Mobile Phone Banking Usage Behaviour: An Australian Perspective

Majharul Talukder[1] Ali Quazi and Milind Sathye, Faculty of Business, Government & law, University of Canberra

Abstract

While the use of mobile phones in financial transactions is witnessing phenomenal growth at the international level, its growth has been relatively slow in Australia. Drawing on the theory of reasoned action and technology adoption framework, this paper reports the results concerning a survey of mobile phone users for banking transactions in Australia. The paper specifically identified the factors affecting usage behaviour when mobile phone banking services were engaged. The findings broaden and deepen our understanding of the usage of mobile-based banking in the information age. This paper contributes to the knowledge of this subject by including identification and testing of constructs of predictors regarding mobile phone banking, which are additional to those employed in the extant theories indicated above. The findings of this paper have important policy implications for banks in terms of understanding the underlying factors that drive customers' mobile banking for financial transactions. Accordingly, design strategies have been developed to promote mobile phone banking – a cost effective channel for delivering financial services.

JEL Classification: N20

Keywords: Mobile phone banking, usefulness, credibility, system quality, social influence, usage level

[1] majharul.talukder@canberra.edu.au

1. Introduction and background

The use of mobile phones in business-related transactions in general has dramatically increased at the global level in recent decades. However, the usage of mobile phones in financial transactions is still limited. While Australians are keeping up with international trends regarding mobile phones generally, they are lagging behind the global trend in terms of using mobile phones for commercial transactions. According to a recent report the use of mobile phones has increased remarkably in the Asia-Pacific region, users are reluctant 'when it came to the level of comfort in using their mobile phone for financial transactions' (KPMG 2010). The report identified the lack of awareness on the part of the users about mobile banking offerings as one of the main reasons for such reluctance. This state of affairs has prompted us to identify the factors that are impeding the use of mobile phones for financial transactions in Australia.

The issue of adopting mobile phones for banking transactions is becoming increasingly popular to researchers in the fields of information systems, banking and marketing (Suoranta & Mattila 2003; Gu, Lee & Suh 2009). Though banks have generally been the forerunners in adopting technology globally (Luarn & Lin 2005; Laforet & Li 2005), the lack of interest in utilizing mobile baking for financial transactions in Australia is intriguing many researchers and practitioners.

Mobile phone banking has the potential for huge growth in Australia because it has vast regional and remote areas which traditionally have had limited access to banking services due to the high cost of setting up brick and mortar branches. Furthermore, 'as many as one in three major bank branches in rural communities have been closed' (Beal & Ralston, 1997, p. 5). This trend began with the closure of nearly 1,000 metropolitan areas during the 1990s (PoA 1999, p.8). Also, access to the Internet is limited in such areas and in 2000 only 33 percent of Australians in regional areas had access to it (Curtin, 2001). Consequently, at present, the Australian federal government is allocating substantial funds to making Internet access available to regional and rural Australia. The government's commitment to broadband technology is a recent example of its active support in developing an appropriate technology that will facilitate mobile banking. Mobile banking, however, offers a further advantage in terms of its outreach – that is, 'any time anywhere availability' of banking services. This is similarly the case with urban consumers. Mobiles provide 'any day, anytime, anywhere' access to banking which is rapidly becoming the normal way of life. Australia has one of the highest rates of mobile phone ownership in the world (GOA 2011). Yet the use of mobile phones for financial transactions is limited. Banks can create a strategic competitive advantage if financial services are delivered over mobile phones. Mobile phone banking would help reduce the operating costs of financial institutions. KPMG (2010) states that mobile banking offers a real source of competitive advantage to Australia banks.

Besides making a practical contribution, this study also has implications for mobile phone banking policy. The Australian government's stated objective as outlined in the 'Knowledge Nation' document is to promote technology to succeed a paper-based system. On the conceptual front, our study would significantly advance the technology adoption model (TAM) which postulates that two particular drivers - perceived ease of use and perceived usefulness -make a specific impact on technology adoption. Our study reveals that at least in the mobile banking adoption context several other factors also impact on adoption. Furthermore, to our knowledge, this would be the first study in Australia looking at factors that drive adoption of mobile phone banking from the user's perspective. In particular, we explore the relationship between the drivers of adoption of mobile phone banking, its usage and respondents' demographic characteristics. It is envisaged that the research outcomes will

help banks target the appropriate customer segments so that the use of mobile phone banking in Australia increases.

Against this backdrop, one important research question is why Australia lags behind in the Asia-Pacific region in its application of financial transactions, and yet mobile usage in Australia is one of the highest in the world. This conundrum leads to an important research question: what drives people to use mobile phones for financial transactions? That is a question this study tries to answer.

