Antecedents of Mobile Banking Usage among Students: A Pilot Study at Universities in Lebanon

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Abstract

Mobile banking use in Lebanon has marked the post war era of banking service evolution. Banking institutions are offering differing features and functionalities of mobile services. Millennials have taken up the lion's share of mobile services addiction, however, clarity lacks on what factors could influence their use of mobile banking. The principal objective of this study is to test antecedents of preference for interaction, familiarity with technology and quality of service influence mobile banking usage among students in Lebanese Universities. Thus, this paper introduces a pilot study using a survey questionnaire at two universities to help answer this question. 87 informants completed the survey. For data analysis, this paper uses the SEM-PLS method then develops a set of findings that could guide a larger scale research on the topic. Theories of human computer interaction design and technology acceptance are used as grounding.

Keywords: Mobile banking, interaction, quality of service; Task-technology fit, Technology Acceptance Model.

1. Introduction

For our work, mobile banking is a product or service offered by a banking institution for "*conducing financial and non-financial*

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transactions using mobile devices such as a mobile phones, smartphones or tablets" (Shaikh & Karjaluoto, 2015). Mobile banking services enable users to receive information about their financial profile in their banking institution. Users benefit from this self-service technology for viewing account balances, completing transactions, performing transactions such as fund transfers between accounts, stock trading, and confirmation of payments (Mallat, Rossi, & Tuunainen, 2004).

Banks are embracing mobile banking to capitalize on the cost reducing potential of traditional physical branch banking (Mas & Kumar, 2008) and increase customer retention (Floh & Treiblmaier, 2006) through high touch mobile application. In addition, banking marketing strategists are attracted to the potential of increased customer satisfaction through value added mobile services and to augmented cross selling opportunities of mobile banking (Vinayagamoorthy & Sankar, 2012; Juniper, 2014).

To the consumer, mobile banking brings the promise of flexibility, ubiquity and convenience (Wessels & Drennan, 2010; Luarn & Lin, 2005). Mobile banking technology makes it possible for customers to conduct their transactions anywhere, anytime (Koenig-Lewis, Palmer, & Moll, 2010) while providing customers with enhanced information, convenience and time savings (Sullivan Mort & Drennan, 2007). Consequently, consumers tend to use mobile devices for simple banking transactions, in situations in which they need instant access to their accounts, and when their other banking channels are not in reach (Hoehle, Scornavacca, & Huff, 2012).

With the increasing popularity of mobile personal devices, the rate of consumer adoption of mobile banking was expected to experience a substantial growth exceeding established retail banking channels such as online banking, telephone banking or ATMs (Steward, 2009). That was true especially in developing countries (Chakrabarty, 2012), where, most often, a poor legacy infrastructure prevents to the expansion of alternate brick and mortar or fixed services (Govindarajan, 2012).

The number of global cell phone users has crossed the 4.61 billion, and this quantity is expected to reach 4.77 billion (i.e. 65 % of world population) by 2017 (BGFRS, 2015). In the past decade this potential

burst in mobile devices has often led to very optimistic estimations about mobile banking's potential for the financial industry (Gartner, 2008). Whereas Gartner's Hype Cycle for mobile applications in 2008 expected broad adoption of Mobile Banking at latest in 2013. However, in more recent years, some negative trends in the adoption of this innovative service has piqued an interest in studying factors that motivate the adoption of m-banking services in both developed and developing countries (Hanafizadeh, Behboudib, Koshksarayc, & Tabarc, 2014).

2. The context of Lebanon

In the post war era, Lebanese banks have hasted to compete for market share (Peters, 2004), especially, in mobile banking "offering unique applications with a unique name that offers consumers, users or bank account holders with privileges and advantages that other banking channels may not offer" (Audi, 2015). In a study conducted on mobile banking adoption in Lebanon, Audi (2015) found that a relationship between antecedents of perceived usefulness, ease of use, compatibility and trust in mobile banking services and customer attitude towards their banking services. However, to the best of our knowledge, studies treating mobile banking adoption have not been conducted on students in Lebanon.

The locus of the sample selected for our paper is set among Lebanese university students. This choice was based on an interest to investigate the increased mobile technology engagement level among university students, especially in the Mediterranean basin (Govender & Sihlali, 2014). Thus, this paper addresses themes of adoption in the Lebanese context identifying factors influencing mobile banking usage in Lebanon's banking industry in an attempt to answer the following question:

Do antecedents of preference for interaction, familiarity with technology and quality of service influence mobile banking usage among students in Lebanese Universities?

In an attempt to answer the research question, the authors extend the Technology Acceptance Model (TAM) at the intersection point of human computer interface design and task technology fit. Antecedents are

defined and their relation to TAM is tested. After data collection, an analysis phase is carried out in two stages: The first uses a descriptive style to lay out the results of the SmartPLS analysis and the second stage provides a thorough analysis of the relationship between the stated antecedents and the TAM variables defined. Finally, the paper concludes with an overview of the findings and a triangulation with existing streams of literature for rigor and support.

