banks.

A similar point has been made by Fruhling and Digman (2000) when they wrote that the Internet is having significant effects on market development strategies. They define market development strategies as "attempts to promote existing products in new markets, in effect broadening the scope of the business by finding new market segments or new service delivery channels".

Mols (1998) suggests that banks should use the Internet as an additional channel of distribution and must keep their traditional channels such as branches and phone banking intact. This gives the banks the opportunity for a gentle transition from a branch banking strategy to e-banking strategy, and it provides good market coverage.

Cronin (1998) draws our attention to the social aspects, which must be considered in the virtual environment. They propose branding as a transferable resource across physical and social barriers to entry, for customers in a new and perceptibly daunting environment. The importance of a brand factor is increasingly recognized (Yousafzai et al., 2005) and many virtual financial organizations are considering opening some high street branches to enhance their brands.

3. ADVANTAGES AND DISADVANTAGES OF E-BANKING USE

The use of internet banking services has brought about radical changes in performing bank transactions and it gains more and more supporters. Online banking was created to cover the clients' growing need for online services that are available whenever and wherever they wish. Simultaneously, the banks have found a new channel of presenting their products and services, investing considerable funds. Moreover, the need for an electronic banking is a sign of our times, as internet has invaded the life of modern man. Let us consider in detail the advantages of electronic banking for the clients and the banks as well as the dangers for both sides.

3.1 From the client's point of view

3.1.1. Advantages

Speed:

The customer avoids travelling to and from a bank branch and via the internet can directly execute any transaction.

Easiness:

The bank's website is available 24 hours a day, 7 days a week. All services provided by the local bank are available on a website.

Access:

The Access for the bank's clients goes beyond the restrictions of location. Internet access means simultaneously access to the Bank. The user can make the transactions via the internet, while being at home.

Cost:

The greatest benefit of internet banking is that it is cheap or even free to customers. However, price seemed to be one factor that is ‘opposed’ to e-banking (Sathye, 1999). For example, internet connections or call pricing may have different cost among different geographical areas.

Greater control over transactions:

Clients who choose the Internet in order to complete their transactions can more easily control their transactions, and have all the "image" of the transaction on their computer screen. Simultaneously, they are informed immediately and clearly for the cost of transaction.

Information:

The client has the potential for direct information to its accounts cards and its portfolio.

Client’s possibility for comparison:

Client’s possibility for comparison so as to decide without any influence which products the client prefers and what investment wants to do.

3.1.2 Disadvantages

Time registration for clients:

In order for someone to use the e-banking, he should first visit a branch to make an application or he can make an application through the website. After that, as soon as the passwords are received, the registration should be made. In case that the application has been made through the Internet, the codes are mailed and after the candidate web client sign the receipt, the documents should be returned to the suitable office to be activated.

Distrust of the user:

The particular case of e-banking that lacks the physical presence of bank branch and a physical interaction between the bank personnel and the customer, include a unique environment where trust is of utmost importance. Aladwani (2000) identified customers' trust as an important future challenge of online banking.

Difficulty in learning and usage:

Difficulty in learning and usage of e-banking for people who are not familiar with technology and especially with the internet. Older people tend to be less proficient in their use of technology.

3.2. From the bank's point of view

3.2.1 Advantages

Reaching new segments of the population:

Reaching new segments of the population as the access to the internet branches is not limited to the geographical borders. In this way there is the possibility of attracting remote clients. So, anyone from anywhere in the world can be a potential client.

Better customer service and satisfaction:

Better customer service and satisfaction give an end to the endless queues in the banks' branches. The service is faster and without any doubt more effective as the employee has more time at its disposal in order to serve the client and resolve any queries.

Enhancement of client's loyalty:

According to the researches that have been conducted both by the banks and the bank analysts, they conclude that the likelihood of a customer

moving to another financial institution is significantly diminished. The main reason for that can be found in the consumer behaviour theory.

Enhancement of the banks' reputation and competitiveness:

Enhancement of the banks' reputation and competitiveness provide an additional channel of services and channels' distribution, 24 hours a day, 365 days a year.

Decrease of operating cost:

Decrease of operating cost as the transactions that are made through the banks cost a lot more compared to those made through the internet. According to Robinson (2000) the cost of an electronic transaction is dramatically less when done online compared to a branch.

3.2.2. Disadvantages

High initial cost of installation:

The creation of a website requires an initial cost which is extremely high. We must bear in mind that the choice of these technologies must be made very carefully and should be compatible with the bank's policy and its profile.

Cost of employees' training:

They must be informed about anything which is related to the use of e-banking and they must also be able to resolve any users' queries as well as to be informed about the changes made from time to time in the use of e-banking. This fact constitutes an additional cost.

Cost of site's maintenance:

There is no computer system that is 100 per cent secure as time goes by. Banks spend enough money on the continuous updating of their security programs and monitoring systems.

Security:

The main concern of banks is the greatest security of their clients with the establishment of special programs and equipment. In addition to the advantages of e-banking, this application is associated with various security risks.

4. SECURITY

4.1 Hacking Incidents

The last decade Hi-Tech companies have developed major breakthroughs in electronic banking transaction processing system. Despite the on-line technological process, they have been numerous hacking incidents during an on-line banking transaction process. Many companies worldwide use on-line banking to transfer huge lump of cash between accounts, consequently hackers are often motivated to interrupt on-line transaction and literally steel banking deposits. (www.wikipedia.org)

There are different methods of hacking on-line banking transactions. Hackers usually identify different "holes" in online security systems, using them while the transaction takes place. The most popular method of hacking an on-line banking account, according to different studies, is of using stolen usernames and passwords. Frequently, corrupted banking employees are willing to deliver lists of account usernames and passwords in exchange of commission on transaction gains. Corporations usually develop and use their own networking systems protected by high level security systems such as fire-wall. However, individual users are not as sophisticated as the corporations, which cause huge problems to the security of an on-line banking transaction. Since individual users are not usually using on-line security software, hackers convert cryptographic security code, through special frequency decoding software, in to a readable form of data that can be easily used to hack an on-line banking account. The corporate world have identified that hacker technology is being developed in a faster than the retail on-line security software, so they are trying to push banks to increase regulation on online-banking. Therefore, big corporations assign different banks to manage bill payment and transaction processing with third-parties. Frequently, banks allow corporate customers to use their networks with no restrictions. (Papadopoulos M, 2005)

Furthermore there are some risks for security transaction defaults, while corporations using banks networks to execute their transactions. Hackers

focus and study on how corporations execute on-line banking transactions, billing payments and payroll payments. Hacker's advanced skills and software tools in addition with an organized plan of action create a great combination to distort bank's networks security. It is not usual for corporations in Greece to use bank's networks. (www.economia.gr)

Additionally, there haven't been official claims of transaction processing fraud. Even though e-banking has been implemented the last decade in U.S.A and Europe with great success, it is a new banking transaction method for the Greek banking territory. Experts mention that Greek banks will need at least ten years to finalize a fully productive development of e-banking software solutions customized to customer's needs. The quickest method of implementing e-banking in Greece is to purchase "of the shelf" software and modified based Greek customers' needs. Therefore Greek banks will utilize online transaction technology experience, in order to save time from common security mistakes that other countries faced.

4.2 Transaction Security

Visa, Master Card, IBM (International Business Machine), Netscape and Microsoft use SET (Secure Electronic Transaction) protocol, which is the most common known protocol for its safety. The purpose of the SET protocol is to develop a safety net around payment transactions that supports privacy of information, to guarantee the reliability of payment orders for merchandise and services order data, to validate both the cardholder and the merchant.

Cryptography is the fundamental method, which protects through SET, hacking of electronic banking transactions. There are two major methods of cryptography: symmetrical and asymmetrical. In Symmetrical cryptography, it is being used the same key for coding and decoding the data, which means both the sender and the receiver are acknowledged about the key meaning. Therefore there has to be a secure way of transmitting the key from the sender to the receiver, to ensure privacy of data. Usually there are different meetings, in which both authorized members participate to decide which key they are

going to use and how often they will change it to ensure security of the system. DES (Data Description Standard) is the most common algorithm that is being implemented by many banks to generate PIN numbers through symmetrical cryptography. (www.wikipedia.org)

In Asymmetrical cryptography, users implement two keys, which are the public key used for decrypting data and the private key used for decoding. One message, which will be encoded with the public key, will have to be decrypted only with private key. Banks distribute the public key to authorized users and maintain the private key only for the bank's use. (www.go-online.gr)

IT (Information Technology) banking experts use TAN (Transaction Authentication Number) numbers supporting on-line banking services to deliver one-time passwords designed for a single usage, to validate electronic banking operation. Transaction authentication numbers offer supplementary safety since they operate as a structure of dual-variable validation. Transaction authentication numbers are a subsequent level of protection, exceeding the conventional single- secret code validation. Furthermore when hackers steal the actual file, which includes Transaction Authentication Numbers, they will need to know password for complete access and usage of it. On the other hand, if hackers want to steal login information, it will be useless without a legitimate Transaction Authentication Number. IT bank experts generate a list of 50 exclusive TANs to be distributed to authorized clients. On average, this list of fifty unique numbers is sufficient for a frequent usage for half a year for an ordinary client. (Papadimitriou G. and Pomportsis A., 2003)

TAN is being constructed from six to eight digits long. Banks distribute to authorized clients list of fifty TANs through mail, otherwise it mails the list from the nearest bank branch to be picked up by a person. When the PIN number is mailed to clients, users will be able to access their accounts, but they will not be able to perform any transactions. The right to process a transaction will be enabled only when users validate a transaction by entering a Transaction Authentication Number. The bank will take few minutes to validate the TAN. Moreover, users are still exposed to a risk of being attacked

while they enter username, password and the TAN, since hackers can interfere by rerouting the user into a fake identical website. Finally, users that are infected with malware programs, that enable a malicious user, are exposed to a forged transaction. Therefore I would advice, when users realize an abnormal operation of the system they should take immediately action and confirm personally a transaction occurred electronically. (Papadimitriou G., and Pomportsis A., 2003)

4.3 Risks of e-banking

The last decade experts have identified a rapid increase of electronic fraud transactions. Online-banking holds the greatest share of these frauds, since on-line banking transactions consist of huge amount of cash. The increase of frauds have affected the frequency of on-line banking transaction processing use, since clients are precautious regarding the privacy of their on-line financial information.

However the majority of users believe that their on-line information is safe and there is no risk of losing their money, while an on-line banking transaction is on process. Even though there are no official statistics for electronic crime, experts mention that eleven billion dollars are accounted approximately for getting lost due to electronic crime. The greatest percentage of this money is getting lost by financial institutions.

Qualitative research has shown that financial institutions invest huge amount of capital on security software tools. This investment capital is measured to total about one million dollars annually, which is greater than the amount of cash that is getting lost through forged transactions. Banks tend to be proactive and desire to get ahead technologically from hackers. This is an on-going competition that never ends; as a result financial institutions will continue investing huge capital on electronic transaction security.

Hackers have many ways to interfere to online-banking transactions; however the biggest danger that can lead to high risks of transaction fraud is the unpredictable human factor. Hackers can use human ignorance or weakness to bypass security systems, no matter how sophisticated are the

online security network systems. For example, email scams that include a link can easily lead a user on giving his account details without realizing that this is a fraud. Hackers usually focus on small community banks. These banks have emerged e-banking services, without taking strict precautionary security measures, due to time constraints. (www.saferinternet.gr)

As a result, there are many network holes, which are easily identifiable by experience hackers. FBI (Federal Bureau of Investigation) electronic crime department records and studies fraud cases and focuses on how hackers process an electronic scam. These inputs are being delivered to financial institutions, in order to adjust their security systems to new technology threats. FBI has caught many electronic criminals and useful conclusions have been derived by interrogations. In 1994 the Russian hacker Vladimir Levin he transferred 10 million dollars from Citibank accounts to his own account. He got access to Russian Citibank's networking system. When he was arrested by Scotland Yard and FBI, he confessed that he used stolen bank's usernames and passwords to transfer money to his own account.

Barclays, which is one of the biggest banks using online banking in U.K, detected a software anomaly that cause a big risk for transaction fraud. Actually it was an online software defect that allowed the bank's user-customers to have access to every user account. The bank shut down the systems, until they fix the defect and apologized customers with a formal written explanation. In September 2000 a Dutch television channel reported that hackers were stealing important financial information from ABN AMRO customers. Hacker emailed bank's customers, an email pretending being the bank, while they installed an application, which was transmitting personal information to the hackers. As a result they would easily have access to many accounts, in order to transfer available cash to different accounts. (www.wikipedia.org)

Following these examples, anyone can conclude that hackers focus on manipulating individual's ignorance. Therefore financial institutions tend to continue inform and train their clients on how to use on-line banking and to take precautionary measures, when they are in an abnormal process. Greek

banking system can benefit from these examples, when it will have to coordinate with foreign secret services for stopping on-line fraud processes.

4.4 Secure e-banking

To protect yourself from manipulation you should cultivate a general level of security awareness when using the internet and check your account activity regularly. If you think that you may have been the victim of internet fraud, you should immediately block online access to your bank account and inform your bank promptly about any suspicious account activity. (www.swissbanking.org)

4.5 Dangers of the internet

The dangers and threats on the internet are changing constantly, and often extremely quickly. The most prevalent dangers include Sniffers, Pharming, Key Loggers, Phishing and Trojan horses.

Sniffers

A ‘Sniffer’ is a program or a device that monitors secretly the movement of a network in order to grab the information that travels on it. In fact, the sniffers are the technology of intercepting data. (www.tsl.state.tx.us/)

Pharming

The new trend in the electronic interception is called ‘Pharming’. It is a type of fraud that involves diverting your internet connection to a counterfeit website, so that even when you enter the correct address into your browser, you end up on the forged site. (www.saferinternet.gr)

The two basic differences between pharming and phishing are the following two:

1. The attack can be massive to many users and not individually to each user (through e-mail)

2. The movement to pharming site becomes without user's intervention (e.g. the choice of a link through e-mail) (Aggelis B., 2005).

Key Loggers

'Keystroke logging', often called 'Keylogging' is the action of tracking (or logging) the keys struck on a keyboard, so that the person using the keyboard is unconscious that their actions are being monitored.

It is used for intercepting credit cards' information, bank transactions, and personal passwords, and it is a serious threat for the leakage of personal and corporate data. There is a wide range of keylogging methods, ranging from hardware and software-based approaches. The registration and the storage of the keystrokes are made by special program (hardware) that it is easy to be installed and simultaneously is difficult to be traced. However, there is a similar program (software) which can be downloaded using the internet. (www.inout.gr)

Phishing

The word 'Phishing' is a contraction of the words password harvesting and fishing. Phishing is the sending of an e-mail to a user, pretending that it comes from a legitimate company, mainly a bank or a telecommunication provider, with the aim of cheating the user and taking the private information that will be used for the interception of user's identity.

The request may come via e mail or through a manipulated internet site, with the goal of intercepting the information required, e.g. e-banking access data or account balances.