2. Literature, theoretical framework and the hypotheses

The paper uses a number of universally accepted theories from the innovation and technology adoption fields. The theory of reasoned action (TRA) and the technology acceptance model (TAM) are the two leading ones. TRA postulates that a person's specific behaviour is determined by his or her behavioural intention to perform the behaviour. The behavioural intention is in turn 'jointly determined by a person's attitude towards a particular behaviour and subjective norms concerning the behaviour in question' (Ajzen & Fishbein 1980, p.6; Kukafka, Johnson, Linfante, & Allegrante 2003, p.220). Consequently, 'behavioural intention is a measure of strength of one's intention to perform a specified behaviour' (Ajzen & Fishbein 1980, p.6). Attitudes are a function of beliefs. A person who believes that enacting a given behaviour will lead to mostly positive outcomes will hold a favorable attitude towards implementing the behaviour, while a person who believes that performing the behaviour will lead to a mostly negative outcome will hold an unfavourable attitude toward the behaviour (Ajzen & Fishbein 1980; Bhattacherjee & Sanford 2006). TRA theorizes that a person's attitude towards a behaviour is determined by his or her salient beliefs about its consequences and an evaluation of the outcome of that behaviour (Davis, Bagozzi, & Warshaw 1989). These beliefs underlying a person's subjective norm are termed normative beliefs.

TAM posits that two particular beliefs - perceived usefulness and perceived ease of use - are primarily relevant to technology acceptance behaviours (Bruner & Kumar 2005; Davis, 1989; King & He, 2006). According to Davis, Bagozzi and Warshaw (1989), Perceived usefulness is defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance. Perceived ease of use refers to the degree to which the prospective user expects the target system to be free of effort. Previous research suggested two determinants that are especially important. The first determinant is that individuals tend to use an application to the extent they believe it will help them do their job better. This variable is referred to as perceived usefulness (Davis, 1989). Second, even if potential users believe that a given application is useful they may feel that the system is too hard to use and that the performance benefits of usage are outweighed by the effort of using the application (Davis, 1989). Therefore, in addition to usefulness, usage is theorized as being influenced by ease of use. Similar to the theory of reasoned action, TAM proposes that attitude towards using technology is jointly determined by perceived usefulness and ease of use. TAM does not include TRA's subjective norms as determinants of behavioural intention since this is one of the least understood aspects of TRA (Davis, Bagozzi, & Warshaw 1989; Schepers & Wetzels 2007).

The theoretical perspectives presented above lay the foundation for the development of research hypotheses for this paper.

3. Development of hypotheses

Hypotheses for this paper are framed reflecting the following constructs that are supported by the relevant literature.

Perceived Usefulness

The construct concerning perceived usefulness refers to the degree to which an individual feels that his/her performance will improve as a result of using a particular system (Davis 1989). Usefulness is also defined as the total value a user perceives from using an innovation (Kim, Chan, & Gupta 2007). Prior research found that perceived usefulness is positively associated with system usage (Al-Gahtani & King 1999; Igbaria 1993; Talukder 2014). Furthermore, perceived usefulness has been identified as one of the strongest predictors of usages of technological innovation (Agarwal & Prasad, 1998; Talukder, Harris & Mapunda 2008; Venkatesh & Davis 2000; Venkatesh, Morris, Davis, & Davis 2003). Ozok and wei (2010) found 'usability' as an important the driver of mobile commerce success in the market. Finally, when an individual perceives that an innovation offers a relative advantage over the firm's current practice, it is more likely to be adopted and implemented. Although research is limited on the specific impact of perceived usefulness on mobile phone usage, exploration of the following hypothesis may produce useful information to resolve this particular issue. Therefore, we have proposed the following:

H1: Perceived usefulness has a significant impact on intention to use mobile phone banking.

Ease of Use

Davis (1989) defines ease of use as the degree to which users expect the target system to be free of effort. According to Karahanna, Agarwal and Angst (2006), ease of use represents the perceived cognitive burden induced by technology. It is an assessment of the mental effort involved when a new system is employed (van der Heijden, 2004; Lee, Lee & Kwon, 2004). It is the extent to which an individual believes that using mobile phone banking would increase flexibility without too much effort. Ease of use would influence the intention and thus ultimately relate to the actual use of the technology (Schepers & Wetzels 2007; Lee, Kim, Rhee & Trimi 2006). Thus, the following hypothesis is proposed:

H2: Ease of use has a significant impact on intention to use mobile phone banking.

Perceived Credibility

Perceived credibility is one of the most crucial issues in mobile phone banking in that there are major concerns regarding the security of online systems; hackers have the ability to retrieve personal information (Quittner 1997). Previously, invasion of customer privacy was relatively easy to manage or solve. However, advances in information technology have made it possible for people to invade privacy and compromise customers' confidential matters (Rotheder 1998). Therefore, the following hypothesis is worth testing:

H3: Perceived credibility has a significant positive effect on intention to use mobile phone banking.

