INTERNATIONAL HELLENIC UNIVERSITY

School of Economics and Business Administration

MSc in Banking and Finance

"E-Banking approach in Greece"

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Abstract

The purpose of this assignment is to present an in depth analysis on various dimensions of e-banking. An extended Technology Acceptance Model (TAM) was employed as a conceptual framework to investigate the factors that influence user's acceptance and intention to use electronic banking. The issues discussed are the advantages and disadvantages of e-banking, the organizational changes necessary for e-banking adoption and the adoption factors of e-banking by retail customers. Through a brief review of literature we have shown that internet banking grows in popularity not only in the developed but also in the underdeveloped countries. The present study utilizes a comprehensive questionnaire survey conducted among Greek users of e-banking and concludes to the most important driver of e-banking adoption from a dataset of 184 responses.

Acknowledgements

Contents

1. Introduction

1.1 Scope of the study

This study entitled *"E-banking Approach in Greece"* aims to provide a comprehensive analysis and interpretation of e-banking adoption in Greek market. The research, in order to achieve its objective, utilizes a comprehensive questionnaire survey conducted among Greek users of e-banking. Many studies have been conducted in the last decades concerning the adoption of the e-banking. Reported results from these studies are quite mixed and controversial. The present survey is inspired by the controversial results of the previous studies and aims to investigate how the e-banking service is perceived by Greek bank customers. It also interprets results derived from an analysis based on primary data collected through a questionnaire based survey, conducted from June 2011 to August 2011 in which one hundred eighty four Greek e-banking users participated. The survey attempts to explore investors' perceptions, attitude, trust, convenience concerning e-banking and finally the intention to use it. The interpretation of results will provide a contribution to the banking community concerning the e-banking adoption in Greece.

1.2 Methodology and Organization of the study

The present study makes use of research methods adopted in the past and are still popular among scholars, to explore bank customers' perception of e-banking service. The research incorporates primary data of the year 2011 collected through a questionnaire survey conducted among e-banking users of the bank community in Greece.

Following the introductory chapter, the second chapter, which addresses the literature review, aims to build the theoretical framework of the study. The chapter starts with a presentation and analysis of the Technology Acceptance Model (TAM). Furthermore, results of the most important studies on the e-banking are reported and commented upon.

These studies have been conducted in the international market, in developed and developing countries. The reported results of these studies are mixed and contradictory.

Chapter three develops the methodology of the study. Firstly, it examines and explains how the selected methodologies of previous studies, such as Mangin *et al.* (2011), Ayo *et al.* (2010), Safeena *et al.* (2010), have been carried out. These studies build various hypotheses all based on TAM and make use of secondary financial data to test them. The following part refers to a discussion on the questionnaire development and the questionnaire survey. This survey, which is the part of the empirical research of the study, has been conducted among Greek bank customers in order to reveal their perception about e-banking over the period under examination.

Chapter four is devoted to the empirical part of the study, namely the questionnaire survey. From June 2011 to August 2011, a questionnaire distributed to a sample of 300 e-banking users of Greek banks. From this sample, 184 completed questionnaires came back, which represents the main source of information for our examination. More specific, the resulting dataset consists of 63.6 per cent male respondents and of 36.4 per cent female respondents. Age categorization indicated that 3.3 per cent is at the 18-25 age bracket, 22.3 per cent at the 26-30 age bracket, 27.2 per cent at the 31-35, 0.5 per cent at the 36-40, 31 per cent at the 41-45, 15.2 per cent at the 51-65 and the rest 0.5 per cent is older than 66 years old. Results are then reported providing evidence about the e-banking adoption in Greece.

Chapter five is the concluding part of the study. It presents a summary of the empirical evidence found and an assessment of the outcome of the overall work in the light of the concluding sections of chapters' two to five. Finally, at the end of this chapter the limitations of the research as well as the recommendations and directions for further research are underlined.

1.3 Significance of the study

It is worthy to mention that, Technology Acceptance Model is a very important tool to measure the customer's acceptance of making banking transactions through the internet. However, the extended Technology Acceptance Model followed the previous one in order to measure more precisely the multiple factors that influence the customer's reaction to the internet banking system. This model has been widely used from 1985 when Fred Davis made his research during his doctoral thesis. It is obvious that the use of the model for over two decades provided useful information to understand the attitude of e-banking user. Many studies of TAM have been made for years afterward showing that this model has made a very good impression with the direct results.

The current paper will begin with a discussion of the theoretical background of the study. The following sections present successfully the pros and cons of using the internet banking as well as the model that was used to estimate the behavior of the customers to web methods. Furthermore, the literature review depicts the different aspects of some researchers that analyze the factors which influence intentions to adopt internet banking facilities. The papers come from various countries in order to have an overall idea of the customer's perspective. The final section is concentrated in the empirical research which gives a thorough analysis of the Greek bank customers by using a questionnaire survey.

2. Literature Review

2.1 Introduction

In these years of financial distress and crisis, financial institutions place their efforts on lowering their costs and increase revenues by finding new ways of doing business. Self-Service Technologies (SSTs) are an answer to the cost reduction and innovating issue. The

most common example of SSTs is the electronic banking (e-banking). According to Durkin (2004), there are various benefits for all the interested parties from the adoption of e-banking. Banks can increase their rated customer basis and on the other hand, e-banking customers have the freedom to use bank services during their free time (Ozdemir *et al*., 2008). SSTs' customer does not need to visit banks for banking transactions any more, as banks now provide round the clock services on the web (Cheng *et al*., 2006). The financial services offered by internet banking could include viewing all transactions and all accounts balances in real time, payment of bills, change of money in other currencies, transfers of money, stocks operations, purchase of all kind of insurances, purchase of travel tickets and travel packages, etc.. (Ainin, Lim and Wee, 2005; Gerrard and Cunningham, 2003; Polatoglu and Ekin, 2001).

According to data released by the Central bank of Greece, the number of branches of banks in Greece has increased the years 2003-2008. This trend of increasing number of branches of credit institutions was interrupted during 2010. The increase illustrates the preference of customers of banks in Greece to carry out banking transactions mainly through the branches. The historical increase in the number of branches was accompanied by a significant and systematic effort, during the 2010, to develop alternative distribution channels for all banks. Particularly, all banks promoted the adoption of phone banking, e-banking and the ATMs.

The particular project resulted not only in the physical increase of ATMs machines (2010: 7.580, 2006: 6.667) but also in the expansion of services provided through them. More specific, along with the traditional services of deposit and cash withdrawal and balance inquiry, to carry out various banking transactions such as transferring funds to third party accounts, payment of debts from credit cards, and paying bills of other businesses. Moreover, it was impressive the continued growth of registered users in electronic banking services developed by Greek banks. According to data released by the Central Bank of Greece, in the first half of 2010, more than 1,929,800 (2009: 1,719,800) natural and legal persons were registered as users of electronic banking services providing an annual increase of twelve per cent. The value of money transactions, including inter-bank and

stock transactions, showed also an annual increase of eight per cent. More specific, 19.7 billion Euros in first half of 2010 compared to 18.3 billion Euros at end of 2010.

Financial institutions all over the world are providing banking services via information systems in an effort to remain competitive as well as enhancing customer service (Levy, 2008). The innovations in the information systems and communication technologies are incessant. Increasingly firms are turning to the Internet and related information technologies to improve business efficiency and service quality, and attracting new customers. The use of the Internet in the conduct of business is growing at a rapid pace. According to a relevant study more than 90% of firms studied have plans to buy and sell on the Internet (Forrester Research, 1999). The application of e-banking has been proven as an effective way to reduce the costs of operation for the financial institutions. For instance, e-banking services will allow banks to reduce expenditures on physical structures. It is believed that the e-banking will help banks to cut costs, increase revenue, and become more convenient for customers (Halperin, 2001). Another important benefit from e-banking is a more effective information collection and management. A combination of a low percentage of customers using e-banking services on a consistent basis and a relatively low start-up cost in developing e-banking services in the banking industry, will make the impact of e-banking (positive or negative) quite limited on financial institutions (Marenzi, *et al*., 2001). Finally, the development of e-banking service has encouraged the adoption of a decentralized approach to give banks more needed flexibility to distribute Internet access to a much larger number of employees and potential customers.

2.2 Banking channels - e-banking

Wan *et al*. (2004), studied the factors affecting the usage of four major banking channels by customers in Hong Kong. The channels examined were branch banking, ATM, phone banking and internet banking (e-banking). The research was based on interviews with ten bank managers in Hong Kong and the answers of 314 bank customers. The model used was based on the Theory of Reasoned Action. The theory of Reasoned Action was

developed by Martin Fishbein and Icek Ajzen as an improvement over Information Integration theory (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). There are two important changes. First, Reasoned Actions adds another element in the process of persuasion, behavioral intention. Reasoned Action is explicitly concerned with behavior rather than an attempt to predict attitudes, as the Information Integration theory (and several others) does. However, this theory also recognizes that there are situations (or factors) that limit the influence of attitude on behavior.

By the time of research, ATM was the most adopted channel for banking transactions in Hong Kong, followed by e-banking. It is stressed that e-banking in Hong Kong seems to grow in popularity, since the business environment enhances its development and has the dynamic to become the dominant banking channel. On the other hand, branch banking and telephone banking were the channels that followed concerning the adoption by customers (See Fig.2 below). Wan *et al*. highlight the fact that older people, less educated people and people with a lower income level constitute a market segment which still is underdeveloped. Due to the fact that this finding is applied in almost every country, banks should base their advertising campaigns towards this target group. This way, financial institutions will be able to reap the benefits of e-banking adoption in a wider range.
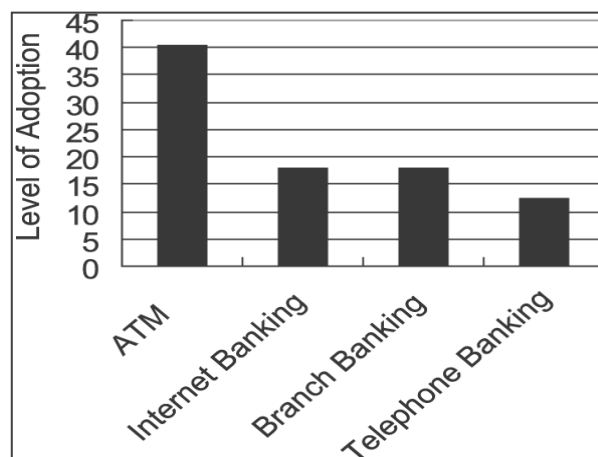

Figure 1: Levels of adoption of four banking channels
Source Wan *et al*. (2004) p. 262

Cheng *et al*. (2006) studied the adoption of internet banking in Hong-Kong. For their research, the Technology Acceptance Model (TAM) was employed in order to examine customers' intention to use e-banking. The TAM was developed by Davis (1989) and it explains that the adoption of a computer system is based on the 'behavioral intention to use'. Accordingly, the intention to use depends on 'attitude' which is a result of the combination of 'Perceived ease of use' and 'perceived usefulness'. Davis (1989) developed the Technology Acceptance Model adapting the scales for Perceived Usefulness and Perceived Ease of Use. According to TAM model "users' adoption of informational system" depends on their "behavioral intention to use", which in extend, depends on "attitude". The "attitude" is consisted by two beliefs, namely the Perceived Ease of Use and the Perceived Usefulness. The target of his study was to build up a model in order to test how system's characteristics affect users' acceptance of the informational system. More specific, Davis developed TAM by building upon an earlier theory, the Theory of Reasoned Action by Fishbein and Ajzen (1975). In Theory of Reasoned Action, Fishbein and Ajzen (1975) proved that intention is "the immediate determinant of the corresponding behavior", which is divided into "attitude toward behavior", and "subjective norm concerning behavior". Davis proved in TAM that the two theoretical constructs, Perceived Usefulness and Perceived Ease of Use, are fundamental determinants of system use in an organization. These constructs also provide better measures for predicting and explaining system use than other constructs (Davis, 1989). The sample of the particular study was consisted of forty master students of a US university.