The phishing attacks are increasing rapidly and in a smart way. According to surveys, the rate of their increase is doubled in six months. (Papadopoulos M., 2005)

Trojan horses

The term is derived from the ‘Trojan horse’ story in Greek mythology.

A Trojan horse may seem a beneficial program for the computer which contains “out of sight” instructions, which when they are executed, create harmful actions. They are spread when the users open a program as they consider that they come from a legitimate source.

Antivirus software is designed to detect and delete Trojan horses and prevent them from ever being installed. In order to remove a Trojan horse manually, you should understand how that particular Trojan horse operates. In addition, if a Trojan horse has possibly been used by a hacker to access a computer system, it will be difficult to know what damage has been done and what other problems have been introduced.

According to a survey conducted by BitDefender from January to June 2009, Trojan-type malware is on the rise, accounting for 83-percent of the global malware find out in the world". (www.wikipedia.org)

5. THE PROMOTION OF E-BANKING IN GREECE

Despite their high profitability even in the midst of an economic crisis, in recent years the banks in Greece have systematically pursued a strategy for achieving goals associated with the promotion of banking products and services. The developments in the banking sector are of great importance, and to a large extent they will shape the future of the Greek labour market, given the sector's significance in the Greek economy. (www.eurofound.europa.eu)

5.1 Composition of the Greek financial system

The Greek financial system was operated in a very robust traditionally isolated economy with high inflation and highly controlled currency exchange mechanism. The implementation of the European Union economic rules has led to several reforms of banking services, as well as to an increase of competition due to free economic market standards existed within European Union. Furthermore, European Union's regulations were implemented in Greece, in-order to reform and deregulate the Greek banking structure, while privatizing few banks and establishing free market conditions in a heavily regulated market. As a result, the market share was redistributed through the privatization of the Greek bank leaders. Actually Greek banking reforms developed for ten years in fast phase rhythm, and they continue to be on the political agenda, in order for Greece to fully comply with European Union's regulations. This on-going process changed the banking ownership strategy for the last decade. Local and international larger banks executed merger and acquisitions strategies to expand their services and gain a competitive advantage within European Union, since they face brutal completion. Strategic alliance of different banks is another business strategy that banks implement to gain access to new markets. Several European Banks used this strategy, during the transition time of reforming the Greek economy, to gain access to the

Greek banking market. The reforms started when Greece had to adopt Euro as a national currency, as a result Greek fiscal and monetary policy changed path from high control/regulated environment to an economy where free trade can be operated without any restrictions. Secondly, interest rates percentage change is controlled by European Union Central Bank, which would affect cost of banking services, affecting indirectly capital supply and demand. Third, European Union mandated the upgrading and implementing new technologies that affect directly on-line transaction systems and indirectly money and capital markets. Moreover, the Greek government implemented European Union's guidelines to reform banking operational requirements. As a result of the monetary deregulation financial institutions could transfer capital freely across borders. Additionally, the Greek government developed a capital maintenance requirement as a safety benchmark ratio to banks' capital repository to protect insufficiencies of cash flow to bank's customers. The reforms were an on-going process, which passed legislations to limit money laundering and modify the operation of capital markets and public traded companies. These reforms were the beginning for opening new financial service intermediate companies, specializing in capital markets, in order to increase competition among banks. (www.hba.gr)

The continuous process of reforming developed a financial system with the following characteristics:

First of all the Greek financial system operates as a sector under the umbrella of the European financial market, which directly have an effect on the Greek economy being influenced by European fiscal, monetary and foreign exchange policies. Secondly, the hierarchical structure is divided into three different institutions such as Stock Exchange Commission, Bank of Greece, Insurance Executive and Regulation Committee. Therefore Greek Central Bank acts as an intermediary to implement guidelines of European Union Central Bank. The Stock Exchange and Insurance Executive Commission are subdivision of the Greek Central bank being responsible for regulating the markets they are assigned of. The Greek Central Bank operates in a very active way within the Greek Banking system. Since banking systems

operate in an unstable environment, the Central Bank monitor and control the Greek banking system, while it interferes when there is an unstable economic activity. Moreover, Greek banks may operate as retail branch, as an investment bank and assurance agency. Greece is the only country in the world, where its financial institutions offers converged financial service. For example in U.S.A it is prohibited by the law for a retail bank to offer investment banking services. There is not high demand for sophisticated financial services in the Greek market, so there are no opportunities for financial services to specialize in a particular sector of financial service. This financial service structure is common to small countries. There are the following three type financial services intermediaries: a) Commercial retail banks, divided into fully private banks, semi-private banks (part of stock is owned by the government) and cooperative banks (majority of stock is owned by professional associations), b) Credit card issuers and particularly companies that offer leasing, bill-payment and foreign currency services, c) Investment management companies, including venture capital, mutual fund and hedge fund companies. (Tsami A., 2004)

Hellenic Bank Association's (HBA) reports of 2008 indicate that 28 Greek banks operate, of which 21 are regular and 7 are associate members, with a workforce of more than 62,000 people, directly employed, in the past five years; 3.900 branches and 7390 ATMs; more than one million private shareholders; foreign institutional investor participation, which for some of the largest HBA member banks amounts to 40% of the share capital; presence in 16 foreign banking markets, either directly or through majority holdings in overseas banks. This structure services a country with active five million customer base. However lately the European Union and the IMF (Internationally Monetary Fund) have mandated the consolidation of the Greek banking sector, due to the insufficiency of several banks to meet the capital maintenance requirements in case of a future economic disturbance. This is a latest updated reform to change the structure of the Greek banking system to fully comply with European Central Bank's regulations. This reform will be an on-going process of mergers and acquisitions of different banks, and will follow a measurement of capital requirement efficiency of the new

financial services to be able to pass the stress-tests. World-wide developed countries face economic turbulence, due to the accumulation of debt in high levels that can lead to the collapse of the whole economic system. Therefore, banks have to be prepared to support economic activity when abnormal economic conditions occur. In addition, the banking service will be affected by economic conditions, where online-banking services can play an important role in financial service convergence. Banks will focus on delivering cheap, effective services to clients, to increase cuts in variable and fixed costs. Therefore, this financial crisis will get many financial technology breakthroughs as cost-cutting effective methods.

5.2 Internet Technology in Greece

Last decade financial software tools have been developed to support cost-effective retail banking in cost-effective way, while Greek banks acquire electronic banking know-how technology by increasing competitiveness and penetrating new markets through online banking.

Even though World Wide Web is a new territory for processing routine activities in Greece, experts mention that Greeks user will get up to speed of becoming sophisticated internet users.

Greek customers are very demanding, while they desire comfort and expediency from cheap services. They tend to avoid endless lines at the cashiers' desks and the strikes. The financial crises lead to an increase in bank robberies, which Greeks tend to avoid. Carrying cash is not safe anymore; in addition Greeks desire to diminish their transaction time. The rapid growth of electronic banking shows the capability of Greek clients to adjust in new transaction methods.

Hellenic Bank Association reported on daily basis 100 million Euros on-line transactions for 2009, whereas the number of transactions for 2006 was about 7 million Euros.

Moreover, there are 20 credit institutions and 10 branches of foreign banks in Greece with presence on the Internet. Europe has been transforming in a fast phase to electronic transaction systems, while twenty four percent of European customers are frequent users of on-line banking services. (www.ecb.int/)

Greek banks are very precautious, particularly after the hacking attempt in 2005 of interfering to customer's account on-line financial information of Alpha Bank, Commercial Bank and National Bank of Greece. As a result IT bank experts have installed firewalls and IDS (Intrusion Detection Systems) to protect banks by system intrusion.

5.3 On-line Services offered by Greek Banks

In general, there are two groups of financial institutions offering on-line banking services. Primarily, several long-established financial service companies such as Alpha Bank, Eurobank and National Bank of Greece expanded their business operation by offering on-line banking. Secondly, the last decade several on-line financial institutions have been established, which have excluded the possibility of opening physical branches. The first group of banks is a common function of the Greek banking operation structure. (www.hba.gr)

5.4 On-line Banking Services Structure in Greece

Greek financial services sector operates under a traditional and very robust structure. The largest market-cap banks control the operation of the financial services market. Profitability in 2008 exceeded 3.1 billion Euros or 1.8% of the Greek GNP (Gross National Product).

Financial Institutions face brutal competition in Greece and as a result they have implemented a strategy for expansion to penetrate new Balkan markets via on-line banking.

Greek banks have made a great progress using Web sites designed as interactive promotional material supporting banking services. Therefore Greek financial institutions are dedicated to continuous customized commitment to their clients based on their needs and preferences. Electronic banking initially emerged in 1997 in the Greek financial services market. In 1999 the Greek banking system pushed and promoted the widespread implementation and use of on-line banking. (www.hba.gr)

5.5 Greek Electronic Banks

On-line banking has been a major sub-sector for future growth of the Greek banking sector.

5.5.1 National Bank of Greece

National Bank of Greece (NBG) has launched a dynamic Web-site, which offers interactive services to users since 1999. NBG offers a full-line of line of electronic services such as secure and time- effective commercial and investment e-banking transactions tailored for client's needs and preferences. NBG internet banking offers access to real-time daily, monthly, annually and semi-annually private financial account information to authorized users. The following list details the tasks a user can execute through NBG e-banking:

1) Transferring money from one account to another

2) Tax-Pay services

3) Bill-Pay services

4) Social Security Payments

5) Credit-Card Bill- Pay

6) Executing stock-market related transactions, such buy and sell stock, while can monitor individual stocks and stock-market performance

7) Transferring money to a third-party abroad and overseas

8) Monitoring annuity portfolio performance

9) Monitoring local and foreign bond portfolio performance

10) Placing and cancelling a new check order

11) Appling for NBG credit card

Any client that operates at least one active account can apply for e-banking service in any NBG branch. NBG Web-Site operates using 128 bit encryption of the transaction data through SSL (Secure Sockets Layer) 128 protocol. Furthermore, NBG has launched certification authenticity developed by VeriSign, to secure access to authorized users. (www.nbg.gr)

5.5.2 Piraeus Bank

Piraeus Bank has developed a Web-Site with fully integrated e-banking services.

On-line users access their accounts through the authentication of their user ID (Identity Document) and a PIN (Personal Identification Number). The banks IT experts generate daily algorithms, a common method to generate User ID and PIN number every 2 months. Additionally, Piraeus Bank offers accessibility of key financial information about credit card accounts. Navigation facilitates the support of several banking services, such as timely account information, payments, transfer of funds, capital finance, and mortgage finance and cheque order/cancellation. Piraeus Bank customers have access to monitor their account balance and their transactions in digital or printed form. Piraeus Bank charges high commission fees for bill-pay and remittances services, as a result the bank has lost some competitive advantage. Piraeus bank online system generates frequently alerts delivered to its on-line users by text messages and e-mail notices to notify them the status of executed transactions. At last, Visa facilitates money transfers between credit card accounts or directly to an on-line banking account. (www.piraeusbank.gr)

5.5.3 Marfin Egnatia Bank

Marfin Egnatia Bank on-line interface offers a digital signature validation security option. Furthermore, Marfin Egnatia Bank deliverers to its on-line users a device, which generates single-use digits (security token). Users will have to press one time a button, allowing a complicated algorithm to generate single-use numbers. The completion of all on-line banking transactions requires the electronic signature. Additionally, Marfin Egnatia Bank, like Piraeus banks, facilitates the delivery of accurate information about uses' accounts, remittances, credit card payments by sending SMS (Short Message Service) or email alerts. Bank's on-line users have the opportunity to monitor detail information regarding date, time, location, description, status of a transaction as well as the remaining balance of the accounts, in digital or

printed format. Even though customers are able to use bill-pay service online, to pay utility and income/sales taxes on-line, Marfin Egnatia Bank requires any process associated with loans and cheques to be executed at the physical branch. (www.marfinegnatiabank.gr)

5.5.4 Alpha Bank

Alpha Bank is the second bank in Greece offering e-banking services through a fully integrated platform to on-line users. Clients are assigned to a unique User ID and a password. Alpha bank sells for seven Euros to on-line users a device, which generates single use five digit numbers. Alpha Bank as all other major Greek financial services has developed a fully interactive platform that facilitates navigation of the interface such as monitoring bank and credit card account balances, credit card transactions/applications and loan requests/balance. Alpha Bank's platform details analytical history of the last twenty transactions executed. Moreover, it allows viewing of information related to the 10 last transactions. Investment banking is the sector, where Alpha bank offers integrated on-line service through its platform. Therefore users will be able monitoring and executing their transactions related to the stock-market, such as bond, annuity, and stock performance. Moreover, Alpha bank offers bill-pay services, a convenient method to pay utility and tax bills. (www.alphabank.gr)

5.5.5 Citibank

Citibank is one of the newest large bank-players during the last decade in Greece. Citibank has a strong presence in commercial and investment banking. Citibank's platform has been developed, based on the technology applied in other countries, preferably United States. As a result, Citibank's platform is primarily focused to customer's needs, desires and preferences. Citibank's platform is designed to facilitate convenience in monitoring and managing stock-market transactions. Therefore an investor will be able to monitor stock-market performance, buy/sell investment products. Furthermore Citibank through a strict encrypted system supports common e-banking service such as bill-payment services to facilitate payment of utilities, tax services and commercial charges. On-line users are able to monitor account balance, executed transaction history and analytical description for any financial transaction regarding the authorized account. (www.citibank.gr)

6. WEB BANK'S VISITS

The increase of the competition, the expansion of the number of the clients, the decrease of the operating cost is some of the benefits of e-banking. In this study we are going to examine to what extent has it been achieved by the banks.

In order to estimate the effectiveness of the use and the spread of e-banking we have made a research on the visits of the web sites of each bank.

For the collection of the data and the information, we have addressed through e-mails to the banks, we have visited their web sites as well as valid web sites which count the visits of other different web sites.

