

Investigating Determinants of E-banking Adoption by Individuals: Comparing the Impact of System Characteristics and User Traits

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Abstract

Internet banking or e-banking systems are one of best examples of innovative technologies that have a great potential to create a win-win scenario for both customers and businesses. However, such potential can only be realized when there is sufficient spread of the technology among banking customers which then creates better economic feasibility for financial institutions. Therefore, understanding the factors that impact customers' willingness to use e-banking systems becomes imperative if banks are to witness the expected returns from their investments in these systems. The aim of this study is to understand whether the adoption of e-banking systems can better be explained as an outcome of individual characteristics of customers or as an outcome of the characteristics of the system itself. For this, we build a research model which integrates two types of factors: those that relate to the individual characteristics of the customers (customer-related factors) and those that relate to customers' perceptions of various characteristics of the e-banking systems (system-related factors). The research model is tested using a questionnaire survey of banking customers. This study offers many theoretical and practical implications.

Key Words: E-Banking, Adoption, TAM, User characteristics, System.

Introduction

Internet banking offers many benefits that can enhance banking experiences for both consumers and banking institutions. In recent years, a large number of banks have started to adopt internet banking as an additional channel to reach and interact with clients. For financial institutions, Internet or Electronic Banking (also known shortly as e-banking) is recognized as a tool that can significantly reduce their overhead costs as well as day-to-day expenses. For customers, e-banking is a convenient remote banking

technology which provides them with an easy access to their accounts. With just a PC connected to the Internet, customers can have their account information at their fingertips and are able to conduct their routine financial transactions from anywhere and at anytime.

Despite these benefits, internet banking has struggled to take-off as expected because customers are still unwilling to embrace this technology as a dependable replacement for the traditional brick-and-mortar banking style. Internet banking can become as effective as it should be only if it is widely adopted by customers. However, e-banking industry is still far from successful (Al-Badi et al., 2006). A mixture of customers' insecurity, technology investment costs and a lack of market-readiness all have conspired to make internet banking lack its anticipated growth. As a result, the understanding of the factors that can determine whether these systems are accepted by customers is critical for the banking industry.

This paper investigates customers' willingness to use e-banking services by examining the impact of a number of important factors including customer demographics, banking activity load, prior knowledge/experience, self-efficacy, perceived usefulness, perceived ease of use, perceived security, and perceived confidentiality. In our research model, we classify these factors into two sets: customer-related factors (those that relate to the individual characteristics of the customers) and system-related factors (those that relate to customers' perceptions of various characteristics of the e-banking systems). This classification allows us to understand which of these two sets is more influential on customers' willingness to use e-banking systems. Building the research model in this way offers many important implications for both theory and practice as will be discussed.

This paper is organized as follows. First, we start by briefly describing Internet banking and technology adoption. Then, we present our research model and hypotheses. After that, we describe the research design that we used to test the research model. Then, the results of the analysis are presented followed by a discussion. We end this study by presenting key conclusions, contributions to theory and practice, limitations, and some venues for further research.

Literature Review

Internet banking is an umbrella term for the process by which a customer may perform a number of banking transactions electronically through the internet without visiting a traditional brick-and-mortar institution (Al-Badi et al., 2006). A large number of terms are used to refer to internet banking such as personal computer (PC) banking, e-banking, virtual banking, online banking, home banking, and remote electronic banking. For consistency and simplicity, we use the term "e-banking" which can be defined as banks' use of the Internet as a channel for receiving instructions and delivering products and services to customers (Abdul Quddus et al., 2006) to refer to Internet banking using a computer and an internet connection.

While the wide spread of the Internet has triggered more interest in e-banking in recent years, this innovation actually dates back to the 1980s through the "Homelink" service that was offered by the Bank of Scotland and the Nottingham Building Society in the UK (Shah and Clarke 2009). However, this service eventually failed to achieve a widespread acceptance among customers and was therefore discontinued. In its very elementary form, e-banking means the provision of information about a bank and its services via a website. More sophisticated e-banking services provide customers with access to their accounts, the ability to transfer money between different accounts, make payments and/or apply for a loan or mortgage (Gonzalez et al., 2008).

With the rapid growth of e-commerce and other types of Internet-based services since the mid-1990s, banks have renewed their interest in electronic modes of delivery. Banks' main purpose from investing in e-banking systems is to provide an electronic service in low cost, information-rich environment. Financial institutions invested heavily in e-banking systems to the extent that some banks created "3D virtual branch"

(Hagel III et al, 1997) to offer their customers with a smooth experience that can replicate their physical branch experience, yet, offering them the benefits of the Internet's anywhere, anytime features. Through such advanced systems, financial institutions again and offer their customers more efficiency, increase productivity, reduced complexity, and lowered costs. In many countries, these benefits coupled with the rapid advancements and spread of technology, have lead to great success in some e-banking systems. For example, in Finland, 55 percent of private banking customers use online banking (Pakkarainen et al., 2004). Abdul Quddus et al. (2006) conducted an evaluation on the Banking websites using Diniz (1998) model and listed many benefits that e-banking can offer including:

- Real-time, online banking: Online Banking is anytime, anywhere, real-time, online banking. Real-time means instant up-to-the-second account transactions displayed on the Internet.
- Account to account Transfer: Transfer funds between customers' accounts, even if they are in different branches/cities.
- Customer can issue a Demand Draft or request a cheque Book for their accounts from the comfort of their home or office.
- Customers can view latest account balance or get detailed account statements.
- Account Statement Inquiry: customers can view all the transactions on their accounts for either the current period, or a specific period.
- Customers can pay their credit card dues directly to the bank through the net
- Report lost ATM cards: This facility will block all the accounts once the lost card report is logged in.
- Customers can pay their utility bills (i.e. water, mobile phone, electricity and telephone bills) through the Internet using the online banking facility.

Despite the benefits and the fact that over the past ten years online banking acceptance has increased rapidly in many countries (Pakkarainen et al., 2004). The inability of e-banking, despite its clear advantages for both customers and banks, is an issue that involves a large number of factors. Understanding these factors, their importance and the extent to which they might encourage or inhibit a wide-spread of this innovation among customers therefore becomes imperative for countries that strive to develop and implement a well-rounded 'digital society' strategy. In this paper, we attempt to contribute to this effort by trying to understand the impact of a number of important factors on banks customer's willingness to use e-banking systems. In the next section, we briefly highlight the technology adoption literature focusing on the adoption of e-banking systems.

Technology Adoption and e-Banking

The technology acceptance and adoption problem has been widely investigated in a large number of contexts. In this field of research, a number of theories/models have been developed, including the Theory of Reasoned Action (TRA) Ajzen and Fishbein (1980), the Theory of Planned Behavior (TPB) (Icek Ajzen, 1991), which is an extension of TRA, the Technology Acceptance Model (TAM) (Davis, 1986) which is based on TRA, and the Extended Technology Acceptance Model (TAM2) (Venkatesh and Davis, 2000), which is an extension of TAM. These theories evolved over time to (in slightly different ways) answer two simple questions: Why do people behave in a certain way in a certain situation? and How can we predict someone's behaviour or action in a given situation? These theories originate from personality and social psychology but they have been adapted by researchers in the Information Systems field in a try to predict people's decisions in regard to adopting or rejecting the use of a certain technology.

The adoption/acceptance concept, as it largely originates from TRA, is based on the idea that dispositions (traits and attitudes) can be used to predict behaviors. A Trait is a characteristic of an individual that influences his/her responses, while an Attitude is a disposition to respond favorably or unfavorably to an object, person, institution, or event (e.g. positive/negative, pro/con, pleasant/unpleasant). Traits and attitudes are latent (hidden), but they can be inferred from a person's behavior expressions which can be either verbal (e.g. number of calls made to test Sociability) or nonverbal (e.g. eye contacts, seating distance next to a person, etc). Traits are much more resistant to transformation as they are part of ones' personality.

Attitudes, on the other hand are perceptions that are more malleable and changeable as new information about the object unfolds.

The goal of acceptance and adoption research is to identify the determinants of behavioral intentions by investigating a number of factors that relate to individuals' traits and/or attitudes. The ability to predict behavior from dispositions is founded on the idea that humans usually behave in a sensible manner; they take account of available information and implicitly or explicitly consider the implications of their actions. In addition, adoption research posits that a person's intention to perform (or not to perform) a behavior (e.g. accept using a technology) is the immediate determinant of that action; and that barring unforeseen events, people are expected to act in accordance with their intentions.

For e-banking adoption by customers, there are a variety of factors (traits and attitudes) that can influence willingness to conduct transactions on-line. Many studies have investigated various factors that can impact the adoption and use of e-banking systems (see for example, Abdul Quddus Mohammed, 2006; Al-Somali et al., 2008; Khalfan, et al., 2006; Gonzalez. et al., 2008). For example, among many other factors, security and confidentiality issues seem to be of profound impact on e-banking use (Zhu et al., 2002, Peterson, 1997, Yiu et al., 2007; Danieland Storey, 1997; Aladwani, 2001, Al-Badi et al, 2006).

In this research we incorporate security and confidentiality with other more established adoption factors (e.g. ease of use and usefulness) to better understand the impact of these factors on customers' willingness to use e-banking systems. In doing so, we compare and contrast the impact of these factors with those that relate to the personal characteristics of customers. Studying these factors in a unified model allows us to more learn about the relative importance of various factors in the e-banking context. In the following section, we discuss in more detail our research model and propose a number of relevant hypotheses.

Research Model and hypotheses

To understand more about customers' willingness to use e-banking systems, we developed a research model, as depicted in Figure 1, which incorporates two sets of factors: customer-related and system-related factors. Customer-related factors are related to customer's characteristics and include self-efficacy, prior knowledge/experience, banking activity load, and demographics. System-related factors are related to customers' perceptions of the characteristics of the e-banking system including perceived ease of use, perceived usefulness, perceived security and perceived confidentiality.