Cheng *et al*. (2006) incorporated an additional variable which is the 'Perceived web security'. Their findings were considered quite constructive for bank management and internet banking (IB) marketing strategies. Firstly, TAM appeared to be the most appropriate framework for the examination of customers' e-banking adoption. Moreover, it was found that perceived usefulness and perceived web security have a direct effect on intention to use e-banking. On the other hand, the effect of perceived ease of use on e-banking adoption is indirect. This fact is very useful for bank managers since it becomes obvious that web security and usefulness are the most significant determinants for IB adoption. In simple words, customers demand safety and usefulness for their on-line banking transactions.

Yiu *et al*. (2007) also conducted a research in Hong Kong producing similar results as Cheng *et al*. (2006). Once again, the TAM was the framework used for their study in order to explore the adoption of e-banking by retail clients, exploring three main issues: a) the e-banking adoption rate b) the effect of perceived usefulness, perceived ease of use, perceived risk and personal innovativeness on the e-banking adoption by clients and c) the impact of the above issues on the strategies that banks adopt concerning e-banking.

Lee Ming-Chi (2008) proposed a theoretical model that investigated customers' intention to use online banking. The particular study was developed in Taiwan using as a sample four hundred forty six customers of a private bank. The investigation followed two primary research streams, the information technology (IT) adoption theory and the perceived risk theory. Over the past decades, TAM and Theory of Planned Behaviour (TPB) have been widely applied to examine IT usage and e-service acceptance (Davis, 1993; Hsu, 2004; Hsu and *et al*., 2006). However, neither TAM nor TPB have been found to provide consistently superior explanations or behavioural predictions (Chen *et al*., 2007). Recently, a growing body of research has focused on integrating them to examine IT usage and e-service acceptance because the two models are complementary, and the results have showed that the integration model had better exploratory power than the individual use of TAM and TPB (Bosnjak *et al*., 2006; Chen *et al*., 2007; Wu and Chen, 2005). The target of this study is online banking service adoption, which is an instance of acceptance of innovative technology intertwined with social systems and personal characteristics, the integration of TAM and TPB. There are twelve constructs in this study's model, which includes perceived ease of use, perceived benefit, performance risk, financial risk, time risk, social risk and security risk as independent variables, perceived usefulness, attitude, subjective norm perceived behavioural control as intervening variables, and intention to use as dependent variable. The proposed model incorporates five categories of perceived risk to provide a more comprehensive investigation covering both the positive and negative aspects of online banking. The results showed that the proposed model has good explanatory power and confirms its robustness in predicting customers' intentions to use such services. The results indicated that the intention to use online banking is unfavourably affected mainly by the security/privacy risk, as well as financial risk and is favourably affected mainly by perceived benefit, attitude and perceived usefulness.

Agarwal *et al.* (2009) examined the customers' perception and satisfaction regarding e-banking in the emerging economy of India. Their study highlighted the factors that drive e-banking adoption by Indian customers. For this research the Unified Theory of Acceptance and Use of Technology (UTAUT) was used. This theory incorporates various previous theories such as the motivational model (MM), the theory of Planned Behavior (TPB) and off course, the Technology Acceptance Model (TAM) discussed above. The research was conducted in a sample of mostly young people (until 45 years old), since they are more familiar with technology and might be using it to their day to day transactions. The factors that mostly affect e-banking adoption were found to be the kind of account they hold, their age and their profession. Moreover, in the same sense as Cheng *et al.* (2006), it was found that web security and trust are the factors mostly affecting customer's satisfaction level. Additionally, low speed of transactions was reported to be the most frequent problem in e-banking usage. These findings have significant implications in the field of internet banking. Agarwal *et al.* (2009) propose that banks must firstly consider the security of customer's transactions. It is stated that a good way to motivate customers to adopt e-banking is to increase their efforts to safeguard customer's assets.

Ayo *et al.* (2010) support that with improved technological development and provision of basic infrastructure there will be improved e-Commerce and e-Payment services with overall reduction in the amount of currency in circulation in Nigeria. Nigeria was characterized to be the fastest growing telecommunication nation in Africa. All members of the Nigeria banking industry have engaged the use of Information and Communication Technology (ITC) as a platform for effective and efficient means of conducting financial transactions. The research's target was to realize the level of user's acceptance of the electronic banking services and investigate the factors that determine the intention of people to use electronic banking system in Nigeria. An extended Technology Acceptance Model (TAM) was employed as a conceptual method to explore the factors that influence user's acceptance and intention to use electronic banking. The sample of the research was 292 customers from various commercial banks in Nigeria. The model measured the impact of Perceived Credibility (PC), Computer Self-Efficacy (CSE), Perceived Usefulness (PU), and Perceived Ease of Use (PEOU) on customer attitude and customer attitude on customer adaptation. The impact of the above factors seems to determine the users'

acceptance of the various e-Banking systems. The result of the research shows that ATM still remains the most widely used form e-Banking service. Customers who are active users of e-Banking services use it because it is convenient, easy to use, time saving and appropriate for their transaction needs. In addition, the network security and the safety of the system in terms of privacy are the major concerns of the users and constitute the obstacle to intending users.

Safeena *et al.* (2010) carried out a study with the target to explore the factors that influence intentions to adopt internet banking services in India and investigated the influence of perceived usefulness, perceived ease of use and perceived risk on use of web banking. Their study highlighted the factors that drive e-banking adoption by Indian customers. For this research the technology acceptance model (TAM) was employed. They realized that original TAM was inadequate because the technology they used and the transaction environment in the internet banking were different from that of conventional information technology (IT) and the normal business environment. The research was conducted in a sample of students from an educational institute and a convenience sampling method was applied. A regression analysis was conducted to reveal how different factors affect the use of online banking. The outcome of the regression analysis pointed out that perceived risk; perceived usefulness and perceived ease of use on web banking are the most leading factors which explain the application of online banking facilities. The construct that mostly affects e-banking adoption was found to be the easiness of using it. Consequently, the adoption of e-banking is affected mainly by the ease of it use. Although internet banking provides flexibility in performing financial transaction, fast and easy, however individuals are still reluctant to adopt the system because of the risk associated with it. Security and privacy are two elements involved in the notion of perceived risk. Customers are not ready to take on any risk by using the new system. Safeena *et al.* (2010) propose that banks need to promote the security that internet banking offer and increase the transactions through it.

Chong *et al.* (2010) in their study empirically examined the factors that affect the adoption of online banking in Vietnam. Specifically in their model they maintain the original variables derived from Technology Acceptance Models (TAM), that is perceived usefulness and perceived ease of use, and extend it by incorporating trust and government

support because they believe will play a major role in influencing Vietnamese users' decision to adopt online banking. The scholars conducted a survey of a sample of 165 local SMEs and empirically validated the proposed research model. They concluded that trust on the security and privacy of online banking as well as clear regulations and laws on internet transactions are the basic factors that determine the adoption of online banking in Vietnam (Chong *et al.,* 2010).

Lévy Mangin (2011) analyzed the acceptance of the on-line banking services among Canadians based on the Technology Acceptance Model (TAM) and the influence of the external variables of TAM ,'Price' and Convenience' on the TAM dependent variables. As already discussed in previous studies 'Ease of Use' is the chief factor for adopting an information system because it is the starting point for every user (Davis, Bagozzi and Warshaw, 1989). A difficult system to use is considered as less useful by user and presents more probabilities to be abandoned (Davis, 1989) by the user. The differentiation of this study is the introduction of two external variables on the TAM model, the 'Price' and the 'Convenience'. Cost saving by using internet services is a factor that encourages customers to adopt e-banking (Karjaluoto, Mattila and Pento, 2002; Sathye, 1999). Their findings proved that in Canada customers adopt on line banking because it allows them to cut down on the cost of their traditional financial operations. According to the 'Convenience' a majority of bank customers feel that the service in branches is time consuming and adopt the e-banking because they prefer the convenience that e-banking offers in order conduct their transaction faster and at the time they choose and suites them. The sample that provided the above findings was comprised by two hundred twenty five persons that owned bank account and used e-banking services.

2.3 Advantages of e-Banking

Electronic banking is the most popular form of e commerce for millions of people. Most mainstream banks and credit unions provide a lot of products and services over the internet. The goal of every company is to maximize profits for its owners and banks make

no exception. There are many benefits of banking online. The first benefit for the banks offering e-banking services are better branding and better responsiveness to the market, (Karpinski, 1998). Automated e-banking services offer a perfect opportunity for maximizing profits. Furthermore, there is the ability to measure in monetary terms. E-banking facilities speed up cash cycle and increase efficiency of business processes as large variety of cash management instruments is available on Internet sites of banks.

From the customers' point of view, the main advantage is saving time by the automation of banking services processing and introduction of an easy maintenance tools for managing customer's money. Moreover, increased comfort, flexibility and time saving transactions can be made twenty four hours a day, without requiring the physical interaction with the bank and standing in a queue for hour. In addition, the quick and continuous access to information is certain. Corporations have easier access to information as they can check on multiple accounts at the click of a button. Private customers seek slightly different services from e-banking. A reduced cost is in terms of the cost of availing and using the various banking products and services. Convenience can be performed from the comfort of the home or office or from the place a customer wants to. As far as speed is concerned, the response is very fast; therefore customers can actually wait till the last minute before concluding a fund transfer. Last but not least, customers can download their history of different accounts and do a "what-if" analysis on their own PC before affecting any transaction on the web. E-banking provides various services. Initially, customers are capable to use the Electronic Fund Transfer, in order to use the online services to perform transactions.

As far as automated teller machines (ATMs) is concerned, they provide a twenty four hour service to withdraw, deposit cash, transfer money from one account to the other and pay bills. Furthermore, many customers prefer to perform transaction through Pay-by-Phone systems offered by banks (De Ruyter *et al.*, 2001). Moreover, e-banking also provides the possibility to perform transactions such as paying bills or fund transferring from one account to the other.

Finally, there is the online banking service, which allows customers to operate their transactions through their personal computers. Researchers state that there are plenty of

advantages by the use of online banking, due to the friendly prices offered by the banks to the customers. There is no doubt that there are of course drawbacks of transacting with the online banks.