6.1 The aim of the research and the methodology

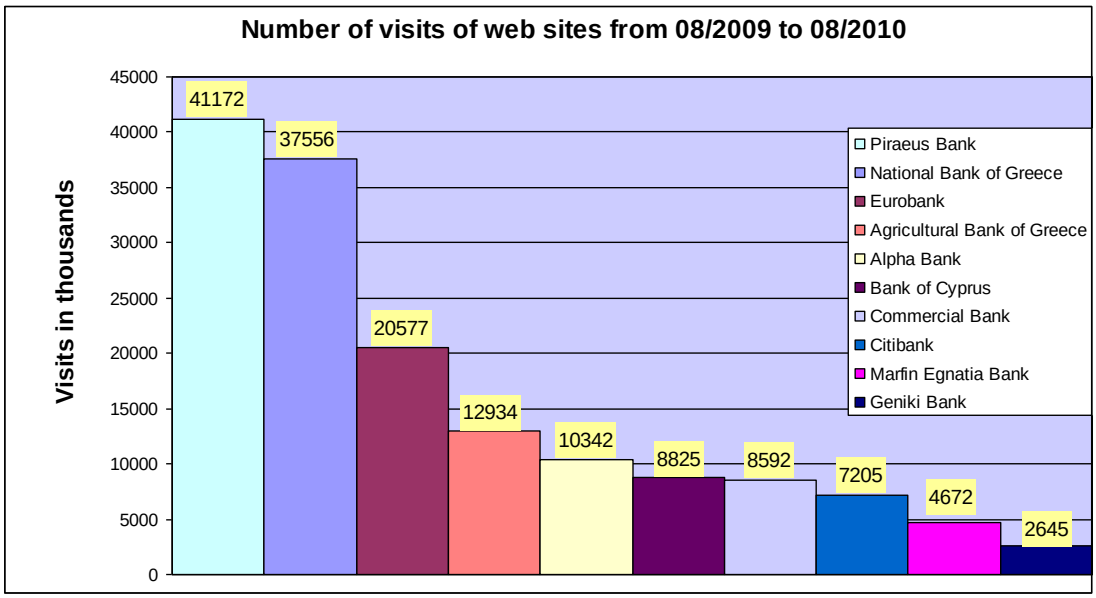
The main aim of our research, is to investigate and draw conclusions about the degree to which the efforts and the enormous funds spent by the major banks in Greece for the diffusion and the use of e-banking by their clients are equivalent to their effectiveness.

For this reason, the following banks have been chosen: Commercial Bank of Greece, Agricultural Bank of Greece, Cyprus Bank, Eurobank, National Bank of Greece, Piraeus Bank and Alpha Bank which are those with the greatest appeal to the public and the most clients as well as those whose web sites' visits is a subject of research and analysis. We communicated with these banks for the selection of data. Only Eurobank, Alpha Bank and Agricultural Bank of Greece corresponded to our demand. For the rest of the banks we gathered information from their sites and the sites "alexa.com" and "compete.com" which are the web sites that count the number of "clicks" made on several other web sites the last twelve months.

6.2 Analysis - Conclusions

6.2.1 Visits of Banks' websites

The total visits in the web sites of our sample from August 2009 to August 2010 appear in the diagram below.



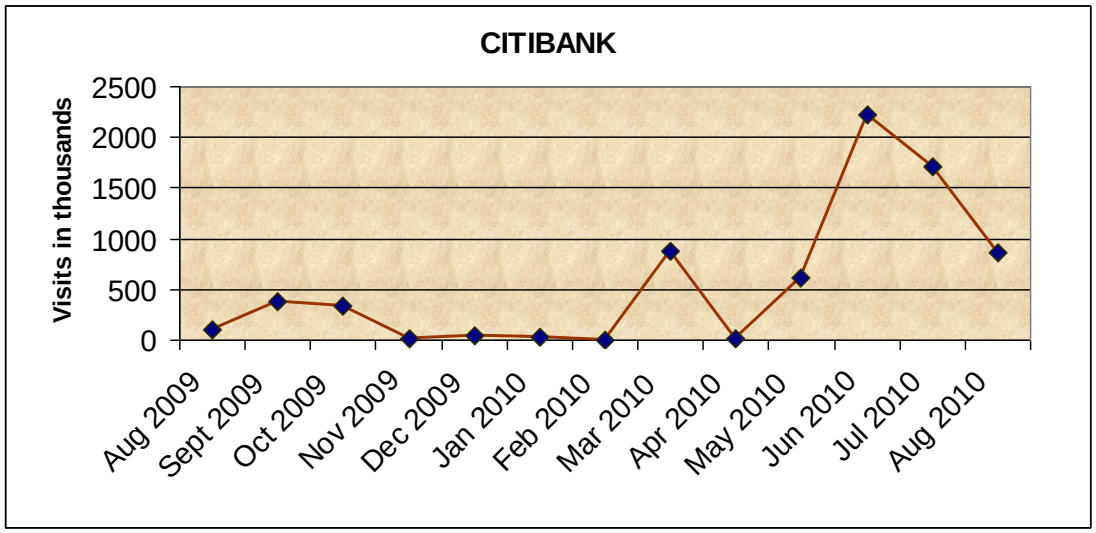
Source: www.compete.com

Diagram 6.1: Number of visits of web sites from 08/2009 to 08/2010

In the next section, we will describe the statistics of each bank concerning the web sites visits.

CITIBANK

The visits of Citibank's web site during the period August 2009 to August 2010 appear in the following diagram.



Source: www.compete.com

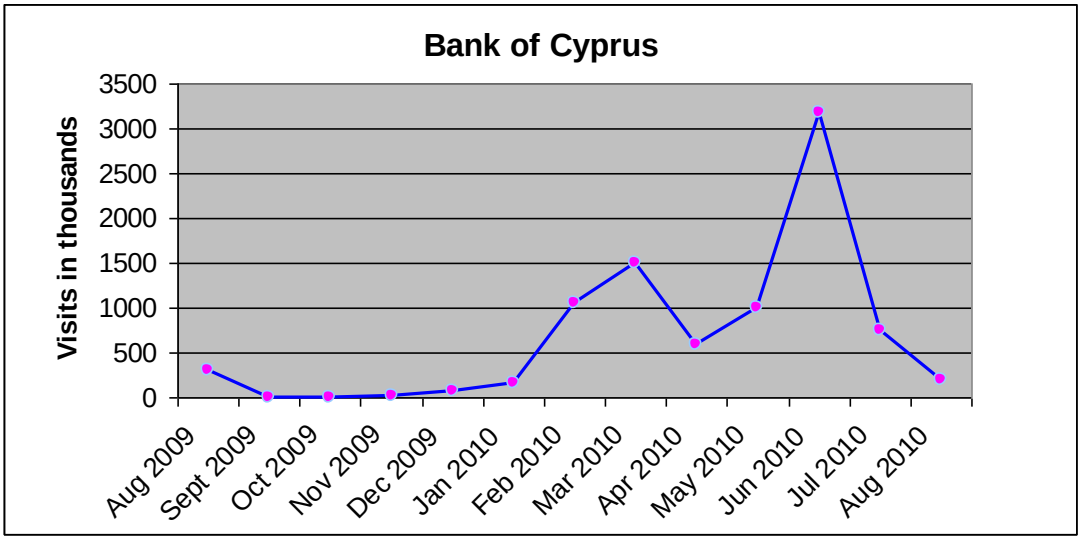
Diagram 6.2: Number of visits of Citibank web sites

Citibank is a USA bank and has got branches in almost all over the world. It is noted that, during the first months of 2010 (January and February), the visits in its web site do not exceed the 30.000. In addition, the visits in its web site in March and May 2010 were 875.000 and 610.000 respectively. In May 2010 and June 2010 there is a recovery and the visits in its web site reached 2.220.000. After that, it follows a gradually decrease in the next two months from July 2010 to August 2010, and the visits in its web site reached 865.000 in August 2010.

Finally we conclude that during the period August 2009 to August 2010 the visits reached the number of 7.205.000

BANK OF CYPRUS

The visits of Cyprus Bank's web site during the period August 2009 to August 2010 appear in the following diagram.



Source: www.compete.com

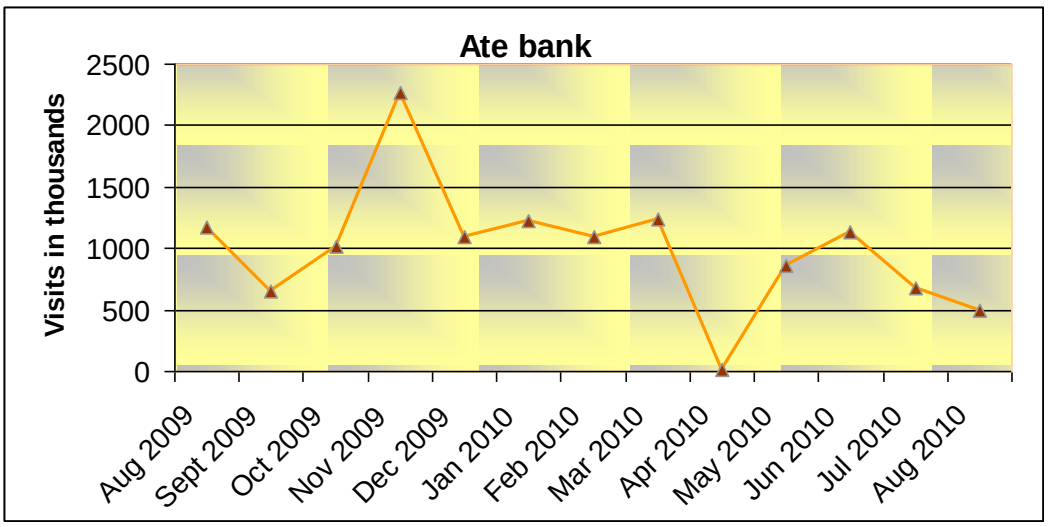
Diagram 6.3: Number of visits of Cyprus Bank web sites

The Bank of Cyprus, a subsidiary bank of Cyprus, presents a gradually increase in the visits of web sites. In the above diagram we observe a stability from September 2009 to November 2009. Then, there is a continuously increase from December 2009 to March 2010. After that, there is a sharp increase from May 2010 to June 2010. The following months present a continuous decrease. In August 2010, the number of "clicks" in Cyprus Bank site is 202.000

Finally we conclude that during the period August 2009 to August 2010 the visits in the web site of Cyprus Bank reached the number 8.825.000.

AGRICULTURAL BANK OF GREECE

The visits in the web site of Agriculutal Bank of Greece during the period August 2009 to August 2010 are presented in the following diagram.



Source: www.compete.com

Diagram 6. 4: Number of visits of Agricultural Bank of Greece web sites

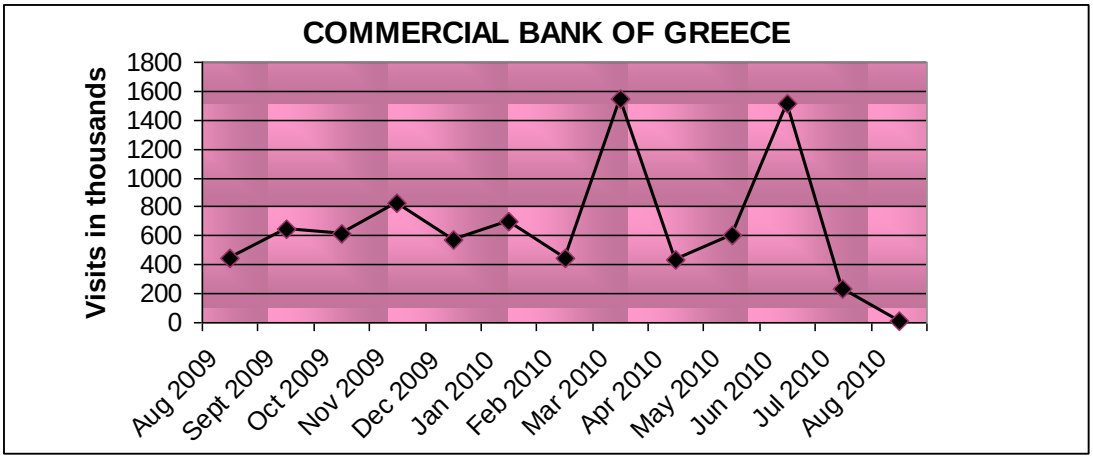
The Agricultural Bank of Greece is a public bank and the network of its branches is the second largest in Greece following that of National Bank of Greece. In Agricultural Bank of Greece the trend of visits presents a strong fluctuation. In August 2009 the visits reached 1.166.000 and in September 2009 647.000. The best month is November 2009, during which 2.269.000 people visited its web site. Then it follows a downward trend from December

2009 (1.100.000) till March 2010 (1.240.000). Then we observe a sharp drop in April 2010 (10.000) with an upward trend immediately afterwards, during May and June 2010 (1.135.000). Finally, in the last two months (July 2010 and August 2010) there is a gradually decrease from 683.000 to 490.000.

It is noted that the visits during one year in the Agricultural Bank of Greece web site reached the number of 12.934.000.

COMMERCIAL BANK OF GREECE

The visits in the web site of Commercial Bank of Greece during August 2009 to August 2010 are presented in the following diagram.



Source: www.compete.com

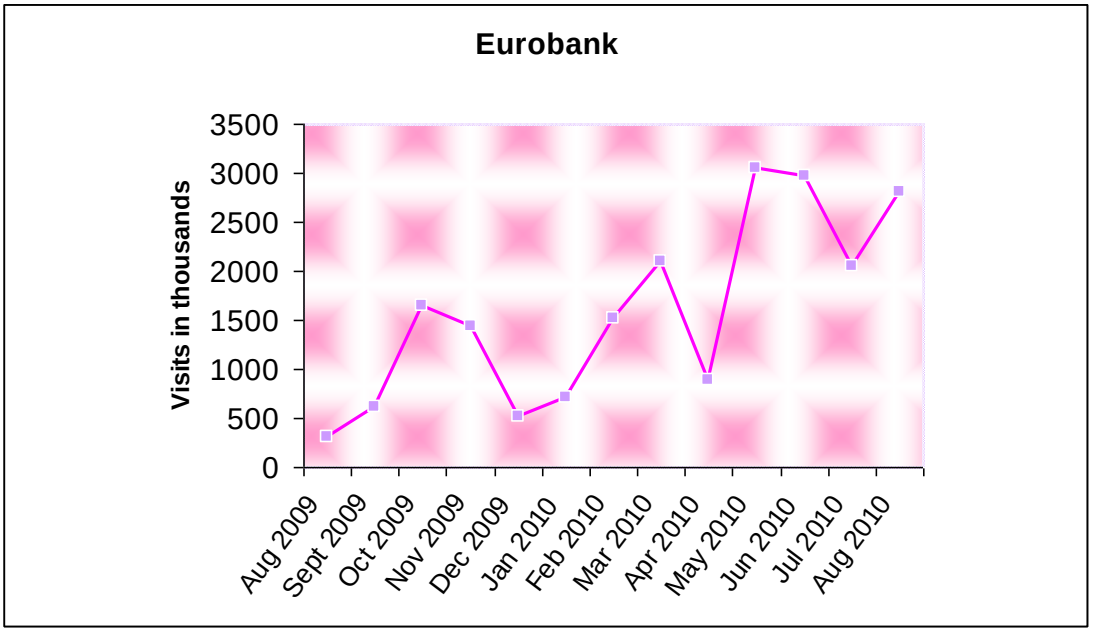
Diagram 6.5: Number of visits of Commercial Bank of Greece web sites

Commercial Bank of Greece is a bank which obviously has not been focused on the use of e-banking by its clients as we observe a signficant drop in the visits. From August 2009 to February 2010 the number of visitors in its web site is almost the same. In August 2009 the visits reached 446.00 and in February 2010 447.000. Its best month is March 2010 during which the visits reached 1.548.000 and June 2010 where the visits reached the number of 1.510.000. The worst month is August 2010 as the visits did not exceed 14.000.

The total number of visits for the under examination year reached the number of 8.592.000 visits.