The classification of the factors in this manner allows us to distinguish between two important sets of factors, namely, those that are more relevant to individuals' traits and those that are more relevant to individuals' attitude. This classification goes in line with traditional adoption theories in general and TRA in specific, as discussed in the previous section by examining the two origins of customer behaviour (traits and attitudes) as important dispositions that determine individuals' willingness to opt to innovation use. The aim of emphasizing these two types of dispositions is twofold. Firstly, combining the two sets of factors in a single model allows us to compare how customers' characteristics (i.e. traits) are more or less influential compared to their perceptions towards a certain aspect of the system (i.e. attitudes) and vice versa. Conducting this comparison offers a better understanding of which type of disposition is more influential on customers and, therefore, gives theory and practice a guidelines as to which type of factors to focus more on in order to encourage e-banking use among customers. This gives a better understanding of the influence of each set of factors (traits vs. attitudes) apart from the influence of the other type.

Secondly, integrating and combining the two sets in a single model gives a better understanding of how the predictive power of a research model can/cannot be enhanced by following this approach. In the next section, we develop and discuss a number of hypotheses that are relevant to each of these two sets of factors and their impact of customers' willingness to use e-banking systems.

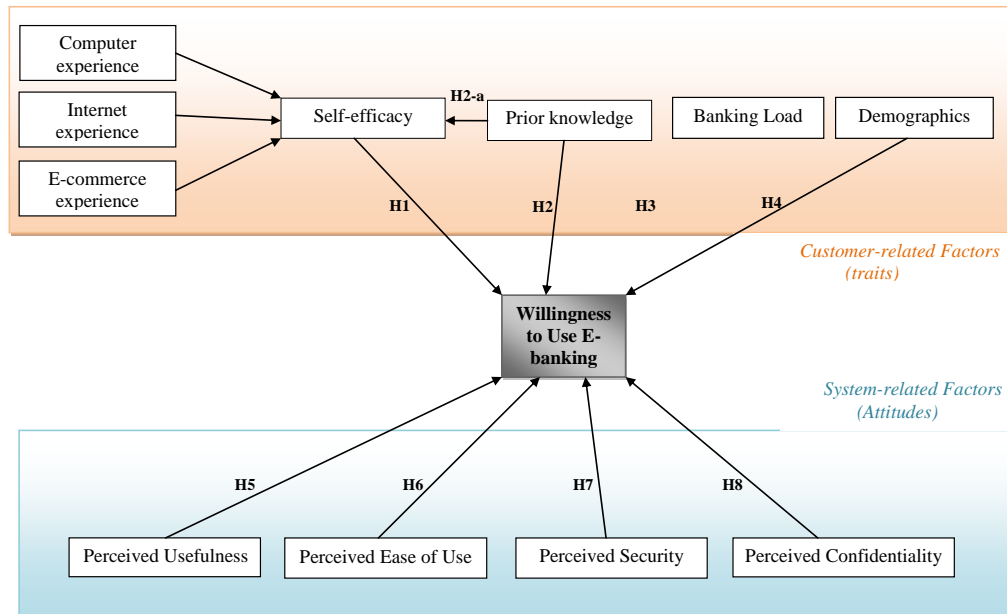


Figure 1. The Research Model

Customer-Related Factors

As shown in Figure 1, this set of factors includes: self-efficacy, Prior-knowledge, banking activity load, and demographics.

Self-efficacy

Self-efficacy is known in traditional technology adoption literature as a person’s confidence in his/her ability to use a new technology. Bandura (2010) describes it more broadly as “...people’s beliefs in their ability to influence events that affect their lives”. In the e-banking domain which normally involves interaction with technology hardware such as PCs or laptops, and software applications such as operating systems and internet browsers, it is imperative that users must first attain a minimum level of IT related knowledge.

This minimum awareness which we describe here as users’ self-efficacy gives the customer the confidence he/she needs to start using a new technology. Many studies investigated self-efficacy and found that this factor has an important impact on technology use (Compeau and Higgins (1995), Agarwal et al (2000), Yi and Hwang (2003), and Jennings and Heitner (2009)). Self-efficacy has also been studied in the e-banking context. For example, Guriting and Ndubisi (2006) found an indirect effect between computer self-efficacy and behavioral intention towards online banking. In addition, Lassar et al (2005), Hernandez and Mazzon (2007) and Al-Somali et al (2009) all have emphasized the importance of this factor in the e-banking context. Therefore, in this study, we propose that:

H1: *The higher the consumer self-efficacy, the more willing he/she would be to use e-banking systems.*

As Figure 1 shows, we measure self-efficacy as a formative construct (composite score) that consists of three basic experiences that are important for a consumer to be able to use online banking systems successfully, including: computer experience, Internet experience and e-commerce experience. This is similar to the way self-efficacy (labelled ‘IT literacy’), as a pre-requisite for e-government adoption, was measured in a previous study by Alshihhi, 2006.

