Journal of International Technology and Information Management

Volume 18
Issue 3 *Double Issue 3/4*

Article 5

2009

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ABSTRACT

The goal of this paper is to increase the awareness of the exogenous factors that influence customers' attitude in the United Arab Emirates (UAE) towards online banking in the light of the Technology Acceptance Model (TAM). The study investigates the effect of three exogenous factors namely computer self-efficacy, security issues, and website features on the TAM. The proposed modified TAM model has been tested with a survey sample of 461 which has been distributed among different customers in the UAE. The data has been analyzed using Structural Equation Modeling (SEM) to evaluate the strength of the hypothesized relationships. The results strongly support the extended TAM model in predicating customers' attitude towards online banking. It also demonstrates the significant effect of computer self-efficacy on customers' attitude through perceived ease of use and perceived usefulness. The implications of integrating the proposed exogenous factors into the TAM are discussed and suggestions for future research. are presented.

INTRODUCTION

Purpose of the Research

The Internet has offered organizations new and more advanced methods to conduct their business (Kamel, 2001; Karajaluto, Mattila, & Pento, 2002), and one business sector which has been highly affected is the banking sector. The Internet represents a new electronic delivery channel, allowing customers to perform faster and more efficient banking transactions, and offering new methods of reaching new clients (Dannenberg & Kellner, 1998; Sathye, 1999). Online banking is considered a dynamic "value added" method which attracts new customers and eliminates the cost of handling transactions manually in a highly volatile banking environment. It can be considered an easy substitute which reduces the need to visit the physical branch in order to perform banking transactions, offering customers instead the ability to conduct any banking services anyplace and at anytime (Polatoglu & Ekin, 2001; Howcroft, Hamilton, & Hewer, 2002; Fredriksson, 2005; Sayar & Wolfe, 2007).

Davis (1989) presented The Technology Acceptance Model (TAM) which is an adaptation of the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980), but with more focus on user acceptance of information systems (IS). The Technology Acceptance Model is considered an important model when investigating user acceptance of a new information technology (Adams, Nelson, & Todd, 1992; Taylor & Todd, 1995). Hernandez, Jimenez and Martin (2008) demonstrate that the TAM model can properly explain the acceptance level of a new technology in the business context.

The success of any information system (IS), especially online banking, is highly determined by user acceptance (Mols, Bukh, & Neilsen, 1999). The TAM posits that perceived ease of use of a technology (PEOU) and perceived usefulness (PU) determine a person's behavior towards the technology. But PEOU and PU are also influenced by exogenous variables, which vary according to the context. Davis (1989) has noted that further research is needed to address how other variables can affect PEOU, and PU. Exogenous variables can be added to the TAM as a way of improving the original model (Davis, Bagozzi, & Warshaw, 1989; Davis, 1993). A key aspect of the TAM, therefore, is to provide a basis for investigating the influence of exogenous factors on endogenous factors of attitudes, and intentions towards any technology including IS.

Most applications of the TAM in online banking research have focused on the adoption of online banking in different parts of the world (Jayawardhena & Foley, 2000; Karjaluoto et al., 2002; Chau & Lai, 2003; Wang, Wang, Lin, & Tang, 2003; Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila, 2004; Kolodinsky, Hogarth, & Higlert, 2004; Chan & Lu, 2004; Eriksson, Kaerem, & Nilsson, 2004; Cheng, Lam, & Yeung, 2006; Yiu, Grant, & Edger, 2007; Lee, 2009), while fewer empirical studies have focused on online banking in the Arab world (Aladwani, 2001; Kamel & Hassan, 2003; Jabnoun & Al-Tamimi, (2003); Awamleh & Fernandes, 2005a; Awamleh & Fernandes, 2005b; Awamleh & Fernandes, 2006; Al-Somali, Gholami, & Clegg, 2009). One of the reasons for the limited empirical research in the Arab world is that the introduction of online banking is relatively new to this region. Thus, the goal of this study is to provide a better understanding and knowledge of the antecedents of users' attitude towards online banking in the light of the TAM in the Arab world. This study focuses on the United Arab Emirates (UAE), which is considered one of the leading Arab countries in the advancement of information and communication technology (ICT), and in the number of banks offering online banking services to their customers (Emirates Bank Association, 2007). To date there have been no studies about customers' adoption of online banking in the UAE, with the exception of one study which has investigated the effect of computer self-efficacy and security on users' attitude towards online banking in the UAE (Awamleh & Fernandes, 2005a).

The TAM suggests that exogenous factors can influence technology adoption indirectly through perceived ease of use (PEOU) and perceived usefulness (PU) (Davis et al., 1989). The author of this paper believes that integrating specific exogenous factors into the TAM will provide a clearer picture of users' attitude towards online banking. Because online banking is considered a relatively new service in the UAE, the research has chosen to focus on exogenous factors that have been identified by previous research conducted in Europe and the United States. User attitudes in Europe and the USA may vary from those in the Arab world. Therefore, the researcher proposes to extend the TAM by adding computer self-efficacy, security issues, and website features as exogenous factors for perceived ease of use (PEOU) and perceived usefulness (PU). The study is of interest to both managers in the UAE who need to forecast for the future and improve this new service, and also to managers in other Arab counties who are offering or seek to offer this type of service to their customers.

In summary, this paper addresses the following research questions: (1) what is the relative importance of the suggested exogenous factors on PEOU and PU?, (2) what is the nature and strength of the relationship among the factors in the TAM?, and (3) what is the relative influence of the exogenous factors suggested by the researcher on customer attitude towards online

banking?

The paper is divided into six parts: the first part provides an introduction. The second part contains a literature review of the application of the TAM in online banking. The third part presents the conceptual model and hypotheses development. The fourth part introduces the research methodology to be used in this work, the analysis of the data collected and the results reached. The data have been analyzed using Structural Equation Modeling (SEM) to evaluate the strength of the hypothesized relationship. The fifth part consists of the discussion and practical implications of the research, and finally the sixth part discuses the limitations of the study and provides suggestions for further research.