EUROBANK

The visits in Eurobank's web site during August 2009 to August 2010 are presented in the diagram below.



Source: www.compete.com

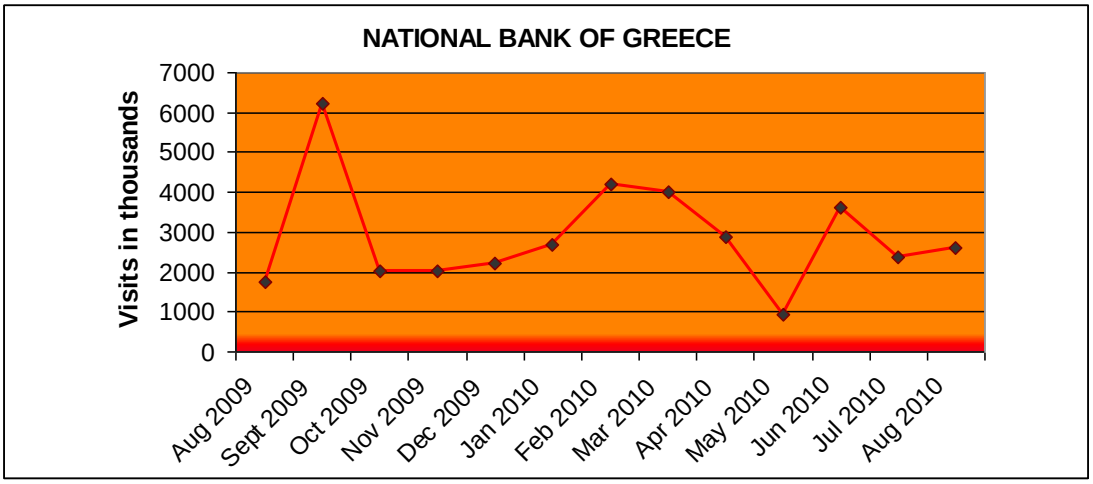
Diagram 6.6: Number of visits of Eurobank web sites

Eurobank is one of the banks with a dynamic presence in Greece, taking the third place regarding the number of network's branches, with National Bank of Greece and Agricultural Bank of Greece in the first two places. It is among the banks with the most websites visits. In the above diagram we observe a gradually increase during the period that we examine. Specifically, it begins with 304.000 visits and it ends up with 2.804.000. In summer, the visits are continuously decreasing and the upward trend begins in September 2009 reaching 1.474.000 visits in November 2009 and 513.000 visits at the end of 2009. In 2010, it begins with a slight increase reaching in March a significant increase (2.089.000) and continues with a fall reaching 888.000. During the next two months we observe another important increase that reached in April 3.053.000 visits.

The total number of visits for the period underexamination reached the 20.577.000 visits for Eurobank.

NATIONAL BANK OF GREECE

The visits in the National Bank of Greece web site during August 2009 to August 2010 are presented in the diagram below.



Source: www.compete.com

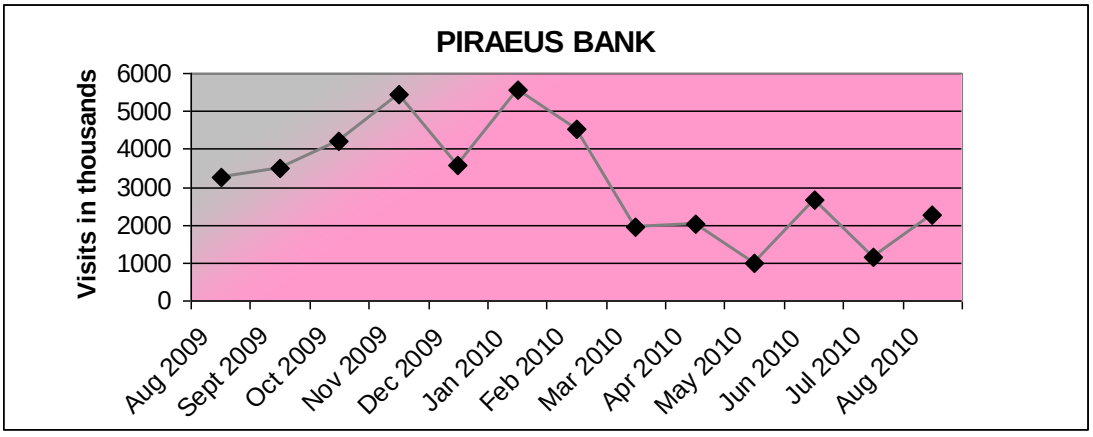
Diagram 6.7: Number of visits of National Bank of Greece web sites

National Bank of Greece is the biggest bank in Greece so it is expected that the visits in its web site are equivalent to its dynamic. 1.746.000 "clicks "in its site occurred in August 2009, with a remarkable increase in the next month. We observe a sharp fall in October 2009 with 2.203.000 visits and then an upward trend with its highest point 4.215.000 visits in February 2010. In May 2010 it is registered the biggest fall that reached 926.000 visits while an increase occurred again in June 2010 (3.635.000). After that, it follows a decrease from 3.635.000 to 2.361.000 in July 2010. In August 2010 there is a slight increase to 2.608.000 visits.

So, National Bank of Greece is a bank that has a very important presence in Greece regarding both the number of branches and the visits in its web site. The visits that occurred in its web site during August 2009-August 2010 reached 37.556.000 visits, keeping National Bank of Greece in the second position.

PIRAEUS BANK

The visits in the Piraeus Bank web site during August 2009 to August 2010 are presented in the diagram below.



Source: www.compete.com

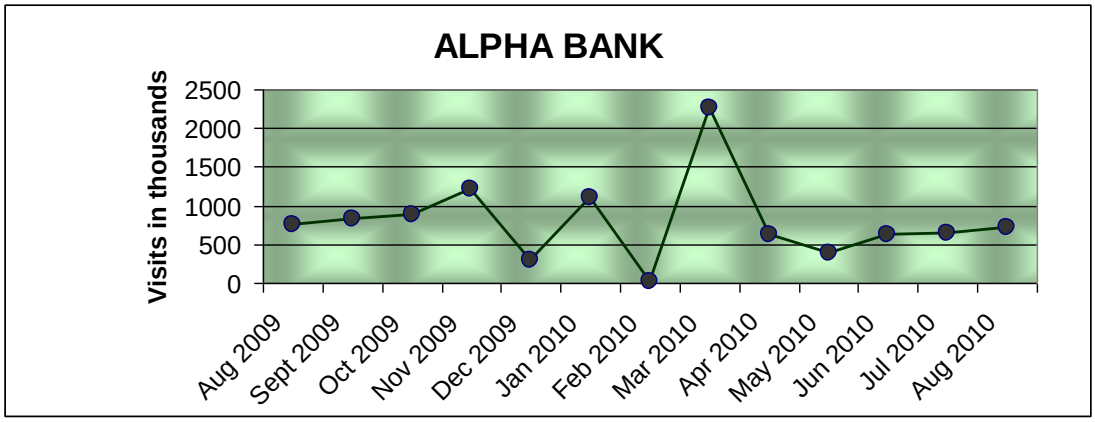
Diagram 6.8: Number of visits of Piraeus Bank web sites

Piraeus Bank has established its position in Greece and has got dynamic presence. It is the bank which gave great attention to the design of its website. The results are satisfactory as it is one of the banks with the greatest number of visits. In August 2009 the number of visits reached 3.277.000 overcoming that of other banks apart from National Bank of Greece. Piraeus Bank follows the same trend with other banks, meaning that there is a drop during summer, followed by a gradual increase during the next months with its peak in January 2010 that reaches 5.551.000 visits. Then we observe a downward trend with the greatest fall in May 2010 (995.000).

The visits in its web site according to the above diagram reached the number of 41.152.000 and it possesses the first place.

ALPHA BANK

The visits in the Aplha Bank web site during August 2009 to August 2010 are presented below.



Source: www.compete.com

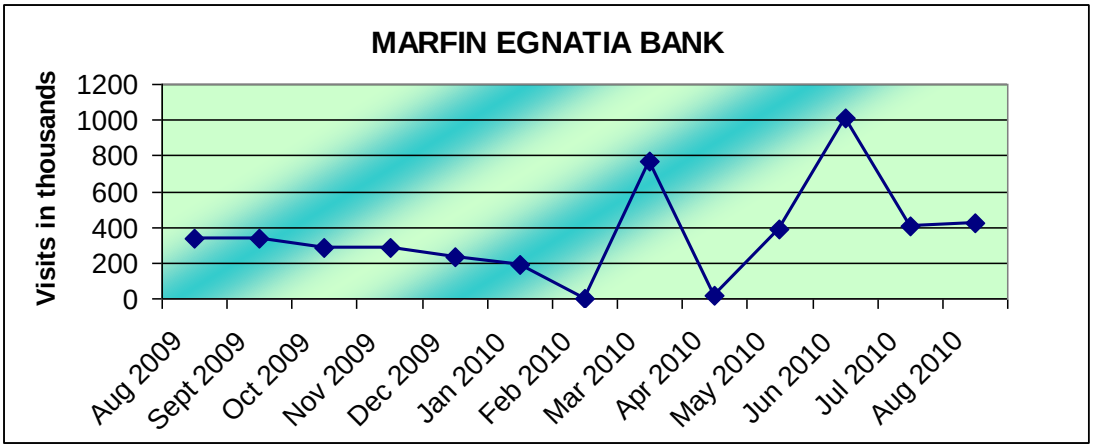
Diagram 6.9: Number of visits of Alpha Bank web sites

According to the above diagram the visits in the Alpha Bank website from August 2009 to August 2010, reached the number of 10.342.000.

It is one of the biggest banks in Greece and its website is the most popular among other banks'web sites. The top month is March 2010, during which 2.262.000 users visited the web site. The worst month is February 2010 with 11.000 visits. In the first months from August 2009 to October 2009 the number of users is almost the same with 753.000 in August 2009 and 888.000 in October 2009. The same trend appears from April 2010 (620.000) to August 2010 (725.000).

MARFIN EGNATIA BANK

The visits in the Marfin Egnatia Bank web site during August 2009 to August 2010 are presented below.



Source: www.compete.com

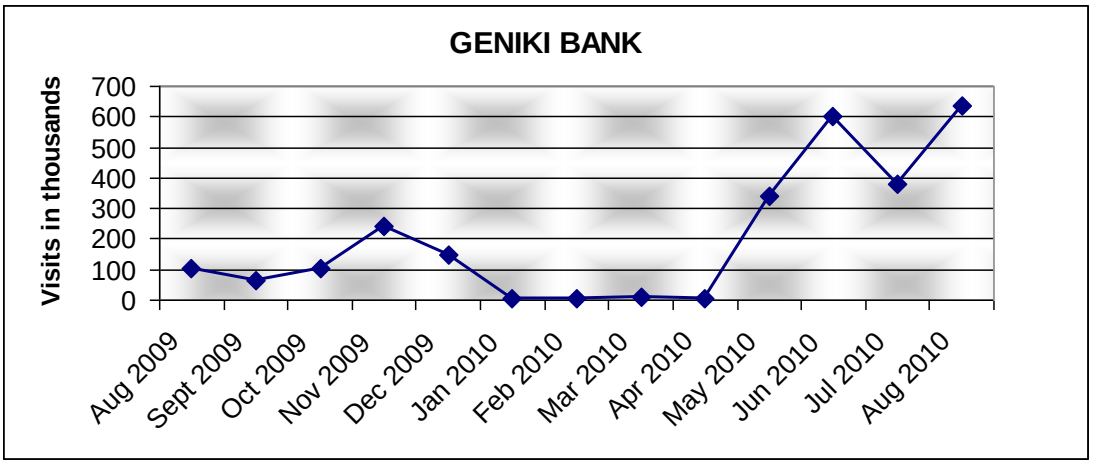
Diagram 6.10: Number of visits of Marfin Egnatia Bank web sites

The web site visits of this specific bank is in low levels. The significant decrease starts from August 2009 with its visits to reach 338.000 until February 2010 when we reached 3.000 visits. It follows a significant increase in March 2010 with its visits to reach 767.000. The best month is June 2010 (1.013.000). In the next two months a decrease follows with 403.000 visits in July 2010 and with 423.000 visits in August 2010.

The total visits for the period of our study reached the number of 4.672.000.

GENIKI BANK

The visits of the Geniki bank web site from August 2009 till August 2010 are presented below.



Source: www.alexa.com

Diagram 6.11: Number of visits of Geniki Bank web sites

The visits of the web site of this bank are in very low levels. Starting from August 2009 with 105.000 visits and following a slight increase in November 2009 (240.000), a downward trend continues which reaches a very low level in January (3.000) to April (3.000) 2010. It recovers in May (340.000) and in June (603.000) 2010. Finally, in August 2010 it reaches the highest point compared to all the other points with 638.000.

The total visits that occur during the period of our study reached for Geniki Bank 2.645.000 visits, a number that puts the bank to the last ranking position.

The visits of National Bank of Greece, Eurobank, Alpha Bank, Piraeus Bank Agricultural Bank of Greece, Bank of Cyprus, Geniki Bank, Commercial Bank of Greece, Citibank and Marfin Egnatia Bank, regarding the use of e-banking for the period August 2009-August 2010 are presented below.

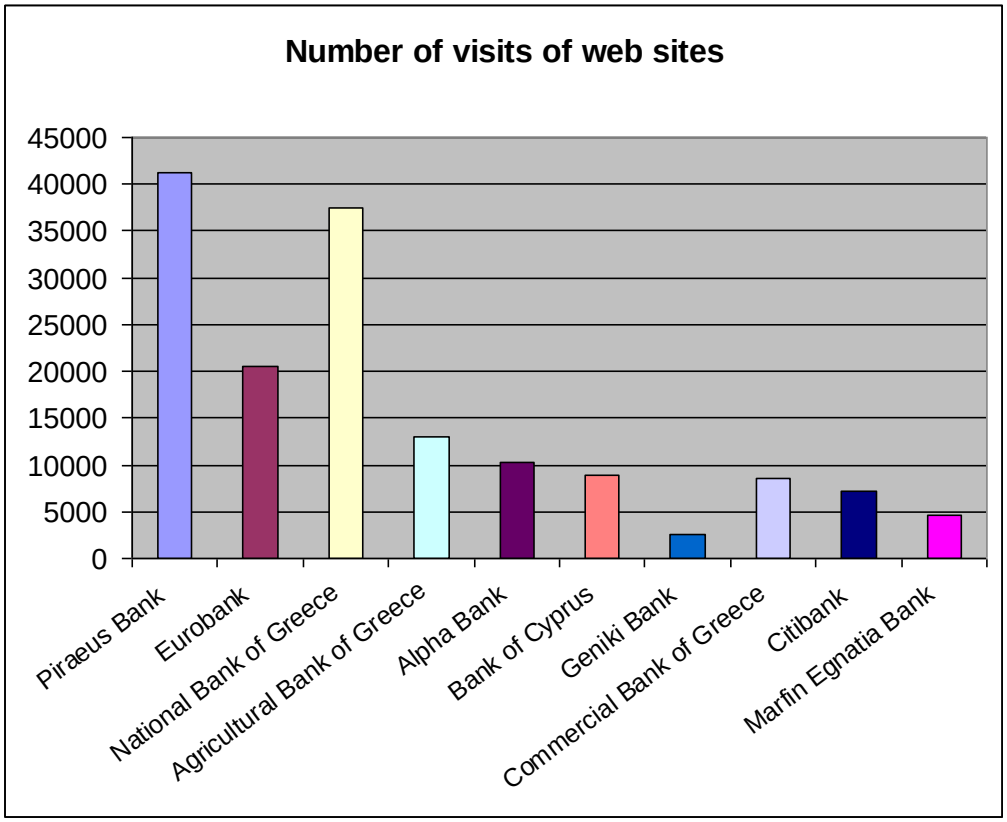


Diagram 6.12: Number of visits of web sites

As it is noted in August 2009, the bank with the most visits was Piraeus Bank, with 3.277.000 visits and the bank with the least number of visits was Geniki Bank. The greatest number of visits is presented in September in the National Bank of Greece with 6.227.000 visits, leaving much behind the other banks. During the summer, we observe a fall in the visiting of all banks while the visiting increases in winter.