Prior knowledge

Prior knowledge or prior experience is a well-established that influences technology use (see for example, S Taylor & P Todd, 1995). In line with this, this study also assesses the impact of the customer's prior knowledge on his/her willingness to use e-banking technology. We use the term prior knowledge rather than prior experience because we think that at this early stage of e-banking adoption in many countries, knowing about the existence of such systems is an important starting point for future adoption. In addition, we are interested to measure willingness to use, which is a pre-use stage, as a dependent construct and therefore we assume that prior knowledge of e-banking is important in order for a customer to decide whether he/she is willing or unwilling to use these systems.

Several studies investigated this factor in different contexts and found that it provides a strong predictor of the acceptance and adoption (Yoon, 2010; Polasik and Wisniewski, 2009; Maenpaa et al, 2007; and Kim et al, 2007). Therefore, in this study, we propose that:

H2: The more prior knowledge of the e-banking system a customer has, the higher is his/her willingness to use the system.

We further propose that prior knowledge/experience can greatly influence the customer's self-efficacy (Bandura, 1986). This means that when the consumer has prior knowledge about a certain technology, he/she would have more confidence about his ability to use that technology. We therefore hypothesize that:
H2-a: The more prior knowledge of the e-banking system a customer has, the higher is his/her self-efficacy to use the system.

Banking Load

Banking activity load also known as banking frequency or banking transactional frequency is an important factor that can determine whether or not the consumer feels the need to use an online system to accomplish banking tasks. When the consumer conducts banking activities in larger numbers and higher frequency, he/she might find online banking more convenient (and useful) option than walking into a physical bank branch.

In this case, the consumer might be more willing to use an online banking system from his/her home or office. This factor does not have enough treatment in the literature where the majority of emphasis was placed upon online banking usage frequency, see for example Vatanasombut et al (2008) and Eriksson and Nilsson (2007). Notwithstanding, some scholars have indirectly pointed out to the importance of banking load/frequency by emphasizing positive correlation between frequency of performing phone banking with online banking usage (Kam and Riqueime, 2007). As a result, in this study, we hypothesize that:

H3: The higher the banking activity load, the higher is the customer's willingness to use e-banking systems.

Demographics

Demographics are known as important factors in technology adoption research and have always been key indicators and predictors of technology use. The literature has extensive research deliberations that examine the importance and the impact of demographic characteristics on technology in general, and online banking acceptance and dissemination in specific (see for example, Al-Somali et al, 2009; Polasik and Wisniewski, 2009; and Sundarraj and Manojehri, 2011). This paper aims also to investigate the impact of Age, Education and Income on consumer willingness to use e-banking. We therefore hypothesize that:

H4: Customer's demographic characteristics including age, education and income have a direct impact on his/her willingness to use e-banking.

System-Related Factors

As shown in Figure 1, this set of factors includes: usefulness, ease-of-use, security, and confidentiality.

Perceived Usefulness

Perceived usefulness is the users' subjective probability that using a specific application system will increase his/ her job performance (Davis et al 1989). Perceived usefulness is believed to be one of the fundamental and well-established determinants of the acceptance and use of IT related systems (Moon, Kim, 2001; Davis, 1986; Straub et al, 1997). For e-banking systems, the user perception of usefulness might influence his/her willingness and use of the system. Pikkarainen et al (2004) found that perceived usefulness and information on online banking on the bank's website are the main factors that influence customers' acceptance. In this study, we similarly hypothesize that:

H5: The higher the customer's perception of the usefulness of e-banking, the higher is his/her willingness to use it.

Perceived Ease-of-use

Perceived ease of use is the degree to which the user expects the target system to be free of effort (Davis et al 1989). Just like perceived usefulness, perceived ease of use is considered by many researchers to be a fundamental determinant of user acceptance (Davis, 1989). These two factors have frequently been examined together in a large number of technology acceptance studies. Here also, we think that ease of using e-banking can be a major determinant of customer's willingness to use the system. After all, e-banking is meant to make customers' life easier by saving them time, money and effort. Therefore, the ease of using the e-banking system is a major requirement for its success and adoption by customers. As a result, we hypothesize that:

H6: The higher the customer's perception of the ease of using the e-banking system, the higher is his/her willingness to use it.

Perceived Security

Many researchers highlighted the importance of providing security assurance to the users' of online banking systems because it gives the customer the confidence he/she needs to use the system (Pikkarainen et al, 2004; Smith, 2006; Lallmahamood, 2007; Law, 2007). In IT-related domains, security is defined as a threat which creates "circumstances, condition, or event with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, modification of data, denial of service and/or fraud, waste and abuse" (Kalakota & Whinston 1997, p. 123). In an e-banking system, security threats can either be through network, through data transaction & transmission attacks, or through unauthorized access to the account by means of false authentication (Yousafzai, Pallister and Foxall 2003, p. 7). Without adequate sense of security, it is difficult to assume that the adoption and use of e-banking systems would ever take off. We therefore hypothesize that:

H7: The higher the customer's perception of the security of the e-banking system, the higher is his/her willingness to use it.

