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Extending the utaut model to understand the customers' acceptance and use of internet banking in lebanon a structural equation modeling approach

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Extending the UTAUT model to understand the customers' acceptance and use of internet banking in Lebanon

A structural equation modeling approach

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Abstract

Purpose – A number of studies have shown that internet banking (IB) implementation is not only determined by banks or government support, but also by perceptions and experience of IB users. IB studies have showed encouraging results from academics in developed countries. Yet little is known about the user adoption of IB in Lebanon. The purpose of this paper is to investigate the factors that may hinder or facilitate the acceptance and usage of IB in Lebanon.

Design/methodology/approach – A conceptual framework was developed through extending the unified theory of acceptance and use of technology (UTAUT) by incorporating two additional factors namely; perceived credibility (PC) and task-technology fit (TTF). A quantitative approach based on cross-sectional survey was used to collect data from 408 IB consumers. Data were analysed using structural equation modelling based on AMOS 20.0.

Findings – The results of the structural path revealed that performance expectancy (PE), social influence, PC and TTF to be significant predictors in influencing customers' behavioural intention (BI) to use IB and explained 61 per cent of its variance, with PE was found the strongest antecedent of BI. Contrary to the UTAUT, the effect of effort expectancy on BI was insignificant. In addition, both BI and facilitating conditions were found to affect the actual usage behaviour and explained 64 per cent of its variance

Practical implications – This study would be helpful for bank managers and policy makers to explain the currently relatively low penetration rate of IB in formulating strategies to encourage the adoption and acceptance of IB by Lebanese customers, where IB is still considered an innovation.

Introduction

The rapid expansions of internet technologies have a tremendous impact on how banks operate their business and the way in which consumers conduct their banking activities (Lee, 2009). Previously, most customers could perform banking transactions only at bank's premises, or by automated teller machine (ATM) or telephone, but nowadays many bank customers are able to benefit from internet banking (IB; also known as on-line banking) adoption and usage because now they have the option to perform banking transactions and other related banking activities anytime from any location (Abu-Shanab and Pearson, 2007; Yousafzai, 2012). Customers can also perform other transactional services such as paying bills, checking account information, transferring funds, and utilising investment and check services through bank websites (Hanafizadeh *et al.*, 2014). There are also numerous benefits for banks in adopting and incorporating use of IB such as cost-savings, increase service quality and increase their revenue (Yousafzai, 2012). As such, IB services grew from the necessity to satisfy consumers' needs and commercial entities striving to meet consumer needs (Al-Ajam and Nor, 2013; Alalwan *et al.*, 2013).

Despite the aforementioned advantages, large groups of consumers have shown reluctance to use IB services (Lee, 2009; Nasri, 2011; Kuisma *et al.*, 2007; Dwivedi *et al.*, 2014). Consumers may have serious concerns about using internet technology for banking; much of their concerns illuminates customer's perceptions of the degree of ease associated with such use, the perceptions of the required skills, infrastructures (e.g. computers, internet, etc.), uncertainty such as security risks and trust; the service effectiveness and the knowledge about transferring online (Eriksson *et al.*, 2005; Yousafzai, 2012; Kuisma *et al.*, 2007). Therefore, it becomes imperative for bank managers and policy makers to understand the factors that can hinder or facilitate the acceptance and usage of IB which enable them to formulate strategies to improve the take up of IB.

The adoption and use of IB by consumers varies from one population group to another, from one social setting to another and from one cultural context to another (Alalwan *et al.*, 2014; Venkatesh *et al.*, 2012; Yi *et al.*, 2006). In Lebanon, the number of internet users increased from 13.3 to 80.4 per cent of the population between 2005 and 2014 (Internet World Stats, 2014) which created opportunities for Lebanese banks to expend to wider customers. However, despite the relatively advanced and well-managed banking system and the huge amount of money and resources that have been projected in this vein by all Lebanese banks (approximately $150 million were invested to implement the IB services) (Association of Banks in Lebanon, 2013), online banking is still a relatively new phenomenon in Lebanon and its adoption by the customers is reported to be very low (Itani, 2008). She indicated that only 3.7 per cent of the Lebanese population used IB service in 2008, while statistics from the Federal Deposit Insurance indicates that about 74 per cent of Americans already adopted IB and 16.9 million customers (one-third of the UK's adult population) used internet

services in 2006. This reality implies that IB in Lebanon is still an innovation and lag very far behind compared to counterparties in other countries (Itani, 2008; Toufaily *et al.*, 2009). Such a low adoption rate is troublesome for banking institutions (Alalwan *et al.*, 2014). Furthermore, it is also true that in Lebanese culture a lot of people prefer the traditional ways (ATM, personal contact) of attaining financial services when doing business which raise concerns about the low adoption rate of IB (Toufaily *et al.*, 2009). Without knowing these factors, bank managers are likely to continue floundering, wasting time and resources. On the other hand, customers need to be made aware of IB services, and feel secure and comfortable with using IB services as such services are radically new to them. Thereby, there is a need for research to understand the factors that influence the adoption and acceptance of IB by customers in Lebanon in order to formulate strategies that will guarantee effective implementation and adoption of IB.