ONLINE BANKING IN THE UAE

Banks that offer online banking services are still considered limited in the Arab region when compared to Europe or the US, yet a few pioneers have emerged, notably in Jordan, Saudi Arabia, Kuwait, Bahrain, and the UAE (Jordan Times, 2001; Guru, Shanmuga, Alam, & Perera, 2003; Awamleh & Fernandes, 2005a). As most Arab countries prepare to enter the World Trade Organization (WTO), they face the possibility of competition from multinational banks. The concern of the national banks in the Arab world about loss of domestic market share has encouraged them to consider offering online banking services.

However, empirical evidence has shown that online banking services do not appear to be as widespread in the UAE as in Europe and the USA and that there are many obstacles preventing the spread of adopting this technology in the Arab world and in the UAE (Awamleh & Fernandes, 2005a; Al Sukkar & Hasan, 2005). There are a number of constraints - related to social and infrastructure issues - that must be taken into account when evaluating the development of online banking in the Arab world. First, while many Arab banks may be technologically capable of offering online banking services, the telecommunications infrastructure in some countries remains deficient. Second, Internet penetration in the region is still relatively low, which may not encourage the investment required to develop online banking. Finally, many bank customers use this technology only for non-transactional activities, such as viewing account statements and balances, while bank managers want customers to use different aspects of online banking (Awamleh & Fernandes, 2005a; Al Sukkar & Hasan, 2005).

Generally, there are two major online banking models: The integrated approach (click and mortar) and the stand alone Internet banks, also known as “virtual” banks that have no physical branches or tellers whatsoever. All of the banks in the Arab world have adopted the integrated approach whereby they keep their existing brand name and offer online banking services as an extension to their other branch-based services, the ATM and the telephone (Jordan Times, 2001; Madar Research Group, 2006).

Today, the UAE banking sector is one of the most competitive sectors in the Arab world, with an estimated 46 banks (21 locally-incorporated banks and 25 foreign banks) servicing a population of approximately 4.3 million (Abigail, 2006; Emirates Bank Association, 2007). According to the Emirates Bank Association (2007), the total number of the banks and their branches including pay offices, customer service units, and automated branches are 615 (496 for national

banks and 119 for foreign banks). UAE has the highest percentage of Internet users in the Arab world (29.6% of the UAE population are Internet users), while in Bahrain Internet users represent 27.7% of the population; and in Kuwait Internet users represent 22.4% of the population (Emirates Bank Association, 2007).

The number of banks offering online banking in the UAE has risen steadily since the service was first launched in 1996 by Emirates Bank International, with 18 banks out of 46 commercial banks now providing online banking services to their customers (Madar Research Group, 2006; Budd & Budd, 2007). Seven of the banks are foreign and nine are national; five of these national banks have their headquarters in Dubai. These national banks constitute about 62.5% of the total banking sector (Madar Research Group, 2006). Table (1) provides information about some of the major banks which offer online banking services in the UAE (Maktoob Business, 2005).

Table 1: List of some major banks offering online banking services in the UAE.

Bank Name	Website	Headquarter	Branches	ATMs	Retail ebanking	Corporate ebanking
Dubai Islamic Bank	www.alislami.ae	Dubai	19	65	Yes	No
Emirates Bank International	www.emiratesbank.ae	Dubai	30	83	Yes	
Mashreq Bank	www.mashreqbank.ae	Dubai	34	91	Yes	Yes
Middle East Bank	www.meb.ae	Dubai	9	13	Yes	No
National Bank of Abu Dhabi	www.nbad.com	Abu Dhabi	57	112	Yes	Yes
National Bank of Dubai	www.nbd.com	Dubai	34	104	Yes	Yes
Union National Bank	www.unb.co.ae	Abu Dhabi	26	47		No
Arab Bank	www.arabbabk.ae	Jordan	8	16	Yes	No
BNP Paribas	www.bnparibas.com	France	2	2	Yes	Yes
HSBC Bank Middle East	www.uae.hsbc.com	UK	10	45	Yes	Yes
Citibank	www.citibank.com.uae	USA	5	8	Yes	Yes
Habib Bank A.G Zurich	www.habibabnk.com	Switzerland	8	8	Yes	Yes
Standard chartered Bank	www.standardchartered.ae	UK	8	22	Yes	Yes

Source: http://business.maktoob.com/report-20050309055637-eBanking_In_The_UAE.aspx.

LITERATURE REVIEW

Researchers have been trying to identify the factors that influence individual's acceptance of a new IS. Several theoretical models which identify the intention to adopt and consequently the

adoption of new information systems have been proposed. One main approach is the technology acceptance model (TAM) introduced by Davis (1989).

Klolodinsky et al. (2004) have applied the TAM to the adoption of three-banking technologies: automatic bill payment, phone banking, and online banking by customers in the Unites States. The study shows that socioeconomic and demographic characteristics and consumer perceptions of the advantage of the different services can affect customer adoption.

Chan and Lu (2004) have used the extended TAM to identify the factors that would influence the adoption and the use of online banking by university students in Hong Kong. The results show that perceived ease of use and perceived usefulness have indirect effect on the intention to adopt online banking, and that both subjective norms and computer self-efficacy have also indirect effect on the intention to adopt online banking.

Guriting and Ndubisi (2006) have applied the TAM in their research of customer intentions to use online banking service in Malaysia Borneo bank. They have found that there is a direct relationship between perceived usefulness, perceived ease of use and the intention to adopt online banking in Malaysia. Also, the study has found that computer self-efficacy is essential in predicting perceived ease of use and usefulness of use to online banking. Customer ease of use and usefulness become positive when they have high computer-efficacy. Their study has found no significant relationship between prior computer experience and perceived usefulness and ease of use.