6.2.2 Transactions per branch

In the field of the research and based on the selected data, we have tried to group the data in that way so as to have a thorough image of the benefits that each bank will get by the use and the promotion of e-banking. The number of visits in each bank leads to some conclusions, which are not satisfactory enough as the number of branches of each bank and the volume of transactions is not the same for all the banks. Thus, at this point it is considered deliberate to be included as an additional element of comparison and the number of branches of each bank. How many transactions (visits of clients in the bank) are saved for each financial institution due to the presence in the web site?

Below we present the number of the branches that each bank has in Greece.

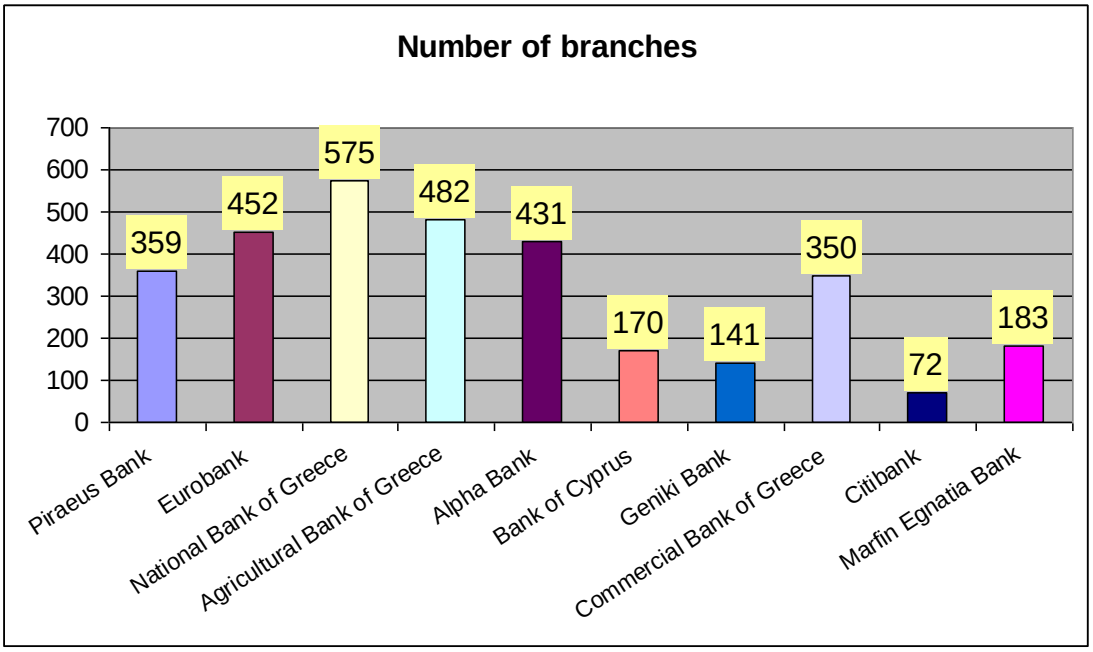


Diagram 6.13: Number of Branches

Thus, the bank with the greatest number of branches is the National Bank of Greece with 575 branches and then follows the Agricultural Bank of Greece with 482 branches. Citibank counts the fewer branches in our country, only 72. Citibank is also, the bank with the lowest number of visits in its web site. The effectiveness of the e-banking promotion based on the visits in the

Citibank web site can not be compared with this of Alpha Bank as the size of their network is totally indifferent.

In order to compare between the under examination banks, we include the following diagram which is the result of the transactions that have been made through e-banking (visiting) to the bank branches. We divided the number of the transactions by the number of the branches that each bank has. (Diagram 6.14)

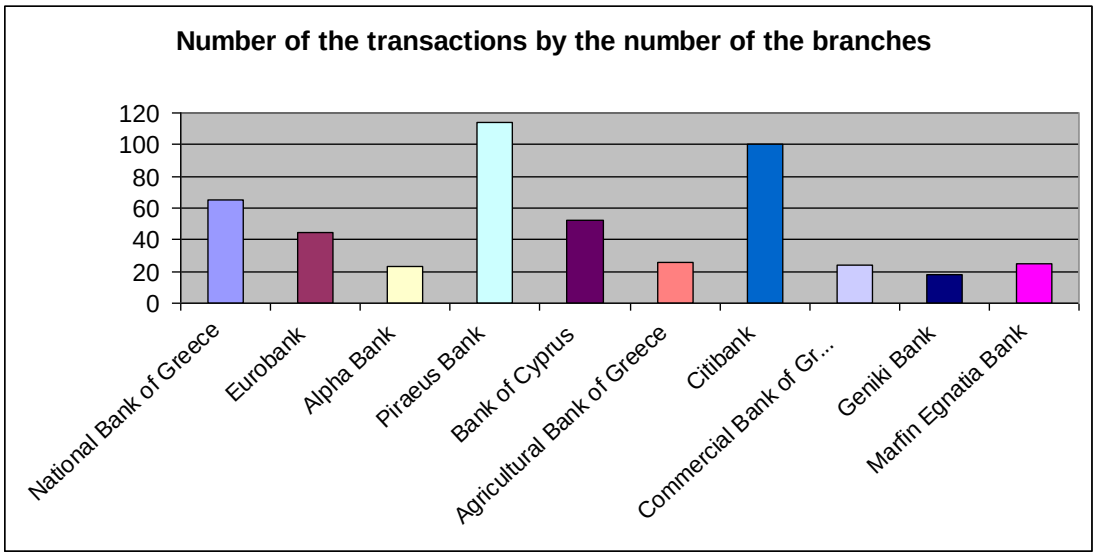


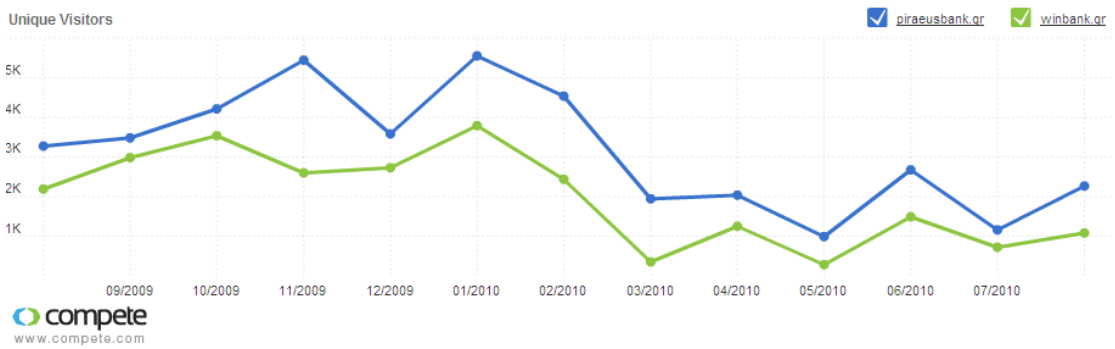
Diagram 6.14: Number of the transactions divided by the number of the branches (In thousands)

We conclude that the ranking of the banks regarding to which degree they have managed to promote the on-line transactions of their clients compared to the transactions executed in the branches differentiate in a great degree.

Piraeus Bank is ranked first due to the use of its web site. Then folows Citibank, which is the big surprise because of the fact that, even if it possesses the last rank in the table of the number of visits it has "gained" for each of its branch 100.000 transactions. The third position belongs to the National Bank of Greece, which although it possesses the greatest number of branches, it has not managed yet to promote its clients to the use of e-banking. Then follows

Eurobank with only 45.000 transactions for each of its branches, regardless of its network as it is one of the most popular banks in Greece. Geniki Bank possesses the last position as each of its branches benefits 18.000 transactions.

The following diagram depicts the number of visits of Piraeus Bank web site in contrast to the number of visits of Winbank. Winbank belongs to Piraeus Bank but it has a different web site from that of Piraeus Bank. Specifically, Winbank web site deals only with e-banking transactions while Piraeus Bank web site refers to all the transactions that are related to this specific bank.



Source: www.compete.com

Diagram 6.15: Number of visits of Piraeus bank web sites vs. the number of visits of Winbank.

7. QUESTIONAIRE

The questioner was answered by 103 persons that are clients to bank branches of Western Macedonia. 50% of them are female and 50% male. They are aged 18 to 65 years old, as it is presented in diagram 7.1 and 7.2.

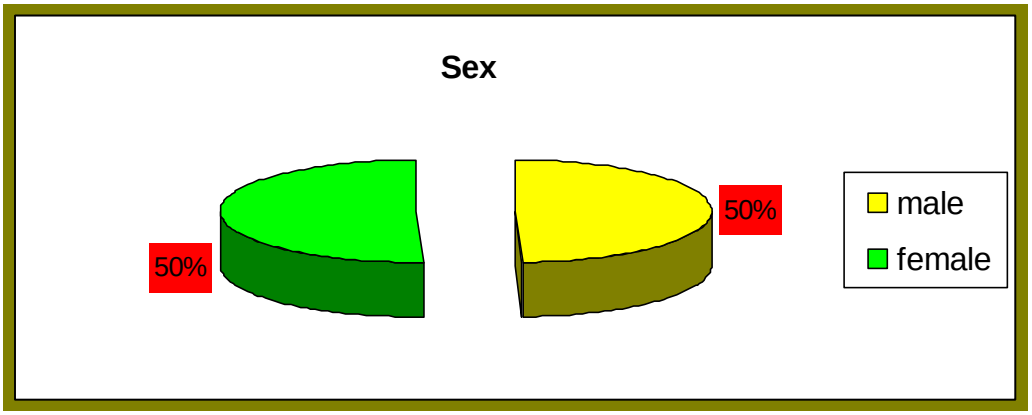


Diagram 7.1: The sex of the interviewers

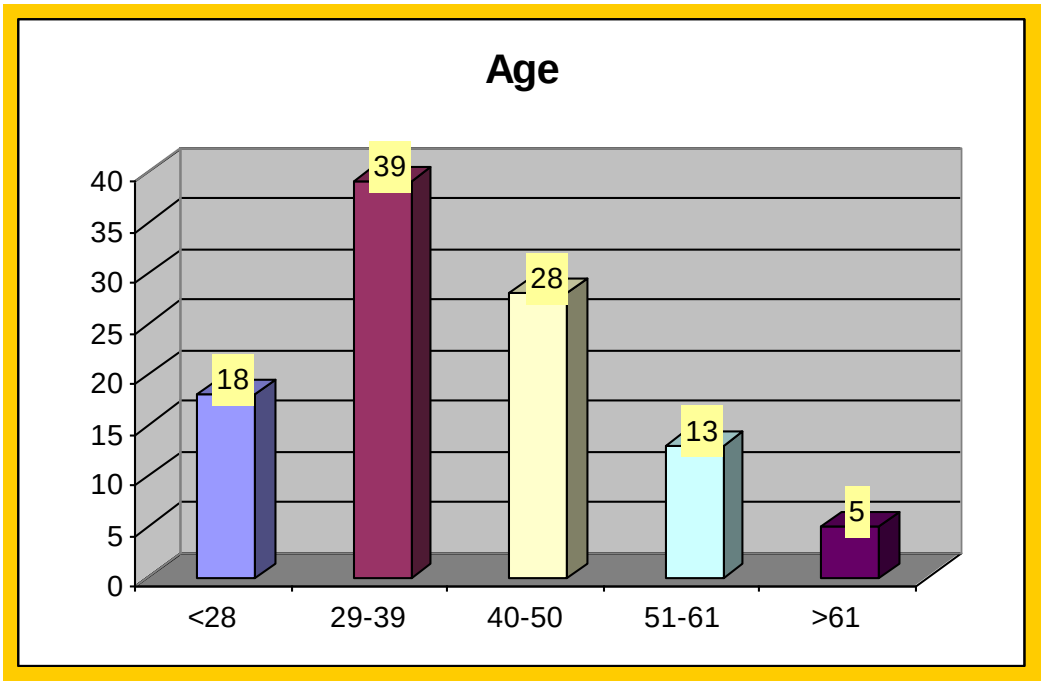


Diagram 7.2: The ages of the interviewers

The majority of the people asked, works in the private sector (43%) and 21% of the people asked work in the public sector. Also, 17% have their own

enterprise. Another 10% belong to the category of other that is, students or unemployed, and 9% are pensioners.

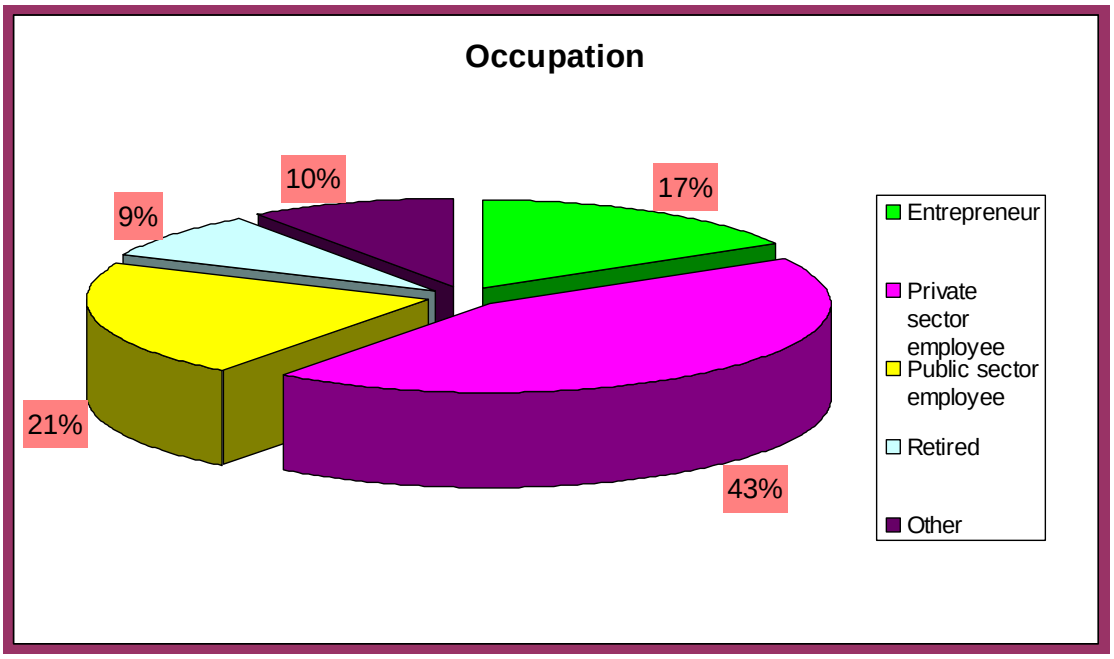


Diagram 7.3: The occupation of the interviewers

The family situation of the interviewers is presented in diagram 7.4 and it is obvious that the majority of them is married (63 persons) while there are 40 singles.