2.4 Disadvantages of e-Banking

There have been several major challenges and issues faced to the e-banking growth and the e-business in general. One major obstacle addressed most is the security concern (Feinman, et al., 1999; Financial Service, 2001). Another issue challenged e-business (including e-banking) is the quality of delivery service; including both delivery speed and delivery reliability. The main drawback for e-banking appeal is the issue of risk and trust. Basic role in the formation of trust plays the existence of risk (Pavlou, 2003), more specific, "the need for trust only arises in a risky situation" (Mayer *et al*. 1995, p. 711). The need for security and trust is much higher in a web environment than in a traditional regular environment because of its virtual nature. However, Guttman (2003) argues that electronic cash transactions are secure and that none of the counterparts, or a third party should be able to crack and reproduce information about an account or a credit/debit card number. There are various ways to ensure security of the sensitive data of each account. To begin with, there is cryptology which codes all available information into short messages and then it scrambles them to ensure the highest security possible. To continue, an electronic signature could be arranged to each and every customer (Gommans *et al*. 2001). This way, electronic documents are going to be linked to specific individuals. The application of electronic signatures has given a great boost in e-commerce services that require signing contracts such as financial services. Furthermore, all available browsers, such as the Internet explorer, Mozilla Firefox, have embodied the SSL (Security Socket Layer) which provides a safe connection between client and server. Payments through MasterCard and Visa are secured through the Secure Electronic Transaction (SET) application (Guttman, 2003). Nevertheless, banks should develop the consciences of their customers that e-banking is secure in order to open the door for a wide development in

electronic banking. Nevertheless, the Greek bank costumers still feel a great insecurity using e-banking systems because of the implied risk and trust issues.

Internet Banking provides the customer's to anytime access to their banks. Customer's could check out their account details, get their bank statements, perform transactions like transferring money to other accounts and pay their bills sitting in the comfort of their homes and offices. However, the biggest disadvantage of Internet banking is the requirement of a Personal Computer with an Internet connection, definitely a big obstacle for the developing countries of Asia like China and India. Mobile banking addresses this fundamental limitation of Internet Banking, as it reduces the customer requirement to just a mobile phone. Mobile usage has seen an explosive growth in most of the Asian economies like India, China and Korea. The main reason that Mobile Banking scores over Internet Banking is that it enables 'Anywhere Anytime Banking'. Customers don't need access to a computer terminal to access their bank accounts, now the can do so on-the-go while traveling or when they out for business.

"In 2011, we expect to see these transformative technologies make the critical transition from early adopter status to early mainstream adoption," said Frank Gens, senior vice president and chief analyst at IDC. "As a result, we'll see the IT industry revolving more and more around the build-out and adoption of this next dominant platform, characterized by mobility, cloud-based application and service delivery, and value-generating overlays of social business and pervasive analytics. In addition to creating new markets and opportunities, this restructuring will overthrow nearly every assumption about who the industry's leaders will be and how they establish and maintain leadership". The following part aims to build the theoretical framework of the study.

2.5 Technology Acceptance Model

User acceptance of technology has been an important field of study for over two decades now. Although many models have been proposed to explain and predict the use of a

system, the Technology Acceptance Model has been the only one which has captured the most attention of the Information Systems community (Chuttur, 2009). The classical TAM has been well validated over hundreds of studies in the past two decades. Current observations indicate that although TAM is highly cited model, researchers share mixed opinions regarding its theoretical assumptions, and practical effectiveness. The Technology Acceptance Model doesn't account for social influence for using new information systems. Davis and Davis *et al.* noted that it is important to account for subjective norm (SN), the construct denoting social influence. However, they observed that the conceptualization of SN based on TRA (Theory of Reasoned Action) has theoretical and psychometric problems. Specifically, they observed that it is difficult to distinguish if usage behavior is caused by the influence of referents on one's intent or by one's own attitude.

In the 1985, Fred Davis proposed the Technology Acceptance Model (TAM) in his doctoral thesis at the MIT Sloan School of Management (Davis, 1985) to explain computer usage behavior. The theoretical basis of the model was Fishbein and Ajzen's, (Fishbein *et. al*, 1975), Theory of Reasoned Action. Davis proposed that system use is a response that can be explained or predicted by user motivation, which, in turn, is directly influenced by an external stimulus consisting of actual system's features and capabilities. Davis (1985) suggested that users' motivation can be explained by three factors: Perceived Ease of Use, Perceived Usefulness, and Attitude Toward Using the system. He hypothesized that the attitude of a user toward a system was a major determinant of whether the user will actually use or reject the system. The attitude of the user, in turn, was considered to be influenced by two major beliefs: perceived usefulness and perceived ease of use, with perceived ease of use, having a direct influence on perceived usefulness. Finally, both these beliefs were hypothesized to be directly influenced by the system design characteristics.
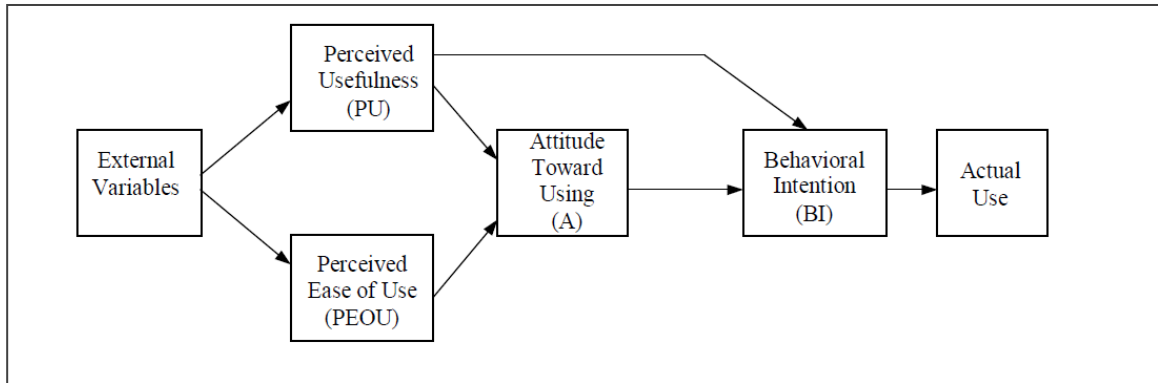
Figure 2 Technology acceptance model (TAM)
Sourse: Davis et al. (1989)

Davis (1985) defined perceived usefulness and perceived ease of use as follows:

Perceived Usefulness: *The degree to which an individual believes that using a particular system would enhance his or her job performance.*

Perceived ease of use: *The degree to which an individual believes that using a particular system would be free of physical and mental effort.*

Mathwick *et al.* (2001) defined perceived usefulness as the extent to which a person deems a particular system to boost his or her job performance. Pikkarainen *et al.* (2004) applied TAM in Finland and they found perceived usefulness as a determinant of actual behavior, which encouraged the user of the 21st century banking to use more innovative and user-friendly self-service technologies that give them greater autonomy in performing banking transactions, in obtaining information on financial advices, and in purchasing other financial products. However, Gerrard and Cunningham (2003) noted that perceived usefulness depends on the banking services offered such as checking bank balances, applying for a loan, paying utility bills, transferring money abroad, and obtaining information on mutual funds. There are extensive evidences proving the significance of effect of perceived usefulness on adaptation intention (Chen and Barnes, 2007; Guriting and Ndubisi, 2006; Jaruwachirathanakul and Fink, 2005; Eriksson et al., 2005; Hu et al., 1999; Venkatesh, 2000; Venkatesh and Davis, 1996; Venkatesh and Morris, 2000). Tan and Teo (2000) suggested that perceived usefulness is an important factor in determining adaptation of innovations. As a consequence, the greater the perceived usefulness of using

16

electronic banking services, the more likely that electronic banking will be adopted (Polatoglu and Ekin, 2001, Jaruwachirathanakul and Fink, 2005).

TAM has become so popular that it has been cited in most of the research that deals with user acceptance of technology (Lee, Kozar, & Larsen, 2003). The technology Acceptance Model is indeed a very popular model for explaining and predicting system use. To date, there have been an impressive number of studies on TAM, but while several confirmatory results have been obtained, there are skepticisms shared among some researchers regarding the application and theoretical accuracy of the model. Consequently, it is tempting to conclude that research on TAM may have reached a saturation level, such that future research will focus in developing new models that would exploit the strengths of the TAM model while discarding its weaknesses.

3. Methodology

3.1 Introduction

The literature review of the former chapter, presented the theoretical framework of the study. The concrete part is developed in this chapter. The main objective of the present study is to realise the adoption of e-banking in Greece and the factors contributing to its adoption. This objective is approached from different points of view by many scholars across the world, since there is a plurality of factors that may affect this convention. Although different methodological approaches are used to address this problem, most of the literature presents surveys on customers to test sets of hypotheses in order to explore the adoption of e-banking mainly based on TAM model.

More specifically, based on literature, a set of factors are identified and used to test whether and to what extent they affect e-banking adoption. In order to realise this objective, primary data was collected and processed through a questionnaire survey. The

sample constitutes of Greek residents, who at the time of the survey (June 2011 to August 2011) were clients of at least one bank that operates in Greece.

3.2 Relevant Methodologies

In an attempt to identify the key factors that affect e-banking usage, several relevant researches were examined. One of the basic surveys was that of Saffena's *et al.*, (2010). This study focused on the factors that influence the consumer's adoption of internet banking in India and hence determine the influence of perceived usefulness, perceived ease of use and perceived risk on use of e-banking. Perceived ease of use, security and privacy are the main persuasive elements to accept online banking system, Saffetna *et al* support. TAM model provides a safe way to study this. Perceived ease of use is a critical factor in the development and delivery of web services (Al-Hajri *et al.*, 2008). Consumers' perceived trust in online payment system is defined as consumers' belief that e-payment transactions will be processed in accordance with their expectations, (Tsiakis *et al.*, 2005.) By applying these into online banking context Saffena *et al.* hypothesize:

H1: Perceived usefulness has a positive effect on use of internet banking.

H2: Perceived ease of use has a positive effect on use of internet banking.

Perceptions of risk are a powerful explanatory factor in consumer behavior as individuals appear to be more motivated to avoid mistakes than to maximize purchasing benefits (Mitchell, 1999). Services are inherently more risky than products and the major reason for this is the higher levels of uncertainty which are associated with services, (Mitchell *et al.*, 1990). Polatoglu *et al.* also found that perceived risk was one of the major factors affecting consumer adoption, as well as customer satisfaction of internet banking services. It usually arises from uncertainty. Hence Saffena *et al.* also hypothesize:

H3: Perceived risks have a negative impact on use of internet banking.

Main survey was Mangin *et al.* (2011). Mangin *et al.*, (2011) investigated the adoption of the on-line banking services among Canadians based on the TAM model in which it was added two new external factors , the 'price' and the 'convenience'. They employed 'price' because bank customers seem to consider that they could obtain better prices using internet than going to the bank (Karjaluoto, Mattila and Pento, 2002; Sathye, 1999) due to the harsh competition between traditional banks outlets and on-line banking (Roman Gonzalez and Martinez Guerrero, 2004). The other construct they employed was 'convenience' based on customers' belief that they spend a great deal of time and effort visiting bank branches to succeed their transactions (Pikksrainen *et al.*, 2004). The 'convenience' is an advantage that is associated with on-line banking (Karjaluoto, Mattila and Pento, 2002) and is appreciated by customers (Lee, Kwon and Schumann, 2005; Sarel and Marmorstein, 2003).

Mangin *et al.* (2011) based on the TAM model develop their first four hypotheses as follows:

H1: There is a significant positive relationship between the Ease of Use and the Perceived Usefulness of banking by internet.