In recent years, a variety of well-known theories and models have been employed to explain the relationship between user beliefs, attitudes and behavioural intentions (BI) to use the technology. From the stream of social psychology, innovation diffusion theory (IDT), theory of reasoned action (TRA), theory of planned behaviour (TPB), the social cognitive theory, the motivational model, the model of perceived credibility (PC) utilisation, technology acceptance models (TAM) and a hybrid model combining constructs from TAM and TPB, are only a few of the major modular approaches that have lead the way in analyses and results (Yi *et al.*, 2006; Venkatesh *et al.*, 2012; Yousafzai, 2012). A review and synthesis of these eight models of technology use resulted in the unified theory of acceptance and use of technology (UTAUT) (Venkatesh *et al.*, 2003).

UTAUT has been proven to be a valid research instrument and tool that is a predictor of adoption behaviour and BI with emphasis on performance expectancy (PE) and voluntariness as the most salient drivers of acceptance (Al-Qeisi, 2009). Thus, this model becomes one of the most widely used models among others due to its simplicity, parsimony and robustness (Abu-Shanab *et al.*, 2010; Yuen *et al.*, 2010; Foon and Fah, 2011; Venkatesh *et al.*, 2012; Tarhini *et al.*, 2015). It was also proved to be superior to other prevailing competing models (Venkatesh *et al.*, 2003; Venkatesh and Zhang, 2010).

Despite the fact that the extensive replication, applications and integration of UTAUT have enabled many researchers to understand technology adoption, there is still a need for a systematic investigation and theorizing of the salient factors that apply to a context-based consumer technology use (Venkatesh *et al.*, 2012). Moreover, there is considerable debate among researchers (for a review, see Venkatesh *et al.*, 2012) who argue that the UTAUT's constructs may not be sufficient to explain user acceptance of new technology in a voluntary context as the initial UTAUT study focused on large organisations in the business environment which limit its explanatory power.

In addition, for studying the adoption and acceptance of internet baking, there are some other factors that should be considered such as the security and the risk associated with it (PC), as well as how the technology will fit the consumer's needs (task-technology fit (TTF)). By extending the UTAUT to include these two factors, a more comprehensive theoretical perspective of user technology acceptance in the context of IB will be provided. Indeed, PC appears to be a key factor that made the customers reluctant from conducting their financial transactions online (Yousafzai *et al.*, 2010; Kesharwani and Bisht, 2012). This is because in a consumer context, the users are primarily responsible for their transactions and thus their decisions will be dominated by issue of security and trust. Kesharwani and Bisht (2012) mentioned that although customers' confidence in their bank is strong, their confidence in technology

is weak due to the high uncertainty, intangibility, heterogeneity and vague outcomes of using this channel. Therefore, adding PC will complement the existing factors of the UTAUT and is expected to offer a better prediction of users' acceptance of online banking. The rationale behind integrating PC in UTAUT is increasing managerial focus on critical challenge to offer safe and secure virtual environment that allow their customers to make full use of IB services. On the other hand, a review of more recent studies suggests that relevance of a new technology to address a specific need might importantly shape the adoption behaviour of customers (Lee *et al.*, 2007). In this study, we integrated the TTF within the UTAUT as an antecedent of BI. The rationale behind adding TTF is based on the fact that users will not simply accept and use the technology if it does not fit their needs and improve their performance (Junglas and Watson, 2008; Gebauer and Ginsburg, 2009). In other words, these customers may be utilitarian, and their adoption of IB services will not only determined by their perception towards the technology but also by a good TTF.

Furthermore, the majority of the technology adoption models and especially UTAUT have not been widely tested in developing countries such as Arab countries in general (Abu-Shanab and Pearson, 2009; Al-Ajam and Nor, 2013; Kamoun and Almourad, 2014; Zhao *et al.*, 2012) and Lebanon in particular (Alsajjan and Dennis, 2010; Tarhini *et al.*, 2014a, b).

To the best of our knowledge, there is no single study that considers the relationship between BI and adoption of IB in Lebanon. Furthermore, the key and critical relationships such as between PC, TTF, social influence (SI), facilitating conditions (FC) and PE have not received any attention from prior studies in the Lebanese context. Therefore, this study aims to fill this gap by extending the UTAUT to include two factors namely; PC and TTF.

In order to provide an insight into the most silent factors that can hinder or facilitate the acceptance and usage of IB by individual users in Lebanon, the following specific research objectives are employed which are:

(1) to investigate whether PE, effort expectancy (EE), SI, FC, PC and TTF affect customers' BI to use IB services in Lebanon;

(2) to detect the nature and strength of the relationship among these factors and clarify which factors are more influential in affecting the decision to use IB;

(3) to evaluate whether the integration of PC and TTF with UTAUT provide a solid theoretical basis for examining the adoption of IB; and

(4) to make appropriate recommendations to bank managers on the measures to employ in order to ensure a successful IB adoption in Lebanon.