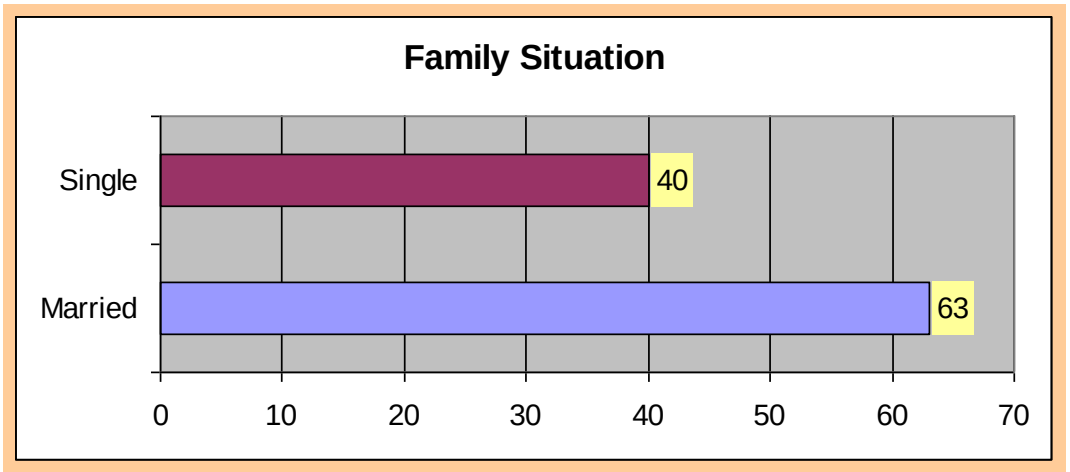


Diagram 7.4: The family situation of the interviewers

From the 103 interviewers the majority has completed the secondary education. Specifically, 38 persons completed the secondary education, 32 persons have a bachelor degree, 17 have an associate degree, 10 have a master or a PhD and 6 out of 103 have only completed the first degree education, as it is presented in diagram 7.5.

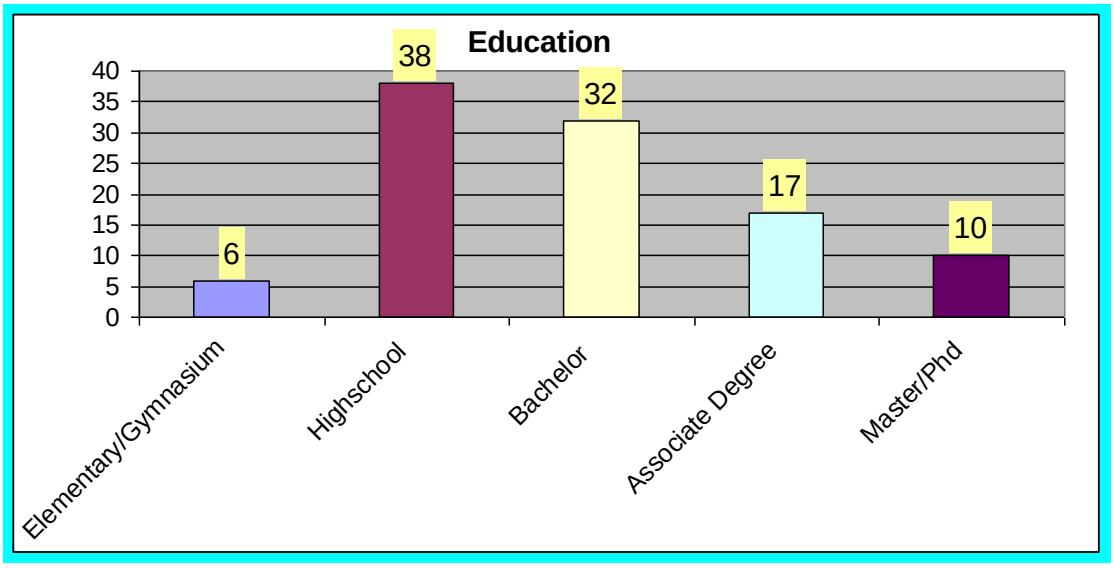


Diagram 7.5: The education of the interviewers

The majority of the interviewers (73%) were internet users and the time they spent to the internet is presented in diagram 7.7.

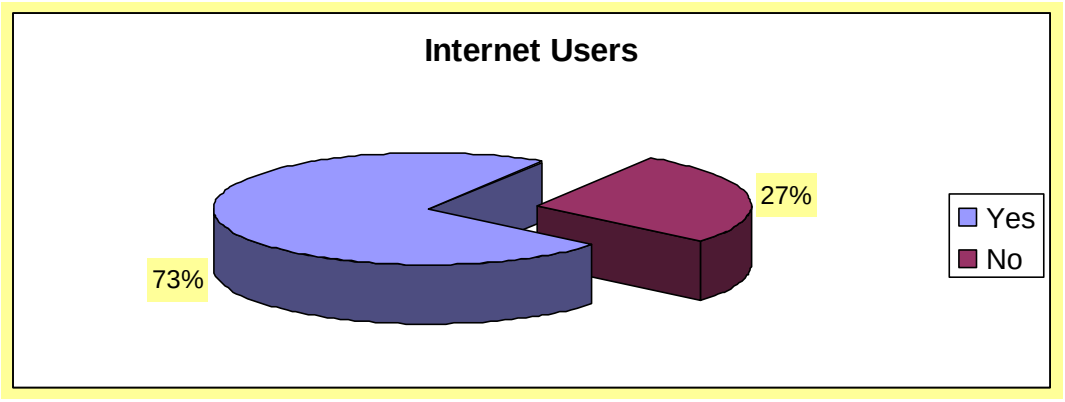


Diagram 7.6: Percentage of internet users

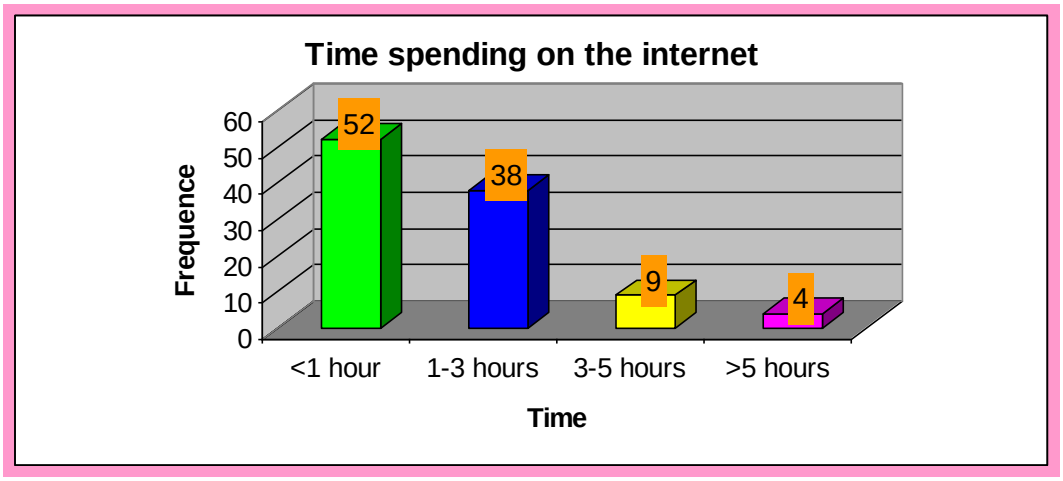


Diagram 7.7: Time of use of internet

The diagram 7.8 presents the places from where the interviewers use internet, apart from their home. The majority uses internet from work while there are others who use it from an internet café, university, or somewhere else. The next question was how often they visit the bank in a month period and the answers are presented in diagram 7.9.

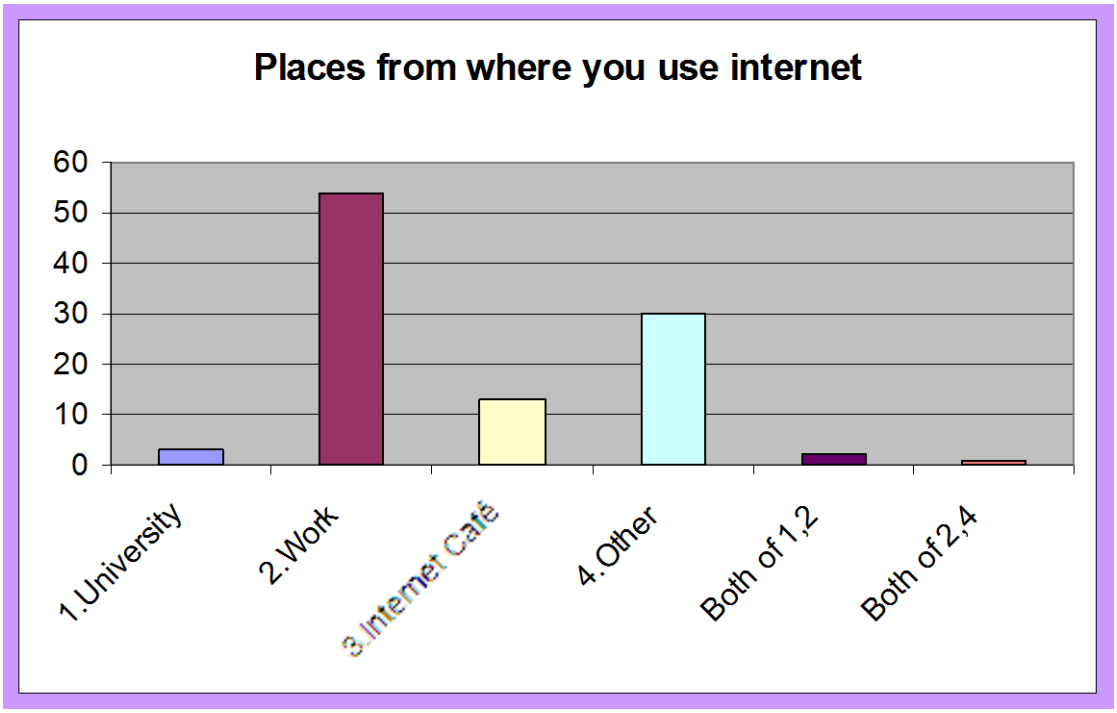


Diagram 7.8: Places from where you use the internet

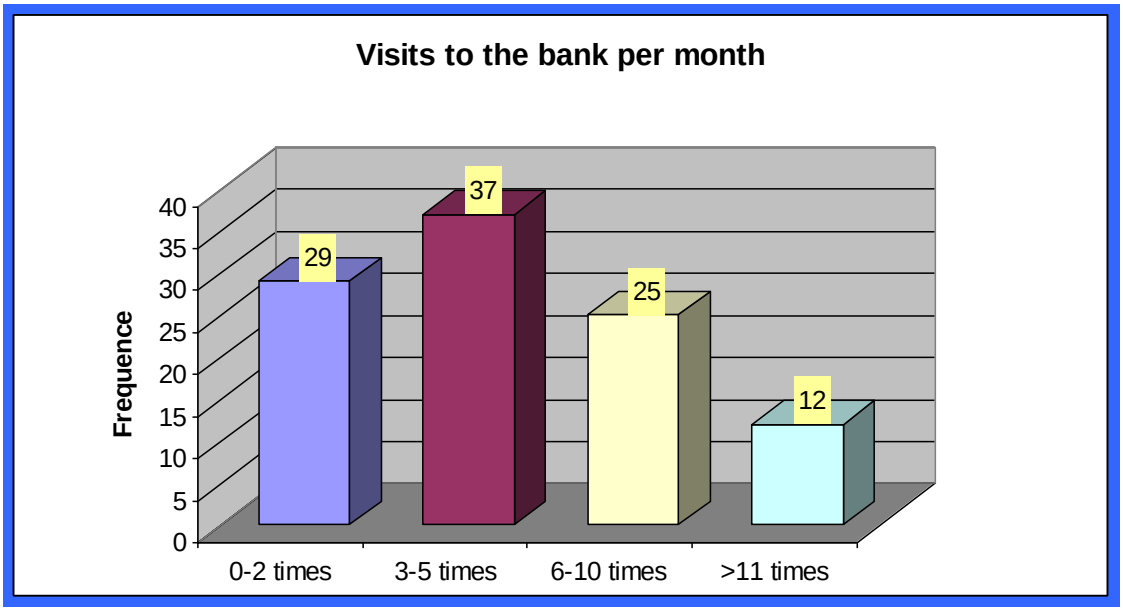


Diagram 7.9: Visits to the bank per month

The 66 of the 103 e-banking interviewers are clients of the Eurobank (20%) and National Bank of Greece (17%). Both banks include one third of e-banking users. Citibank, Alpha Bank, Agricultural Bank of Greece, Marfin Egnatia Bank and Piraeus Bank include 8% to 11% of the users. The rest of the banks share less than 16% of the users. (Diagram 7.10)

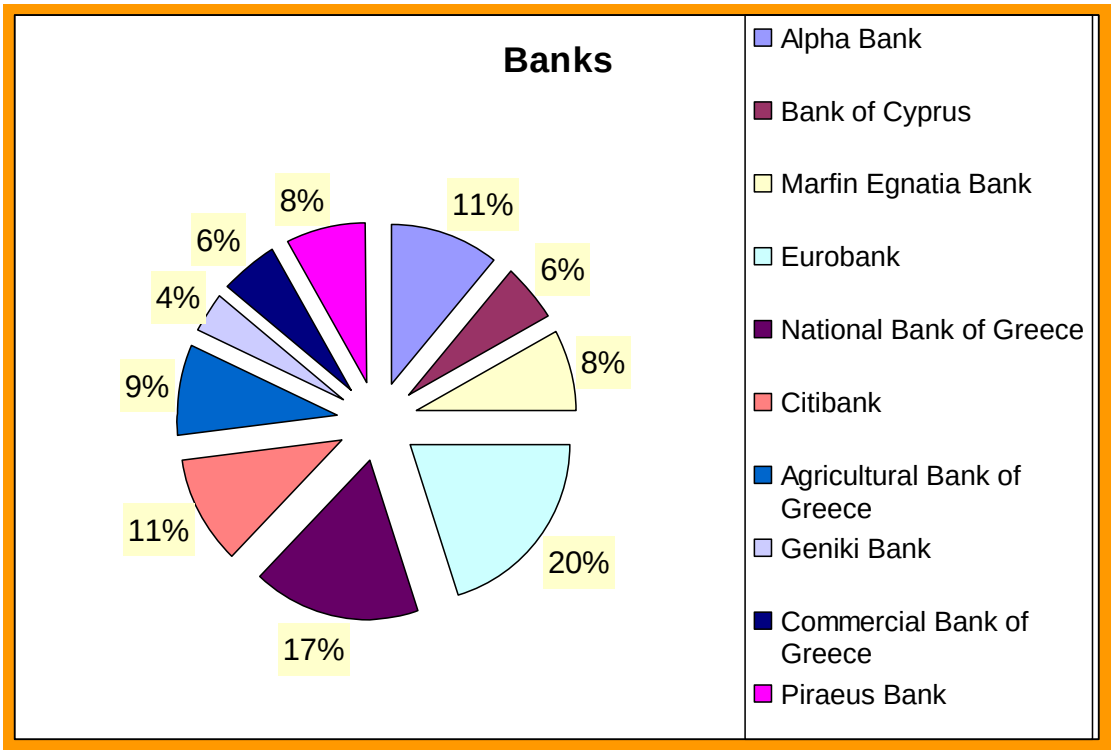


Diagram 7.10: Percentage of preference of banks

Then we asked whether they have heard about e-banking, 88 of persons responded that they have heard about e-banking but only 66% of them use it. (Diagrams 7.11 and 7.12).