A similar study by Wang et al. (2003) focused on the extended TAM to explain the process by which personal differences, such as computer self-efficacy, can influence customer intention to adopt online banking in Taiwan. The study introduced a new factor called "perceived credibility" and found that this factor has stronger influence on customer intention to adopt online banking than the TAM factor "perceived usefulness". They suggest that management should focus on developing approaches to encourage customers to believe in the usefulness, the ease, and the credibility of online banking. This in turn will affect their behavioral intention to adopt online banking services.

Previous research has shown that integrating different exogenous factors in the TAM can provide a better insight of the factors that indirectly influence user attitude towards online banking through PEOU and PU. Pikkarainen et al., (2004) have found that "online banking information" is an important factor in influencing customer acceptance. Researchers also have found a positive relationship between "convenience perception" and the use of online banking (Polatoglu & Ekin, 2001; Gerrard & Cunningham, 2003). Gefen, Karahanna and Straub (2003) have suggested that "usability" and "navigability" will make users perceive a website as easy to use. Navigation has proved to be a significant factor in several TAM studies (Childers, Carr, Peck, & Carson, 2001; Chau, Massey, Montoyo-Weiss, & O'Keefe, 2002). Chau and Lai (2003) have found out that PU is the only important factor influencing users' attitude towards online banking, and Eriksson et al. (2004) have stated that PU is the most essential factor in predicting customers' acceptance of online banking in Estonia. The findings of Lassar, Manolis and Lassar (2005) have suggested that the more experienced the consumers are in using computers and the Internet, the higher the probability that they will use online banking. Other indicators that have

been associated with user attitude towards online banking include "subjective norms" (Chan & Lu, 2004), "computer self-efficacy" (Guriting & Ndubisi, 2006), and "demographic factors" (Sathye, 1999; Jayawardhena & Foley, 2000; Kajaluoto et al., 2002).

As online banking has been introduced into the Arab world relatively recently, little empirical research has been conducted to understand customer attitude and behavior. Kamel and Hassan (2003) have applied the TAM to study the level of customer acceptance of different banking technology-based delivery channels, including online banking, automated teller machines, and phone banking in Egypt. They found that Internet usage as an online banking channel had little interest to the respondents, due to the cost associated with the hardware and the Internet connection, which may not be affordable except to a limited group of customers.

Kabeil and Al-Safar (2005) have identified the factors that affect the use of online banking by comparing between online banking customers and non-online banking customers. The results of their study indicate that security and the value of using online banking are important factors to online banking customers.

A study by Awamleh and Fernandes (2005b) have used Diniz's model (1998) to evaluate UAE bank websites. The results revealed that the banks do not use their websites effectively to improve customer relationship or to encourage customers to use online banking. The researchers suggested that banks should improve their online banking advertisement strategies and make banking account procedures less complex. The study also applied the TAM to investigate the level of customer adoption of online banking. The researchers identified independence, convenience, and security as the factors that affect satisfaction of UAE online banking customers.

The study of Al-Somali et al. (2009) about the factors that encourage customer acceptance of online banking in Saudi Arabia has found that the quality of the Internet connection, awareness of online banking and its benefits, social influence and computer self-efficacy have significant impact on the perceived usefulness (PU) and perceived ease of use (PEOU).

In short, the above literature review shows that little empirical research related to investigating user's attitude towards online banking has been conducted in the Arab world in general and in the UAE in particular compared to the research that has been conducted in Europe and the United States. Although the diffusion of online banking in Europe and the USA is high in comparison with the Arab world, we believe that more empirical studies are needed to better understand the extent of the use of this relatively new service, and to determine the extent to which the results of previous research are reflected in the Arab world.

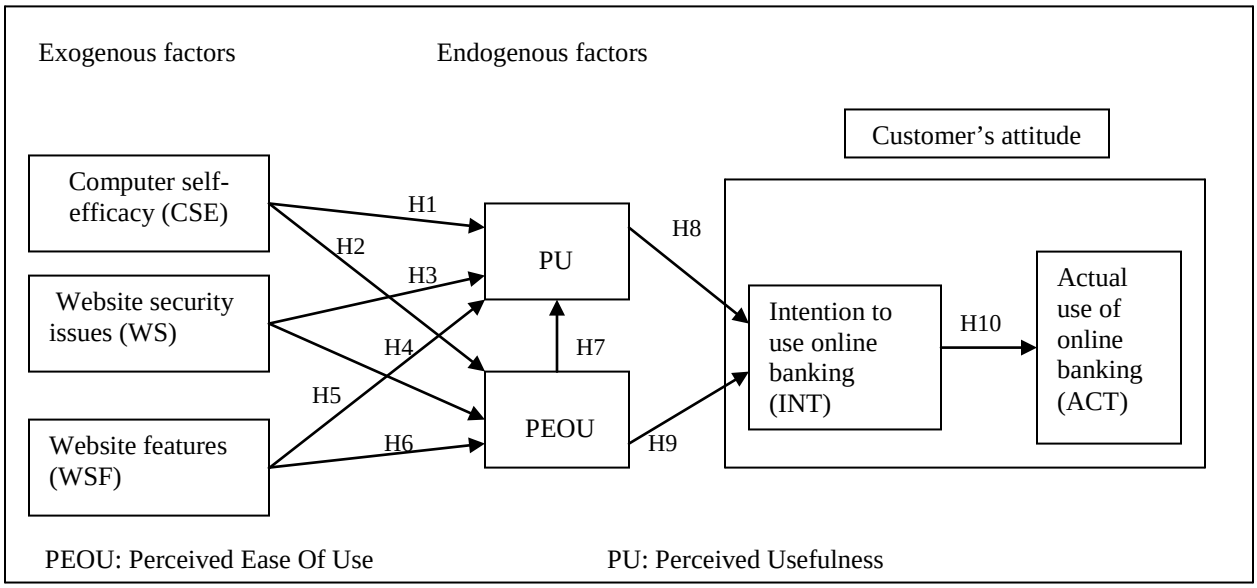
COCEPTUAL MODEL AND HYPOTHESIS DEVWELOPMENT

The Model

The purpose of this study is to help banks to better understand customer behavior and attitude towards online banking by assessing the factors that influence this behavior. The research examines these relationships and thus adds knowledge which may be useful to banks and other

interested institutions. We have investigated the effect of the following exogenous factors or group of factors: computer self-efficacy, security issues, and website features on the TAM. Figure (1) depicts a proposed online banking customer attitude model showing the suggested exogenous factors affecting the PEOU and PU which in turn affects customer's attitude towards online banking. The model consists of five factors that we posit to have an influence on user attitude towards online banking.