Generally, this study would be helpful for bank managers and policy makers to explain the currently relatively low penetration rate of IB in formulating strategies to encourage the adoption and acceptance of IB by Lebanese customers, where IB is still considered an innovation.

This paper also contributes to the literature related to theories and models of technology adoption and acceptance which have recommended to be expanded to new contexts by many researchers (e.g. Venkatesh *et al.*, 2012; Bagozzi, 2007; Benbasat and Barki, 2007) and specifically to the generalisability and applicability of the UTAUT in a new context (online banking), new user group (consumers) and new cultural setting (Lebanon), which is a critical step to advance a theory (Alvesson and Kärreman, 2007). Taking into consideration the fact that Lebanon is a country with a population that is diverse in terms of culture, education, income and language, these features will add an

interesting dimension to the work and provide a unique insight into the nature of factors that are important to banking institutions in such environment.

The structure of the paper is as follows. The first section proposes a theoretical model of the factors which influence the acceptance of IB. The second section presents the research methodology used in this work. The third section presents the results of the statistical data analysis. The fourth section discusses the results, including the implications for theory and practice. Finally, further possible research directions are outlined and study's limitations are presented.

Theoretical background and hypotheses

Figure 1 depicts the proposed research model and a detailed explanation of each construct is presented in the next subsections.

PE

PE is defined in terms of utilities extracted by using IB service such as saving time, money and effort, convenience of payment, fast repose and service effectiveness (Venkatesh *et al.*, 2012; Zhou *et al.*, 2010). In other words, PE measures the degree to which an individual believes that using the IB services will help him/her attain gain in performing bank tasks.

Reviewing the literature, several studies in the IB context have been found to be inconsistent. For example, Yu (2012) claims that PE had a significant influence on the customers' BI to use the system. Similarly, Lee (2009) and Al-Somali *et al.* (2009), found that PU (similar to PE) to be an important factor in understanding IB. In the information and communication technologies (ICT) acceptance, Tarhini *et al.* (2014a, b, c) and Harfouche (2010) found that perceived usefulness was an important factor in explaining the technology acceptance by Lebanese. Therefore, PE can have an important role in individual behaviour for accepting or rejecting of IB services in Lebanon. In the context of this study, it is expected that if the customers find the system to be useful, then they are more likely to use and adopt the system. Hence, we propose the following hypothesis:

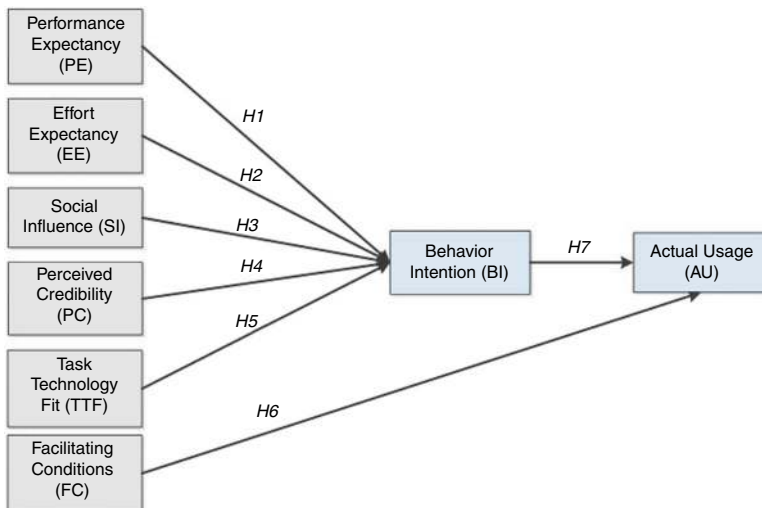*H1.* PE will significantly affect customers' BI to use IB in the Lebanese context.

Figure 1.
The proposed
theoretical model

EE
EE is the degree of ease associated with customers' use of technology (Venkatesh *et al.*, 2003). According to UTAUT, EE positively influence the BI to use the technology (Venkatesh *et al.*, 2003). If the users found the IB services easy to use and do not require much effort then they are more likely to adopt it.

In the IB context, mixed results were observed, the degree of differences was based on the context and the sample size. For example, Lee (2009), Yoon and Steege (2013) found that PEOU (similar to EE) to have an effect on BI but it was not the strongest predictor. Similarly, and Martins *et al.* (2014) found that EE has a significance positive influence on BI. In contrast, Zhou *et al.* (2010) and Yu (2012) failed to support the relationship between EE and BI.

In Lebanon, some researchers proved that the Lebanese is ready to adopt certain behaviour if it is easy to use (Itani, 2008; Harfouche, 2010). Tarhini *et al.* (2013a, b) reconfirmed it when they found that perceived ease of use of e-learning system was a significant predictor of students' intention to adopt the system. In the context of this study, it is expected that if the users find the IB services easy to use, then they are more likely to use and adopt it. On the contrary, if the users find the IB services to be difficult to use, then they are less likely to adopt it. Accordingly, we postulate the following hypothesis:

H2. EE will significantly affects customers' BI to use IB in the Lebanese context.