Trust

The acceptance of mobile phone banking depends not only on consumer acceptance of Internet technologies as a means of viable transactions, but also on individuals' recognition of web retailers as reliable merchants (Pavlou 2003). The nature of technology as a transaction infrastructure creates uncertainty around online transactions and this makes trust a crucial element of mobile phone banking. There is a risk of monetary loss since an individual has to rely on electronic information and this becomes vulnerable to incomplete or distorted information provided by web retailers and third parties. Culnan & Armstrong (1999) found the risk of loss of privacy associated with providing personal information on the web as a factor affecting adoption of electronic financial product. In a similar vein Hanafizadeh and Khedmatgozar (2012) found perceived risk as a negative indicator of intention to adopt an e-banking system. Perceptions of trust are likely to be important factors in predicting acceptance of mobile phone banking. Research shows that privacy is the number one issue of concern facing the online business environment (Benassi, 1999). Trust can be described as the belief that the other party will behave in a socially responsible manner and by doing so, will fulfill the trusting party's expectations without taking advantage of its vulnerabilities (Gefen 2000). Trust has a positive influence on the development of positive attitude, intention and consequently the usage of a new system (Swan, Bowers & Richardson, 1999).

Consumers' lack of trust is also partly due to data security concerns. Many still hesitate to transmit private information, especially financial information over open electronic networks (Chen & Tan, 2004). Information exchange in a trustful environment is an essential part of online banking. Consumers' trust can only be inspired if the risks associated with online purchase are reduced to a level consumers can tolerate (Chen & Tan, 2004). Thus, consumers have personal beliefs regarding the inherent risks involved in every transaction based on the limited information available to them (Dowling & Staelin 1994). According to Suh and Han (2003) security is one of the most challenging problems faced by individuals who wish to bank online. Narayanasamy, Rasiah and Tan (2011) found security inter alia affect adoption of electronically based financial system. Accordingly, the following hypothesis is developed:

H4: Trust has a significant positive impact on intention to use mobile phone banking.

System Quality

System quality represents both the technical quality of the mobile system itself and the quality of the information being provided to customers. Technical quality is concerned with the consistency of the user interface, system accessibility, ease of use, system reliability, data accuracy, response time and system flexibility (Lin 2008; DeLone & McLean 1992). Information quality is concerned with issues such as reliability, timeliness, relevance, completeness and accuracy of information generated by mobile phone banking (Chiu, Hsu, & Wang 2006; Lin 2008). A number of studies found the technicality of a system as an important determinant of usage (DeLone & McLean 19920) and success (Jennex, Amoroso & Adelakun 2004) of an e-based system. Accordingly, the following hypothesis is proposed for testing:

H5: System quality has a significant positive impact on intention to use mobile phone banking.

Social influence

Social influence is the extent to which members of a social group influence one another person's adoption of an innovation (Konana & Balasubramanian 2005; Venkatesh & Brown 2001). It is perceived pressure and influence that peers feel when adopting an innovation and this influence is exerted through messages and signals that help to form perceptions of the value of innovation or activity (Fulk & Boyd 1991). Ajzen and Fishbein (1980) refer to such influences as normative beliefs about the appropriateness of adoption of innovation. According to this perspective, employees may adopt an innovation not because of its usefulness but because of perceived social pressure. Such pressure may be perceived as coming from individuals whose beliefs and opinions are important, including peers and people who are in social networks (Igbaria, Parasuraman, & Baroudi 1996; Talukder, Quazi & Djatikusumo 2013). According to Abrahamson and Rosenkopf (1997), it is a largely internal influence that potential adopters exert on each other that persuades them to adopt technological innovation. Individuals very often are influenced by peers in the adoption of an innovation. When peers embrace an innovation, this may signal its importance and certain advantages which eventually motivate an individual to accept it.

It has been suggested that social persuasion and communication from peers are factors that influence the acceptance of an innovation (Davis, Bagozzi, & Warshaw 1989; Mirvis, Sales, & Hackett 1991). Adoption of an innovation is also affected by the social environment. Communication between members of a social network can enhance the degree of innovation adoption. The participation of individuals in an organization in informal networks facilitates the spread of information about the innovation, which consequently influences the probability of an adoption (Yi, Jackson, Park, & Probst 2006; Talukder, Quazi & Keating 2014). No direction has been postulated apriori for the following hypothesis because social influence may have a positive or negative impact on intention to use mobile phone banking. The hypothesis below is therefore worth testing:

H6: Social influence has a significant positive impact on intention to use mobile phone banking.

Behavioural Intention

Ajzen and Fishbein (1980) define intention as a pre-disposition to respond favourably or unfavourably to an object, person, event or institution. According to Lam, Cho and Qu (2007) intention is an individual's feelings of the favourableness or un-favourableness of his or her behavioural action. Ajzen and Fishbein (1980) state that attitude is the function of behavioural beliefs and evaluation of outcomes. They explained that behavioural belief is one's belief in performing a specific behaviour that will lead to a specific consequence, and evaluation of the outcome is one's assessment of that specific consequence (Lam, Cho, & Qu 2007). Liao and Landry (2000) assert that employees' attitudes toward the acceptance of innovation would affect the intention of adopting the innovation (Lam, Cho, & Qu 2007). According to Pavlou and Fygenson (2005) intention has been shown to influence usage behaviour and this relationship has received substantial empirical support. Individuals may behave differently when their intention toward a certain type of behaviour has changed.