Figure 1: The proposed online banking research model.



Computer Self-Efficacy

Computer self efficacy is defined as the ability of an individual to use the computer (Compeau & Higgins, 1995; Maraks, Yi, & Johnson, 1998). Individuals with low computer self-efficacy are uncertain and less comfortable using computers, and therefore they would perceive their capabilities as limited to any information technology related to computers. Also, individuals with low computer self-efficacy will be frustrated more easily by obstacles. On the other hand, Individuals with a high computer self-efficacy would see themselves as able to accomplish difficult computing tasks and would judge themselves as capable of operating with less support and assistance than those with lower computer self-efficacy.

Research has found that computer self-efficacy has a direct and powerful effect on the ease of use of a new technology (Agarwal, Sambamurthy, & Stair, 2000). On the other hand, a high degree of computer self-efficacy has proved to have a significant effect on the relationship between "usefulness" and attitude toward using the Internet (Eastin & LaRose, 2000). The results of a study by Chan and Lu (2004) showed that the effect of computer self-efficacy on PEOU is stronger for potential customers than for actual users. Wang et al. (2003) have found that computer self-efficacy has an indirect positive effect on behavior intention of citizens in Taiwan towards online banking through both perceived ease of use and perceived usefulness. The findings of Boyle and Rupple (2006) have revealed that computer self-efficacy positively affects online purchasing intention.

Since, computer self-efficacy can influence an individual's perception of a technology's ease of use and hence their acceptance, we suggest that computer self-efficacy has a direct positive effect on PEOU and PU. Accordingly, we propose the following hypotheses:

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

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

Website Security Issues

Customers inevitably reveal sensitive information while conducting online banking transactions (Morgan & Hunt, 1994). Thus, it is unlikely for users to accept a system if they have doubts and anxieties when using it. A study by Aladwani (2001) has found that potential customers ranked Internet security as one of the most important future challenges that banks are facing.

Many researchers have found that security is a key dimension in studying user attitude towards online banking (Polatoglu & Ekin, 2001; Suh & Hn, 2002; Shih 2004; Cheng et al., 2006; Hernandez & Mazzon, 2007). Gefen et al. (2003) demonstrated that PEOU increases trust, which in turn allows the customer to feel secure. Privacy and security issues are considered the main barrier to the adoption of online banking in Australia, and that over 70% of the customers indicate a concern over these issues (Sathye, 1999). Lack of security has been considered an important obstacle to the adoption of a new information technology (Chen & Barnes, 2007).

In short, security issues have proven to be an important barrier to the use of online banking. Thus, we are interested in investigating the indirect effect on website security concerns on user's attitude, through perceived usefulness and ease of use. We thus propose the following hypotheses:

H3: Security issues have a positive effect on perceived usefulness.

H4: Security issues have a positive effect on perceived ease of use.

Website Features

Website features have an impact on the extent users are able to conduct the various tasks offered online effectively and satisfactorily. This concept is becoming an important factor in all electronic businesses, including online banking (Loiacono & Lin, 2005). Specific aspects of the interface design provide an indication as to the degree of trustworthiness of the website. McCarthy, Aronson and Petrausch (2004) believe that consumer satisfaction increases when the web site design classification matches the desired response. Factors that have an influence on website features include: freedom from typographical and grammatical mistakes (Fogg, Marshall, Laraki, Osipovich, Varma, Fang, Paul, Rangnekar, Shon, Swani, & Treinen, 2001), a general professional look of the website (Fogg et al., 2001), ease of processing online transactions (Lohse & Spiller, 1998), homepage presentation (Ho & Wu,1999), and degree of

download speed (Zeithaml, Parasurawan, & Malhotra, 2002), and ease of information searching (Mahatanankoon, Klaus, & Wen, 2007).

This study believes that customers in the UAE will consider website features to be an important factor affecting PEOU and PU, which leads to the following hypotheses:

H5: Website features have a positive effect on perceived usefulness.

H6: Website features have a positive effect on perceived ease of use.

PEOU and PU

According to the TAM, user attitude towards the use of information systems (IS) is determined by perceived usefulness (PU) and perceived ease of use (PEOU). The TAM considers these two factors to be of great importance for any acceptance of a new information system. PEOU is defined as the degree to which the user expects the information system to be easy to use (Davis, 1989). In other words, the easier one finds the IS, the more likely he or she will use it. PU considers user's attitude towards an IS will increase his or her performance (Davis, 1989).

As suggested by the TAM, PEOU is seen to have significant direct effect on PU and Attitude (Davis et al., 1989; Venkatesh & Davis, 2000). In other words, the less effort it takes an individual to use a system, the more using it can increase his or her performance. Thus, the current research investigates the following hypothesis:

H7: Perceived ease of use has a positive effect on perceived usefulness.