Perceived Confidentiality (privacy)

Privacy is defined as the claim of individuals, groups, or institutions to determine when, and to what extent, information about them is communicated to others (Agranoff 1991). Often, both privacy and security go together in all studies about technology acceptance (Godwin, 2001; Aladwani 2001; White and Nteli 2004; Sathye, 1999; Yousafzai et al, 2010). Privacy concerns are vital to online activities and transactions and can

constitute a major driver of/barrier to the adoption and use of e-banking systems. Therefore, this research posits that:

H8: *The higher the customer's perception of the confidentiality of the e-banking system, the higher is his/her willingness to use it.*

Research Design

This research project is primarily directed at assessing and explaining relationships (correlations) between multiple aspects of a phenomenon (adoption of e-banking) to better understand the causal mechanisms underlying that phenomenon. These relationships are shown in Figure 1 (above). A number of characteristics of this research model indicate that a cross-sectional design, as described by De Vaus (2001), is appropriate for this study.

First, there is no time dimension integral to the conceptualisation of any of the proposed adoption factors that could affect how they are theorised or measured. Second, in this research we are interested in measuring the proposed variables based on variance or difference between individuals' perceptions rather than on how these perceptions change over time, after a change in the environment, or after a controlled intervention as in a longitudinal study, an event study, or an experiment (respectively). Therefore, the empirical stage of this study entails collecting data at one point of time. Third, the analysis of the collected data will depend on existing differences between the individuals or groups (such as demographic differences) rather than differences that result from manipulations or interventions.

For the purpose of this study, within this cross-sectional approach, data was collected using a questionnaire survey of banking customers. According to Neuman (2006) a survey is a closed, structured research method that is suitable when the researcher wants to learn about people's beliefs or opinions in regard to a specific issue. Newsted, Huff and Munro (1998) list several benefits of surveys including ease of administration, they allow the researcher to determine relations among variables, they provide responses that can be generalised and they can be reused easily and provide an objective way of comparing responses over different groups, times, and places to predict behaviour and objectively test theoretical propositions (p.553). A total of 200 questionnaire forms were delivered to respondents of which 50 were returned giving a response rate of 40%. Out of these 50 surveys, 46 were included in the analysis after removing incomplete responses. Questionnaires were filled in different places including universities, government agencies and companies. This resulted in a sample that was well distributed in terms of demographic information. The results of the analysis to test the proposed model and hypotheses are discussed in the following section.

Analysis and Results

The objective of the analysis is twofold: firstly, to test the explanatory power of the research model in predicting banking customers' willingness to use e-banking, and secondly to confirm/disconfirm the proposed hypotheses. The data collected from the survey was analysed using SPSS software package version 19.

The sample in this study is relatively young as 72% (33 respondents) is in the 20-30 age group, 24% (11 respondents) are 30-40 years old, and only 4% are above 40 years old. The young age group in the sample is advantageous for this study which explores the use of advanced electronic systems because the young population is usually better prepared to use advanced technologies compared to older ones. In terms of education, the sample is generally educated since at least 42 respondents out of 45 (90%) have attained bachelors or other degrees. This also is advantageous for our study since it is generally accepted that more educated individuals are usually more lenient to change and acceptance of new ideas. For income, most of the sample (41%) earn between 500 OMR and 900 OMR per month, while 35% earn more than 900 OMR per month. Clearly, this sample is characterised by relatively high income earnings which means that these customers might conduct more banking activities than those who earn small incomes. This is advantageous

for our study because evaluating the potential of using of e-banking systems would be more sensible if the sample conducts more banking transactions.

To test the explanatory power of the whole research model, we used regression analysis. This part of the analysis answers the following question: how much of the variance in customers' willingness to use e-banking system can be explained by the variables in the research model collectively (customer-related and system-related)? In other words, how well can these variables predict whether a customer will be willing or unwilling to use e-banking. The results of a standard multiple regression tests show that our model explains 40% of the variance in the willingness to use e-banking (R-squared value = .395). This is quite a respectable result for predicting customers' willingness.

To confirm/disconfirm the proposed hypotheses, we run separate tests (e.g. chi-square, person product-moment correlation, etc) for each path because the nature of the different variables in the model varies from continuous (measured using Likert scales) to categorical (measured using nominal or ordinal scales). This means that a different statistical test is required for testing the relationship between each pair of variables in the hypotheses. In this research, the willingness to use construct is measured using a single question: Are you willing to use/continue to use e-banking? with a yes/no options. This makes this variable, in terms of its measurement a categorical one. This specification of the variable type is important because it helps determine which statistical test is more suitable.

