

Factors Affecting Consumers' Adoption of Mobile Banking in Bangladesh: An Empirical Study

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Abstract — Tremendous growth in mobile penetration among the people of Bangladesh has created an immense opportunity for banks to extend their investment in developing mobile banking system. Though more than 95 percent bank account subscribers are cell phone users, the adoption of mobile banking is slower than expected. In this connection, this study employs the Unified Theory of Acceptance and Use of Technology (UTAUT) model to identify the factors affecting individuals in their adoption of mobile banking in Bangladesh. Data had been collected from 225 respondents through self-administered questionnaire. Based on data analysis, this study empirically found that individual intention to adopt mobile banking was significantly influenced by social influence, effort expectancy, performance expectancy, and perceived financial cost, in their order of influencing strength. The behavior was considerably affected by individual intention in this regard.

Keywords — Mobile Banking, UTAUT Mode, Consumer Adoption

I. INTRODUCTION

Mobile Banking (MB) refers to the use of a mobile phone or other wireless devices to perform banking activities while away from home, such as monitoring account balances, transferring funds between accounts, bill payment and locating an ATM. Despite many wireless commercial services increase quickly, the use of mobile banking service is much lower than expected [1] and still underused [2], and the market of mobile banking still remains very small in comparing to the whole banking transactions [3]-[5]. That is, the widespread adoption and large usage of cell phones did not reflect on the adoption and usage of mobile banking, although mobile banking perhaps was the first commercial mobile service [6].

Both Internet banking and mobile banking are often considered as electronic banking [7]-[10], but Internet banking and mobile banking are two alternative channels for banks to deliver their services and for customers to acquire services [11]. That is, customers using Internet banking are through computers connected to Internet, while customers using mobile banking are through wireless devices [12].

II. BACKGROUND

There are 160 million people in Bangladesh at the time, of which, 87 percent didn't have a bank account and most are living in rural areas [13]. This represented a huge untapped market for commercial banks. However, establishing bank branches across rural Bangladesh is not an option because of

the costs and of regulatory constraints as the central bank only grants new branch opening licenses for a maximum of 15 branches in a year. Though, among the bank account holders, more than 95 percent are mobile phone users, adoption of mobile phone banking is not up to the mark. In addition, within the unbanked 87 percent, which is more than 139 million people, 50 percent have mobile phones [14]. Considering the immense penetration of cell phones, reference [1] observed that banks have very large potential to offer mobile banking services to people living in remote villages where only few computers are connected to the Internet. Acknowledging the limitations of Internet banking as opposed to widespread mobile phone penetration, reference [15] suggested that the emerging mobile banking may give banks a good commercial opportunity providing their services to rural people who are unable to access the Internet. In this circumstance, it is an immense opportunity for the banks to reach their potential customers through mobile banking because Mobile banking is the way that made it possible to bring mass population under the banking services and reach the banking facilities at the doorstep of the people.

III. LITERATURE REVIEW

Literature reveals that abundant research on electronic banking has focused on Internet banking (also called online banking), whereas research focusing on mobile banking is relative little and receives underrated attention [7], [16], [17]. By employing innovation diffusion theory (IDT) and the decomposed theory of planned behavior (DTPB), reference [18] surveyed 162 respondents and discovered that perceived advantages, the opportunity to try out cell phone banking, the number of banking services required by respondents and perceived risk significantly influenced people to adopt mobile banking. Reference [7] took the Bass model of diffusion to separate 1253 respondents into non-users, occasional users, and regular users according to their mobile banking usage experience and density. The Bass diffusion model assumes that potential adopters of an innovation are influenced by two types of communication channels: mass media and interpersonal word-of-mouth, and the adoption rate can be described by S-shaped diffusion curves. Accordingly, Reference [7] empirically identified that interpersonal influence was over mass media in affecting users to adopt mobile banking. Contrasting to the study of [7], [8] surveyed 128 respondents randomly selected in the city streets and indicated that awareness significantly influenced the adoption

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of online and mobile banking, while consumer awareness was effectively increased through mass media rather than word-of-mouth communications. Given that the reference group did not significantly affect the adoption of online and mobile banking. Reference [8] thus contended that mass media was much more important than interpersonal word-of-mouth in affecting people to adopt mobile banking.