In addition, evidence has shown that PEOU and PU have an influence on user attitude towards IS acceptance (Davis et al., 1989; Vanatesh & Davis, 1996; Agarwal & Prasad, 1999; Venkatesh & Morris, 2000). Chang (2008) has applied the TAM to identify consumers' acceptance of intelligent agent (IA) technology for the automation of auction websites. He found that PU was the most influential in promoting intention to use an auction website. Similarly, Lee (2009) found that perceived usefulness has a significant effect on behavioral intention towards online banking. Consistent with previous findings, this research suggests that:

H8: Perceived ease of use has a positive effect on customer's behavioral intention to use online banking.

H9: Perceived usefulness has a positive effect on customer's behavioral intention to use online banking.

Adoption of Online Banking

An individual's acceptance of an information system (IS) is determined by his or her intention to accept it (Fishbein & Ajzen 1975). The intention, in turn, is determined by the individual's attitude toward the IS. Thus, individuals will adopt a specific behavior if they perceive it will lead to positive outcomes (Compeau & Higgins, 1995). Previous studies have found that

behavioral intention to use a new technology has a positive impact on the actual adoption (Agarwal & Parasad, 1999; Davis, 1989). In an online banking context, we have assumed that an individual with a positive intention to adopt online banking will use this service. We therefore have investigated the following hypothesis:

H10: Customer's perceived behavioral intention has a positive effect on actual use of online banking.

RESEARCH METHODOLGY

Research Instrument

This research is primarily concerned with understanding customers' attitudes towards online banking in the United Arab Emirates, using the constructs of the TAM as a basis. Our study postulates that several factors including lack of computer self-efficacy, security issues, and the features of the website, will affect PU, PEOU, which in turn will affect user's attitude towards online banking.

This research used the survey method to test its hypotheses. A questionnaire consisting of eight parts was developed and administrated. The first part (five questions), contains demographic data about bank customers. The next seven parts include 35 items, which have been measured using a five-point Likert scale, ranging from 1-strongly agree to 5-strongly disagree. The variables are divided as follows: eight items are used to measure computer self-efficacy (CSE), six items are used to measure perceived ease of use (PEOU), five items are used to measure perceived usefulness (PU), three items are used to measure website security issues (WS), seven items are used to measure features of the Website (WSF), three items are used to measure user's intention to use online banking (INT), and finally three items are used to measure user's adoption of online banking (ACT).

The items in the questionnaire have been developed and validated by previous TAM related research investigating IS acceptance (Zhang & Dran, 2001; Chan & Lu, 2004; Jaruwachirathanakul & Fink, 2005; Pikkarainen et al., 2004; Shergill & Chen, 2005). The final questionnaire items used to measure each construct are presented in Table (2).

Table 2: Summary of the measurement scales.

Construct	**Measures**	
Computer self-efficacy (CSE)	CSE1	I find working with computers very easy.
	CSE2	I enjoy working with computers
	CSE3	My work involves learning about the use of information technology
	CSE4	I usually find it easy to learn how to use a new information technology
	CSE5	I can usually deal with most difficulties I encounter when using computers
	CSE6	I am very confident in my abilities to use computers
	CSE7	I am confident in using online banking if somebody shows me how to use it first
	CSE8	I am confident in using online banking even if I have only online instructions for reference
Perceived ease of use (PEOU)	PEOU1	Learning to use online banking is easy for me
	PEOU2	Doing what I want is easy on online banking
	PEOU3	Using online banking services is clear and understandable
	PEOU4	Using online banking is flexible to interact with
	PEOU5	It is easy to become skillful at using online banking

	PEOU6	Using online banking is easy
Perceived usefulness (PU)	PU1	Using online banking enable me to complete my transaction more quickly
	PU2	Using online banking makes my dealing with bank transaction easy
	PU3	Using online banking saves me time
	PU4	I find using online banking useful in my life
	PU5	Using online banking has increased my job productivity
Website security issues (WS)	SE1	I feel secure using online banking
	SE2	I have trust in online banking to protect my information
	SE3	I am not worried about security of online banking
website features (WSF)	WSF1	I face no problems with the services of online banking (online usability problems)
	WSF2	Steps to complete online banking transactions are too easy
	WSF3	The bank's web design and navigation makes it comfortable to conduct a transaction
	WSF4	The bank's web site executes transactions quickly and efficiently
	WSF5	Online banking customer service is effective
	WSF6	The web site allows for saving an application and complete it later
	WSF7	The web site does not contain any bank-oriented jargon which are not explained
Customer's intention (INT)	INT1	I plan to use online banking in the near future
	INT2	I am interested in using online banking
	INT3	I am very likely to use online banking in the near future
Customer's adoption (ACT)	ACT1	I have used online banking
	ACT2	I strongly recommend the use of online banking
	ACT3	I will increase my use of online banking

The Participants

The methodology used in this research was based on a quantitative approach. The population of this study consisted of different bank customers in the UAE. A questionnaire was distributed by hand to a random sample of different bank customers. A total of 850 questionnaires were distributed among employees by hand in different medium and big size business companies, and academic institutions in the three major cities of the UAE, namely Dubai, Sharjah, and Abu-Dhabi. These cities host more than 80% of the UAE population. After asking for permission from the officials of the companies and the academic institutions, the questionnaires were distributed by hand on the premises and later were collected also by hand from the employees who completed the questionnaires. A total of 685 questionnaires were returned by hand from the respondents. Questionnaires from respondents who were clients of banks that did not offer online banking services, and incomplete questionnaires were eliminated. The final sample consisted of 461 questionnaires. The final response rate was 54.23%, which is acceptable for the research purpose. Statistical analysis was performed to test the relationships between the different research variables using structural equation modeling (SEM). The study used SPSS to analyze the demographic data and to evaluate Cronbach's alpha, and AMOS (a statistical software package for SEM produced by SPSS) to test the model fitness by performing confirmatory factor analysis (CFA) and structural equation modeling (SEM).