Specifically, individuals are more likely to perform a behaviour if they possess a positive intention and are more likely not to perform it when they possess a negative intention (Kwok & Gao, 2006). Intention to adopt an innovation is an aggregate belief of organizational, individual and social factors (Frambach & Schillewaert 2002). A favourable intention is likely to encourage individuals to adopt and use the innovation. Therefore, we propose the following hypothesis:

H7: Intention has a significant impact on the usage of mobile phone banking.

The above seven hypotheses and their relationship to behavioural intention and in turn the association between behavioural intention and mobile banking usage is depicted in the following diagram.

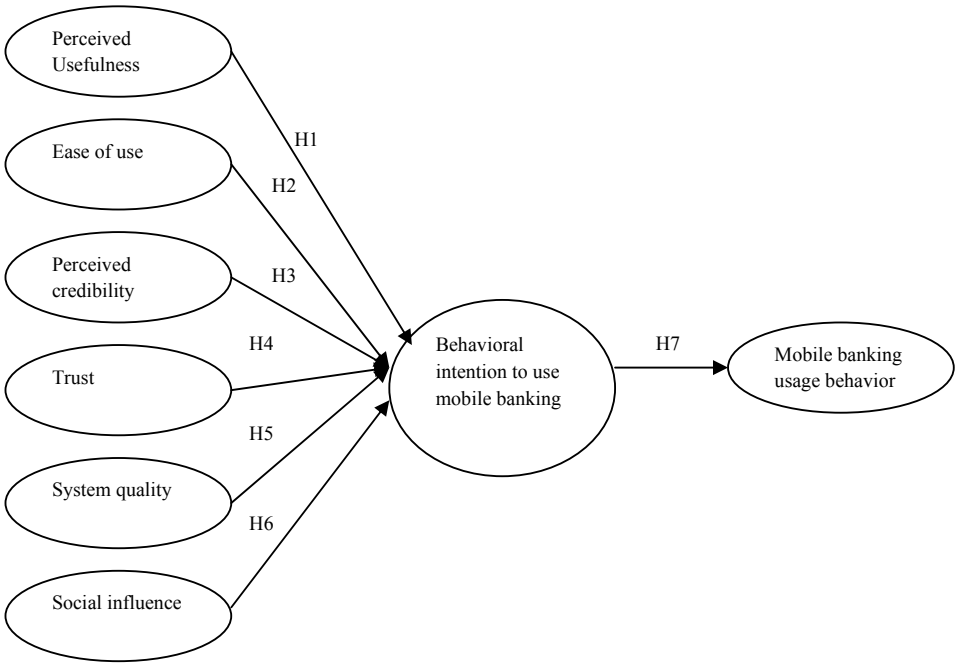

Figure 1: Research model for mobile banking

Table 1 below summarizes the sources of information employed in developing the variables included in the model.

Table 1: The sources of information used in developing the model's leading variables.

Factors/drivers/ antecedents	Sources
Perceived usefulness	Davis (1989); Moore & Benbaset (1996), Al-Gahtani and King (1999); Agarwal & Prasad (1998); Venkatesh & Davis (2000); Venkatesh, Morris, Davis, & Davis (2003).
Ease of use	Lee, Lee & Kwon (2004); Davis (1989); Karahanna, Agarwal & Angst (2006); Schepers & Wetzels (2007); van der Heijden (2004).
Perceived credibility	Quittner (1997); Rotheder (1998).
Trust	Suh & Han (2003); Pavlou (2003); Chen & Tan (2004); Culnan & Armstrong (1999).
System quality	Lin, 2008; DeLone & McLean (1992); Chiu et al. (2006).
Social network	Venkatesh & Brown (2001); Frambach & Schillewaert (2002); Sledgianowski & Kulviwat (2009); Talukder & Quazi (2011); Talukder, Harris & Mapunda (2008).
Behavioural intention	Ajzen & Fishbein (1980); Lam, Cho, & Qu (2007); Frambach & Schillewaert (2002); Kwok & Gao (2006).
Usage behaviour	Igbaria, Zinatelli, Cragg & Cavaye (1997); Al-Gahtani & King (1999); Igbaria, Guimaraes, & Davis (1995).

4. Methods

As stated previously this study is grounded in the Theory of Reasoned Action (TRA) (Ajzen & Fishbein 1980) and Technology Acceptance Model (TAM) (Davis, 1989). We used a previously tested questionnaire that Luarn and Lin (2005) and Gu, Lee and Suh (2009) used in Taiwan and the Republic of Korea, respectively. The items used to design the questionnaire were adopted and modified from previously developed and validated measures with appropriate modifications to make them specifically relevant to Australian conditions. The population for this study consisted of residents of Australian Capital Territory. The samples were drawn from the list of telephone subscribers appearing in the territory's telephone white pages. Random sampling technique was used to select 650 participants using random number tables; 650 questionnaires were then mailed to the target participants in October 2010 along with a reply paid envelope. After two follow-ups the total completed questionnaires stood at 269 of which 242 were deemed usable after scrutiny. These 242 responses were then statistically analysed.