SI
SI is defined as "a person's perception that most people who are import to him think he should or should not perform the behaviour in question" (Ajzen, 1991) and is similar to social norm in TRA, TAM2 and TPB; and image in IDT. In other words, SI refers to the social pressure coming from external environment which surrounds the individuals and may affect their perceptions and behaviours of engaging in a certain action such as the opinions of friends, relatives and superiors. Although Davis (1989) omitted the SI construct from the original TAM due to theoretical and measurement problems, however SI was added later in TAM2 due to its importance in explaining the external influence of others on the behaviour of an individual. Much of the empirical research in information system found that SI to be an important antecedent of BI (e.g. Venkatesh *et al.*, 2003; Venkatesh and Zhang, 2010; Tarhini *et al.*, 2013c, 2014c) and in IB (e.g. Amin, 2009; Yousafzai *et al.*, 2010; Kesharwani and Bisht, 2012; Im *et al.*, 2011). These studies empirically supported the direct positive relationship of SI on the customers' intention to use the system.

The rationale is based on the fact that the consumers will be highly influenced by the uncertainty that will be created from an innovation such as online banking and this will force these consumers to interact with their social network to consult on their adoption decisions. This research assumes that the customers will be highly influenced by others (friends, family, co-workers and media) since relationships are perceived as an important factor in human behaviour in the Lebanese context (Yahchouchi, 2009; Fahed-Sreih and Djoundourian, 2006). The rationale is also based on the cultural index which is proposed by Hofstede (1980). He indicated that power distance, uncertainty avoidance, femininity and collectivism are high in Lebanon. In the acceptance of technology, Saleh (2008) found that the Lebanese is ready to adopt and accept certain behaviours just in order to impress the group he/she belongs to, or because of their

significant influence on the individual behaviour. Consequently, this research proposes the following hypothesis:

H3. SI will significantly have an influence on customers' BI to use IB in the Lebanese context.

PC
The authors argue that integrating PC into UTAUT will offer better prediction of customers' BI towards using IB. Recent research claimed that security and trust issues plays a major rule on user willingness to engage in online exchanges of money and personal sensitive information due to the high uncertainty, intangibility, heterogeneity and vague outcomes of using this channel (e.g. Daniel and Jonathan, 2013; Amin, 2009; Yuen *et al.*, 2010). The rationale is based on the fact that customers cannot evaluate the transactional situation in online banking services as in a face-to-face interaction with the physical bank personnel. For example, Yuen *et al.* (2010) found that trust and security issues are the most important factor in accepting the online banking systems in Romania. They concluded that many consumers refused to use the technology voluntary as they have to provide sensitive information on the net by which they do not have control over their own behaviour. They continued to advice that the policy makers should take privacy, security and trust concerns seriously when implementing the online system. Therefore, it is crucial for the user to believe that his/her banking transactions can be completed confidentially and safely via the internet (Amin, 2009). However, Daniel and Jonathan (2013) found that customers are likely to believe that IB is safe, when their banks tell them is safe which contradicts the truth about online security, while others claims that they have confidence in the bank but not in the technology. There is no doubt that consumers will only take part in the interaction if the perceived rewards exceed their fears from using the technology. The current study uses PC construct in order to measure the individual security, privacy and trust issues that may affect his/her intention to use IB. The rationale is based on the fact that users always fear losing money with transactions.

We believe that PC will be one of the most influential factors that may affect the acceptance and adoption of IB acceptance by Lebanese customers. The rationale is based on the fact that Lebanese are sensitive to the issues of eavesdropping and thus will have lack of trust in the security and in the privacy in the online environment (Harfouche, 2010). To this end, we postulate the following hypothesis:

H4. PC will have a positive effect on users' BI towards using the IB in Lebanon.

TTF
The main aim of this research was not similar to the study of Venkatesh and Zhang (2010), which is validating the UTAUT in different cultural context. In this research, we extend the UTAUT to include two additional constructs in order to understand the key factors that affect the individuals' BI to use and adopt IB in Lebanon. In this regard, we integrated the TTF within the UTAUT as an antecedent of BI. Empirical evidence shows that users will not simply accept and use the technology if it does not fit their needs and improve their performance (Junglas and Watson, 2008; Gebauer and Ginsburg, 2009).

Research on IB showed that providing the users with real-time services has significantly enhanced the customers' experience compared to traditional services (Alalwan *et al.*, 2014). Therefore, it is assumed that providing a good TTF will increase the users' BI to use the technology (Zhou *et al.*, 2010; Lin and Huang, 2008). This research assumes that this construct will be important in the Lebanese context. The rationale is based on the fact that implementing a technology from developed countries such as USA, and simply implements it in a developing country like Lebanon will boom to failure (Harfouche, 2010; Tarhini *et al.*, 2014a, b, c; Yahchouchi, 2009). For example, if the Lebanese customers do not require IB transactions (e.g. they are mostly in the office and have a low demand for IB services), then they will most likely select traditional banking rather than IB services. Hence, we hypothesis the following:

H5. TTF will have a positive significant influence on customers' BI towards using the IB in the Lebanese context.