H2: There is a significant positive relationship between the Perceived Usefulness and Attitude towards Using banking by internet.

H3: There is a significant positive relationship between the Perceived Usefulness and Intention to Use banking by internet.

H4: There is a significant positive relationship between Attitude towards Using and Intention to Use banking by internet.

Hypothesis involving two external of TAM model are the following:

H5: There is a significant positive relationship between Price and Perceived Usefulness.

H6: There is a significant positive relationship between Convenience and Perceived Usefulness.

In conclusion, this model combined all variables of the TAM original Model. They are all significant and the TAM Model could easily be applied to analyze the adoption of on line banking on a Canadian environment in North America (Davis, Bagozzi, Warshaw, 1989). The TAM Model applied to on-line banking with the two external variables 'price' and 'convenience' applied to Perceived Usefulness represents a substantial and significant increase in the model predictability. The methodology followed was the distribution of questionnaire to a number of university students in Ottawa. The questionnaire was constructed by general question concerning age, sex, educational and social status and specific questions concerning the use of internet correlated to banking services.

The target of Ayo *et al.* study was to investigate the causes that affect users' acceptance of e-Banking, taking into consideration their attitude and confidence in the use of the system. More specific, perceived usefulness (PU), perceived ease of use (PEOU), perceived credibility (PC), computer self-efficacy (CSE), and customer attitude is sought to determine the level of users' acceptance of the various e-Banking services. Ayo *et al.* also adopted the TAM model extended by two extra constructs; 'credibility' and 'self efficacy'. Self efficacy is defined by Bandura as "judgments of how well one can execute courses of action required to deal with prospective situations" (Bandura, 1982), consequently is positive correlated to the perceived ease of use.

The proposed relationship between computer self-efficacy and perceived ease of use is based on the theoretical argument by Davis (1989). Studies have also shown that there exists empirical evidence of a causal link between computer self-efficacy and perceived ease of use (Levy *et al.*, 2008). Furthermore, it has been proven by Hanudin (2007), that computer self-efficacy had a positive effect on both perceived usefulness and perceived ease of use on Internet. Based on the researches mentioned Ayo *et al.* proposed their first three hypotheses as followed:

H1: Computer self-efficacy has a positive effect on perceived usefulness.

H2: Computer self-efficacy has a positive effect on perceived ease of use.

H3: Computer self-efficacy has a positive effect on customer's attitude.

Based on Hanudin's (2007) research, perceived credibility determines the intention to use internet services. Perceived credibility involves in its notion privacy and security. Security refers to the protection of information or systems from unauthorized intrusions and privacy to the confidentiality of transaction and personal data. More specific, 'perceived credibility' embraces the idea that transaction details and personal data are secured against unauthorized access. Karjaluoto (2002) has also concluded in their research that perceived credibility has an important effect on perceived ease of use and perceived usefulness. Supported also from Karjaluoto's research Ayo *et al.* formulated another three hypotheses.

H4: Perceived credibility has positive effect on perceived ease of use of e-Banking.

H5: Perceived credibility has positive effect on customer perceived usefulness of e-Banking.

H6: Perceived credibility has positive effect on customer attitude towards the use of e-Banking.

'Perceived ease of usefulness' is described as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989). Therefore, it is believed that the user would adopt an easier application and would abandon the more complicated. Based on the mentioned, the seventh hypothesis was formulated as followed:

H7: Perceived ease of use has a positive effect on customer's attitude.

The eighth hypothesis has derived from the tendency to use applications that improves their performance. Davis defined perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance".

H8: Perceived usefulness has a positive effect on customer's attitude.

Attitudes are described by Davis (1989) and Karjaluoto *et al.*, (2002) as the users' desirability to use the system.

H9: Customer attitude have a positive effect on customer acceptance of electronic banking

Ayo *et al.* study has also adopted the TAM extended model added with three new constructs, perceived credibility; computer self-efficacy and customer attitude. In order to conduct their survey a questionnaire was distributed to indicate their perception on a likert five scale. The result of this study illustrates that perceived usefulness is the critical factor in explaining users' adoption of e-banking. Moreover, that credibility of the system is a major concern for both users and intending users and finally privacy of data and security measures are the issues that worry the minds of users.

Inspired by the previously discussed studies mainly from this research the present study tries to identify the factors that affect e-banking adoption in Greek market. In order to examine the factors which affect the e-banking adoption a set of hypotheses is tested. The following four constructs are selected and examined : a) perceived usefulness, defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance" b) attitude, described as an individual's positive or negative behavior towards innovation adaptation c) computer self-efficacy analyzed by Compeau and Higgins (1995) which refers to individuals' judgment of their capabilities to use computers in diverse situations and d) trust a factor introduced by Gefen *et al.*, Wang *et al.*, an inducing factors built into the framework of IS, thus reducing individuals concerns and heightening their decision to use these systems.
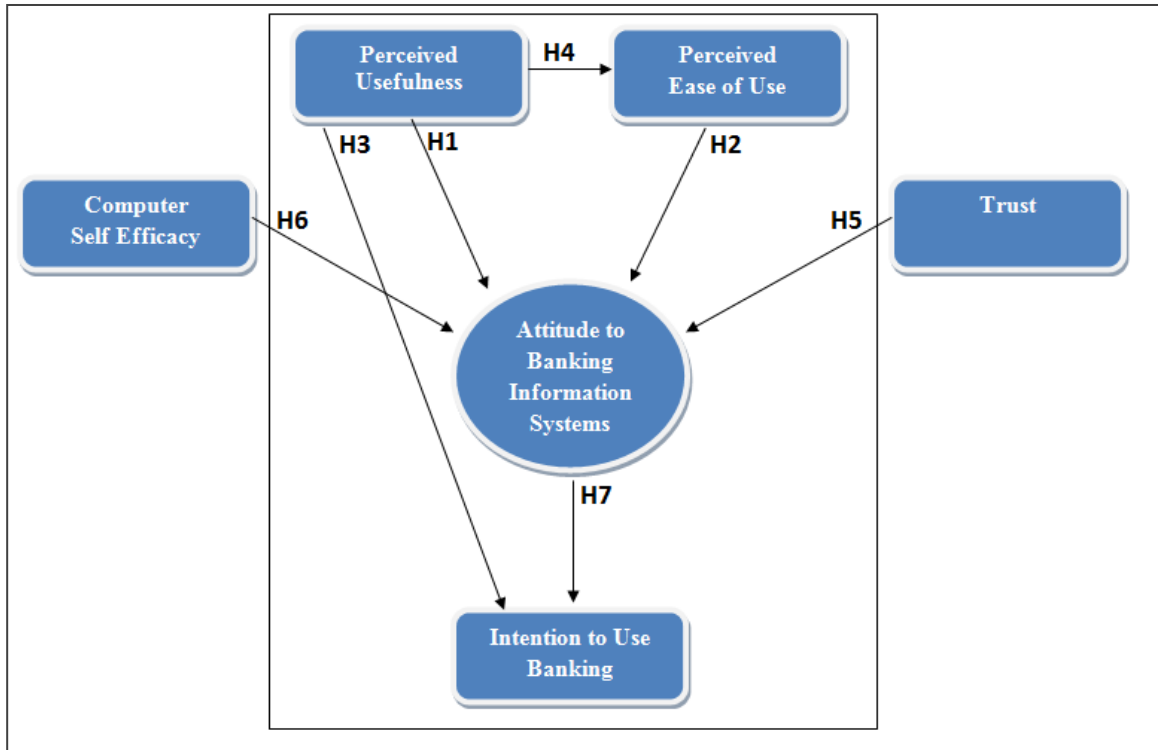
Figure 3: Technology Acceptance Model
Source Davis *et.al*, 1989

3.3 Hypotheses development

In order to examine the relationships between the attributes of e-banking and their effect on its adoption a set of seven hypotheses is tested. The hypotheses conceptualisation is mainly based on the literature review that was presented in previous chapter making some necessary adjustments.

The hypotheses are developed according to TAM model which is based on the Theory of Reasoned Action (TRA, Ajzen and Fishbein, 1975; Fishbein and Ajzen, 1980). The perceived usefulness is a factor that affects the behaviour and the intention of the user; more specifically the attitude of the user towards internet services. Hence, the first hypothesis is the following:

H1: Perceived Usefulness has a positive correlation with Attitude to Banking Information Systems.

Ease of Use is a crucial factor for adopting the use of an information system (Davis, Bagozzi and Warshaw, 1989). The perceived Ease of Use implies how comfortable the user feels with the system. Thus, the second hypothesis is formulated as follows:

H2: Perceived Ease of Use has a positive correlation with Attitude to Banking Information Systems.

Perceived Usefulness as mentioned above is a factor that affects attitude of the user towards Banking Information Systems and consequently the intention to use them. Thus, the third hypothesis is as follows:

H3: Perceived Usefulness has a positive correlation with Intention to Use Banking Information Systems.

Based on the above elements, Perceived Usefulness influences and involves the perceived Ease of Use. Therefore, the fourth hypothesis is formed as follows:

H4: Perceived Usefulness has a positive correlation with Perceived Ease of Use.

The importance of security and privacy and consequently trust has been underlined in many banking studies for the acceptance of online banking (Agarwal *et al*., 2009, Hernandez and Mazzon, 2007; Chen and Barnes, 2007). As a result, the fifth hypothesis is formed as follows:

H5: Trust has a positive correlation with Attitude to Banking Information Systems.

Furthermore, individual's confidence about their capability to use internet banking services on line, known as their computer self-efficacy (CSE), have also been highlighted as fundamental factor that affects intention to employ a banking information system (Compeau & Higgins, 1995; Levy *et al*., 2008). Thus, the sixth hypothesis has formed as following:

H6: Computer Self Efficacy has a positive correlation with Attitude to Banking Information Systems.

Finally the last hypothesis is formed as followed concerning that:

H7: Attitude to Banking Information Systems has a positive effect on Intention to Use Banking Information Systems.

3.4 Instrument Development and Questionnaire Design

The instrument that is used to investigate the above proposed model is an on line questionnaire consisting of twenty five questions. These questions are primarily used to test the hypotheses that were developed and presented earlier in the analysis. The response structure for each question is a five point Likert (1932) scale where 'score five' means 'always' or 'very accurate' or 'very much' while 'score one' means respectively 'not at all' or 'not accurate'. This rating scale is consistent with Agarwal *et al*. (2009) and similar to the one presented in the study of Lévy Mangin (2011). Furthermore, the importance of every item for the user is also measured on a five point Likert scale. The questionnaire was pre-tested through a pilot survey among the students of the Msc in Banking and Finance at the campus of International Hellenic University. After this test some adjustments are made in several items, while some unnecessary items were eliminated as they were conceived by the respondents as similar in meaning with others or because they were not fully applicable in the Greek language. Three different types of studies (theoretical studies/publications, empirical studies on individual investors and empirical studies on professional investors) were taken into consideration in order to design this questionnaire. Broad literature on survey data collection, methodology and questionnaire design was examined to decide how to construct the questions and the design of a whole questionnaire. Thus, according to previous studies and based mainly on Agarwal *et al*. (2009), the design of the questionnaire took into consideration and the following: the proper wording of relevant questions that could significantly contribute to improving the accuracy of the answers, the

structure and the content of the questionnaire to be substantially influenced by the type of information needed to answer a question, the question format and the questionnaire layout to be influenced by the decisions about the data collection (mail, internet or personal interview) , the guidelines that help to prevent the most common mistakes in questionnaire design (e.g. avoid: complication, leading and loading questions, vagueness, making assumptions, and troublesome questions), the sequence of questions (e.g. asking general questions before specific questions in order to obtain unbiased responses), the importance of questionnaire layout, and the importance of pre-testing and revising the questionnaire. To make it easy for the respondents it was translated into Greek. Also, two different forms were created for each language (one to be used for postal communication and the other to be sent, completed, and returned via e-mail).