3. Literature review

Studies on consumer adoption of mobile banking have received increased attention since 2010. A survey of the recent literature shows that adoption models tested across self-service technologies applied mobile banking (Mortimer, Neale, Hasan, & Dunphy, 2015) were rigorous in the application of technology acceptance models (TAM). Early models for technology acceptance stated that technology system usage is predicted by perceived ease of use and perceived usefulness (Davis, Bagozzi, & Warshaw, 1989). These models have been researched in diverse technology perspectives and extensive testing has shown the robustness (Gefen, Karahanna, & Straub, 2003) supporting the influence of factors of technology readiness, perceived ease of use and perceived usefulness on the adoption of self-service technologies (SST). Nevertheless, information technology and marketing literature found that such adoption models could not fully generally explain the adoption phenomena across different demography of the world's population (Lee and Allaway, 2002; Dabholkar, Bobbitt, & Lee, 2003; Curran & Meuter, 2005; Wang & Benbasat, 2007; Kelly, Lawlor, & Mulvey, 2010; Hsiao & Tang, 2015).

In agreement with adoption theories, the level adoption of self-service technologies, such as mobile banking, was found to depend on the level of customization of the technology (Cunningham, Young, & Gerlach, 2008) and the influence of factors of technology readiness (Lin, 2011). Among these factors, perceived relative advantage, ease of use, compatibility, competence and integrity could lead to adopt mobile banking use (ibidem).

Prior research have compared mobile banking with different

electronic modes of banking services in terms of characteristics, acceptance and adoption (Curran and Meuter, 2005; Karjaluoto, Töllinen, Pirttiniemi, & Pihlström, 2012). For instance, it was recognized that contrary to previous findings, security issues are not perceived by customers to be major obstacles in mobile banking transactions (Suoranta & Mattila, 2004; Laukkanen & Lauronen, 2005), echoing earlier findings that trust is a dynamic process that develops gradually over time and is connected with an acquired sense of security (Lewicki & Bunker, 1996).

Other studies have focused on identifying factors that push or impede mobile banking's adoption (Wessels & Drennan, 2010; Riquelme & Rios, 2010; Koenig-Lewis et al., 2010). Research in different geographic, social or technological context have used the technology acceptance model theory and applied it to mobile banking specific characteristics to identify as well as test factors that support (e.g. awareness and content, guidance by the providing banking institution, ease of use) or impede (e.g. risks, costs, security concerns, trust, privacy doubts, ethnic and gender differences, etc.) broad adoption of mobile banking (e.g. Hoehle et al., 2012; Cruz, Neto Muñoz-Gallego, & Laukkanen, 2010; Laukkanen & Kiviniemi, 2010; Püschel, Mazzon, & Hernandez, 2010; Kim, Shin, & Lee, 2007; Luarn & Lin, 2005) investigated the adoption of mobile services by US customers from the perspectives of channel extension (mobile vs internet), keeping in consideration. The table below is illustrative of factors themed on a sense of security and control, level of technology customization, cultural, geographic and biographic contexts. Other factors could relate to the availability, quality, and convenience of the services.

In a nutshell, there is not a unified position regarding adoption factors affecting use of mobile devices for banking (Shaikh & Karjaluoto, 2015). Extending the apparent themes of our literature review, we focus this paper on extending the model of technology acceptance to include elements of interaction and service quality.

Table 1: Sample of the literature review on factors that impede or encourage adoption

Reference	Theme	Factors Impeding (-) or Encouraging (+) Adoption
Luarn and Lin, 2005	Convenience	(+) Flexible, ubiquitous and convenient
Laukkanen, 2007	Sense of Security and control	(+) Secure, and a sense of constant control over financial assets
Kim et al., 2007	Cultural and geographic contexts	(+) Vary among regional and cultural contexts
Cunningham et al., 2008	Level of technology customization	(-) Level of customization of the technology
Lee and Lee, 2008	Biographic contexts	(-) Ethnic and gender differences
Wessels and Drennan, 2010	Quality of the services	(+) Availability of services
Riquelme and Rios, 2010	Quality of the services	(+) Mobile use leads to quality service delivery
Püschel et al., 2010	Quality of the services	(+) Better digital alternative of online banking
Luo et al., 2010	Interaction	(+) An innovative method of interaction
Lin, 2011	Perceptions of use	(-) Perceived relative advantage, ease of use, compatibility, competence and integrity
Hoehle et al., 2012	Interaction	(+) … the "better digital alternative
Karjaluoto et al., 2014	Convenience	(+) Ease of use and speed of delivery

4. Conceptual foundations

As a theoretical foundation for our model, the literature sources reviewed for this study consist of publications such as the Journals of Community Informatics, Information technology for development, Information Technologies and International Development, Electronic Journal of Information Systems in Developing Countries, Journal of the Association for information systems, in addition to relevant references from Journals of Marketing, Service Industry, etc. For our conceptual model, we consider an intersection between human computer interaction (HCI) design theory and the theory of technology acceptance (TAM),

with perceived ease of use and perceived usefulness as the two fundamental variables from TAM models that could predict use of mobile banking.