FC

The FC has been defined as "the degree to which an individual believes that an organisational and technical infrastructure exists to support the use of the system" (Venkatesh *et al.*, 2003, p. 453).

There is no doubt that using IB services requires a particular kind of skill, resources and technical infrastructure and these facilities are not usually free at customer context (Zhou *et al.*, 2010). Multiple avenues of promotion of IB, and support from the organisation remove impediments to usage and influence adoption. IB, as a crucial service, requires the user to have the latest technology to use the system. As previously mentioned, the Lebanese banks have a relatively advanced and well-managed banking system and a huge amount of money and resources have been projected in this vein (Association of Banks in Lebanon, 2013). In the context of this study, FC will be measured by the perception of customers of whether they are able to access the required resources and the necessary support to use the IB services. Hence, it is expected that these external resources will lead the customers to adopt the IB system. Therefore, we propose the following hypothesis:

H6. FC will have a positive influence on actual usage of IB system in the Lebanese context.

BI and actual usage

BI is considered to be an immediate antecedent of usage behaviour and gives an indication about an individuals' readiness to perform a specific behaviour. Actual behaviour is "the manifest, observable response in a given situation with respect to a given target" (Ajzen, 1991). There is considerable evidence of the significant effect of BI on AU in information technology acceptance studies (e.g. Venkatesh *et al.*, 2003, 2012; Venkatesh and Zhang, 2010; Tarhini *et al.*, 2013b). This has recently been extended to the IB context (Im *et al.*, 2011; Ma *et al.*, 2010; Yu, 2012). Thus, the current study attempts to investigate the following hypothesis:

H7. Customers' BI will have a positive significant influence on his/her actual usage of the IB in the Lebanese context.

Research methodology

Sample and procedure

Similar to previous research in technology acceptance and specifically in IB (Im *et al.*, 2011), this study employed a quantitative research approach to test the proposed research model. More specifically, a personally administrated questionnaire containing 38 questions was used to collect a convenient sample from the current users of IB in Lebanon. Some of the data were collected from students from three universities and some others from regular customers from service halls of three banks located closely to those universities in Beirut during October and November 2013. Those participants were selected for this study for two main reasons. First, it was essential to include university students in our sample as previous research has confirmed that they are the largest age group in using the internet and technology (Yu, 2012), so they are most likely familiar with the IB, and also student sample reflects current and future banking customer (Alalwan *et al.*, 2014). Second, it was not feasible to collect data from other resources such as shopping malls, bus stops, etc. Hence, it is reasonable to expect that the experiences of the participants in this study are representative of what most internet users would experience.

Participation in the study was completely voluntary. Respondents were asked to complete a survey questionnaire based on their opinions and beliefs towards accepting and using the system. Those participants were briefed on the aim of this study and told of their rights to withdraw from the study before, during or after they had completed the questionnaire. On average, each participant took not more than 12 min to complete the questionnaire. To encourage participation, respondents were entered into a lucky draw to win various prizes. Out of the 600 distributed questionnaires 422 were returned indicating a 70.3 per cent response rate. After reviewing the returned questionnaires, 14 invalid questionnaires were excluded due to incomplete data. This left a total number of 408 responses for final analysis. As can be shown in the Table I, the gender split was 56 per cent males and 44 per cent females, with age range varied from 18 to 65 years old and their self-rated internet experience was either some or experienced. With respect to educational level, 9 per cent had secondary education, 37 per cent were diploma holders and 54 per cent had undergraduate degree or above.

Category	Frequency	%
Gender		
Male	228	55.88
Female	180	44.12
Age		
18 years-less than 25 years	153	37.5
25 years-less than 35 years	114	27.95
35 years-less than 45 years	95	23.28
45 years and above	46	11.27
Educational level		
Secondary education	37	9.06
Diploma	150	36.77
Bachelor and above	221	54.16
Experience in internet usage		
Some experience	15	35.4
Experienced	54	64.6

Table I.
Respondents
demographic profile

Measurement
All the scales for the current study were adapted from existing studies related to UTAUT
and previous empirical studies carried out in relation to TTF and PC to preserve the
validity and reliability of those items. More specifically, PE and EE were measured using
five items, whereas BI, SI and FC were measured using four items. These items were
adapted from Venkatesh *et al.* (2003) and related work (Yu, 2012; Venkatesh *et al.*, 2012;
Im *et al.*, 2011; Foon and Fah, 2011; Zhou *et al.*, 2010). Two items for the AU were also
adapted (Venkatesh *et al.*, 2003, 2012). In addition, TTF was measured using five items
and the scale was adapted from the work of Zhou *et al.* (2010) and Lin and Huang (2008).
Finally, five items were adapted from Yu (2012), Daniel and Jonathan (2013) and Amin
(2009) were used to measure the PC. A seven-point Likert scale ranging from 1, strongly
disagree to 7, strongly agree were used to measure the items that represent each
construct within the proposed research model. The demographic information about the
respondents such as gender, age, experience and educational level were measured using a
nominal scale. It should be noted that AU was measured using a self-report questionnaire
as it was not feasible to capture the actual use of the system through the users' log file.
The first question measures how frequently the users use the system, whereas the second
measures the average using of the system.