Table 2 illustrates the sources of the construct measures and their operational indicators. The measures of each construct use item to total correlations, standardized Cronbach alpha, exploratory and confirmatory factor analysis for purification. Based on analysis and suggested modifications, 11 measures indicators from eight constructs were dropped. Due to the low AVE (Average variance extracted) and low Cronbach alpha (α) one factor was also removed from the model. The authors tested the proposed model using refined measures and common multiple regression procedures (Hair, Anderson, Tatham & Black 1998).

5. Data Analysis, results and discussion

Demographic profile of respondents

The respondents' demographics include gender, age, academic qualification and income. Data shows that there were more male respondents (56%) than females (44%). Most of the respondents (65%) are in the 20-25 age group and the second major (13%) age group are those who are 40 and above. A majority of respondents (46%) have a HSC level qualification, 15% have an undergraduate degree, 27% have SSC and 7% have a postgraduate degree. Only 11% of respondents have a monthly income above $5,000 and the majority (65%) earn below $3,000 per month. The demographic information shows that most of the responders are male, young, moderate to highly educated and have reasonable incomes.

Validity and the reliability

The study uses alpha reliability, AVE and confirmatory factor analysis to test the validity and the reliability of the construct. Results show a good model fit. Table 2 shows the detailed confirmatory factor analysis (CFA) results with standardized loading score for each construct measures. As Table 2 illustrates, all constructs demonstrated AVE score greater than the 0.50 recommended minimum score. Discriminant validity is adequate when constructs have an AVE loading greater then 0.05, which means at least 50% of measurement variance was captured by the construct (Kim & Garrison, 2009). CFA results in Table 2 indicate that all items are significantly associated with their hypothesized factors as evidence for convergent validity. All factor loadings are significant at an alpha level 0.001 and the factor loadings are fairly high. This supports the view that the measurements show convergent validity. Cronbach alpha for all constructs is higher than the acceptable level of 0.07 (Chang & Cheung, 2001), which also demonstrates the convergent validity of the measurement.

Table 2: Results for reliability and convergent validity

Construct	Measures		Std. Est [b]	t-value
	Sources	Indicators		
Perceived usefulness (α= .96, AVE= .93)	Davis (1989); Moore & Benbaset (1996), Al-Gahtani & King (1999).	MPB enables me to accomplish things quickly	.80	16.80 [c]
		Using MPB improves my performance	.94	18.23 [c]
		Using MPB increases my productivity	.95	18.59 [c]
		Using MPB enhances my effectiveness	.94	20.03 [c]
Ease of Use (α= .96, AVE= .94	Lin (2011); Gu, Lee & Suh (2009); Luarn & Lin (2005)	Learning to use MPB is easy	.86	16.52 [c]
		It is easy for me to become skilful	.92	18.96 [c]
		Learning to operate MPB is easy	.98	21.45 [c]
		Overall, I find MPB is easy to use	.93	19.08 [c]
Perceived credibility (α= .86, AVE= .82)	Luarn & Lin (2005); Brown, Cajee, Davis & Stroebel (2003); Luo, Li, Zhang & Shim (2010);	Using MPB would not disclose	.65	10.94 [c]
		I find MPB is secure	.94	19.57 [c]
		Using MPB is secure	.95	19.80 [c]
		Security issues have great influence	.79	14.41 [c]
Trust (α= .94, AVE= .92)	Luo, Li, Zhang & Shim (2010); Gu, Lee & Suh (2009)	I believe MPB is trustworthy	.90	17.86 [c]
		I believe MPB keeps its promise	.94	19.18 [c]
		I trust MPB as normal banking	.87	17.28 [c]
		I trust in the technology MPB is using	.87	16.91 [c]

System quality (α= .91, AVE= .92)	Lee & Chung (2009); Gu, Lee & Suh (2009); Lin (2011); Luo, Li, Zhang & Shim (2010);	MPB is a stable system	.85	16.55 [c]
		The speed of MPB is quick and fast	.84	16.95 [c]
		MPB is a easily navigable system	.94	17.68 [c]
Social influence (α= .92, AVE= .85)	Venkatesh & Brown (2001); Talukder & Quazi (2011).	People think I should use MPB	.72	14.88 [c]
		People think using MPB is valuable	.89	13.75 [c]
		People's opinions are important	.76	13.19 [c]
		I learned how to use it from my friends	.75	16.40 [c]
Intention to use (α= .97, AVE= .94)	Gu, Lee & Suh (2009); Luarn & Lin (2005); Lin (2011); Luo, Li, Zhang & Shim (2010)	I intend to use mobile banking	.88	17.51 [c]
		I intend to increase my use of MPB	.97	20.63 [c]
		I intend to use MPB continuously	.97	20.74 [c]
		I will frequently use MPB in the future	.98	21.29 [c]
Usage behaviour (α= .84, AVE= .82)	Igbaria, Zinatelli, Cragg & Cavaye, 1997; Al-Gahtani & King, 1999; Igbaria, Guimaraes, & Davis, 1995; Lin (2011);	How frequently do you use MPB	.95	18.96 [c]
		How much time do you spend	.67	11.81 [c]
		Usage of different MPB applications	.95	19.87 [c]