4.1. TAM (USEFULNESS and EASE OF USE) extension

We attempt to extend TAM (Davis et al., 1989) using external variables of (HCI) with factors of enjoyment of interaction, usability (due to the quality of the design) and familiarity with the use of technology (Rogers, 2012). Other research have proposed such extensions in direction of incorporating risk factors (Venkatesh & Davis, 2000), gender differences (Gefen & Straub, 1997) and others discussing security and privacy issues in the context of online banking use (Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila, 2004). At a distance from the technology attributes, researchers have placed their focus on antecedents such as perceived need, ease of use and usefulness (Curran and Meuter, 2005; Parkinson & Ramirez, 2006; Lin, 2011; Kaushik & Rahman, 2015).

4.2. Enjoyment of INTERACTION

Grudin (1992) identifies human–computer interaction studies as "inquiries into the ways in which humans make, or do not make, use of computational artifacts, systems and infrastructures". Thereafter, Dabholkar et al. (2003) and Curran & Meuter (2005), had proposed that the population would be attracted to the SST technology because they **enjoy the interaction**. Conversely, people who may not have favorable attitudes towards technology may avoid SSTs because they cannot replace the personal interaction (Dabholkar et al., 2003; Lee & Allaway, 2002). Some authors even argue that even past experience in interaction may influence SST attitudes (Wang, Harris, & Patterson, 2012).

4.3. Usability of the service (QUALITY)

Similarly, usability of SST and software interfaces has preoccupied scholars and researches who related mostly to the quality of the design of the interface (Bevan, 1995; Bevan, 2001) leading to a quality of use and

quality of experience (McNamara & Kirakowski, 2005). Offering flexibility and customization to individual consumer needs, SSTs are believed to improve service quality perceptions (Bitner, Ostrom, & Meuter, 2002). These perceptions are represented by time and money saving and Time and place convenience (Meuter, Ostrom, Roundtree, & Bitner, 2000). A common theme among researchers who investigated electronic service quality perceptions of technology-based banking services was linked to the convenience of these services (Joseph, McClure, Joseph, 1999; Al-Hawari, Hartley, & Ward, 2005) leading to an increased customer satisfaction (Sindwani and Goel, 2015). The provision of convenient/accurate electronic banking operations for UK banking customers was one of the key factors of the electronic service quality perceptions (Ibrahim et al., 2006). Later, Ganguli and Roy (2011) posited that technology convenience, and technology usage easiness and reliability was important to undergraduate students.

4.4. Familiarity with the USE OF TECHNOLOGY

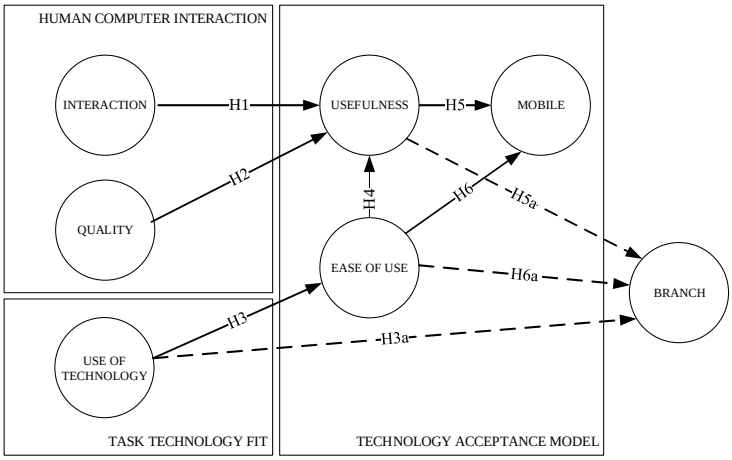
Models addressing behavior intentions viewed perceived ease of use as a function of task/technology fit (Mathieson & Keil, 1998). Findings show that willingness to use the self-service technology in the financial scope, is related to the capability to engage with these service systems (Walker & Johnson, 2006). Factors such as technology anxiety were shown to lead to confusion regarding the task to be performed and to a decreased level of motivation to use (Meuter & Bitner, 1997). Tarhini, Hone, Liu, and Tarhini, (2016) confirmed that task-technology fit as significant predictors of ease of adoption of internet banking in Lebanon. Hence, we have opted to study the construct of use of technology as an antecedent to perceived ease of use influencing the adoption and use of mobile banking.