   The questionnaire was first developed in English, and then translated into Arabic
by a professional translator in English-Arabic language. Then the questionnaire was
translated back into English by another expert to ensure translation equivalence.
Although the questionnaire items were adapted from well-developed model, however
prior to further study, we conducted a pilot test with 30 participants randomly chosen
in order to revise and modify the questionnaire items and to establish content validity
and reliability. Some items were reviewed and modified based on the pilot-test results.

Analysis and findings
Descriptive analysis
The descriptive statistics for each factor in the proposed research model is presented
in Table II. All means were greater than 4.37 which indicate that the majority of
participants express positive responses to the constructs that are measured in this
study. Additionally, Cronbach's α scores indicated that all factors exhibited strong
internal reliability.

Measurement model
As suggested by Anderson and Gerbing (1988) and Schumacker and Lomax (2010), this
study employed a two-step approach to examine the relationship among the factors

Construct	Mean	SD	Cronbach's α
PE	4.52	1.14	0.908
EE	5.30	1.05	0.905
SI	4.15	1.17	0.829
PC	4.37	1.26	0.904
TTF	4.84	0.97	0.858
FC	5.07	1.13	0.785
BI	4.95	1.23	0.849
AU	5.12	1.25	0.757

Table II.
Descriptive statistics
of the constructs

within the proposed model. The measurement model was first analysed to assess the reliability and validity of the instrument before testing our research hypotheses in the structural model. First, a confirmatory factor analysis based on AMOS 20.0 was used to first consider the measurement model fit and then evaluate the validity of the measurement model (Arbuckle, 2009). This study adopts the maximum-likelihood method to estimate the model's parameters where all analyses were conducted on variance-covariance matrices (Hair et al., 2010). However, it was essential to test for multicollinearity before proceeding with our analysis. According to (Pallant, 2010), multicollinearity occurs when two or more variables are highly correlated to each other. Different values were suggested to be satisfactory by different scholars. For instance, correlations up around 0.8 or 0.9 is considered highly problematic according to (Tabachnick and Fidell, 2007) while a value 0.7 or higher is considered reason for concern according to (Pallant, 2010). The presence of multicollinearity is determined by two values: tolerance and variance inflation factor (VIF) (Pallant, 2010). If the value of tolerance is greater than 0.10 and VIF value less than 3.0, then there is no multicollinearity. Given all the independent constructs had VIP value less than 3.0 and tolerance value above 0.10, this suggests the absence of multicollinearity in our sample.

There are some fit indices that should be considered in order to assess the model goodness-of-fit (Hair et al., 2010; Kline, 2010). First, it was determined using the minimum fit function χ^2. However, as the χ^2 was found to be too sensitive to sample size and is not always the best indication of model fit (Hu and Bentler, 1999), the ratio of the χ^2 static to its degree of freedom (χ^2/df) was used, with a value of less than 3 indicating acceptable fit (Carmines and McIver, 1981). This study used a range of additional fit indices as recommended by Hair et al. (2010), these indices are: "goodness-of-fit index; normed fit index; parsimony normed fit index; root mean square residuals; comparative fit index; adjusted goodness-of-fit index; and the root mean square error of approximation". We deleted some indicators SI3, FC4, PC4 and TTF5 from the initial measurement model in order to ensure a good fit between the model and the data. The process was to delete one indicator at a time and then re-estimate the model. The actual and recommended values of model fit indices are listed in Table III. It is clear from the table that all fit indices were in the recommended range. Therefore, we can proceed to assess convergent validity, discriminant validity in addition to reliability in order to evaluate and validate if the psychometric properties of the measurement model are adequate.

Fit index	Recommended value[a]	Measurement model	Structural model
χ^2	NS at $p < 0.05$	574	583
df	n/a	339	348
χ^2/df	< 5 preferable < 3	2.553	2.558
GFI	> 0.90	0.918	0.920
AGFI	> 0.80	0.873	0.874
CFI	> 0.90	0.937	0.936
RMSR	< 0.10	0.074	0.076
RMSEA	< 0.08	0.053	0.053
NFI	> 0.90	0.932	0.928

Table III.
Fit indices summary for the final measurement and structural model

Notes: AGFI, adjusted goodness-of-fit; CFI, comparative fit index; df, degrees of freedom; GFI, goodness-of-fit index; NFI, normed fit index; RMSEA, root mean square error of approximation; RMSR, root mean square residuals
Sources: [a]Hu and Bentler (1999), Kline (2010) and Hair et al. (2010)