By adding one trust-based construct and two resource-based constructs, [3] employed the extended technology acceptance model (TAM) to explore human behavioral intention to use mobile banking. They collected 180 respondents in Taiwan and discovered that perceived self-efficacy, financial cost, credibility, easy-of-use and usefulness had positive effects on the behavioral intention to use mobile banking. Likewise, due to the parsimony and predictive power of TAM, [19] used an extended TAM containing five constructs - perceived usefulness, perceived ease-of-use, perceived credibility, the amount of information, and normative pressure - to explore the adoption of mobile banking. They gathered 158 valid questionnaires in Malaysia and supported that perceived easeof-use markedly influenced perceived usefulness and credibility, and human intentions to adopt mobile banking was significantly affected by perceived usefulness, perceived easeof-use, perceived credibility, the amount of information, and normative pressure.

Reference [5] employed the Rasch (a psychometric model for analyzing categorical data) measurement model and item response theory to survey 178 students from one of largest university in south Taiwan. He found that the speed of transactions and special reductions in transaction fees encouraged mobile baking adoption, while factors inhibiting mobile banking adoption were safety and initial set-up fees. Similar to the finding of [5], reference [1] surveyed 3585 online respondents in Brazil and supported that the cost of Internet access and service and perceived risk were top two barriers for adopting mobile banking services.

By performing an empirical study in Brazilian major cities, reference [17] integrated the TAM, TPB, and IDT to investigate main factors influencing mobile banking adoption. Via collecting 666 usable samples, they found that relative advantages, visibility and compatibility significantly impacted attitude, self-efficacy and technology facilitating condition significantly impacted perceived behavioral control, and perceived behavioral control, attitude, and subjective norm significantly impacted Intention to use mobile banking. Drawing from TAM and IDT, [20] surveyed 681 Singaporean consumers and concluded that perceived usefulness, social norms and risks (in the order of influence) were three crucial factors influencing the adoption of mobile banking. Built on TAM and IDT, reference [21] collected 155 consumers aged 18-35 in Germany and uncovered that perceived usefulness, compatibility, and risk significantly affected consumer intention to adopt mobile banking, while perceived costs, easy-of-use, credibility, and trust were not salient factors influencing behavioral intention to adopt mobile banking.

Based on TAM and TPB research structure, reference [10] collected 195 respondents and found subject norms to be the

most influential factor, perceived usefulness to be the second influential factor, and self-efficacy to be the third influential factor in mobile banking adoption. Based on the extended TAM and through collecting 325 valid responses from MBA students in India, reference [15] first employed the exploratory factor analysis to identify seven antecedents to behavioral intention toward the adoption of mobile banking. Thereafter, they utilized the regression technique to examine the effects of these antecedents on behavioral intention. Their empirical results supported six of seven antecedents, except for risk. The six antecedents were perceived image, perceived usefulness, perceived ease-of-use, perceived value, selfefficacy, perceived credibility, and tradition, which significantly influenced the behavioral intent to use mobile banking. Recently by using interpretive structure modeling and mapping of mobile banking influences in India, reference [22] systematically plotted key mobile banking barriers and enablers on the two dimensional map. By treating driving power of enablers as positive and that of barriers as negative, their work identified "facility to get quick updates", "time and cost saving", "reach of telecom distribution" and "need for telecoms to improve customer retention" as the crucial drivers for the adoption of mobile banking.

Reference [23] employed UTAUT model to find out the factors affecting individuals to adopt mobile banking. Through sampling 441 respondents, this study empirically concluded that individual intention to adopt mobile banking was significantly influenced by social influence, perceived financial cost, performance expectancy, and perceived credibility, in their order of influencing strength.

IV. HYPOTHESIS DEVELOPMENT

To understand technology adoption, reference [24] empirically compared eight competing models named the theory of reasoned action (TRA), TAM and TAM2, TPB and DTPB, combined TAM and TPB (C-TAM-TPB), IDT, motivational model (MM), model of PC utilization (MPCU), and social cognitive theory (SCT) by surveying 215 respondents from four organizations. Based on their longitudinal studies, reference [24] further integrated and refined the above eight models into a new model named UTAUT which captures the essential elements of different models. Because UTAUT has been empirically tested and proven superior to other prevailing competing models [24]-[26], this study chooses UTAUT as a theoretical foundation to develop the hypotheses.