4. Empirical Results

4.1 Introduction

E-banking is based on a complex and sophisticated information technology and it was largely boosted by the advent of the internet, electronic commerce and communication technology. Meanwhile the great users' response to this technology has been a great opportunity for many businesses including financial institutions. In this study, it is used the most accepted and widespread research framework of technology acceptance, the TAM (Technology Acceptance Model) introduced by Davis (1986) to investigate acceptance of the electronic banking context among bank clients in Greece. Based on previous literature and detailed study of the research methodologies that were presented in former chapters, we conceived a conceptual framework and constructed a research model which is an extended version of the Technology Acceptance Model comprised of seven distinct constructs that were empirically proved by other researchers for predicting acceptance behavior. In this chapter the proposed research framework is empirically tested in a large

sample of Greek bank customers, through an on-line survey. Furthermore, it has been tested a set of hypotheses that was presented earlier in the analysis to validate the research framework. Finally, by using regression analysis it is described the impact of each construct to the e-banking technology adoption in the Greek context.

4.2 Sample Selection

The respondent body of the research includes Greek residents, who at the time of the survey were clients of at least one bank that operates in Greece. Data were collected through an on line questionnaire which can be accessed at this link: http://goo.gl/cDStR. The link was mailed to students and professors of the International Hellenic University. The link was also posted to the most popular social networking sites, namely facebook, linkedin and twitter. Finally, the link was posted to several internet-related groups in these social networking sites. The e-mail invitations and the social postings were sent out in July 2011 while reminders were sent in August 2011. Last but not least, there were received 184 valid responses by respondents who are clients of at least one bank located in Greece. Responses were categorised according to the respondents' residence, age, working status, monthly income and level of education (see Table 1). The names of all the Greek banks that operate in Greece were isolated and asked respondents to indicate the banks they do business with either electronically or physically. The banks are the following: Alpha Bank, ATEbank, Attica Bank, Bank of Cyprus, Citibank, EFG Eurobank Ergasias, Emporiki Bank, First Business Bank, Geniki Bank, Hellenic Bank, HSBC, Marfin Egnatia Bank, Millennium Bank, National Bank of Greece, Panellinia Bank, Piraeus Bank, Probank, Proton Bank, T Bank, TT Hellenic Postbank. Respondents were able to indicate another bank that was not mentioned in the list.

The dataset that was created with the 184 responses was processed with Statistical Package for Social Sciences (SPSS) v. 17.0. A missing value analysis was performed using the series mean method in order to replace missing values. A questionnaire tracking method was used by assigning a unique number to each complete questionnaire, so as to be able to

edit the questionnaires and to minimize bias. Also, the Internet Protocol addresses were checked for uniqueness in order to avoid multiple spam responses by one respondent.

4.3 Respondent's Profile

Respondents' residence is in all the regions of Greece and the amount of required responses from each region was selected as a proportion of its internet users (AGB Nielsen and the Information Society Observatory, 2010). The resulting dataset consists of 63.6 per cent male respondents and of 36.4 per cent female respondents. Age categorization indicated that 3.3 per cent is at the 18-25 age bracket, 22.3 per cent at the 26-30 age bracket, 27.2 per cent at the 31-35, 0.5 per cent at the 36-40, 31 per cent at the 41-45, 15.2 per cent at the 51-65 and the rest 0.5 per cent is older than 66 years old. The age and gender distribution of the respondents is presented in the following table and the corresponding bar chart.

Table 1: Respondent's Age and Gender

Age	Male	Female	Total
18 to 25	4	2	6
26 to 30	23	18	41
31 to 35	35	15	50
36 to 40	0	1	1
41 to 45	38	19	57
51 to 65	17	11	28
66 and greater	0	1	1
Total	117	67	184
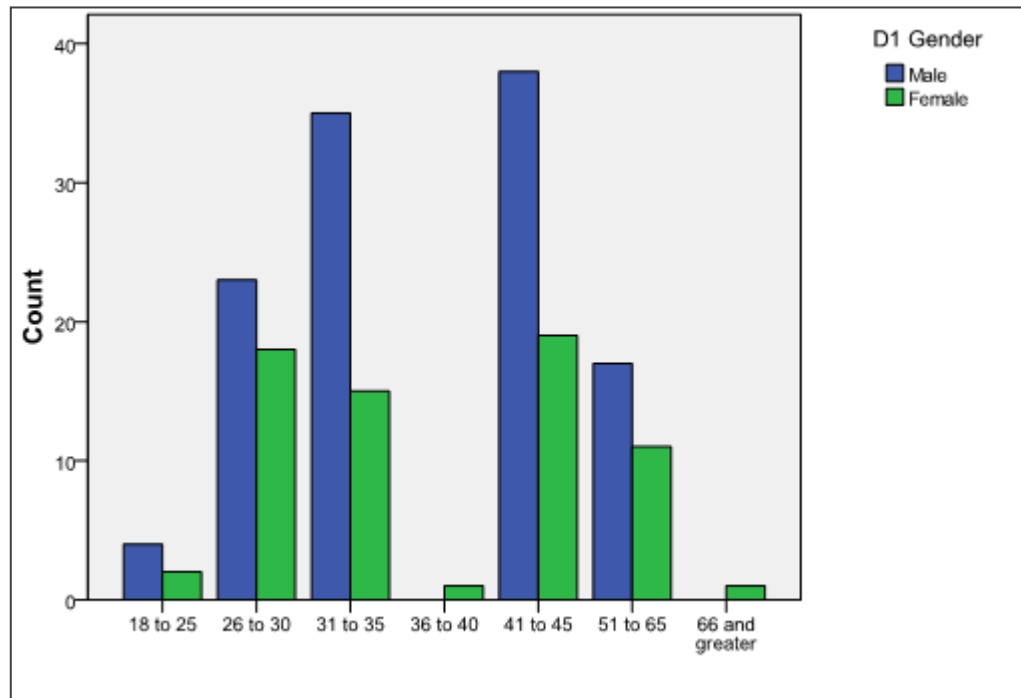
Chart 1: Respondent's Age and Gender

In the following table it is depicted the ultimate level of education that respondents have completed cross tabulated with their monthly income. This relationship is an indication of the respondents' social status. More specific, primary level has only one respondent, secondary level has fifty one respondent, college level has ninety one, post graduate has thirty four and phd level has seven respondents. As occurs from the table most of the respondents are college graduates earning a monthly income of 900€ to 1100€.

Table 2: - Respondents' Income and Education

		0-500 €	701-900 €	901-1100 €	1101-1300 €	More than 1500 €	Total
				Income			
Education	Primary	0	0	0	1	0	1
	Secondary	0	0	17	16	18	51
	College/University	2	2	33	24	30	91
	Post Graduate	4		17	4	7	34
	Phd	0	0	1	0	6	7
	Total	6	4	68	45	61	184
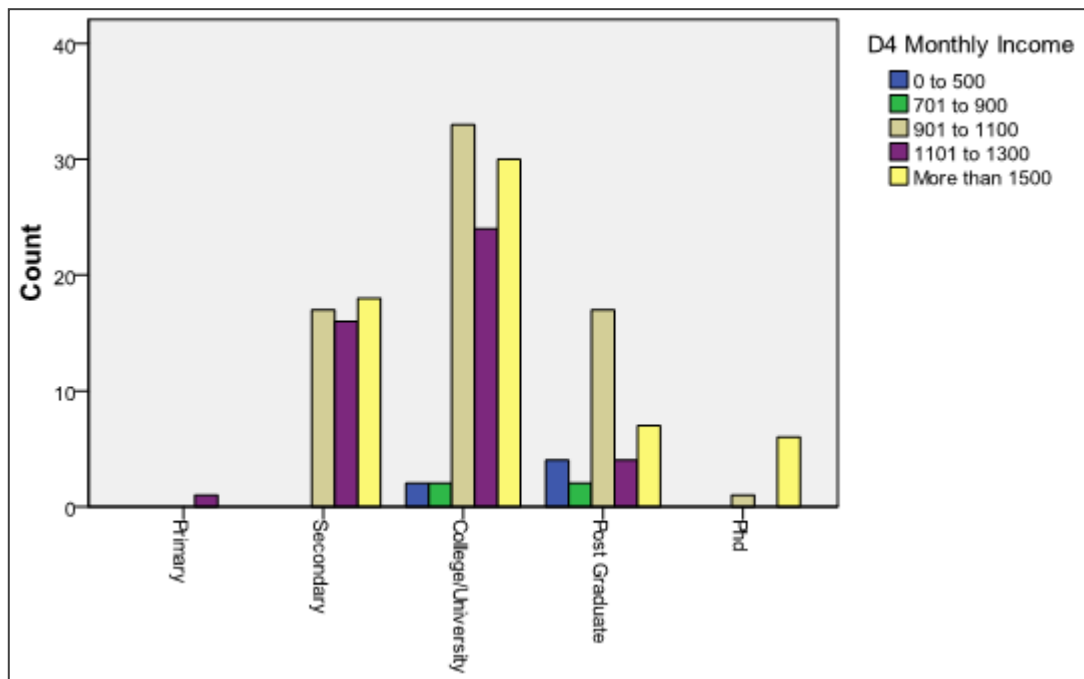
Chart 2: - Respondents' Education and Income

In the next table and the corresponding two bar charts it is revealed the use of banking services in general and the use of on line banking services by the respondents. The bar charts show the use of banking services either on line or off line according to the respondents' status that is their age and education. It is clear that the most popular bank is Alpha Bank (thirty eight per cent) following by the EFG Eurobank (fifty five point four per cent). The last bank in preference is the TT Hellenic Postbank.