5. Research model

Grounded in the literature, we developed the conceptual model (Figure 1). For this study, the original TAM was modified to show the hypothetical antecedent relationship between preferences for personal contact (INTERACTION) (Hypothesis H1), perceived service quality (QUALITY) (Hypothesis H2) to USEFULNESS. The USE OF

TECHNOLOGY construct is also tested as an antecedent to perceived EASE OF USE influencing the adoption and use of mobile banking (Hypothesis H3).

Figure 1: Research model



A summary of the hypothesis is presented in Table 2 below.

Table 2: Model hypothesis

Hypothesis	Statement
H1	There exists between INTERACTION (preferences for personal contact) an antecedent relationship USEFULNESS
H2	There exists relationship between QUALITY (perceived service quality) as an antecedent to USEFULNESS
H3	There exists between the USE OF TECHNOLOGY as an antecedent relationship (perceived) EASE OF USE
H3a	There exists a connection between the USE OF TECHNOLOGY (familiarity with the use of technology) and BRANCH (preferences for visiting a branch)
H4	There exists a connection between the EASE OF USE and USEFULNESS
H5	USEFULNESS influences (the use of mobile banking) MOBILE.
H5a	There exists a connection between USEFULNESS and BRANCH (the propensity to visit a branch instead of using mobile banking).
H6	EASE of USE will influence use of mobile banking (TAM)
H6a	There exists a connection between EASE OF USE and BRANCH (the propensity to visit a branch instead of using mobile banking).

Following TAM, we have included EASE OF USE and USEFULNESS as mediating variables to mobile use (MOBILE). As Davis (1989) showed, we hypothesize that USEFULNESS and EASE of USE will influence use of mobile banking (Hypotheses H5, H6), and predict a relationship between EASE OF USE and USEFULNESS (Hypothesis H4). In order to enrich our model, we have added relationships that hypothesize (H5a, H6a) connections between USEFULNESS, EASE OF USE and a dependent variable BRANCH. This variable indicates a state where users would prefer to visit the branch in person instead of using mobile banking. Additionally, we posit a connection between the familiarities with the use of technology which may impact the decision to visit a branch instead of using mobile banking. This connection is proposed as Hypothesis H3a between the USE OF TECHNOLOGY and BRANCH.

6. Data collection

As noted by Leedy and Ormrod (2001), "*Research is a viable approach to a problem only when there are data to support it*". In order to answer the research question, an online survey was conducted among a share of demography of Lebanese students for the pilot study (Appendix 2). The technique of convenience sampling was used as students were willing to answer the questionnaire as it was administrated on the spot after their courses. The population for this survey consisted of students in Saint Joseph University and the Lebanese University. Despite the modest number of respondent (87), the purpose of this exploratory and descriptive pilot study was to discover the major factors that affect the usage of mobile banking among students in Lebanon. The participation to the survey was completely voluntary and anonymous.

The Web-based survey was conducted using a survey free software program: mon-enquete-en-ligne.fr. Although the maximum number of data of respondent were 87 and maximum time of usage were one month, the program offered many features including unlimited number of survey questions, ability to do result filtering, and the capability to export data for statistical analysis.

Variables used in the survey are summarized in Table 3.