A. Performance Expectance

In UTAUT, performance expectance is driven from perceived usefulness (TAM/TAM2), relative advantage (IDT), extrinsic motivates (MM), job-fit (MPCU), and outcome expectations (SCT). In mobile banking studies, reference [18] empirically demonstrated that the greater the perceived relative advantage, the more likely mobile banking would be adopted. Similarly, reference [3], [10], [15], [19], and [20] identified perceived usefulness as a crucial factor. Through using mobile data services instead of mobile banking services,



reference [27] employed UTAUT as a research basis to survey 1320 respondents and illustrated that performance expectance significantly influenced people to use mobile services. Taken the above together, this work posits the following hypothesis:

H1: Performance expectance significantly affects individual intention to use mobile banking.

B. Effort Expectance

Drawing upon other competing models, reference [24] captured the concept of perceived ease-of-use (TAM/TAM2), complexity (MPCU), and easy-of-use (IDT) to define effort expectation as the degree of ease associated with technology use. Grounded in UTAUT, reference [25] and [27] employed three constructs of performance expectancy, effort expectancy, and social influence to explore what influences individual intention to accept mobile technology and data service, respectively. Both studies supported that effort expectance significantly influenced human intention to use mobile technology or service. As a result, rooted in UTAUT, this study hypothesizes:

H2: Effort expectation significantly affects individual intention to use mobile banking.

C. Social Influence

Reference [24] used social influence to represent subjective norm in TRA, TAM2, TPB/DTPB, and C-TAM-TPB, social factors in MPCU, and image in IDT. They defined social influence as the degree to which an individual perceives that important others believe he/she should use the technology. In a survey of 158 customers from a major bank in Malaysia, reference [19] empirically found that individual intention to use mobile banking was significantly affected by people surrounding them. The above might explains why [28] argued that mobile commerce users are not just technology users, but also part of social network. Accordingly, the following hypothesis is posited:

H₃: Social influence significantly affects individual intention to use mobile banking.

D. Perceived Credibility and Financial Cost

The goal of the present study is not to replicate the UTAUT study as in [26]. Instead, this paper aims to ascertain what factors considerably influence people to adopt mobile banking. Therefore, two additional constructs culled from mobile banking literature are taken into the research structure, which are addressed as follows.

As the literature reveals that different scholars employ different perspectives to assess the concern of security, risk, trust, and credibility, the concern has been conceptualized and assessed from a variety of ways that fully depends on which discipline researchers interpret the concern. Given that perceived credibility has been empirically supported and used not only in mobile banking adoption studies [3] and [19], but also in many Internet banking studies as discussed in [29] and [30], the present study uses perceived credibility to represent

individual security, privacy, risk, and trust concerns about mobile banking adoption. Accordingly, this study hypothesizes:

H4: Perceived credibility significantly affects individual intention to use mobile banking.

Academics generally investigate consumer adoption of mobile banking from psychological and sociological theories, but empirical evidence has also revealed that mobile banking adoption is highly encouraged by economic factors such as advantageous transaction service fees [5] or discouraged by economic considerations such as concerns on basic fees for connecting mobile banking [5], cost burden for using mobile banking [1], and high payment for using mobile banking [2]. By interviewing consumers in person, [3] empirically identified perceived financial cost as a negative effect on behavioral intention to use mobile banking. Taken the above together, this study hypothesizes:

H₅: Perceived financial cost significantly affects individual intention to use mobile banking.

E. Facilitating Conditions

In UTAUT, reference [24] integrated 32 factors used in eight competing models into five constructs and empirically identified that behavioral intention and facilitating conditions were two direct determinants of adoption behavior. In the mobile banking adoption literature, [31] illustrated that the more convenient the access of respondents to computer and Internet, the more proficient their use of the computer and Internet, which results in a higher adoption rate of respondents using electronic banking. Consequently, grounded in UTAUT, the following hypothesis is put forth:

Hs: Facilitating conditions significantly affect individual behavior of using mobile banking.