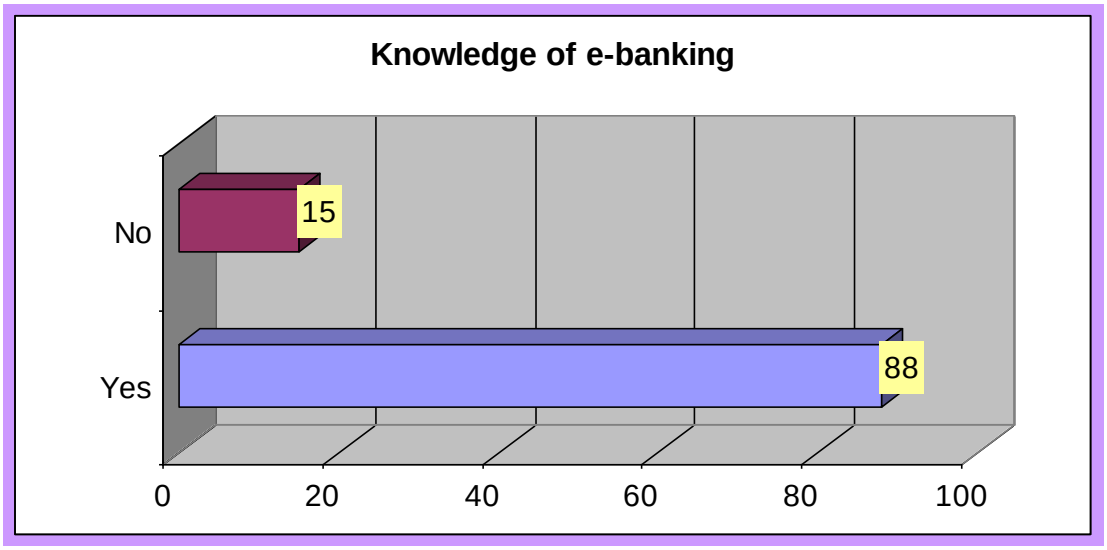


Diagram 7.11: Knowledge of e-banking

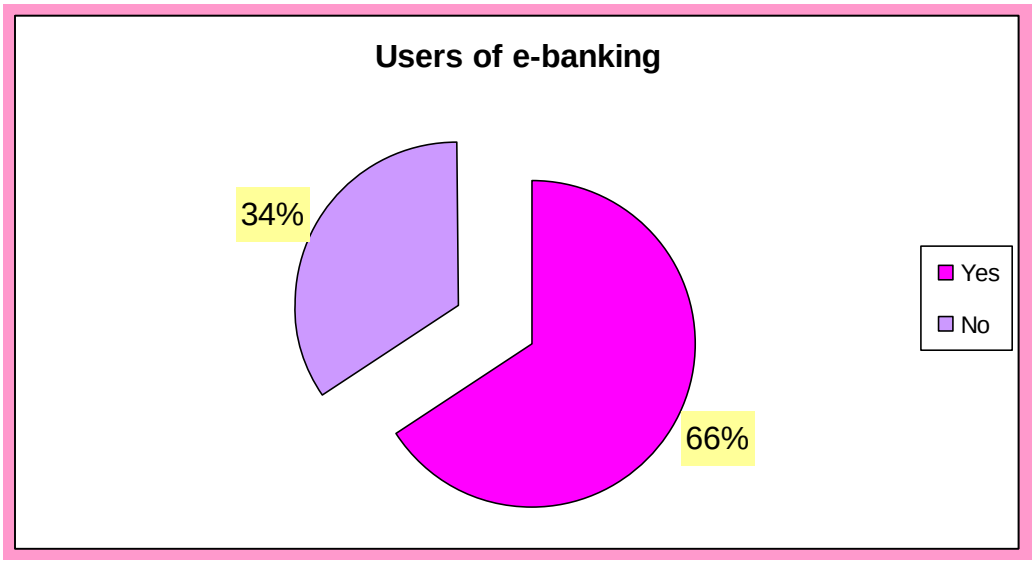


Diagram 7.12: Users of e-banking

28 people are users of e-banking for 3 to 8 times, 19 for 0 to 2 times, 16 people use e-banking from 9 to 12 times and 6 people use e-banking for more than 12 times per month.

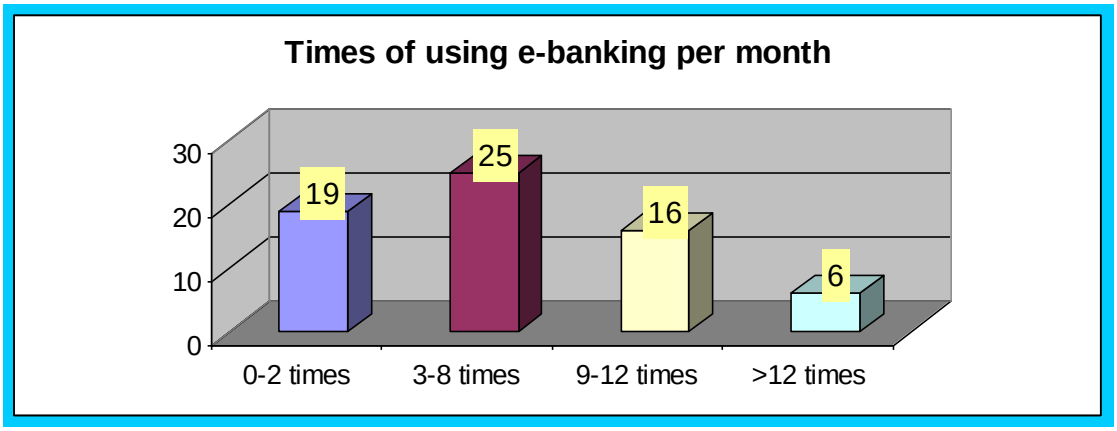


Diagram 7.13: Users of e-banking

The following diagram presents the difficulties that someone faces through the use of e-banking. The majority answers that there are not at all problems while a smaller percentage answers that they face problems less frequent.

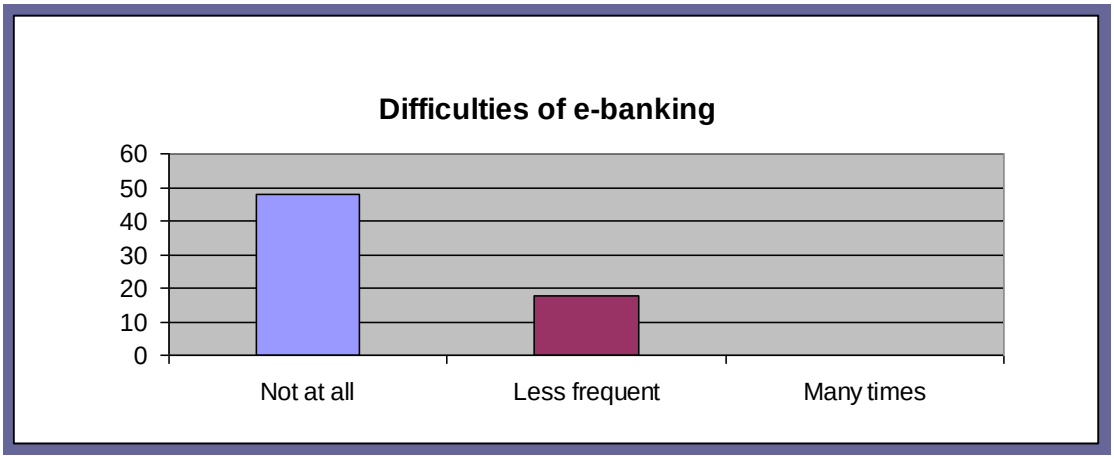


Diagram 7.14: Difficulties of e-banking

The next question refers to the characterization of the usage of e-banking. As it is presented in diagram 7.15, 50% of the interviewers who use e-banking find it very easy while 6% find the usage of e-banking difficult and none of the users find it very difficult.

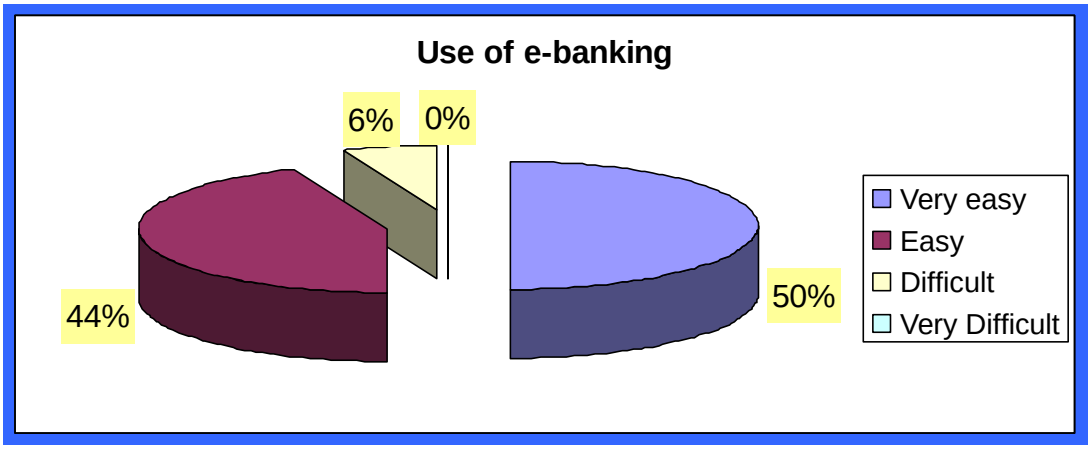


Diagram 7.15: Use of e-banking in percentage

Diagram 7.16 presents the advantages of e-banking. The majority of the interviewers who use e-banking find that the most important advantage is the easiness and the speed when executing financial transactions through e-banking.

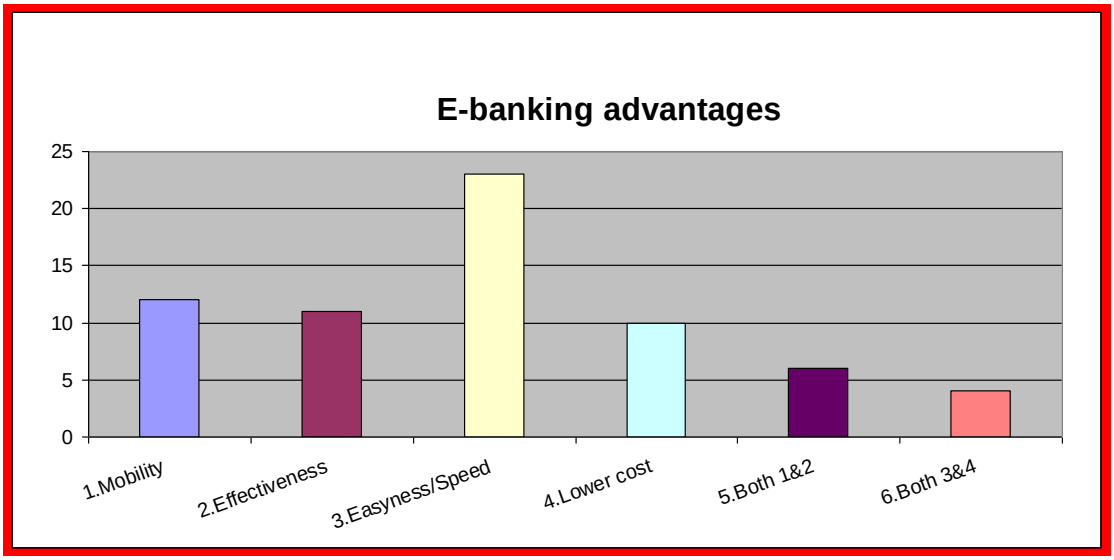


Diagram 7.16: E-banking advantages

We also asked the interviewers what type of transactions they fulfill via e-banking. The most popular are 'Transfer of money to your account or others accounts' and 'Information on accounts' transactions, credit cards, loans' with more than 85%, and then follows 'Payment of credit cards and loans', 'Payment of utility bills (electricity, phone bill)' and 'Buying and selling of stocks and mutual funds' with 66%, 57% and 45% respectively.

	Questions	%
1	Transfer of money to your account or others accounts	89
2	Payment of credit cards and loans	66
3	Payment of utility bills (electricity, phone bill)	57
4	Information on accounts' transactions, credit cards, loans	85
5	Buying and selling of stocks and mutual funds	28
6	Information on your accounts by sms or e-mail	46
7	Payment of VAT, Insurance	17
8	Payment of employees' wages or payment of suppliers	4

Table 7.1: Type of transactions

We asked the 37 people who are not using e-banking, the reasons for not using e-banking. The majority of them answers that the main reason for doing so is the fear of using e-banking. Others claim that they do not use it because of some security problems or there are others that do not know even the importance of using it.