Customer-Related Factors

In our research model, this set of factors include self-efficacy, prior-knowledge, banking activity load, and demographics. Self-efficacy is measured using a 5 point Likert scale. A one-way analysis of variance (ANOVA) test was conducted to explore the impact of self-efficacy on the willingness to use e-banking. We found a statistically significant difference at the $p < .05$ level in self-efficacy scores between those who are willing and those who are not willing to use e-banking : $F(1, 43) = 9.7, p = .003$. To assess the importance of this significant result, we calculated the effect size using eta squared. We found an effect size = .18, which is a large effect size according to the Cohen's (1988, p. 284-7) criteria for effect size (Cohen classifies .01 as a small effect, .06 as a medium effect and .14 as a large effect). These results indicate that self-efficacy is a significant predictor of customers' willingness to use e-banking. Representing the data on a Means Plot graph showed that higher levels of self-efficacy are directly associated with more willingness to use the technology, which means that hypothesis H1 is supported.

Prior knowledge is measured in this study as a categorical variable (yes/no). To assess its relationship with customers' willingness to use e-banking (which is also categorical, yes/no), we were interested to answer the following question: are those customers who have prior knowledge/experience in e-banking more willing to use this technology than those who do not have that knowledge/experience? Answering this question gives us clear idea about the impact of prior knowledge on the dependent variable. For this purpose, we used chi-square test for independence (with Yates Continuity Correction since we have a 2 by 2 table). The results indicate no significant association between prior knowledge and customer's willingness to use e-banking, $X^2(1, n = 46) = .012, p = .913, \phi = .14$. These results indicate that prior knowledge has no significant impact on willingness to use e-banking, which means that hypothesis H2 is not supported.

Running a one-way ANOVA analysis to evaluate the impact of/relationship between prior knowledge and self-efficacy (hypothesis H2-a), shows an insignificant result, $F(1, 44) = .002, p = .965$. This means that customers' prior knowledge about e-banking technology has no direct association with whether they would be willing or unwilling to accept the use of this technology. This means that hypothesis H2-a is not supported.

To evaluate the impact of banking activity load or frequency (which is evaluated using a categorical measure based on 4 activity levels: less than 2 times/day, 2-5 times, 5-8 times, or more than 8 times/day) on customers' willingness to use e-banking technology, we used Pearson Chi-square test. The results indicate no significant association between a customer's banking activity load and his/her willingness to

use e-banking, $X^2(3, n = 46) = 1.86, p = .64$. This means that customers who conduct banking activities more frequently are not necessarily more inclined to use e-banking systems. Therefore, hypothesis H3 is not supported.

We run a series of additional chi-square tests to assess the impact of the last customer-related factor in our model (i.e. demographics) on customers' willingness to use e-banking. Demographic characteristics in this study include age, education, and income. The chi-square results show that demographics has no significant impact on willing to use: for the age-willingness path: $X^2(2, n = 46) = .333, p = .847$, for education-willingness: $X^2(2, n = 46) = 1.610, p = .447$, for income-willingness: $X^2(3, n = 46) = .137, p = .987$. Collectively, these results mean that hypothesis H4 is not supported.

System-Related factors

In the research model, this set of factors includes perceived usefulness, perceived ease-of-use, perceived security, and perceived confidentiality. Perceived usefulness is measured using a 5 point Likert scale. A one-way analysis of variance (ANOVA) test was conducted to evaluate the impact of this factor on the willingness to use e-banking. The results show a statistically significant difference at the $p < .05$ level in usefulness scores between those who are willing to use e-banking technology and those who are not: $F(11, 42) = 3.181, p = .005$. The effect size calculation using eta squared for this impact is 0.53, which is a large effect size according to the Cohen's (1988, p. 284-7) criteria (above 0.14). These results demonstrate that perceived usefulness is a significant and important predictor of customers' willingness to use e-banking, which shows that hypothesis H5 is supported.

Just like usefulness, perceived ease of use is well-established determinant of the use of technology. Our study shows the same result, which re-emphasizes ease of use as a significant predictor of customers' willingness to use e-banking technology: $F(1, 41) = 4.947, p = .03$. However, the importance of this factor is not as strong as usefulness because the effect size is 0.11 which is slightly below Cohen's benchmark for what can be considered as a large effect size. Nevertheless, it is demonstrated in this study that ease of use is an important factor when it comes to predicting banking customers' willingness to use e-banking technology, which means that hypothesis H6 is supported.

For perceived security, which we initially predicted along with perceived confidentiality to be very important factors in this study, results show that this factor is indeed a significant predictor of customers' willingness to use e-banking systems: $F(1, 45) = 10.339, p = .002$. This result is further supported by a large effect size: 0.19. Therefore, we can confidently say that whether customers perceive e-banking systems as secure or not has a direct impact on their willingness to use this technology, indicating that hypothesis H7 is supported.