Table 3: Use of banks

Banks	Frequency	Percent	Valid Percent	Cumulative Percent
Alpha Bank	70	38.0	38.0	38.0
EFG Eurobank	32	17.4	17.4	55.4
Marfin Egnatia Bank	19	10.3	10.3	65.8
National Bank of Greece	14	7.6	7.6	73.4
Piraeus Bank	16	8.7	8.7	82.1
Probank	1	0.5	0.5	82.6
TT Hellenic Postbank	32	17.4	17.4	100.0
Total	184	100.0	100.0	
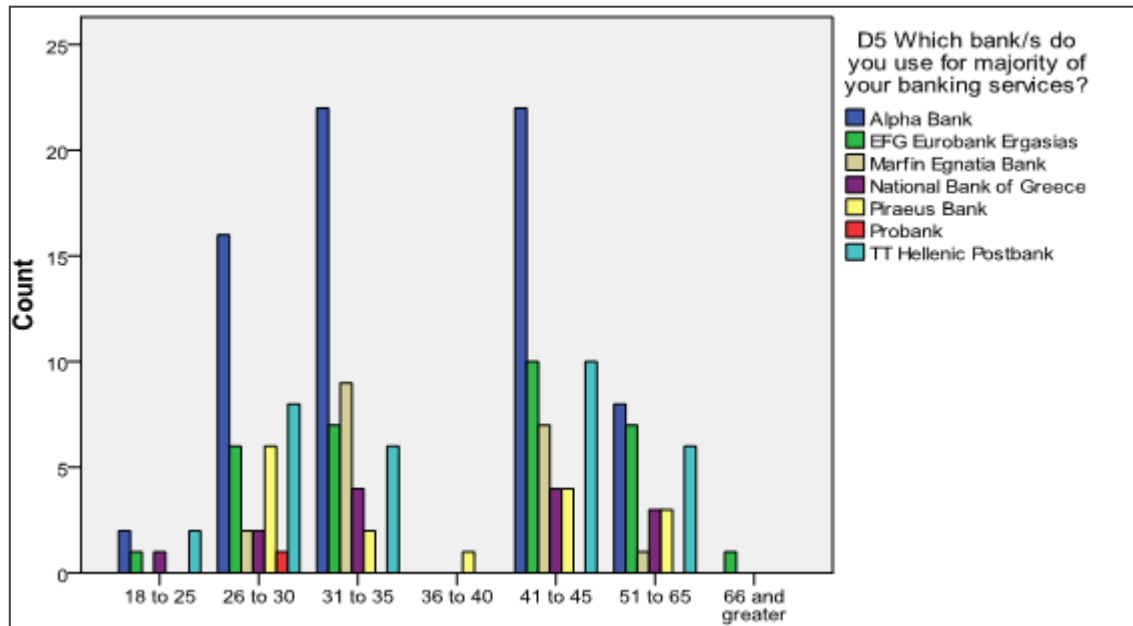
Chart 3: - Internet Banking according to age range
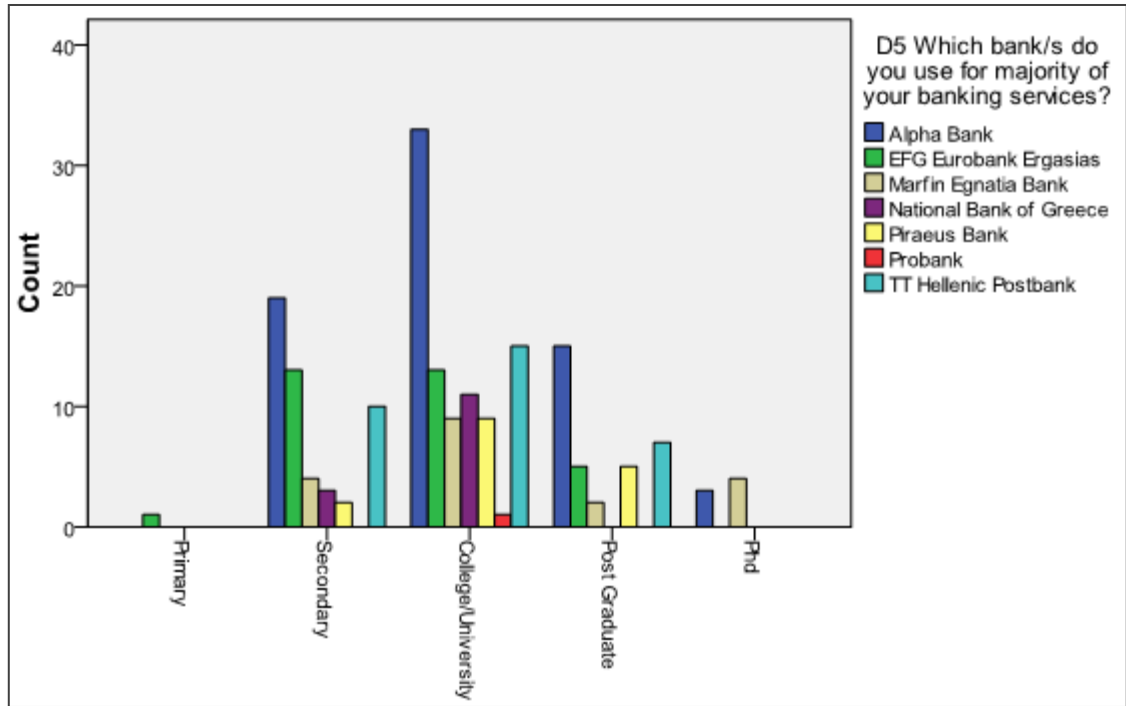
Chart 4: Banks according to education

In the next table we present the banks according to the popularity of their internet banking services. It is clear that Alpha Bank is again the most frequently chosen by respondents to perform their online banking transactions. Furthermore there is a big percentage (25 per cent) not using internet banking services at all. In the subsequent bar charts we crosstabulate the internet banking use with the age range and it is clear that at the 51-65 range the use of online banking is limited. Also it is obvious that respondents who are at least college graduates are the most frequent users of on line banking services. From these results it seems that younger age groups and educated people tend to use online banking services more frequently. Possible reasons for this fact are outlined next in the analysis, where we test our research model.

Table 4: Use of internet Banking services

Banks	Frequency	Percent	Valid Percent	Cumulative Percent
Alpha Bank	59	32.1	32.2	32.2
EFG Eurobank	13	7.1	7.1	39.3
Marfin Egnatia Bank	19	10.3	10.4	49.7
National Bank of Greece	14	7.6	7.7	57.4
Piraeus Bank	17	9.2	9.3	66.7
Probank	1	0.5	0.5	67.2
TT Hellenic Postbank	14	7.6	7.7	74.9
Not use of online banking	46	25.0	25.1	100.0
Total	183	99.5	100.0	
Other	1	0.5		
Total	184	100.0		
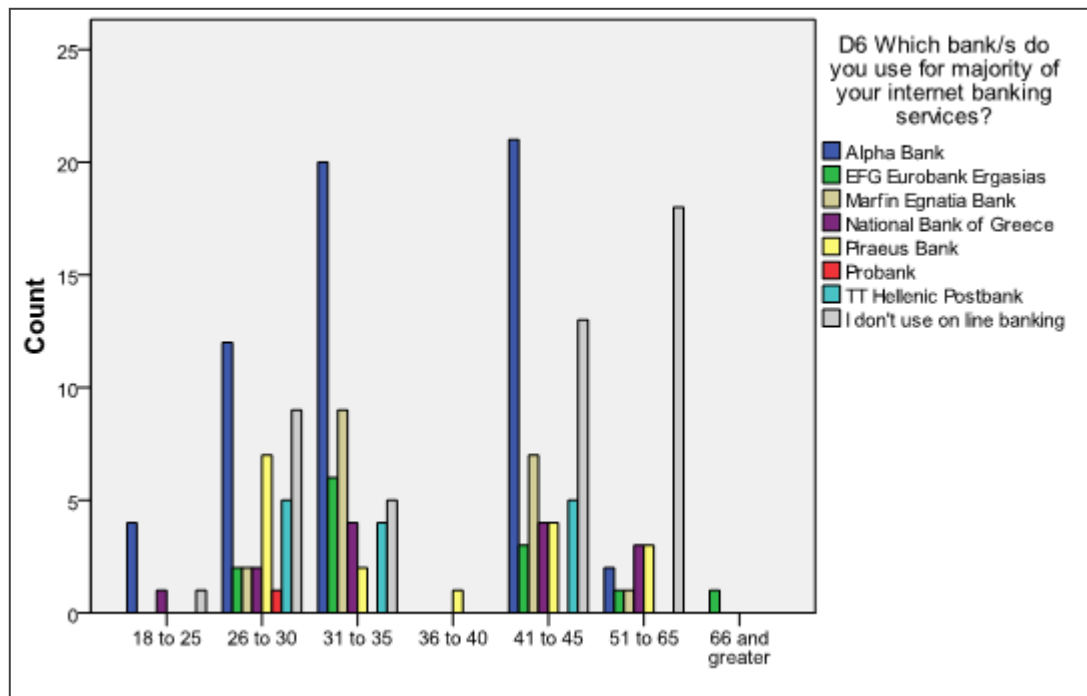
Chart 5: Internet Banking according to age range
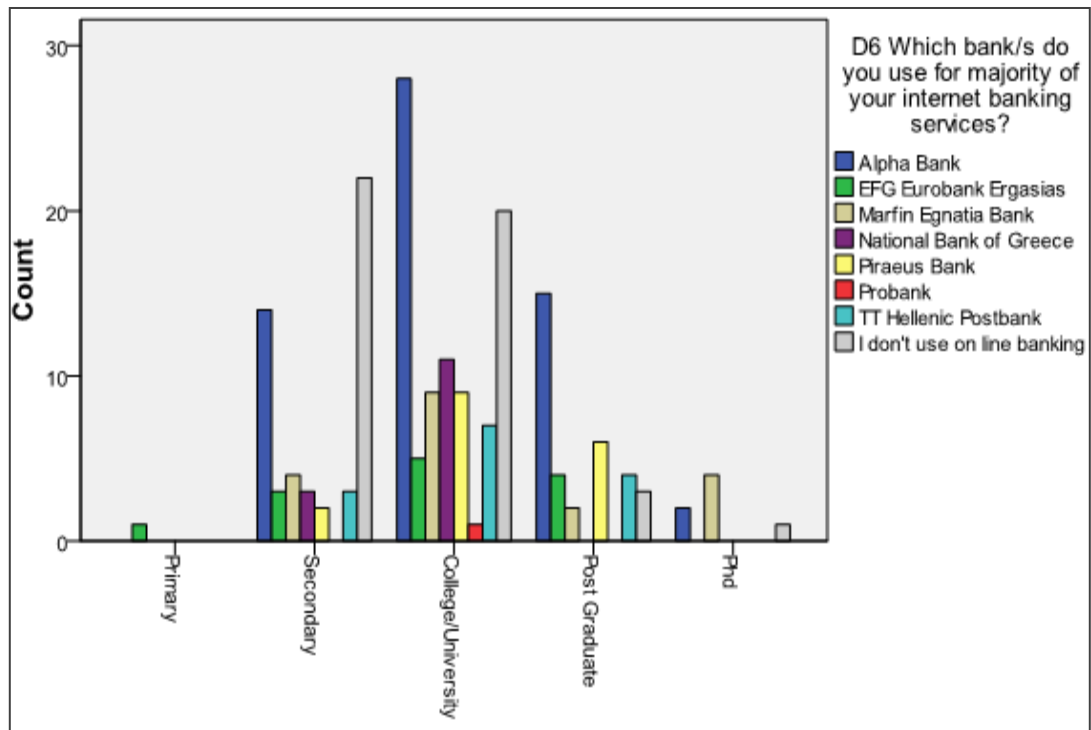
Chart 6: Internet Banking according to education

4.4 Construct validity and reliability analysis

The ratio between the amount of responses and the amount of variables is 30:1 and is primary validating evidence about the sample size adequacy (Parasuraman *et. al*, 1988). Furthermore an acceptable Kaiser-Meyer-Olkin measure of sampling adequacy of 0.691 (>0.5) as well as acceptable Bartlett sphericity test statistics (sig. =.000) also validate the sample size of 359 accepted responses. The Kaiser-Meyer-Olkin lies between 0 and 1. A value of zero indicates that the sum of partial correlations is large relative to the sum of correlations causing diffusion in the pattern of correlations and the factor analysis to be inappropriate. A value close to 1 on the other hand shows that the patterns of correlations are relatively compact hence the factor analysis yields distinct and reliable factors. Generally, values greater than zero point five are acceptable; (such as in our own research). Bartletts's test of sphericity tests the null hypothesis that the original correlation matrix is

an identity matrix. A significant Bartlett's test of sphericity indicates that the R-matrix is not an identity matrix and therefore there are some relationships among the variables and the factor analysis is appropriate. As presented in table 5 both test are acceptable in our research.