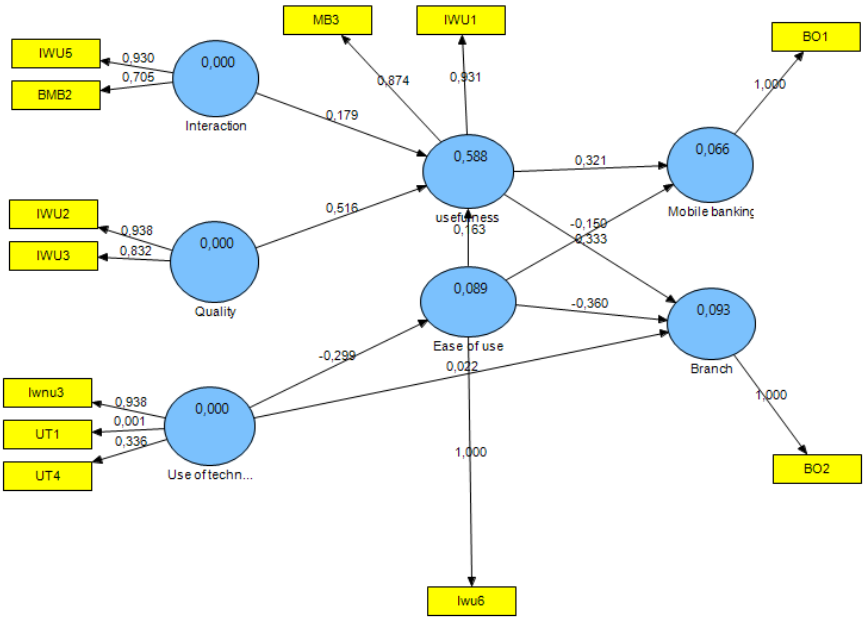
Table 3: Variables and measures

Variable	Measure	Survey Questions	Indicator
INTERACTION	Enjoy the interaction	I will use mobile banking because I enjoy the interaction	IWU5
		Do you believe that mobile banking will be used only by people who enjoy interaction?	BMB2
QUALITY	It saves me time	I will use mobile banking because It saves me time	IWU2
	It saves me money	I will use mobile banking because It saves me money	IWU3
USE OF TECHNOLOGY	Use of phone	How many hours per week do you use social media or other APPs on your phone?	UT1
	Use of other computing devices	How many hours per week do you use a computer for personal reasons?	UT4
	Previous experience	I will not use mobile banking because I had a previous bad experience with technology	IWNU3
EASE OF USE	Easy to use	I will use mobile banking because it is easy to use	IWU6
USEFULNESS	Has benefit	Do you think that mobile banking is beneficial to you?	MB3
	Convenient	I will use mobile banking because it is convenient	IWU1
MOBILE	Use of mobile phone for banking	How many hours per week do you use mobile phone banking service?	BO1
BRANCH	Visiting a branch	How many hours per week do you visit your branch bank?	BO2

7. Data analysis

We next perform the data analysis using SMARTPLS, a standalone software specialized for PLS path models (Monecke & Leisch, 2012). The PLS path modeling estimation for our study is shown in the figure 2 below:

Figure 2: PLS algorithm



The following sections describes the findings in the context of these antecedent variables (INTERACTION, QUALITY and USE OF TECHNOLOGY). Observations regarding inner model path coefficient sizes and significance, reliability and validity are offered.

7.1. Inner model path coefficient sizes and significance

The results of the inner model coefficient review suggests that QUALITY has the strongest effect on USEFULNESS (~0.516), followed by INTERACTION (~0.179) and EASE OF USE (~0.163). This is supported by the fact that the path coefficient is larger than 0.1 (Reference). Additionally, as shown in table 4, USE OF TECHNOLOGY as measured has a negative effect on EASE OF USE (~ - 0.299) and very little effect on BRANCH (~0.022). A careful review of statistical significance show that the relationship between USE OF TECHNOLOGY and BRANCH shows little significance (Path Coefficient = 0.0219) (Table 4).

It is noteworthy that the easier the use of mobile banking applications the lesser is the propensity to visit a branch (Path coefficient of EASE OF USE – BRANCH ~ -0.360). However, an unexplained anomaly can be observed in the negative path coefficient between EASE OF USE and MOBILE (~ -0.1497). Nevertheless this a weak relationship.

All path coefficient values are summarized in the table 4 below:

Table 4: Path coefficients (parenthetic values are negative)

	BRANCH	EASE OF USE	MOBILE	USEFULNESS
EASE OF USE	(0.3602)		(0.1497)	0.1632
INTERACTION				0.1794
QUALITY				0.5161
USE OF TECHNOLOGY	0.0219	(0.2986)		
USEFULNESS	0.3329		0.3205	

The path coefficient value between variables USE OF TECHNOLOGY and BRANCH does not support a statistically significance, which is supported for all others in table 5.

Table 5: Path relationship between variables

The path relationship between…	Is statistically significant?
EASE OF USE and BRANCH	Yes
EASE OF USE and MOBILE BANKING	Yes
EASE OF USE and USEFULNESS	Yes
INTERACTION and USEFULNESS	Yes
QUALITY and USEFULNESS	Yes
USE OF TECHNOLOGY and BRANCH	No
USE OF TECHNOLOGY and EASE OF USE	Yes
USEFULNESS and BRANCH	Yes
USEFULNESS and MOBILE BANKING	Yes

7.2. Checking reliability and validity

7.2.1. Indicator reliability

In this research, the loadings of interaction variable (Table 6) explain good indicators (IWU5, 0.930 and BMB2, 0.705). This means that the indicator IWU5 affects INTERACTION variable better than BMB2. With loadings of 0.938, and 0.832 respectively, people have good perception of the QUALITY that can give mobile banking. Furthermore, the composite indicator reliability for is confirmed (greater or equal to 0.4 – according to Hulland, 1999), with the exception of two: UT1 and UT4, which may indicate that the use of phone and other computing devices may not adequately explain the behaviour of USE OF TECHNOLOGY in the context of this model.