Demographic data, with single item questions, were gathered about the participants including gender, nationality, age, level of education, and income. Table (3) shows that the percentage of male is slightly higher than that of females. Male respondents account for 54.7% of the sample, while female respondents account for 45.3%. Also, 81.8% of the respondents have university degrees, with more than 50% of them between 26 and 45 years old. The percentage of non-UAE national is relatively higher than the UAE nationals (64.2% to 35.8) because, according to the latest UAE government statistics, UAE nationals constitute 21.9% of the total UAE population.

Finally, 51.5% of the respondents have a yearly income less than 75, 000 dirham (The dirham=$3.68).

Table 3: Demographic profile.

Item	Number	Percentage (%)
Gender	252 male	54.7
	209 female	45.3
Nationality	165 (UAE national)	35.8
	296 (Non-UAE national)	64.2
University Degree	377 (Yes)	81.8
	84 (No)	18.2
Age	116 (< 25)	25.2
	126 (26-35)	27.3
	120 (36- 45)	26.0
	75 (46-55)	16.3
	24 (>55)	5.2
Average yearly income (UAE Dirham)	139 (<=49,9999)	30.2
	98 (50,000-74,999)	21.3
	91 (75,000-99,999)	19.7
	88 (100,000-149,999)	19.1
	45 (>=150,000)	9.8

Measurement Model

A confirmatory factor analysis (CFA) was used to test the measurement of the proposed model (Table 4). According to Hair, Anderson, Tatham and Black (1998), a factor should have a minimum of two items and each item factor loading should be greater than 0.4. As a result of the confirmatory factor analysis, 4 items have been excluded (One item has been removed from CSE, one item has been removed from PU, and two items have been removed from WSF), which means that 31 items are considered significant. The factors have been loaded as following: seven items are used to measure computer self-efficacy (CSE), six items are used to measure perceived ease of use (PEOU), four items are used to measure perceived usefulness (PU), three items are used to measure website security issues (WS), five items are used to measure website features (WSF), three items are used to measure customer's intention towards online banking (INT), and finally three items are used to measure customer's adoption of online banking (ACT).

Reliability of the instrument measures is a major concern in empirical research. It may be defined as the degree to which measurements are free from error and, therefore; yield consistent results. Reliability of the factors have been estimated by composite reliability and average variance extracted (Table 4). According to Fornell and Larcker (1981), convergent validity coefficients should be higher than or equal to 0.50. It should be noted that all convergent validity coefficients calculated for all factors in this study have been higher than 0.50. Also, the reliability for all the factors in our model has been above 0.70 (Hair et al., 1998).

Finally, Cronbach's alpha test is often used to measure the reliability of measures in a Likert-type scale, where multiple items are used to measure a specific research variable. There is a general agreement in the literature that a value of 0.70 and above for the Cronbach's alpha is sufficient (Nunnally, 1978; Nunnally & Bernstein, 1994; Hair et al., 1998). As Table (4) indicates, all the variables have an alpha of 0.75 and above, leading us to conclude that their reliability is satisfactory.

Table 4: Confirmatory Factor analysis and fitness statistics (from SPSS-AMOS).

Item	Factor loading	Composite reliability	Variance extract	Cronbach's α
Computer Self Efficacy (CSE)		0.90	0.55	0.833
CSE1	.778			
CSE2	.743			
CSE3	.675			
CSE4	.762			
CSE5	.805			
CSE6	.670			
CSE7	.681			
Perceived Ease Of Use (PEOU)		0.95	0.65	0.873
PEOU1	.923			
PEOU2	.947			
PEOU3	.950			
PEOU4	.929			
PEOU5	.912			
PEOU6	.905			
Perceived Usefulness (PU)		0.83	0.75	0.752
PU1	.920			
PU2	.686			
PU3	.752			
PU4	.801			
Website Security (WS)		0.79	0.56	0.857
SE1	.817			
SE2	.890			
SE3	.788			
Website Features (WSF)		0.85	0.54	0.799
WSF1	.832			
WSF2	.863			
WSF3	.761			
WSF4	.790			
WSF5	.866			
Intention to Use (INT)		0.75	0.52	0.807
INT1	.654			
INT2	.996			
INT3	.951			
Adoption of online banking (ACT)		0..94	0.83	0.872
ACT1	.930			
ACT2	.884			
ACT3	.514			

Items with less than 0.4 loading factor have been removed (hair et al., 1998).

We have used several common model-fit measurements to assess the model's overall goodness (Table 5). SEM does not offer a statistical test to describe the strength of the model's

predications; instead, there are various parameters to be used. The value of CMIN/DF is 3.831, which is acceptable. The value of GFI is 0.91, which is above the suggested value of 0.90. The values of the comparative and the normalized fit indices CFI and NFI are both 0.91, which is above the suggested value of 0.90, and the value of RMSEA is 0.04 (the suggested value < 0.05). These statistics indicate a good fit for the proposed model.

Table (5) – fitness indices for the measurement and the structural models.

Fit statistics	Recommended value	CFA model	SEM model
CMIN/DF (chi square /degree of freedom ratio)	<= 5.0	3.831	3.931
Goodness-of-fit (GFI)	> 0.90	0.91	0.91
Normed fit index (NFI)	> 0.90	0.91	0.92
Comparative fit index (CFI)	> 0.90	0.91	0.91
Root mean square residual (RMSEA)	< 0.05	0.04	0.04

Structural Model

A similar set of fit indices have been used to examine the structural model (Table 5). In this study, the assessment of overall model fit has been based on the following indices: relative chi-square (CMIN/DF), root mean square residual (REMSEA), goodness-of-fit index (GFI), and normed-fit-index (NFI). In addition, the comparative fit index (CFI) has been used to measure comparative model fit. The results show that the estimates have approximately normal distribution and are therefore acceptable (Table 5). Thus, we have been able to proceed to examine the path coefficients of the structural model.

Hypotheses Testing

To test the hypotheses, the following regression model is used:

- PU = f (CSE, WS, WSF).
- PEOU = f (CSE, WS, WSF).
- PEOU = f (PU).
- INT = f (PU, PEOU).
- INT = f (ACT).