Table 5: KMO and Bartlett's test of Sphericity

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.691
Bartlett's Test of Sphericity	Approx. Chi-Square	11,121.588
	df	561.000
	Sig.	0.000

With acceptable results of all the tests concerning sample adequacy, the 34 items were submitted to a principal components factor analysis using VARIMAX rotation in order to assess the discriminate validity. Rotation convergence was achieved in 5 iterations. The resultant six factors produced strong factor loadings all greater than 0.5. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. A high score of alpha is often used as evidence that the items measure an underlying (or latent) construct. In our research all constructs present acceptable alpha scores indicating the internal consistency of the items for each construct and the scores are presented in table 6 below. It is obvious that all constructs yield alpha scores greater than 0.793 and many approaching 1, which is a primary strong indication for the appropriateness of factor analysis.

Table 6: Cronbach Alpha Scores

Construct	Items	Alpha
Computer Self-Efficacy	CSE1	0.961
	CSE2	
	CSE3	
	CSE4	
	CSE5	
	CSE6	
	CSE7	
	CSE8	
	CSE9	
	CSE10	
Trust	TRST1	0.992
	TRST2	
	TRST3	
	TRST4	
	TRST5	
	TRST6	
	TRST7	
	TRST8	
	TRST9	
	TRST10	
Perceived Usefulness	PU1	0.804
	PU2	
	PU3	
	PU4	
Perceived Ease of Use	PEOU1	0.915
	PEOU2	
	PEOU3	
	PEOU4	
Attitude	ATT1	0.815
	ATT2	
	ATT3	
Intention to Use	ITU1	0.793
	ITU2	
	ITU3	

After testing the sampling adequacy and the consistency of the variables we run the factor analysis.

Table 7: Variance explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.731	28.622	28.622	9.731	28.622	28.622	9.482	27.889	27.889
2	7.384	21.717	50.339	7.384	21.717	50.339	7.528	22.141	50.030
3	3.270	9.617	59.956	3.270	9.617	59.956	3.219	9.467	59.497
4	2.843	8.361	68.317	2.843	8.361	68.317	2.697	7.932	67.430
5	2.579	7.586	75.903	2.579	7.586	75.903	2.524	7.422	74.852
6	1.860	5.471	81.375	1.860	5.471	81.375	2.218	6.523	81.375
7	0.936	2.753	84.128						
8	0.915	2.690	86.818						
9	0.677	1.991	88.809						
10	0.617	1.816	90.625						
11	0.507	1.490	92.115						
12	0.432	1.272	93.387						
13	0.331	0.974	94.361						
14	0.285	0.838	95.199						
15	0.254	0.748	95.947						
16	0.215	0.633	96.579						
17	0.194	0.571	97.151						
18	0.186	0.548	97.699						
19	0.154	0.452	98.150						
20	0.132	0.388	98.539						
21	0.108	0.317	98.855						
22	0.091	0.269	99.124						
23	0.066	0.195	99.319						
24	0.063	0.185	99.504						
25	0.052	0.154	99.658						
26	0.042	0.124	99.782						
27	0.025	0.073	99.855						
28	0.016	0.048	99.903						
29	0.013	0.040	99.943						
30	0.008	0.023	99.966						
31	0.006	0.018	99.983						
32	0.003	0.009	99.992						
33	0.002	0.007	99.999						
34	0.000	0.001	100.000						

Extraction Method: Principal Component Analysis.

In the above table 7 we present the initial eigenvalues that represent the variance explained by each component. The second column represents the variance explained by each factor yielding the number of factors with eigenvalues greater than 1.

Finally the third column of the table represents the variance explained by the final factors. Here in this part we present the eigenvalues of the factors after rotation that is the effect of optimizing the factor structure and equalizing the relative importance of the extracted factors.

In the next table 8 we present the factor loadings of the six remaining factors, after the above analysis. According to that table the questions that loads highly under each

component are closely related and combined, they describe each component. Finally the numbers of factors are represented in the scree plot that follows the table.

Table 8: Rotated Component Matrix

Rotated Component Matrix[a]						
	Component					
	1	2	3	4	5	6
CSE1 "I could complete my bank transaction using the bank's Website and/or the automated teller machine (ATM) if there is no one around to tell me what to do"	0.102	0.796			0.220	
CSE2 "I could complete my bank transaction using the bank's Website and/or ATM if I had never used a similar system like it before"	0.336	0.575				
CSE3 "I could complete my bank transaction using the bank's Website and/or ATM if I only had manuals or online help for reference"		0.921				
CSE4 "I could complete my bank transaction using the bank's Website and/or ATM if I had seen someone else using it before"		0.963				
CSE5 "I could complete my bank transaction using the bank's Website and/or ATM if I could call someone for help if I got stuck"		0.891				
CSE6 "I could complete my bank transaction using the bank's Website and/or ATM if someone had helped me get started"		0.844			-0.189	0.166
CSE7 "I could complete my bank transaction using the bank's Website and/or ATM if I had a lot of time to complete the job"		0.933				
CSE8 "I could complete my bank transaction using the bank's Website and/or ATM if I had built-in help available for assistance"		0.899			-0.219	
CSE9 "I could complete my bank transaction using the bank's Website and/or ATM if someone assisted me the first time"		0.916			-0.160	
CSE10 "I could complete my bank transaction using the bank's Website and/or ATM if I used a similar system before to do the same job"		0.843			0.154	
TRST1 "I believe the bank's Website and/or ATM keep my best interest in mind"	0.941				-0.146	
TRST2 "I believe the bank's Website and/or ATM will keep the promises made to me"	0.968					
TRST3 "The bank's Website and/or ATM I am using is totally trustworthy"	0.968				-0.108	
TRST4 "I believe in the information provided by this bank's Website and/or ATM"	0.984					
TRST5 "My tendency to trust the bank's Website and/or ATM is high"	0.917				0.180	
TRST6 "Trusting in the bank's Website and/or ATM is not difficult"	0.934				-0.175	
TRST7 "I feel secure putting my personal information in the bank's Website and/or ATM"	0.973					
TRST8 "I believe the bank's Website and/or ATM has security feature to protect users"	0.982					
TRST9 "I trust the bank's Website and/or ATM even though I have little knowledge of it"	0.985					
TRST10 "I trust the bank's Website and/or ATM to do the right job"	0.989					
PU1 "Using the bank's Website and/or ATM improves my banking experience"		0.179		0.799	-0.242	0.172
PU2 "Using the bank's Website and/or ATM improves my banking productivity"				0.956		
PU3 "Using the bank's Website and/or ATM improves my banking effectiveness"				0.948		
PU4 "I find using the bank's Website and/or ATM useful"				0.421		
PEOU1 "Learning to use to bank's Website and/or ATM is easy for me"			0.910			
PEOU2 "My interaction with the bank's Website and/or ATM is clear and understandable"			0.893			
PEOU3 "It would be easy for me to become skillful in using the bank's Website and/or ATM"			0.887			

PEOU4 "I find the bank's Website and/or ATM easy to use"			0.875		-0.107	
ATT1 "In my opinion. it is desirable to use the banks' Website and/or ATM"					0.681	0.137
ATT2 "Using bank's Website and/or ATM is a pleasant experience"					0.896	
ATT3 "Using bank's Website and/or ATM is a wise idea"					0.916	
ITU1 "I intend to use the bank's Website and/or ATM to carry out routine banking transactions"	-0.124			0.133		0.764
ITU2 "As much as is possible. I will use the bank's Website and/or ATM on a regular basis"				0.111		0.874
ITU3 "I will strongly recommend others to use the bank's Website and/or ATM"					0.126	0.842
a. Rotation converged in 5 iterations.						
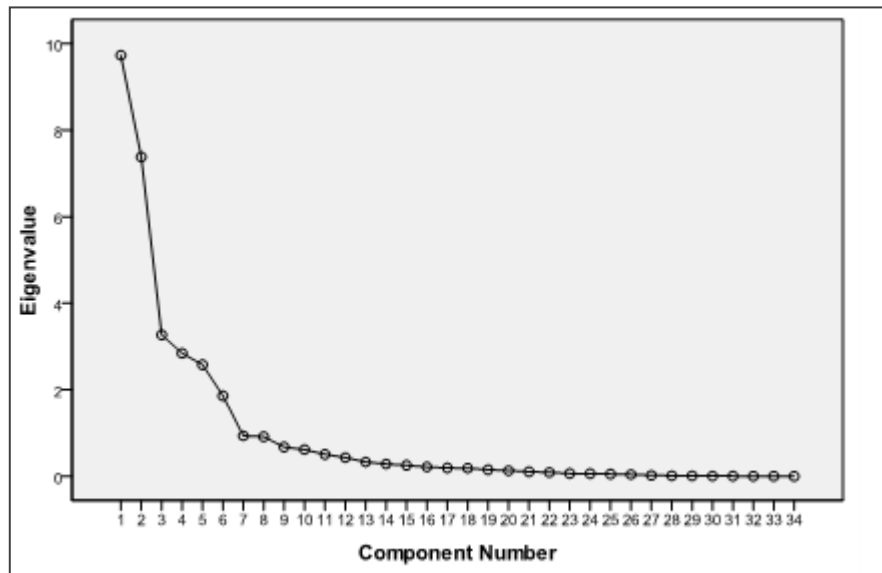
Chart 7: Scree Plot

4.5 Hypothesis Test

In chapter three, a set of seven hypotheses was developed concerning the attitude of stakeholders to baking information systems. In this section correlation tests are conducted in order to examine the validity of this set of hypotheses. For this purpose Pearson's correlation coefficient is employed, the significance of which proves strong degree of dependence between the six constructs and the attitude towards banking information systems. These tests are performed with the bivariate correlations method of SPSS 17.0.

The first hypothesis about the connection of perceived usefulness and attitude toward banking information systems is as follows:

H1: Perceived Usefulness has a positive correlation with Attitude to Banking Information Systems

This hypothesis is not supported by the data. Spearman's correlation coefficient score is not significant at the 1 per cent level. This fact illustrates that attitude to banking information systems do not correlate on perceived usefulness.

The second hypothesis is the following:

H2: Perceived Ease of Use has a positive correlation with Attitude to Banking Information Systems

The second hypothesis is not supported by the data either at the 1 per cent significance level with Spearman's correlation coefficient test. These results indicate that perceived ease of use do not correlate with attitude to banking information systems.

The third hypothesis is as follows:

H3: Perceived Usefulness has a positive correlation with Intention to Use Banking Information Systems

The third hypothesis is supported by the data and implies that perceived usefulness is positively correlated with the intention to use banking information systems. Specifically Spearman's correlation coefficient yields a score of 0.136 at the 0.05 significance level.