F. Perceived Self-Efficacy

After considerably analyzing eight competing models, [24] ever considered three constructs of perceived self-efficacy, facilitating conditions, and behavioral intention would directly affect actual behavior. However, after empirically testing the three constructs at three time-points in their longitude study, they finally verified that perceived self-efficacy did not play a determinant role in influencing the actual behavior. Through a further analysis, [24] argued that self-efficacy was an indirect determinant captured by effort expectancy and fully mediated by effort expectancy. Therefore, they dropped self-efficacy from the direct determinant of behavior, which is also supported by other UTAUT studies [26]. Among mobile banking adoption researches, [18] supported self-efficacy was not a direct determinant in affecting individual behavior to adopt mobile banking, and [17] supported self-efficacy was not a direct determinant in affecting individual intention to adopt mobile banking. The above discussion reveals a need to ascertain the role of self-efficacy. Therefore, the following hypothesis is posited:



H₇: Perceived self-efficacy significantly affects individual behavior of using mobile banking.

G. Behavioral Intention

Consistent to all models drawing from psychological theories, which argue that individual behavior is predictable and influenced by individual intention, UTAUT contended and proved behavioral intention to have significant influence on technology usage [24], [26]. Given that the ultimate goal of businesses (i.e., banks) is to attract consumers to adopt their services rather than the intention to adopt services, extensive research has examined the relation between behavioral intention and actual use. However, only one work in extant mobile banking studies has taken this relation into the research structure [10], which encourages a need to examine the relationship between behavioral intention and actual behavior in the mobile banking setting. Accordingly, this study hypothesizes:

H₈: Behavioral intention significantly affects individual behavior of using mobile banking.

Based on the above discussion, a modified UTAUT model is proposed which is depicted in figure 1.

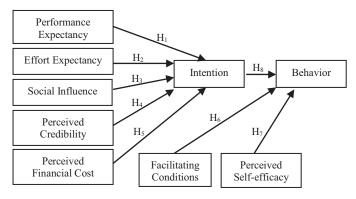


Fig. 1 Research Model along with the specification of hypotheses

V. QUESTIONNAIRE DESIGN AND SAMPLING

Referring to [3], [10], [24], [26], and [32], this research operationalized performance expectance as the extent to which a person believes that adopting mobile banking will help him/her gain banking performance, operationalized effort expectance as the degree to which a person perceives that the level of ease associated with mobile banking adoption, operationalized social influence as the degree to which a person perceives that important others believe he/she should use mobile banking services, and operationalized perceived credibility as the extent to which a person believes that the use of mobile banking will have no security or privacy threats. Further, perceived financial cost was operationalized as the extent to which a person believes that adopting mobile banking will cost money, facilitating conditions was operationalized as the degree to which a person believes that he/she have necessary context to support using mobile banking, perceived self-efficacy was operationalized as the

degree to which a person believes that he/she has capabilities to use mobile banking, and behavioral intention was operationalized as the degree to which a person perceives his/her willingness to use mobile banking.

To ensure the content validity of the questionnaire used to assess each constructs depicted in Fig. 1, all items regarding the measurement of constructs were adapted from previous studies and carefully reworded to fit the mobile banking adoption context in Bangladesh. The selection and rewording of items were based on three criteria: measurability according to the operationalization definition of each construct, fitness to mobile banking context, and fitness for general respondent perceptions when adopting mobile banking.

TABLE I
THE PROFILE OF RESPONDENTS

Variable	Category	Frequency	Percent	
Gender	Male	146	64.9	
Gender	Female	79	35.1	
	< 20 years	12	5.3	
A 92	20 to 30	183	81.3	
Age	30 to 40	23	10.2	
	>40 years	7	3.1	
	Student	76	33.8	
	University Teacher	36	16.0	
Occupation	Banker	42	18.7	
	Govt. Service	37	16.4	
	Others	34	15.1	
	SSC	4	1.8	
	HSC	48	21.3	
Education	Honors	145	64.4	
	Masters	27	12.0	
	PhD	1	0.4	
	< Tk. 20,000	114	50.7	
Monthly Income	20,001 to 30,000	60	26.7	
	30,001 to 40,000	20	8.9	
	40,001 to 50,000	12	5.3	
	>Tk. 50,000	19	8.4	
Have you use	Yes	152	67.6	
mobile banking	No	73	32.4	

Thereafter, a pre-testing with 15 respondents was executed to check the wording, completeness, sequencing, and other possible errors in the questionnaire. Following respondent feedback, the questionnaire was slightly reedited to strengthen clarity and completeness. As a result, the formal questionnaire was organized into two sections, comprised of 38 questions. The first section contained 31 questions used to evaluate eight constructs of performance expectance (four items), effort expectance (four items), social influence (four items), perceived credibility (four items), perceived financial cost (four items), facilitating conditions (four items), perceived self-efficacy (four items), and behavioral intention (three items). All questions in the first section were measured using a five-point Likert scale, ranging from "strongly disagree" to "strongly agree".