Table (6) provides a summary of the regression weights. To test the statistical significance of the parameter estimates from SEM, the critical ratio (C.R.) is calculated by dividing the parameter estimate by its standard error (S.E.). Based on a significance level of 0.05, the critical ratio (C.R.) has to be equal or greater than 1.96. Below this level, the factor can be considered unimportant to the model (Chau, 1997; Hair et al., 1998). Thus, the results of the SEM analysis show that H1, H2, H7, H9, and H10 have been supported as the significance level equals 0.00, while H3, H4, H5, H6, and H8 have not been supported as the significance level is greater than 0.05.

Table 6: Regression results (P<=0.001).

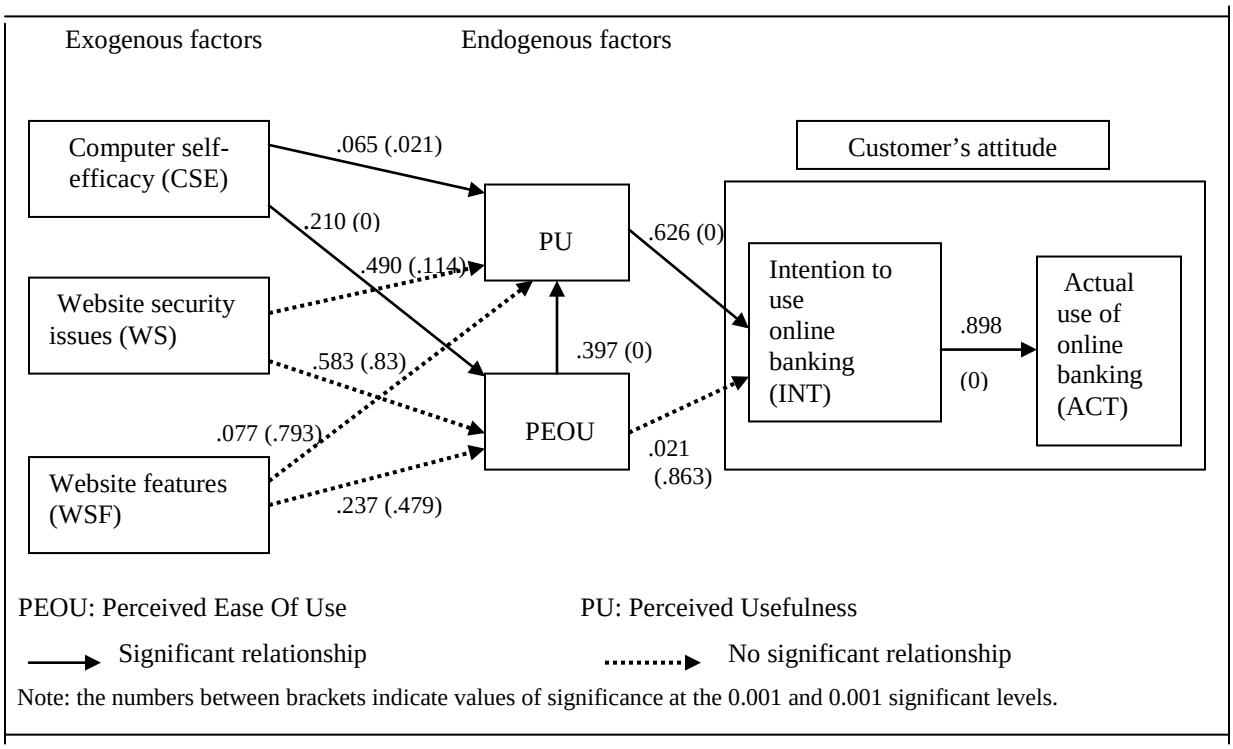
	Estimate	S.E.	C.R.	P
PEOU ← CSE	.417	.057	7.264	0.00
PEOU ← WS	.640	.369	1.734	0.83
PEOU ← WSF	.268	.379	.709	.479
PU ← CSE	.114	.049	2.311	.021
PU ← WS	.473	.299	1.579	.114
PU ← WSF	.076	.292	.262	.793
PU ← PEOU	.349	.055	6.368	0.00
INT ← PEOU	.010	.058	.173	.863
INT ← PU	.343	.073	4.698	0.00
ACT ← INT	1.517	.125	12.123	0.00

In short, only computer self-efficacy seems to have a significant impact on both perceived usefulness and perceived ease of use, while the other exogenous factors, namely website security and website features appear to have low impact on both PEOU and PU. Also, as many researchers have concluded before, the impact of Perceived ease of use on Perceived usefulness is also significant. In addition, the results indicate that perceived usefulness has a significant influence on user's intention, while perceived ease of use has no significant influence. Finally, H10 which tests the impact of user's intention on user's adoption of online banking indicates that there is a strong relationship between the two factors. Table (7) provides a summary of the research results. Also, figure (2) shows the standardized parameters estimates for the proposed model.

Table (7): Summary of the research results.

Hypothesis	Result of testing
H1: Computer self-efficacy of user has a positive effect on perceived usefulness.	Supported
H2: Computer self-efficacy of user has a positive effect on perceived ease of use.	Supported
H3: Security issues of online banking have a positive effect on perceived usefulness.	NOT Supported
H4: Security issues of online banking have a positive effect on perceived ease of use.	NOT Supported
H5: The features of the website have a positive effect on perceived usefulness.	NOT Supported
H6: the features of the website have a positive effect on perceived ease of use.	NOT Supported
H7: Perceived ease of use of online banking has a positive effect on perceived usefulness.	Supported
H8: Perceived ease of use has a positive effect on customer's intention to use online banking.	NOT Supported
H9: Perceived usefulness has a positive effect on customer's behavioral intention to use online banking.	Supported
H10: Customer's behavioral intention has positive effect on actual use of online banking.	Supported

Figure 2: Standardized regression weights for the proposed model.