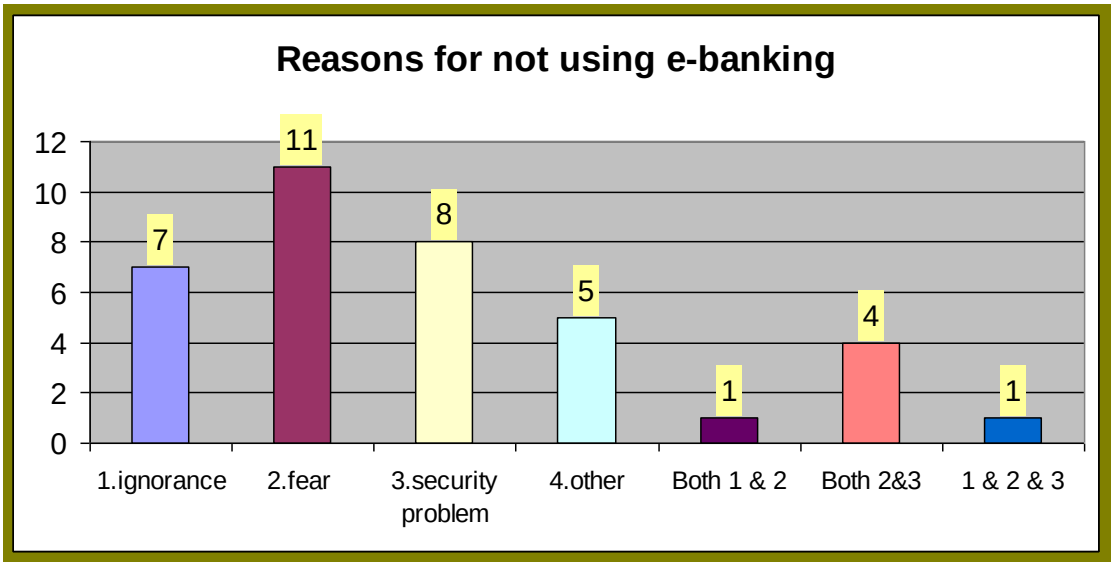


Diagram 7.17: Reasons for not using e-banking

The next question refers to whether they are going to use e-banking in the future or not. From the 37 people who do not use e-banking, 27 answered that they may use it in the future and 5 of them answered that they are going to use it for sure. On the other hand, there are 5 interviewers who answered that they are not going to use e-banking in the future.

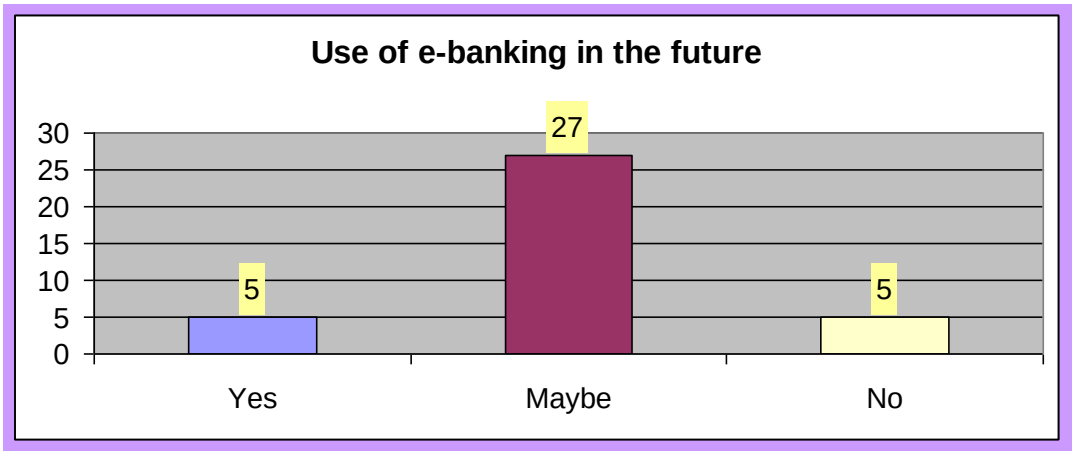


Diagram 7.18: Use of e-banking in the future

We shall proceed with contingency analysis of the age and the use of internet and e-banking. The size of a relation in a table of contingency is given by the factor contingency of Pearson. Variable X shows how much the observed frequencies from the expected frequencies abstain. The smaller the X, the closer are the observed frequencies from the expected ones.

Table 7.2 presents the observed frequencies (n_{ij}) between the age and the internet, e-banking use:

Age		Internet users	e-banking users	**Sum**
18-28	2	3	13	**18**
29-39	2	5	32	**39**
40-50	4	10	14	**28**
51-61	1	7	5	**13**
>62	3	1	1	**5**
Sum	**12**	**26**	**65**	**103**

Table 7.2: The observed frequencies between the age and the internet, e-banking use

From this Table we estimate the expected frequencies (θ_{ij})

Age	Internet users	e-banking users	Sum	
18-28	2,10	4,54	11,36	18
29-39	4,54	9,84	24,61	39
40-50	3,26	7,07	17,67	28
51-61	1,51	3,28	8,20	13
>62	0,58	1,26	3,16	5
Sum	12	26	65	103

Table 7.3: Cross Tab

We calculate the χ^2 (n=103)

$$X^2 = \sum_{i=1}^{s}\sum_{j=1}^{k}\frac{\left(n_{ij}-\theta_{ij}\right)^2}{\theta_{ij}} = \sum_{i=1}^{s}\sum_{j=1}^{k}\frac{n_{ij}^{\ 2}}{\theta_{ij}} - n = 26,2$$

The chi-square follows distribution with (s-1)(k-1)=4*2=10 degrees of freedom

The contingency coefficient (Pearson) C is:

$$C = \sqrt{\frac{X^2}{X^2+n}} = \sqrt{\frac{26,2}{129,2}} = 0,45$$

where the maximum value of C for contingency table of this size is:

$$\sqrt{\frac{q-1}{q}} = \sqrt{\frac{2}{3}} = 0.82$$

So we can claim that there is a significant contingency between the age and the use of internet and e-banking. So we can conclude that younger people adopt new technologies easier than the older.

Now we proceed with contingency analysis of the educational profile and the use of internet and e-banking. The observed frequencies are given in the next table:

		internet users	e-banking users	**Sum**
Elementary/Gymnasium	2	1	3	6
Highschool	6	10	22	38
Bachelor	2	10	20	32
Associate Degree	1	4	12	17

Master/Phd	0	0	10	10
Sum	11	25	67	103

Table 7.4: Observed frequencies

From the above table we estimate the expected frequencies:

		internet users	e-banking users	Sum
Elementary/Gymnasium	0,64	1,46	3,90	6
Highschool	4,06	9,22	24,72	38
Bachelor	3,42	7,77	20,82	32
Associate Degree	1,82	4,13	11,06	17
Master/Phd	1,07	2,43	6,50	10
Sum	11	25	67	103

Table 7.5: Cross Tab

Then we calculate the χ^2 :

$$X^2 = \sum_{i=1}^{s}\sum_{j=1}^{k}\frac{\left(n_{ij}-\theta_{ij}\right)^2}{\theta_{ij}} = \sum_{i=1}^{s}\sum_{j=1}^{k}\frac{n_{ij}^{\ 2}}{\theta_{ij}} - n = 11,61$$

The chi-square follows distribution with (s-1)(k-1)=4*2=8 degrees of freedom

The contingency coefficient (Pearson) C is:

$$C = \sqrt{\frac{X^2}{X^2+n}} = \sqrt{\frac{11,61}{114,61}} = 0,32$$

where the maximum value of C for contingency table of this size is 0.82

So we can claim that there is a significant contingency between the educational profile and the use of internet and e-banking.

8. CONCLUSIONS –PROPOSALS

The primary objective of this research was to study consumer acceptance of online banking in Western Macedonia.

Profitability of greek banks is closely related to the intesity and the adoption of e-banking promotional strategies to penetrate new markets. Cost-cutting goals can easily be accomplished, when new on-line technology will enhace the widespread use of e-banking services. Since financial service products do not differ among banks, efficient support of e-banking services is the only method of gaining competitive advantage in the meditteranean brutal competitive enviroment.

Despite of owning less braches than other major banks, Piraeus Bank has gained significant competitive advantage against Eurobank and National Bank of Greece, since it has developed e-banking services customized based on their perspective client's needs.

Eurobank offers a fully-integrated user-friendly e-banking service, since it won many awards fot its Web-site. Although on-line user's are frequent visitors of bank's Web-site visits, statistics show that customers anticipate better service value when they do their transactions at branches.

Depite of the largest number of branches in Greece, National Bank of Greece is ranked third concerning the competitiveness.

Even though Greek banks have invested huge amount of money in promoting e-banking, on-line traffic and bank profitability are not on the desired levels. The main reason of this anomaly is due to the low user adaptability using web-banking transactions.

Greek financial institutions have supported a heavy e-banking promotion strategy, to increase user's e-banking adaptation and awareness, to detail the benefits of the on-line banking. Furthermore e-banking has been developed and fully operated in Greece the last decade intensively, but e-banking is at early stages of user adaptation. It should be a subject of research, why bank's clients prefer branches than on-line banking. This research should

analyse on-line behavioural statistics such as “click” frequency, web-site traffic.

Experts should also analyze how promotion can affect user’s adaptation and what other marketing methods could be more efficient. Greek banks will eventually have to focus on marketing differentiation promoting e-banking services. For example, they can establish different web-metrics, to analyze behaviour of on-line traffic.

Moreover this research analyzes a way to identify effectiveness promotion of e-banking in Greece. The bank selection is based on the number of the branches and on-line traffic. A great obstacle in this research was the banks themselves as they were not willing to provide us with data. This denial has not been specified if it is due to the lack of registered data or to the bank’s policy.

Reducing operating cost has been a major goal, leading to profitability and growth, while market share changes rapidly in unstable economical environment. The implementation of e-banking services was successful in Europe and in other developed countries. In Greece banks’ promotions have difficulties of increasing e-banking awareness. The future looks bright for e-banking but financial institutions should target efficiency in the long term, since many different variables are involved in on-line services user adaptation.

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- www.inout.gr (www.inout.gr/showthread.php?t=24288)
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- www.compete.com
- www.alexa.com

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- Alpha Bank: www.alpha.gr
- Bank of Cyprus: www.bankofcyprus.gr
- Citibank: www.citibank.gr
- Commercial Bank: www.emporiki.gr
- Eurobank: www.eurobank.gr
- Geniki Bank: www.geniki.gr
- Marfin Egnatia Bank: www.marfinegnatiabank.gr
- National Bank of Greece: www.nbg.gr
- Piraeus Bank: www.piraeusbank.gr

10. APPENDIX

Reference Letter

Dear Mr. /Ms,

I am a finance graduate student at International Hellenic University. As my thesis requests, I distribute an internet banking user adaptability questionnaire to Greek financial institutions to be completed by bank's clients. I would appreciate to forward me the completed questionnaire by September 10th of 2010.

Confidentiality of client's information is prerequisite to our research, since we desire to gather explicit data only for research purposes.

For any questions you have, you can contact me at: radou_dina@yahoo.com

Best Regards,

Konstantina Radou

Questionnaire of e-banking' use

DEMOGRAPHIC QUESTIONS

1) SEX: ☐MALE

☐FEMALE

2) OCCUPATION: ☐ ENTREPRENEUR

☐ PRIVATE SECTOR EMPLOYEE

☐PUBLIC SECTOR EMPLOYEE

☐ RETIRED

☐OTHER

3) AGE: ☐<28

☐29-39

☐40-50

☐51-61

☐ <61

4) FAMILY SITUATION: ☐MARRIED

☐SINGLE

5) EDUCATION ☐ELEMENTARY/GYMNASIUM

☐HIGH SCHOOL

☐BACHELOR

☐ASSOCIATE DEGREE

☐MASTER/PHD

GENERAL QUESTIONS

6) DO YOU OWN RESIDENTIAL INTERNET CONNECTION? ☐YES ☐NO

7) OTHER LOCATION WHERE YOU ARE PRIMARY INTERNET USER:

(you can use more than one)

☐UNIVERSITY ☐WORK ☐INTERNET CAFE ☐OTHER

8) REASONS FOR USING INTERNET:

(you can use more than one)

☐E-MAIL

☐INFORMATION SEARCH

☐NEWS

☐ENTERTAINMENT

☐OTHER

9) HOW MANY HOURS PER DAY YOU ARE USING WORLD WIDE WEB?

☐<1 ☐1-3 ☐3-5 ☐>5

E-BANKING USAGE

10) HOW OFTEN DO YOU GO TO THE BANK ON A MONTHLY BASIS?

☐0-2 TIMES

☐3-5 TIMES

☐6-10 TIMES

☐>11 TIMES

11) PLEASE NOTE WHICH OF THE FOLLOWING BANKS DO YOU USE:

☐ALPHA BANK

☐AGRICULTURAL BANK OF GREECE

☐CITIBANK

☐NATIONAL BANK OF GREECE

☐EUROBANK

☐COMMERCIAL BANK

☐GENIKI BANK

☐MARFIN EGNATIA BANK

☐PIRAEUS BANK

☐BANK OF CYPRUS

12) ARE YOU AWARE OF E-BANKING USE?

☐YES ☐NO

13) HAVE YOU EVER USED E-BANKING?

☐YES ☐NO

In case you say yes in question 13:

13a) HOW OFTEN DO YOU USE E-BANKING PER MONTH?

☐0-2 TIMES

☐3-8 TIMES

☐9-12 TIMES

☐>12 TIMES

13b) HOW OFTEN YOU FACE DIFFICULTIES, WHEN YOU USE E-BANKING;

☐NOT AT ALL

☐LESS FREQUENT

☐MANY TIMES

13c) DO YOU CONSIDER E-BANKING USE:

☐VERY EASY ☐EASY ☐DIFFICULT ☐VERY DIFFICULT

13d) E-BANKING ADVANTAGES:

(you can choose more than one)

☐MOBILITY

☐EFFECTIVENESS

☐EASINESS/ FAST SPEED EXECUTING TRANSACTIONS

☐LOWER COST

13e) WHICH SERVICES OF THE E-BANKING DO YOU USE?

☐TRANSFER OF MONEY TO YOUR ACCOUNT OR OTHERS ACCOUNTS

☐PAYMENT OF CREDIT CARDS AND LOANS

☐PAYMENT OF UTILITY BILLS (ELECTRICITY E.T.C.)

☐INFORMATION ON ACCOUNTS TRANSACTIONS, CREDIT CARDS, LOANS

☐BUYING AND SELLING OF STOCKS AND MUTUAL FUNDS

☐INFORMATION ON YOUR ACCOUNTS BY SMS OR EMAIL

☐PAYMENT OF VAT, INSURANCE

☐PAYMENT OF EMPLOYEES' WAGES OR PAYMENT OF SUPPLIERS

13f) BESIDES E-BANKING YOU USE:

☐ATM

☐PHONE BANKING

☐MOBILE BANKING

☐NOTHING AT ALL

In case there is a negative answer in question 13:

13a) REASONS FOR NOT USING E-BANKING:

(you can use more than one)

☐I AM NOT AWARE OF HOW E-BANKING CAN HELP ME

☐FEAR OF USING E-BANKING

☐SECURITY/PRIVACY PROBLEM

☐OTHER

13b) DO YOU INTEND TO USE E-BANKING IN THE FUTURE?

☐YES ☐MAYBE ☐NO