α= Cronbach alpha

AVE= Average variance extracted

b Standardized estimate

c p=.001

Inter-Correlation among variables

The study used correlation analysis as the first step to identify the relationships between the variables in the research model, so that any primary evidence for relationships between study variables could be found. These results were then used as the basis of further analysis such as regression. Table 3 shows the construct measures' correlations. The Pearson's correlation matrix table shows that there is a significant (at a level of 0.01), positive correlation between dependent and independent variables. The table shows that intention is significantly and positively related to perceived usefulness ($r=.742$, $p<.01$), ease of use ($r=.580$, $p<.01$), perceived credibility ($r=.630$, $p<.01$), trust ($r=.680$, $p<.01$), system quality ($r=.669$, $p<.01$) and social influence ($r=.506$, $p<.01$). Intention is also significantly and positively related with usage level ($r=.667$, $p<.01$).

Results of the multi-collinearity tests confirmed that there was no issue relating to multi-collinearity amongst the variables. Table 3 shows that coefficient of correlations (r) among dependent and independent variables ranged from 0.201 to 0.842, indicating no multicollinearity problems among the variables since correlations are below 0.9. Hair, Anderson, Tatham and Black (1998) state that the 'simplest and most obvious means of identifying collinearity is an examination of the correlation matrix for the independent variables and the presence of high correlations (generally .90 and above) is the first indication of substantial collinearity.

Table 3: Correlations among the research variables

	1	2	3	4	5	6	7	8
1. USE	1.000	.626 [a]	.658 [a]	.726 [a]	.715 [a]	.412 [a]	.742 [a]	.510 [a]
2. EAS	.626 [a]	1.000	.702 [a]	.630 [a]	.672 [a]	.201 [a]	.580 [a]	.391 [a]
3. CRE	.658 [a]	.702 [a]	1.000	.842 [a]	.759 [a]	.509 [a]	.630 [a]	.355 [a]
4. TRU	.726 [a]	.630 [a]	.842 [a]	1.000	.816 [a]	.476 [a]	.680 [a]	.431 [a]
5. QUA	.715 [a]	.672 [a]	.759 [a]	.816 [a]	1.000	.503 [a]	.669 [a]	.416 [a]
6. SOC	.412 [a]	.201 [a]	.509 [a]	.476 [a]	.503 [a]	1.000	.506 [a]	.363 [a]
7. INT	.742 [a]	.580 [a]	.630 [a]	.680 [a]	.669 [a]	.506 [a]	1.000	.667 [a]
8. USA	.510 [a]	.391 [a]	.355 [a]	.431 [a]	.416 [a]	.363 [a]	.667 [a]	1.000

Legend: USE=Usefulness; EAS=Ease of use; CRE=Perceived credibility; TRU=Trust; QUA=System quality; SOC=Social influence; INT=Behavioural Intention; USA=Usage level

[a] Correlation is significant at the 0.01 level.

Hypothesis testing

Results of multiple regression analysis are presented in Table 4. In this model behaviour intention is used as the dependant variable. The model explained 63.6% of the variance in intention and its associated F statistics indicated that it was significant at the $p<0.001$ level. Perceived usefulness, ease of use and social factors were significant at the $p<0.01$ level. Trust was significant at the level of $p<0.05$ level. Prior research showed that trust which is driven by website quality, has impact on increased intention to transact in online settings (Gregg & Walczak 2010). However, perceived credibility and system quality were not significant despite showing strong correlations with intention and usage level. Perceived usefulness was found to be the most important predictor of intention to use mobile phone banking followed by social influence. The model implies that usefulness and social influence are the most important determinants of perception of a technological innovation.

Regression analysis was also carried out for intention with usage level as the dependent variable and the outcome is depicted in Table 5. The result of the regression model explained 44.5% of the variance in usage (usage behaviour) and its associated F statistics indicated that it was significant at the $p<0.001$ level. The model implies that intention to use mobile phone banking is a precondition for an individual to adopt the technological innovation in that person's daily life.

Table 4: Regression model study variables with intention as the dependent variable

Variables	Unst. Coef. B	St. Coef. β	CR	R^2	F	*p*	Result
				.636	68.57	.000	Supported
Perceived usefulness	.425	.425	6.821			.000	Supported
Ease of use	.179	.179	2.799			.006	Supported
Perceived credibility	-.069	-.069	-.820			.413	Not supported
Trust	.177	.177	2.005			.046	Supported
System quality	.040	.040	.510			.610	Not supported
Social influence	.226	.226	4.513			.000	Supported

Table 5: Regression model usage as dependent variable with intention as the independent variable

Variables	Unst. Coef. B	St. Coef. β	CR	R^2	F	*p*	Result
				.445	192.32	.000	Supported
Intention to use	.667	.667	13.868			.000	Supported

We then performed regression analysis with usage level as the dependent variable and the results of the regression model are shown in Table 6. The model explained 32.2% of the variance in usage and its associated F statistics indicated that it was significant at the $p<0.001$ level. Usefulness, ease of use, credibility and social influence were significant at one percent level ($p<0.01$). Trust was significant at the level of six percent. System quality was not found to be significant in both models.