Table 6: Outer loadings

	BRANCH	EASE OF USE	INTERACTION	MOBILE	QUALITY	USE OF TECHNOLOGY	USEFULNESS
BMB2			0.7047				
BO1				1.000			
BO2	1.000						
IWU1							0.9311
IWU2					0.9382		
IWU3					0.8321		
IWU5			0.9296				
Iwnu3						0.9383	
Iwu6		1.000					
MB3							0.8736
UT1						0.0012	
UT4						0.3355	

7.2.2. Convergent validity

Convergent validity is confirmed for indicators of INTERACTION and QUALITY (AVE are 0.5 or higher – (Bagozzi & Yi, 1988)), however convergent validity is not confirmed for USE OF TECHNOLOGY (AVE = ~0.3310 < 0.5) (Table 7). This means that the indicators used do not reliably describe this latent variable.

7.2.3. Target endogenous variable variance

As can be visible in the tabulated results (Table 7), the coefficient of determination, R^2 is 0.588 for the USEFULNESS endogenous latent variable. It means that the three latent variables (INTERACTION, QUALITY and EASE OF USE) moderately explain 58.8 % of the variance in USEFULNESS. USE OF TECHNOLOGY explain 8.9 % of the variance in EASE OF USE. USEFULNESS, EASE OF USE explain 6.6 % of the variance in MOBILE (mobile banking). USEFULNESS, EASE OF USE and USE OF TECHNOLOGY explain only 9.3 % of the variance in BRANCH.

Table 7: Quality criteria (parenthetic values are negative)

	AVE	**Comp. Reliability**	R^2	**Cronbachs Alpha**	**Communality**	**Redundancy**
BRANCH	1.0000	1.0000	0.0925	1.0000	1.0000	(0.0125)
EASE OF USE	1.0000	1.0000	0.0891	1.0000	1.0000	0.0891
INTERACTION	0.6805	0.8069		0.5651	0.6805	
MOBILE	1.0000	1.0000	0.0663	1.0000	1.0000	(0.0364)
QUALITY	0.7863	0.8800		0.7412	0.7863	
USE OF TECHNOLOGY	0.3310	0.4476		0.1874	0.3310	
USEFULNESS	0.8151	0.8980	0.5883	0.7775	0.8151	(0.1395)

7.2.4. Bootstrapping (T-statistics)

Figure 3 and Table 10 (Appendix 1) show bootstrapping results exposes T-Values for our model. Bootstrapping is a nonparametric procedure that is applied to test whether coefficients such as outer weights, outer loadings and path coefficients are significant by estimating standard errors for the estimates. For each hypothesis, values of (Inner

model path coefficient > 0.1) and (Bootstrapping > |1.96|) conclude hypothesis support. Hence, table 8 indicates that all hypotheses of the proposed model are supported with the exception of H3 and H6 while H4 is uncertain (Bootstrapping = 1.945 which is close to the limit of |1.96|).

Finally, as seen in table 8 below, hypotheses H3a, H4 and H6 are not supported.

Table 8: Hypotheses and outcomes

Hypothesis	Findings		Hypothesis Supported?
	Inner model path coefficient > 0.1 (parenthetic values are negative)	*Bootstrapping > |1.96|*	
H1	0.179	2.061	YES
H2	0.516	5.830	YES
H3	(0.299)	2.450	YES
H3a	0.022	0.220	NO
H4	0.163	1.945	NO (borderline)
H5	0.321	2.875	YES
H5a	0.333	2.794	YES
H6	(0.150)	1.369	NO
H6a	(0.360)	4.125	YES

8. Discussion

All hypotheses of the proposed model are supported with the exception of the following three:

- H3a supposing that the connection between the familiarity with the use of technology the preferences for visiting a branch is not supported (USE OF TECHNOLOGY -> BRANCH Bootstrapping = 0.22 and Inner model path coefficient = 0.022).
- The second hypothesis that was not supported is H6. H6 was defined as the connection between perceived ease of use and the readiness to use mobile banking. Ease of use is found not to influence the use of mobile banking (Bootstrapping = 1.369 < |1.96|). This cannot be explained, however it does contradict the basic theory of technology acceptance (TAM).

- On the other hand, findings around the third hypothesis H4, indicate uncertainty (Bootstrapping = 1.369). H4 states that there exists a connection between the EASE OF USE and USEFULNESS. This is in agreement with different variations TAM models (Davis, 1989; Phan & Daim, 2011) that show differing support for this connection between the two constructs.

The findings of the study imply that INTERACTION, QUALITY and EASE OF USE moderately explain 58.8 % (Figure 2) of the variance in USEFULNESS. This underlines the importance of usefulness (understood as convenience and benefit). Here, it is notable that the indicators of USEFULNESS based on convenience (IWU1 = 0.9311) and benefit (MB2 = 0.8736) are both significant.

It is noteworthy that the easier the use of mobile banking applications the lesser is the propensity to visit a branch (Path coefficient of EASE OF USE – BRANCH ~ -0.360). However, an unexplained anomaly can be observed in the negative path coefficient between EASE OF USE and MOBILE (~ -0.1497). Nevertheless this a weak relationship.