Convergent validity confirms whether each construct can be reflected by its own indicators (Gefen *et al.*, 2000) in order to ensure unidimensionality of the multiple-item factors and to eliminate unreliable indicators (Bollen, 1989). Discriminant validity assesses the extent to whether the measures of different concepts are statistically different (Gefen *et al.*, 2000). As suggested by Hair *et al.* (2010), reliability, convergent validity and discriminant validity can be assessed by using composite reliability (CR), average variance extracted (AVE), maximum shared squared variance (MSV), and average shared squared variance (ASV). To establish reliability, Hair *et al.* (2010) suggest that CR should be at least 0.6 and preferably above 0.7. To establish convergent validity the AVE should be at least 0.5 (50 per cent of the variance of the indicators has to be accounted for by the latent variables) and CR is greater than the AVE, whereas discriminant validity is supported if MSV is less than AVE and ASV is less than AVE (Hair *et al.*, 2010). As shown in Table IV, the CR for all the constructs were above 0.7 and ranged from 0.76 to 0.91, while the AVE ranged from 0.53 to 0.77 which is well above the threshold value of 0.5, and therefore adequate internal consistency and convergent validity were supported. Additionally, the MSV for all constructs is less than AVE and the square root of AVE is higher than their correlation value and therefore the constructs illustrated sufficient discriminant validity.

Based on the examination of the measurement model, it is concluded that each variable represents a reliable and valid factor. Therefore, the next step was to assesses the structural model in order to test the research model and examine the hypotheses.

Structural model
Based on the same criteria used for measurement model to measure the goodness-of-fit for the proposed model, the results of the structural model were very close to the measurement model which again indicated good fit of the data (see Table III). Thus, we proceed to examine the hypothesised relationships within the model.

As can be shown in Table V, except *H2*, the results of the path coefficient showed that all other hypotheses were supported. More specifically, PE ($\alpha = 0.260$, $p < 0.01$), SI ($\alpha = 0.211$, $p < 0.01$), PC ($\alpha = 0.131$, $p < 0.1$) and TTF ($\alpha = 0.216$, $p < 0.01$) were found to have a significant positive influence on BI towards using IB, with PE having the strongest magnitude on the relationship with BI. These results donate support for *H1*, *H3*, *H4* and *H5*. Surprisingly, the path coefficient from EE to BI was not significant. As a result, this study failed to find support for *H2*. PE, SN, TTF and PC explained 61 per cent of the variance of BI, with PE contributing the most to BI than the other constructs. On the other hand, the results of the statistical analysis of the research

Factor	CR	AVE	MSV	ASV	PC	PE	EE	SI	TTF	FC	AU	BI
PC	0.913	0.772	0.420	0.265	0.877							
PE	0.908	0.668	0.319	0.217	0.369	0.820						
EE	0.916	0.747	0.327	0.269	0.567	0.562	0.863					
SI	0.838	0.534	0.269	0.195	0.489	0.451	0.394	0.712				
TTF	0.867	0.612	0.479	0.274	0.470	0.513	0.520	0.423	0.776			
FC	0.885	0.745	0.421	0.280	0.645	0.352	0.574	0.454	0.510	0.863		
AU	0.768	0.530	0.438	0.234	0.515	0.386	0.393	0.318	0.426	0.582	0.711	
BI	0.856	0.705	0.479	0.339	0.513	0.563	0.572	0.526	0.596	0.525	0.562	0.842

Note: Factor correlation matrix with $\sqrt{\text{AVE}}$ on the diagonal

Table IV.
Construct reliability,
convergent validity
and discriminant
validity

model showed that both FC ($\alpha = 0.194$, $p < 0.01$) and BI ($\beta = 0.542$, $p < 0.001$) significantly influenced the actual usage of the system and jointly accounted for 64 per cent of the variance in AU, with BI contributing the most to AU compared to FC. Thus, *H6* and *H7* were supported. It is important to note that our proposed research model explained more variance of BI and AU compared to the original UTAUT.

Discussion and conclusions

The main aim of this study was to extend the UTAUT by integrating PC and TTF constructs in order to investigate the factors that affect the consumers' intention to use IB in Lebanon. Our findings supports theoretically and empirically the ability of UTAUT to be a useful theoretical framework for better understanding the customers' acceptance of IB. Overall, our results showed that IB is well accepted in Lebanon. Most of the path coefficients in the proposed model were found statistically significant except the path from EE to BI. More specifically, our results shows that consumers' intention to use and adopt the IB system was found to be significantly affected by PE, SI, PC and TTF, while EE did not play a salient role in influencing BI to use the system. Our results also show that both FC and BI were found to be significant determinants of the actual usage of IB. Overall, the proposed model achieves acceptable fit and explained 61 and 64 per cent of the variance of BI and AU, respectively, which is higher than that of the original UTAUT.