Table 6: Regression model study variables with usage level as the dependent variable

Variables	Unst. Coef. B	St. Coef. β	CR	R^2	F	*p*	Result
				.322	18.62	.000	Supported
Perceived usefulness	.338	.338	3.973			.000	Supported
Ease of use	.255	.255	2.931			.004	Supported
Perceived credibility	-.311	-.311	-2.700			.007	Supported
Trust	.225	.225	1.868			.063	Supported
System quality	-.077	-.077	-.728			.468	Not supported
Social influence	.262	.262	3.838			.000	Supported

The summary for the results of the hypothesis testing are evident in Table 7. The t values relating to hypothesis testing are presented in Figure 2. The statistical results indicate that there are no issues such as presence of outliers or multicollinearity; the Durbin-Watson statistics prove that no autocorrelation exists. Furthermore, to check the normality assumption, the researchers examined normal probability plots. Both histogram and normal probability plots revealed relatively normal distribution; hence this assumption is not violated. The results are shown in Figure 2 below:

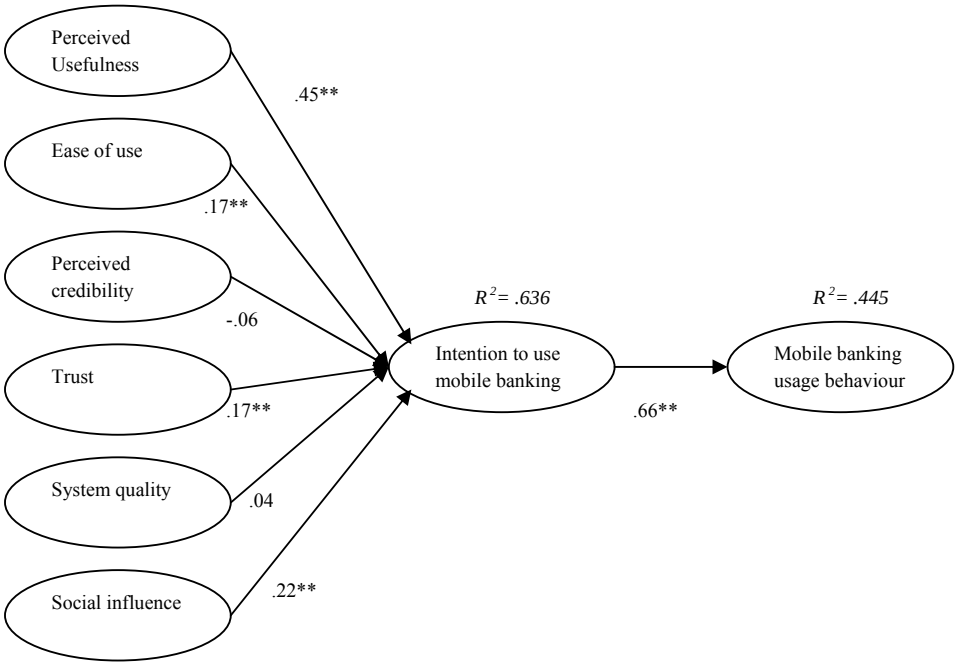

Figure 2: Test of the proposed model

Note: Regular numbers represent standardized weight. Numbers inside the bracket represent critical value. Italicized numbers represent variance explained **p=.001.

Table 7: Results of hypothesis testing at a glance

Hypothesis	Results	Comments
H1: Perceived usefulness has a significant impact on intention to use mobile phone banking.	Significant positive relationship is established	Supported
H2: Ease of use has a significant impact on intention to use mobile phone banking.	Significant	Supported
H3: Perceived credibility has a significant positive effect on intention to use mobile phone banking.	Significant	Supported in the direct model but not in the first model relating to intention to use mobile phone banking.
H4: Trust has a significant positive impact on intention to use mobile phone banking.	Significant	Supported
H5: System quality has a significant positive impact on intention to use mobile phone banking.	No significant relationship found	Not supported in multiple regression analysis but have significant correlation with intention to use.
H6: Social influence has a significant positive impact on intention to use mobile phone banking.	Significant	Supported
H7: Intention has a significant impact on the usage of mobile phone banking.	Significant relationship is established	Supported