8.1. Interaction

Informants to this study believe that the enjoyment of interaction is an antecedent to using mobile banking as people find it convenient (IWU1 = 0.9311) and useful (MB2 = 0.8736). The more people are interactive, the more they will use mobile banking (Dabholkar et al., 2003; Curran & Meuter, 2005). Mobile banking is attractive to users who enjoy interaction (IWU5=0.9296), even if not used exclusively by those who enjoy interaction? (BMB2= 0.7047). This is in line with the literature on human computer interaction (Section 2.2).

8.2. Quality

With high indicator loadings, people have good perception of the service quality (QUALITY) offered by mobile banking as it was reported to save time (IWU2= 0.938) and money (IWU3 = 0.832). QUALITY as measured by service quality of time and money saving in our model, has the strongest effect on USEFULNESS (~0.516), followed by enjoyment

of the interaction (~0.179) and the perception of ease of use (~0.163). INTERACTION, QUALITY and EASE OF USE moderately explain 58.8 % of the variance in USEFULNESS, which is significant.

8.3. Use of technology

Convergent validity is not confirmed for USE OF TECHNOLOGY (AVE = ~0.3310 < 0.5) (Table 5). This means that the indicators used do not reliably describe this latent variable. However, familiarity with use of technology (USE OF TECHNOLOGY) as measured, shows a negative effect on EASE OF USE (~ - 0.299). However, our findings show that H3 is not supported. H3 stipulates that there is an antecedent relationship between the USE OF TECHNOLOGY and (perceived) EASE OF USE. Though these findings contradict the literature of task technology fit (Mathieson and Keil, 1998; Tarhini et al., 2016) that show an inverse relationship between familiarity with use of technology and the perceived ease of use of this technology. This could be due the context of technology of mobile banking vs. e-banking. The latter could sometimes be more difficult to adopt than the former. Another cause could be extant in or choice of indicators that do not spell out exactly "Mobile" ranking rather asks for the users' on the frequency of use of phone APPs or computer applications which may not fully illustrate familiarity with banking application. The use of phone and other computing devices (UT1 and UT4) may not adequately explain the behaviour of USE OF TECHNOLOGY in the context of this model. Nevertheless, when asked directly about whether past experiences in the use of technology would encourage them to use mobile banking or defer back to visiting a branch, the informants agreed on the relevance of positive or negative experience on their choice (IWNU3 = 0.9383). On the other hand, the statistical insignificance of the relationship between USE OF TECHNOLOGY and BRANCH (Path Coefficient = 0.0219) shows that maybe the chosen indicators are not enough to fully reflect antecedents for that choice.

9. Conclusion

The use of theories of HCI and TAM has resulted in a potentially valuable extension to TAM that connects the constructs of TAM to antecedents of human computer interaction. In this article, we can conclude that the preference of people for interaction strongly affects usage of mobile. The study supports the logical concept that might connect the interaction we have with the technology with usage of mobile banking. More relevant is the fact that quality perceptions of technology-based banking services is linked to usefulness (convenience and benefit) of the electronic services (Joseph et al., 1999; Al-Hawari et al., 2005). Generally, the study reinforce the opinion that people who had a bad experience with technology don't have a positive perception of its usefulness (Curran & Meuter, 2005; Parkinson & Ramirez, 2006; Lin, 2011; Kaushik & Rahman, 2015).

Lebanese millennials find that enjoyment of interaction is an important antecedent to using mobile banking as they find it convenient and useful. For Lebanese students, the usefulness of the technology is explained by how much they enjoy interacting with it, the time and money it saves them. Surprisingly so, ease of use was not a clear factor in mobile banking usage.

On the other hand, though millennials are more into interaction and somehow addicted to their portable devices, the study did not show a direct effect on their need to visit physical branches, however, they have indicated that a good perception of service quality offered by mobile banking lessens their propensity to visit a branch. The informants to the study underlined the relevance of positive or negative experience on their choice. They were forthcoming in the indication that past experiences in the use of technology would encourage them, or not, to use mobile banking versus deferring back to visiting a branch.

More generally, our results show that despite problems with the weak infrastructure in Lebanon, the young generation is fully influenced by technology which can affect more and more their willingness to perform electronic transactions.

As with any research, there are limitations associated with the studies. First, the choice of sampling (convenience). Students might have similar perception of the use of technology. Second, we could not collect bigger data, because of cost and time limitation. Since, to the knowledge of the authors, the subject of the paper has not yet been addressed in the Lebanese university context. This paper is designed as a pilot study to be expanded into a full scale study and orient the researcher toward potential useful modification to the tested model.