Regarding the PE, this study found that PE was the strongest determinant within the proposed model. Our results are consistent with those of previous research (Venkatesh *et al.*, 2012; Venkatesh and Zhang, 2010; Tarhini *et al.*, 2013a; Ezzi, 2014). Hence, when the users find the system to be useful then they are more likely to have better perception about using the technology. Therefore, practitioners should improve the quality of their IB system based on users' suggestions in order to attract more users and meet their expectations and needs. In order to achieve this, policy makers should provide user manual that include a detailed instructions about the benefits of the system such as services that allows users to perform banking transactions at anytime from anywhere in the world.

Although users are not affected by referent groups but by individuals' necessity in a voluntary context (Venkatesh *et al.*, 2003; Venkatesh and Davis, 2000), our results indicate that SI has a significant positive influence on BI which is consistent with the majority of previous studies (e.g. Foon and Fah, 2011; Zhou *et al.*, 2010; Tarhini *et al.*, 2014a, b, c). In this context, it is advised that practitioners should persuade earlier adopters of the system to help in promoting it to other users. This is very crucial in the Lebanese culture which scores high on uncertainty avoidance, power distance, femininity

	Path	Path coefficient	Results
H1	PE → BI	0.260**	Supported
H2	EE → BI	0.072	Not supported
H3	SI → BI	0.211**	Supported
H4	PC → BI	0.131*	Supported
H5	TTF → BI	0.216**	Supported
H6	FC → AU	0.194**	Supported
H7	BI → AU	0.452***	Supported

Table V.
Path coefficient and their significance

Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; NS $p > 0.01$

and collectivism (Hofstede, 1980). Generally speaking, in such environments, consumers may be influenced by positive word-of-mouth from their referent peers. In an attempt to attract more users, banks are also advised to enhance the use of social websites and communities such as Facebook, Twitter, Blogs and SMS messages through mobile phones and e-mail as well as traditional media such as newspapers, television and radio. This, in turn, will affect customers' decision to adopt and accept the technology.

A growing number of studies suggest that FC play an important role in the actual usage behaviour of technology (Venkatesh *et al.*, 2003; Venkatesh and Zhang, 2010; Yu, 2012) and the findings of this study confirms their studies in the context of IB. Therefore, banks need to invest more in ICT infrastructure and should also provide all facilities for the customers such as marketing campaigns, setting up customer service centres to increase the users' skills in using computers. By doing so, customers are more likely to derive interest in accepting IB.

Interestingly, EE has unexpectedly emerged in this research as an insignificant predictor of customers' intention to use IB. Even though this finding is inconsistent with previous research (Venkatesh *et al.*, 2003; Venkatesh and Zhang, 2010), it is similar to those of Yu (2012), and Koenig-Lewis *et al.* (2010). A possible reason is that difficulty in using internet and computers is becoming less of a concern for the consumers as they become more user-friendly. As a result, the consumers will mainly use the on-line systems because of its perceived usefulness rather than its ease of use. Therefore, it is advised that software developers should design more user-friendly IB interfaces in order to encourage consumers with less computer skills to adopt and use the system.

Furthermore, this study found that TTF has a significant positive influence on BI towards using IB. This is consistent with the findings of previous research (Zhou *et al.*, 2010; Junglas and Watson, 2008). Therefore, it is advised that service providers should consider the fit between the task required by the users to perform the service and the system functions before promoting their online services. For example, IB is more convenient for those always staying in the office and do not have time for traditional banking services since they can perform banking transactions from anywhere at any time. As a result, the customers' intention to such user group will be greater than otherwise.

Similarly, the empirical evidence of this study revealed that the PC was a significant factor in influencing intention to use the IB. Our results support the majority of previous studies (Amin, 2009; Yuen *et al.*, 2010; Daniel and Jonathan, 2013). It is therefore advised that banks should enhance consumer confidence and trust in using IB by providing secure and reliable services especially when the use of the system is voluntary such in the case of Lebanon. For example, safety measures programs such as firewalls and intrusion detection should be enforced during any IB service. Accordingly, a major security concern should be given to "Phishing" which was found in previous research to be the key tool that fraudsters use to attack banks (Amin, 2009). In addition, banks should also emphasise on the positive safety features of the system during any marketing campaign rather than building brand awareness. Hence, when IB is secure and builds an innovative reputation, bank customers' intention to use the system will be greater.

Limitations and future research
Like any other research using statistical methods, this study has some limitations that should be considered before interpreting the findings. The first limitation

concerns generalisability of the results since this study was based on non-probabilistic sampling technique. Additionally, the users were mostly experienced in using the technology which could cause a selection bias. Therefore, future research could include data from users with different background and experience. Second, this research studied one type of technology (IB) from one country (Lebanon). Future research can study different technologies (e.g. mobile banking), or be conducted on different countries. Third, although this study extended the UTAUT to include two other predictors namely; PC and TTF, the results of the explanatory power of the research model provide evidence that there still room for improvement. Therefore, future research could include other predictors (e.g. habit, familiarity with bank) that may increase the applicability of the UTAUT to a wide range of technology contexts. Finally, although this study was based on a quantitative research approach and the research aims and objective were met, it would have strengthened our findings if we used a mix-method approach.

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