Of the seven questions in the second section, the first five questions were used to collect respondent demographic variables of gender, age, occupation, education level, and



income level. The sixth question was to ask respondents whether they had used mobile banking or not. If the respondents answered "Yes", they were deemed as mobile banking users. The seventh question was to ask respondents "how frequently do you use mobile banking each month". The seventh question gave the respondents five options: zero, one-five times per month, six-ten times per month, eleven-fifteen times per month, and over fifteen times per month. Notably, for those respondents answered "No" to the sixth question, they were deemed mobile banking nonusers and coded to choose "zero" to the seventh question.

People using cell phone were defined as target population for this study. Convenience sampling technique was used to select sample of 225 diversified respondents from the population pool of Dhaka City. Data had been collected through structured questionnaire within the period of January 10 to January 30, 2014. Descriptive statistics of the respondent is summarized in table I.

VI. DATA ANALYSIS AND FINDINGS

Data were analysed using SPSS/AMOS 16. In order to check internal consistency, Cronbach alpha coefficients were calculated for constructs. After running SPSS 16, this study found that factor loading of one item is very low in both social influence and perceived credibility constructs. Accordingly, both items from each construct were removed and SPSS 16 was executed again. Table II shows the descriptive statistics and outcome of reliability test for each construct and table III shows correlation coefficients among the constructs.

TABLE II
DESCRIPTIVE STATISTICS AND RELIABILITY MEASURES OF CONSTRUCTS

Constructs	N	No. Of items	Composite Reliability Mean		SD
PE	225	4	0.7918	4.0589	0.6977
EE	225	4	0.8491	3.8511	0.8204
SI	225	3	0.7916	3.3704	0.8575
PC	225	3	0.7869	3.6400	0.8581
PFC	225	4	0.7527	3.2444	0.8545
FC	225	4	0.7263	3.6367	0.7683
PSE	225	4	0.7735	3.6044	0.8126
BI	225	3	0.7967	3.6222	0.8110

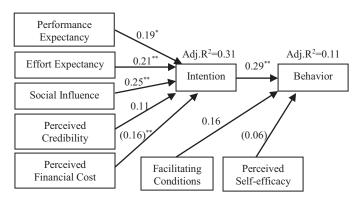
TABLE III
CORRELATION COEFFICIENTS AMONG THE CONSTRUCTS

Const -ructs	PE	EE	SI	PC	PF C	FC	PS E	BI
PE								
EE	.58**							
SI	.33**	.29**						
PC	.42**	.46**	.38**					
PFC	.03	.12	04	00				
FC	.48**	.44**	.49**	.45**	09			
PSE	.29**	.30**	.31**	.22**	.13*	.37**		
BI	.42**	.41**	.44**	.37**	14*	.59**	.25**	

Note: **= significant at 1 percent level; *= significant at 5 percent level; otherwise insignificant

Note: PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; PC: Perceived Credibility; PFC: Perceived Financial Cost; FC: Facilitating Condition; PSE: Perceived Self-Efficacy; BI: Behavioral Intention.

This study tested the statistical significance of the paths in the model and the result is shown in figure 2.



Note: **= significant at 1 percent level; *= significant at 5 percent level; otherwise insignificant

Fig. 2 Evaluated Extended UTAUT Model

This study was done to find out the factors affecting individual intention to adopt mobile phone banking in the context of Bangladesh. Fig. 2 displays the generated R²_{adjusted} as 0.31 and 0.11 accounted for the variances explained in behavioral intention and in actual behavior, respectively. Consequently, this study demonstrates the applicability of UTAUT to a mobile banking setting, and the empirical results strongly support the extended UTAUT in predicting individual intentions and behaviors of mobile banking adoption. Fig. 2 also presents that consumer intention to adopt mobile banking was significantly influenced by social influence, effort expectancy, performance expectancy, and perceived financial cost, in their order of influencing strength. Perceived credibility was found as an insignificant predictor of individual intention to adopt mobile banking. The actual behavior was significantly impacted by individual intention. Whereas perceived self-efficacy and facilitating condition did not play a salient role in affecting actual adoption behavior. Table IV represents the summary of the factors according to their order of influencing strength over intention and behavior.