The last factor in the system-related set is perceived confidentiality or privacy. Even though confidentiality is usually linked with security, our analysis show that, unlike security, perceived confidentiality is not a significant predictor of customers' willingness to use e-banking systems: $F(1, 44) = 0.437, p = .512$. We can therefore conclude that hypothesis H8 is not supported.

Discussion

The results of testing the proposed research model (Figure 1) and our set of hypotheses showed mixed, but interesting outcomes for both customer-related factors and system-related factors. These results present many interesting implications on the ways financial institution currently promote their e-banking systems. We discuss the results for each set of factors in the following sections.

Customer-Related Factors

For the customer-related factors (self-efficacy, Prior-knowledge, banking activity load, and demographics), only self-efficacy showed a significant impact on customers' willingness to use e-banking systems. Self-efficacy was measured by evaluating three sets of skills, ranging from basic to more competent, that we

thought are important for a customer to have enough confidence in him/herself to use e-banking comfortably. These include computer skills, internet skills, and e-commerce skills. The assumption was that the more of these skills that a customer possesses, the more he or she will be willing to replace traditional physical branch banking with banking online. This assumption was supported showing that for e-banking systems to spread, at least a minimum level of expertise and confidence in using computer and internet technology is required. This has implications on the way banks promote their online banking systems, indicating that educating and training customers should be an integral part of banks promotion campaigns for e-banking.

For the other three customer-related factors including prior-knowledge, banking activity load, and demographics), none of these showed significant impact on customers' willingness to use e-banking. For prior knowledge, we initially thought that if a customer already knows about e-banking systems or had an experience with these systems, he or she would be more willing to use them for the clear advantages they offer such as the saving of customers' time, effort and money. The results for the data we collected in this study showed the opposite. What this result basically says is that it does not matter whether the customer knows or doesn't know about e-banking in order to decide whether he or she is willing or not willing to use this technology. This could mean that when it comes to using e-banking systems for private banking, direct experience with the system is more important to customers than whatever previous knowledge they had.

This is further emphasized by the insignificant result for the link between prior knowledge and self-efficacy, meaning that knowing about the system does not add to customers' confidence to use e-banking. It can therefore be said that only when customers actually try e-banking systems they would be willing to use. As a result, when it comes to e-banking systems, hands-on experience becomes more influential on actual use than conceptual or general knowledge. This conclusion has an important implication for financial institutions because it indicates the importance of offering customers with mock trials in order to convince them to use e-banking systems compared to just providing general information through ads and commercials for example.

The insignificant result for the impact of banking activity load on customers' willingness to use e-banking systems indicates that our initial assumption that customers who conduct financial transactions more frequently would be more willing to use e-banking systems might not be completely valid. While this result might sound counter-intuitive at a first glance, it is in fact quite sensible because when it comes to monetary possessions, people tend to be generally more careful. If we submit that this is true, then customers who conduct more frequent financial transactions might actually be more hesitant to trust an online system to handle the large amounts of financial transactions they conduct daily, which is confirmed in our results from this study. So, does this mean that e-banking systems should be focused on customers with lower banking activity loads? Not necessarily.

What our result indicates is that banks strategies to promote the use of e-banking systems should not be the same to all customers. It means that customers who conduct higher loads of banking activities might need different marketing and promotion techniques than those who conduct only a few transactions every now and then. This provides an important implication on the ways e-banking systems are currently promoted using single, mass-reaching campaigns. It might, therefore, be more fruitful for the future of e-banking systems if banks start thinking about what it takes for each group of customers (based on their banking activities) to be convinced to replace traditional branch banking habits with the use of e-banking technologies.

Finally, for customer-related factors, demographics including age, education and income showed insignificant impact on customers' willingness to use e-banking systems. This simply means that when it comes to financial activities, all age groups, all education groups, and all income groups have equal probability for using or not using e-banking systems. This puts forth a challenge for financial institutions because it becomes more difficult for them to predict which age, education, or income segments among their customers have stronger potential to become users of online banking technology. Further research might be needed here in order to understand more about the reasons behind this indifference in the individual characteristics of potential e-banking users.

System-Related Factors

For the system-related factors including perceived usefulness, perceived ease-of-use, perceived security, and perceived confidentiality, the first three factors showed a significant impact on customers' willingness to use e-banking systems, while only perceived confidentiality demonstrated an insignificant effect. Perceived usefulness is one of the most established acceptance factors in the traditional and more recent adoption studies. Our study confirms this conclusion and demonstrates that it is important for potential users to see how useful the e-banking system is going to be for them in order to be willing to use it. Therefore, banks should seriously focus on showing customers how this new technology is going to be of benefit to them (e.g. save the time, effort, increase productivity, increase efficiency, etc).

Perceived ease of use is another system-related factor that demonstrated important effect on spread of e-banking systems among customers. Once again, financial institutions that are planning to develop and introduce e-banking systems must promote and demonstrate to potential users how this system is going to be easy to use. After all, the system is meant to save customers' time and effort, and being easy to use is integral to achieving these advantages. While building a positive perception among customers in relation to how the system is going to be potentially easy to use, building this expectation among customers must be matched with actual ease of use when customers start to use the system.