The fourth hypothesis is the following:

H4: Perceived Usefulness has a positive correlation with Perceived Ease of Use

This hypothesis implies that perceived usefulness is positively correlated with perceived ease of use. This hypothesis is supported by the data at the 5 per cent significance level with a 0.138 Spearman coefficient score.

The fifth hypothesis is the following:

H5: Trust has a positive correlation with Attitude to Banking Information Systems

This hypothesis is also supported by the data with a Spearman's coefficient score of 0.203 significant at the 1 per cent level. This implies that trust is directly correlated with attitude to banking information systems.

The sixth hypothesis is the following:
H6: Computer Self Efficacy has a positive correlation with Attitude to Banking Information Systems

This hypothesis is supported at the 1 per cent significance level with Spearman's score of 0.231. The correlation proves that computer self efficacy positively affects attitude to banking information systems.

Finally, the seventh hypothesis is the following:
H7: Attitude to Banking Information Systems has a positive effect on Intention to Use Banking Information Systems

Seventh hypothesis is also supported by the data at the 1 per cent significance level with Spearman's score of 0.318. This result illustrates the strong relationship of attitude toward banking information systems with Intention to use banking information systems.

All the tests that concern the validation of the set of the hypotheses as well as coefficient scores for each hypothesis are shown in following table.

Table 9: Hypothesis Test

Hypotheses	Spearman Coefficient		Outcome	Significance level (1 – tailed)
	Score	Significance		
H1	-0.48	0.260	Not	-
H2	0.29	0.349	Not	-
H3	0.136	0.033	Supported	5 per cent
H4	0.138	0.031	Supported	5 per cent
H5	0.203	0.003	Supported	1 per cent
H6	0.231	0.001	Supported	1 per cent
H7	0.318	0.000	Supported	1 per cent

4.6 Summary

In this section all the theoretical background that was developed in previous sections is empirically tested and examined through the dataset of 184 responses. After discriminate validity and sample adequacy tests, the set of hypotheses that was developed earlier in the analysis is tested and produce valuable conclusions for the research framework we developed about the on line banking environment acceptance by bank clients. In the next chapter detailed conclusions from this analysis are extracted and limitations of our research are outlined. Also some suggestions for further research and analysis are presented.

5. Concluding Remarks

This paper came up with a conceptual framework and constructed a research model, which is an extended version of the Technology Acceptance Model, in order to examine the acceptance behaviour of e-banking by Greek bank customers. The attitude of the stakeholders towards e-baking is examined through the validation of a set of seven hypotheses. The research was performed using a sample of 184 Greek on e-banking users. The respondents are customers of at least one out of nineteen different Greek banks and were approached by e-mail invitations and by delivering hard copy of the questionnaire at Marfin and Alpha branches in Thessaloniki. All the numeric findings of the statistical procedures and tests are used to extract information about the Greek bank customers' perception on e-banking.

The results of the study supported five out of seven hypotheses generated. The study has also contributed to a more comprehensive understanding of the determinants of the Perceived usefulness. Specifically, our findings indicate that Perceived Usefulness is a significant driver of intention to use the Banking Information Systems. This hypothesis is encouraged by the data; meaning that the probability when using a technology would

improve the user to complete a given task is influenced by his intention to manipulate the Information Systems. On the other hand, the hypotheses that Perceived Ease of Use and the Perceived Usefulness have both positive correlations with the attitude to Banking Information Systems are not supported by the data. We also made another important deduction about the relationship between Perceived Usefulness and Perceived Ease of Use. Their significant positive correlation shows, without a shadow of a doubt, that the customer's job performance is affected by the little (mental and physical) effort the user makes to complete a job. Moreover, a thorough analysis of the collected data revealed some expected but still useful results. The importance of trust as a basic factor for any electronic transactions is directly positive correlated with attitude to Banking Information Systems. In addition, Computer Self Efficacy plays a significant role in influencing the attitude towards Banking Information Systems. Last but not least, there is a strong relationship between the attitude to Banking Information Systems and the intention to use Banking Information Systems. It seems that a high level of overall satisfaction leads to a significant increase of intention.

Although this study's findings provide important and useful implications for the e-banking context in Greece, there are several limitations that may have affected the reliability and validity of the findings. At first, the significantly low internet usage in Greece made it quite difficult to gather enough valid responses to form an acceptable and absolutely representative dataset. The relatively few customers that own and use e-banking accounts or services and the lack of trust for internet transactions made it quite hard to reach a significant amount of on line customers from different contexts. This fact compelled us to accept responses from bank customers that use e-banking for quite simple transactions or just to follow their accounts. Second, the use of self reported Likert scales includes the possibility of a common method bias and slight distraction of the results since the conception of Likert scales may vary by each respondent. Besides, this is illustrated by the comparison of self reported satisfaction and index based satisfaction means which are slightly different. Finally, the sample for this research was based on the respondents of a specific geographical area (mainly Northern part of Greece). The study, therefore, is limited to the extent that this sample can be projected to the entire country or foreign

countries and provides only a snapshot of customer beliefs, behaviours, and preferences in respect of e-banking services.

The findings of the study provide important insights to banks by outlining their e-banking strategies and policies. For future research, we propose the need for banks to understand that the financial products and services supplied over the Internet must not only be custom-made to meet wants, preferences, security, and quality expectations of customers at the present time, but also be required to induce customers to demand and use e-banking on a wider scale in the future. A research by marketing expertise in order to catch up future market conditions, needs and to ensure success of Internet e-retail banking is also recommended. Security is likely to emerge as the biggest concern among the e-banking customers taking into consideration the open nature of the Internet. Since transactions risk might obstruct customers' acceptance of e-banking, it is also suggested for further research building the management of the bank for promoting customer confidence, as well as operational efficiency, in the bank. It is consequently essential for the banks to apply measures to safeguard client assets and information and to ensure trust by advertising as widely as possible the introduction and expert endorsement of initiatives taken by the bank to maximize transaction security and anti fraud systems.

Finally, it is more than a certainty that the rapid growth of internet will finally be infused in the Greek market and so e-banking is expected to follow this way in the near future. We consider it as a very important that an electronic bank framework be built on standardized principles and rules because, that would minimize possibilities of a breakdown and would peter out the second thoughts of e-banking customers.

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Appendix

Computer Self-Efficacy							
CSE1	I could complete my bank transaction using the bank's Website and/or the automated teller machine (ATM) if there is no one around to tell me what to do	1	2	3	4	5
CSE2	I could complete my bank transaction using the bank's Website and/or ATM if I had never used a similar system like it before	1	2	3	4	5
CSE3	I could complete my bank transaction using the bank's Website and/or ATM if I only had manuals or online help for reference	1	2	3	4	5
CSE4	I could complete my bank transaction using the bank's Website and/or ATM if I had seen someone else using it before	1	2	3	4	5
CSE5	I could complete my bank transaction using the bank's Website and/or ATM if I could call someone for help if I got stuck	1	2	3	4	5
CSE6	I could complete my bank transaction using the bank's Website and/or ATM if someone had helped me get started	1	2	3	4	5
CSE7	I could complete my bank transaction using the bank's Website and/or ATM if I had a lot of time to complete the job	1	2	3	4	5
CSE8	I could complete my bank transaction using the bank's Website and/or ATM if I had built-in help available for assistance	1	2	3	4	5
CSE9	I could complete my bank transaction using the bank's Website and/or ATM if someone assisted me the first time	1	2	3	4	5
CSE10	I could complete my bank transaction using the bank's Website and/or ATM if I used a similar system before to do the same job	1	2	3	4	5
Trust							
TRST1	I believe the bank's Website and/or ATM keep my best interest in mind	1	2	3	4	5
TRST2	I believe the bank's Website and/or ATM will keep the promises made to me	1	2	3	4	5
TRST3	The bank's Website and/or ATM I am using is totally trustworthy	1	2	3	4	5
TRST4	I believe in the information provided by this bank's Website and/or ATM	1	2	3	4	5
TRST5	My tendency to trust the bank's Website and/or ATM is high	1	2	3	4	5
TRST6	Trusting in the bank's Website and/or ATM is not difficult	1	2	3	4	5
TRST7	I feel secure putting my personal information in the bank's Website and/or ATM	1	2	3	4	5
TRST8	I believe the bank's Website and/or ATM has security feature to protect users	1	2	3	4	5
TRST9	I trust the bank's Website and/or ATM even though I have little knowledge of it	1	2	3	4	5
TRST10	I trust the bank's Website and/or ATM to do the right job	1	2	3	4	5
Perceived Usefulness							
PU1	Using the bank's Website and/or ATM improves my banking experience	1	2	3	4	5

PU2	Using the bank's Website and/or ATM improves my banking productivity	1	2	3	4	5
PU3	Using the bank's Website and/or ATM improves my banking effectiveness	1	2	3	4	5
PU4	I find using the bank's Website and/or ATM useful	1	2	3	4	5
Perceived Ease of Use						
PEOU1	Learning to use to bank's Website and/or ATM is easy for me	1	2	3	4	5
PEOU2	My interaction with the bank's Website and/or ATM is clear and understandable	1	2	3	4	5
PEOU3	It would be easy for me to become skillful in using the bank's Website and/or ATM	1	2	3	4	5
PEOU4	I find the bank's Website and/or ATM easy to use	1	2	3	4	5
Attitude						
ATT1	In my opinion, it is desirable to use the banks' Website and/or ATM	1	2	3	4	5
ATT2	Using bank's Website and/or ATM is a pleasant experience	1	2	3	4	5
ATT3	Using bank's Website and/or ATM is a wise idea	1	2	3	4	5
Intention to Use						
ITU1	I intend to use the bank's Website and/or ATM to carry out routine banking transactions	1	2	3	4	5
ITU2	As much as is possible, I will use the bank's Website and/or ATM on a regular basis	1	2	3	4	5
ITU3	I will strongly recommend others to use the bank's Website and/or ATM	1	2	3	4	5
Demographics Information						
D1	Gender					
	Male Female					
D2	What is your age range?					
	18 to 25 26 to 30 31 to 35 36 to 40 41 to 45 46 to 50 51 to 65 66 and greater					
D3	What is your highest educational level attained?					
	Primary Secondary College/University Postgraduate Phd					
D4	What is your monthly income (in €)?					
	0 to 500 501 to 700 701 to 900					

	901 to 1100 1101 to 1300 1301 to 1500 More than 1500 Do not wish to disclose
D5	Which bank/s do you use for majority of your banking services?
	Alpha Bank ATEbank Attica Bank Bank of Cyprus Citibank EFG Eurobank Ergasias Emporiki Bank First Business Bank Geniki Bank Hellenic Bank HSBC Marfin Egnatia Bank Millennium Bank National Bank of Greece Panellinia Bank Piraeus Bank Probank Proton Bank T Bank TT Hellenic Postbank Other (which one?)
D6	Which bank/s do you use for majority of your internet banking services?
	Alpha Bank ATEbank Attica Bank Bank of Cyprus Citibank EFG Eurobank Ergasias Emporiki Bank First Business Bank Geniki Bank Hellenic Bank HSBC Marfin Egnatia Bank Millennium Bank National Bank of Greece Panellinia Bank Piraeus Bank Probank Proton Bank

	T Bank
	TT Hellenic Postbank
	Other (which one?)
D7	Which of the following have you used in the past year?
	Online banking
	ATM
	Visit Branch