The empirical evidence of the study indicates that the social influence is the most powerful factor in affecting people intention to use mobile banking, which is consistent with the finding of [10]. Besides, this work found that respondents were significantly influenced by peer groups and interpersonal world-of-mouth, which is consistent to [7] but against to [8]. The study also indicates that perceived financial cost significantly affects behavioural intention negatively, which is supported by the finding of [3].



TABLE IV FACTORS INFLUENCING INTENTION AND BEHAVIOR OF MOBILE BANKING

SL	Factors (in their order of influencing strength)	Criterion Variable	Status
1	Social Influence	Intention	Significant
2	Effort Expectancy	Intention	Significant
3	Performance Expectancy	Intention	Significant
4	Perceived Financial Cost	Intention	Significant
5	Perceived Credibility	Intention	Insignificant
6	Bahavioral Intention	Behavior	Significant
7	Facilitating Conditions	Behavior	Insignificant
8	Perceived Self-efficacy	Behavior	Insignificant

VII. BUSINESS IMPLICATIONS

As the adoption rate and usage of mobile phone banking in Bangladesh are marginal, it is an immense opportunity for the bankers to expand their business through this new channel (mobile phone). This study reveals that individual intention to adopt mobile banking was significantly influenced by social influence, effort expectancy, performance expectancy, and perceived financial cost, in their order of influencing strength. Being consistent with the finding of [10] which argued subjective norm was the most influential factor, this study identified the social influence was the most powerful factor in affecting people intention to use mobile banking. By further analysis, this work found that respondents were significantly influenced by peer groups and interpersonal world-of-mouth, which is consistent to [7] but against to [8]. Taken the above together, the first business implication may lead to that banks are advised to enhance the use of social media to promote mobile banking, particularly the strength and popularity of social media are significant powerful among interpersonal interactions. In other words, banks are suggested to emphasize interpersonal word-of mouth and put more advertising on emerging social media (such as Facebook, MSN, Twitter, and Blog) than traditional mass media (i.e., televisions, radios and newspapers) to increase the penetration of mobile banking.

Moreover, behavioural intention is influenced significantly by perceived financial cost. Therefore, service providers (banks) should concentrate on this issue and focus on how to make mobile phone banking service reasonable to the users in terms of cost.

VIII. CONCLUSIONS, IMPLICATIONS FOR FUTURE RESEARCH AND LIMITATIONS OF THE STUDY

Despite the rapid increase of many wireless commercial services, the usage of mobile banking services still remains very small compared to the entire banking transactions in Bangladesh. Given that the widespread diffusion of cell phones does not reflect the adoption of mobile banking, there is a need to study what influences individuals to adopt mobile banking here. Since UTAUT has higher predictive power for technology adoption than other competing models such as TAM/TAM2, TPB/DTPB, and IDT, this study presented an extended UTAUT model to explore what affects consumers to adopt mobile banking. Finding of the study reveals that all the antecedents mentioned in the extended model are significantly related to individual intention to adopt mobile phone banking

in the context of Bangladesh with exception of perceived credibility construct.

Like any study, this work naturally leaves some clues for further researches as well as some limitations. First, to contrasting the original UTAUT study which is a longitudinal study, this research only measures respondents' perceptions, intentions, and usage at a single time point. Since the empirical research underlying UTAUT and the investigation of mobile banking adoption and usage are relatively few, conducting longitudinal studies on mobile banking adoption are necessary in order to compare the findings with Venkatesh's UTAUT studies. Moreover, the present study reveals the perceived financial cost is a crucial factor influencing people intention to adopt mobile banking, while the original UTAUT lacks of considering economy-based constructs, which may results in a limitation of UTAUT. However, given that the empirical result culled from this work is just single empirical evidence, it is too early to make conclusion. More studies using UTAUT to examine the limitation, validity and applicability of UTAUT are required, particularly in the context of mobile banking.

Since intention measures future behaviour and actual purchasing measures past behaviour, there should be a time lag between when intention is measured and when behavior is measured. How long such a time lag should be is not always comprehensible. For instance, reference [33] tested the Technology Acceptance Model by incorporating TRA and waited 14 weeks between measuring intention and measuring behaviour. Fourteen weeks may be a long period to linger between measures of intention and actual Internet banking, but some time lag is essential.

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