This means that the significant influence that the ease of use factor has should be utilized by financial institutions in two essential ways: building a positive perception before use, and matching this perception with actual ease of use by making sure that the system does in fact possess this feature for the customer. Therefore, Banks must pay close attention to match perceived ease of use before system use with actual ease of use while using the system. Of course, while this expectation-reality matching is vital for most adoption factors, it is particularly important for ease of use because this factor is directly linked with the tangible benefits an e-banking system is supposed to offer (i.e. conduct financial activities easily via a few clicks).

Perceived security also showed a significant impact on customers' willingness to use e-banking systems. This makes sense since e-banking systems deal with monetary possessions and therefore feeling secure cannot be neglected or ignored by any customer. Therefore, aside from making sure that the e-banking system is technically secure (firewalls, anti-fraud, etc); it is important that banks promote this aspect of the system to potential users and make it apparent when he/she get to the bank's website. Successfully showing the system as a secure one will directly influence customers' willingness to use it.

Finally for system-related factors, perceived confidentiality (privacy) showed an insignificant impact on customers' willingness to use e-banking. While this immediately becomes an alarming result, it can actually be a logical one if we know that customers that banks promote e-banking systems to are mostly existing customers and therefore these customers have already established sufficient levels of trust in their banks to protect their confidentiality. This explains why perceived confidentiality is not as influential factor on the willingness to use e-banking among bank clients compared to other system-related factors such as usefulness, ease of use and security. Nevertheless, the confidentiality that an e-banking system can offer should always be promoted along other features of the system in order to add more confidence to customers and encourage them to use the system.

Conclusions and Contributions

This study aims to investigate the adoption of e-banking technology by examining the impact of a number of factors on customers' willingness to use e-banking. To accomplish this, we build a research model that includes two sets of factors: 1) customer-related factors including self-efficacy, prior knowledge, banking activity load, and demographics, and 2) system related factors including perceived usefulness, perceived ease-of-use, perceived security, and perceived confidentiality. The idea of this classification of factors is that the first set of factors is related to customer individual traits or characteristics, while the second set of

factors is related to attitudinal perceptions of customers towards the e-banking system. The inclusion of and the distinction between these two types of factors offers unique and interesting theoretical and practical insights because it allows to understand how traits and attitudinal perceptions, individually and collectively, affect consumers' acceptance of e-banking. Based on this a number of hypotheses are proposed.

To test the research model and hypotheses, we conducted a questionnaire study of 200 banking customers, out of which 46 valid responses were used in the analysis. The results show that the proposed model explains 40% of the variance in customers' willingness to use e-banking (R-squared value = .395). The testing of the proposed hypotheses showed mixed but interesting results. On the one hand, only self-efficacy in the customer-related set of factors showed a significant impact on the willingness to use e-banking. On the other hand, all the system-related factors except perceived confidentiality showed a significant impact on customers' willingness to use e-banking technology.

In summary, it can be concluded from this study that customer-related set of factors which reflects individual traits or characteristics of customers can greatly vary among different societies and over time. For example, the results we presented in this study that pertain to individual characteristics might vary if we move from one geographical area to another because each area might have its own cultural connotations which usually reflect on the impact that individual differences (e.g. age, education, income, etc.) have on their behaviors.

Financial institutions that are planning to introduce e-banking technology should carefully consider and study the individual traits and characteristics of potential users in specific geographical areas where the technology is planned to be introduced. This will help them to understand the implications that these traits might have on customers' willingness to accept and use this technology.

Collectively, system-related set of factors which reflects individual attitudes or perceptions towards certain (expected) features in an e-banking system seem to play a more influential role in determining or predicting customers' willingness to use these systems compared to customer-related characteristics. This shows that financial institutions need to make sure that the best features of their e-banking systems are well communicated to potential users in light of the individual differences among their customers and customer segments.

Limitations and Future Work

In this paper we investigated the adoption of e-banking systems by customers to find out whether factors that relate to the customer personal traits are more or less influential than factors that relate to the consumers' perceptions of the characteristics of the e-banking system.

To address this question, we developed a research model and a set of hypotheses that we tested using a questionnaire study of 46 banking customers. While the empirical data provided sufficient evidence to validate the model and answer the research question, the study would have benefited from a larger number of participants. In addition and as mentioned before, the study was carried out in Oman. This encourages additional testing's in future works in other countries which could provide confirmative/supplementary results.

For future research, triangulating survey data with qualitative methods (e.g. interviews or focus groups) will help uncover underlying relationships among different variables that might not be directly evident from survey data alone. On the other hand, the model from this study can also be tested using organizational data to compare customers' perspectives as presented in this study with organizational perspective. The similarities and/or discrepancies between the two will help uncover and develop well-rounded strategies to improve the adoption of e-banking systems.

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