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Appendix 1

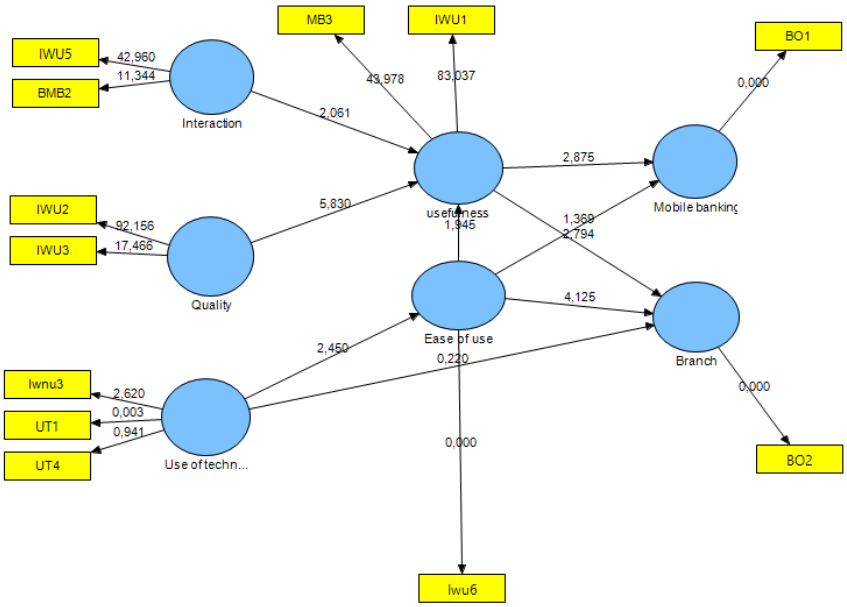
Table 9 : Latent variable correlation (parenthetic values are negative)

	Branch	Ease of use	Interaction	Moblie	Quality	Use of Technology	Usefulness
Branch	1.0000						
Ease of use	(0.1626)	1.0000					
Interaction	0.0608	0.5779	1.0000				
Mobile	0.6975	0.0467	0.1500	1.0000			
Quality	0.0625	0.6703	0.6265	0.2366	1.0000		
Use of Technology	(0.0120)	(0.2986)	(0.3627)	0.0183	(0.3016)	1.0000	
Usefulness	0.1027	0.6130	0.5972	0.2287	0.7381	(0.4251)	1.0000

Table 10 : Path coefficients (Mean, STDEV, T-Values)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|O/STERR|)
Ease of use -> Branch	-0.360228	-0.363863	0.087335	0.087335	4.124670
Ease of use -> Mobile	-0.149776	-0.136676	0.109424	0.109424	1.368766
Ease of use -> usefulness	0.163294	0.165237	0.083970	0.083970	1.944678
Interaction -> usefulness	0.179472	0.190988	0.087062	0.087062	2.061424
Quality -> Usefulness	0.516182	0.512027	0.088539	0.088539	5.829970
Use of technology -> Branch	0.021967	0.041664	0.099660	0.099660	0.220423
Use of technology -> Ease of use	-0.298639	-0.294661	0.121916	0.121916	2.449550
Usefulness -> Branch	0.332972	0.331363	0.119178	0.119178	2.793899
Usefulness -> Mobile	0.320582	0.313034	0.111519	0.111519	2.874692

Figure 3 : Bootstrapping results



Appendix 2

Survey questions

A- Use of technology: how many hours per week do you use(1- Less than 1 hour, 2- One to 4 hours, 3- Five to 9 hours, 4- Ten to 15 hours, 5- over 15 hours)

1 - Social media on your mobile
2 - A computer for fun/play?
3 - A computer for work?
4 - A computer for personal reasons?

B- Banking operations: how many hours per week do you (1- Less than 1 hour, 2- One to 4 hours, 3- Five to 9 hours, 4- Ten to 15 hours, 5- over 15 hours)

1 - Use telephone banking services (for example, balance inquiry, fund transfer between accounts
2 - Visit your bank branch
3 - Use an ATM (Automated Teller Machine)

C- Mobile banking: (yes, no, NA)

4 - Do you think that mobile banking is a good investment for banks?
5 - Do you think that it is beneficial to you?

D- I will use mobile banking because :(1- Strongly disagree, 2- Disagree, 3- Undecided, 4- Agree, 5- Strongly Agree)

6 - It is convenient
7 - It saves me time
8 - It saves me money
9 - I enjoy the interaction
10 - It is easy to use

E- I will not use mobile banking because (1- Strongly disagree, 2- Disagree, 3- Undecided, 4- Agree, 5- Strongly Agree)

11 - Do not trust it
12 - I think there is a safety exposure to me while using it

13 - I had a previous bad experience with technology
14 - It is against my religious belief

F- Do you believe that mobile banking will be (1- Strongly disagree, 2- Disagree, 3- Undecided, 4- Agree, 5- Strongly Agree)

15 - Easily accepted by customers?
16 - Used only by people who enjoy interaction?
17 - Installed by banks because of imitation?
18 - Installed by banks in order to increase transactions?
19 - Obsolete in few years

A new strategy to attract new customers.