DISCUSSION AND IMPLICATIONS

This study has undertaken an empirical investigation of customers' attitude towards online banking in the UAE, which has provided some insights about the use of this relatively new service in this part of the Arab world. The model proposed in this research, suggests that three exogenous variables, namely computer self-efficacy, security issues, and features of the website can be modeled with the endogenous variables derived from the TAM, specifically perceived ease of use, perceived usefulness and user's attitude towards online banking. This study represents a contribution to the TAM related research about the acceptance of a new technology. First, it has validated TAM results from different web-based applications and has shown the applicability of a uniquely extended TAM in predicting the factors that can affect customers' attitude in the UAE towards online banking. Second, this study is consistent with previous studies which consider the TAM one of the most universally applied model for explaining individual's attitude towards an IS (Lee, Kozar, & Larsen, 2003; King & He, 2006).

Several observations may be of interest to bank managers interested in improving online banking services for their banks as well as researchers who are interested in investigating this service and customers' attitude towards it. The findings show that computer self efficacy has the most significant impact on the PU and PEOU, particularly on PEOU. However, the impact of security issues and website features is not as significant. Results of this research contradict previous online banking studies in Europe and the United states (Saythe, 1999; Polatoglu & Ekin, 2001; Howcroft et al., 2002) with respect to the importance of security issues. This finding can be attributed to the fact that the use of the Internet in the UAE is still considered low compared to those in Europe and the United States. In addition, empirical evidence has shown that online

banking services do not appear to be as widespread as in Europe and the USA and that there are many obstacles, such as illiteracy, preventing the spread of this technology in the UAE and the Arab world (Awamleh & Fernandes, 2005a, Al Sukkar & Hasan, 2005).

As the study reveals, computer self-efficacy has significant impact on perceived usefulness and ease of use. Consequently, customers' positive judgment of their ability to use online banking would favorably influence their perception of the system's usefulness and ease of use. When customers feel confident in their computer ability, their usefulness and ease of use perceptions of online banking becomes more positive, and as a result will promote positive attitudes towards adopting this service. To encourage their customers to adopt or to continue using online banking, bank managers could increase computer self-efficacy of their customers by offering training courses on various web-based business applications to increase the customers' familiarity with these applications. Although these courses may not be directly related to online banking, they will still show the customers the extent of the usefulness and ease of use of these systems in general and online banking in particular. Customers need to become aware of online banking services, and feel comfortable with using this technology. Also, Bank managers need to understand that people with higher computer-self-efficacy will be more readily prepared to use online banking services. Banks have already invested in providing online banking services and increased adoption helps to improve their return on investment in these technologies. This study has also highlighted the knowledge gap with respect to security issues in the UAE, and part of the banks effort might focus on this aspect as well. People have limited understanding of online banking security risks, although they may be aware of the risks (Roboff & Charles, 1998). They believe that banks are concerned about the security issues and will provide the means to protect their transactions (Roboff & Charles, 1998).

Also, the results show that perceived ease of use has a significant impact on perceived usefulness. When new IS is perceived to be useful, users will have a positive attitude towards this system. These results have been supported by previous IS studies (Pikkarainen et al., 2004; Chan & Lu, 2004). In addition, detailed analysis of the survey data reveal that perceived usefulness has greater influence on user's intention to use online banking than perceived ease of use. David (1989) has reported that while perceived ease of use is significantly related to actual usage, when considering usefulness, the effects of the ease of usage are non-significant. This may imply that customers adopt certain types of information technology mainly because they believe it is, or will be, useful to them. Thus, it would be profitable for the bank managers to promote the benefits of online banking to their customers and the advantages that they will derive from using it, including convenience, speed and 24/7 availability. This in turn will influence the behavioral intention and change these intentions to actual adoption of this new technology, and again, improve the banks' return on investment for this service.

The aim of this research has been to identify the factors that affect customer adoption of online banking in the United Arab Emirates, which can be useful to IS researchers in general and online banking managers in particular. This study is one of the few empirical studies which have investigated the adoption of online banking in the UAE, which is considered one of the fastest growing countries in the region. Knowing the factors affecting online banking customers' behavior and the relationship between these factors, national and international bank managers in the UAE can develop their marketing strategies to ensure that people use this new service. The

findings show that in order to achieve this goal, attention must be given to designing easy-to-use and useful systems. Bank managers need to create favorable beliefs of usefulness, ease of use in the customers regarding their adoption of online banking service. This could be done by organizing computer training courses and motivational sessions to increase the general computer self-efficacy and confidence of potential users. People with higher computer self-efficacy are better prepared to use the online banking services because they have more favorable perceptions of the system's usefulness, and ease of use, thus it is important to improve self-confidence in the customers.

The findings of this research are of interest to European IS researchers as it reveals the factors affecting customer's attitude in a fast developing country in the Arab World, namely the UAE. Results of this research contradict previous online banking studies in Europe and the United states with respect to the importance of security issues and website features. More research can be conducted to compare the factors affecting customers' attitude towards online banking in Europe and the Arab world.

LIMITATIONS OF THE RESEARCH AND FURTHER RESEARCH DIRECTIONS

This study has to be evaluated keeping in mind its limitations. Online banking is considered relatively new to the Arab world. The findings discussed above and their implications are derived from one single study in one country, thus we need to be careful when generalizing our findings to other Arab countries. In addition, the study tested the effect of only three exogenous factors on user's attitude towards online banking. Further empirical research can be conducted to test the effect of other exogenous factors, such as enjoyment, customer loyalty, and culture on customer's attitude towards online banking. Also, additional research is needed to further empirically test the validity of the proposed model and its conclusions. Longitudinal evidence can enhance our understanding of the relationships between variables that are considered important to user's attitude towards online banking.

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