Table 8: Major findings of the research at a glance

Relationship investigated	Statistical analysis used	Findings summary	Remarks
Perceived usefulness and intention to use mobile phone banking	Correlation, bivariate and multiple regression analysis	Perceived usefulness and intention to use mobile phone banking are positively linked, suggesting that perceived advantages are instrumental in creating a positive view of an innovation among individuals.	Regression analysis does reveal a significant relationship.
Ease of use and intention to use mobile phone banking	Correlation, bivariate and multiple regression analysis	Ease of use has a positive impact on intention to use mobile phone banking, suggesting that ease of use is essential to encourage individuals to use a particular system.	Significant relationship established.
Perceived credibility and intention to use mobile phone banking	Correlation, bivariate and multiple regression analysis	There is a direct relationship between credibility of the system and the intention to use mobile phone banking.	Regression analysis does reveal a significant relationship.
Trust and intention to use mobile phone banking	Correlation, bivariate and multiple regression analysis	The intention and use of the mobile phone banking system is directly influenced by individuals' trust of the system.	Regression analysis does reveal a significant relationship.
System quality and intention to use mobile phone banking	Correlation, bivariate and multiple regression analysis	System quality has no causal relationship with intention to adopt mobile phone technology. However, a non-directional relationship exists between the two variables.	Regression analysis does not reveal any significant relationship but they have significant correlations.
Social influence and intention to use mobile phone banking	Correlation, bivariate and multiple regression analysis	Social influence has a positive impact on individuals' intention to use mobile phone banking.	Regression analysis does reveal a significant relationship.
Intention to use mobile phone banking and mobile phone banking usage behaviour	Correlation, bivariate and multiple regression analysis	Individuals' intention to use mobile phone banking influences their adoption and use of the system.	Regression analysis does reveal a significant relationship.

It is worth noting that an analysis of the above findings supporting most hypotheses implies that the paths that we have identified using prior literature and our research experience in the field are theoretically and empirically viable. The construct 'system quality' that has not been supported in this study is consistent with the finding of another prior study that revealed that "the complexity of sophisticate e-commerce implementations is negatively co-related with the future level of use of e-market places (Hayada 2006). The main reason for the non-support status of the construct is understandable given the fact that the non-system or non-technical aspects of mobile technology are increasingly become more important to users as the technical aspects are already standardized. Therefore the technical core of mobile technology is no longer a basis for competitiveness in the market place. We therefore suggest that future research can re-specify the model by excluding the system quality construct to see if the model fit indices improves with this exclusion.

7. Discussion and implications of the findings

The data analysis presented above reveals that all but hypotheses 5 are supported in terms of impact of predicting variables on intention to use mobile phones in financial services in Australia. Hypotheses 3 and 4 are concerned with firstly, the relationship between credibility and intention to use and secondly, the relationship between system quality and intention to use mobile phones, respectively. It should be noted that this finding changes when the determinants are directly regressed against the outcome construct (usage behaviour). Therefore, this research shows that there is a direct linkage between the predicting variables and the outcomes variable. Although this finding is not fully in lined with theoretical underpin suggesting that the linkages should be mediated by intention. However, this is understandable given the fact that this direct linkage makes sense in the context of mobile phone usage behaviour in research setting of this study. In this sense this paper makes a contribution to the literature which is considered noble when it comes to utilization of mobile phones in financial transactions in Australia. It is to be noted that there is evidences in the literature in terms of direct influence of drivers of mobile phone usage (e.g perceived usefulness) on the behavioural intention (Zarmpou, Saprikis, Markos, & Vlachopoulou, 2012), a different context in the literature as to this direct link. For example Talukder and Quazi (2011) found direct links between social influences on usage behaviour of technologically innovative systems in Australia. Furthermore, the direct link between intention to use and usage behaviour is also established in this research suggesting that behavioural intention as a predictor of usage behaviour of mobile bank users is understandable, given the fact that the usage decision concerning mobile phones in financial transactions is to be backed up by the intention to use the system. This is also consistent with the existing theory of technology adoption.

The above findings have several important implications for providers, users, regulators and the economy as a whole. These implications are discussed below:

Implications for providers

From the providers' (i.e. banks) perspective, the advantages of mobile phone banking are enormous. Mobile banking helps banks penetrate underserved markets and reach out to remote localities in a cost effective way. This aspect of mobile phone banking is particularly important in the Australian context because many underserved populations are located in regional and rural areas. It has been stated that mobile-as-Internet-machine can allow customers to transact remotely (sending remittances, paying bills) without having to physically access a service point (Rosenberg, 2008). Yet another strategic advantage for banks would be to sell more products to customers through mobile phone banking. It would also be possible for the banks to retain their most valued customers as usage of mobile phone increases and clients start transacting business via mobile phones. Replacing more expensive service delivery channels with mobile phones would help banks to secure a strategic competitive advantage in the market place. Our study clearly elucidates the barriers to adopting mobile phone banking and would therefore help banks develop strategies that address and solve these problems.

Implications for users

For the users of mobile phone banking, it helps them manage their bank accounts anytime, anywhere. It gives people instant access to finances and enables them to conduct transactions with ease. In addition, news and business information is also available at the finger tips, making it easier to make financial decisions quickly. In most financial decisions, such as buying and selling of securities, the element of time is crucial. As described by Johnson (2010) mobile phone banking would enable bank account holders to manage their finances easily and securely anywhere in the world, transfer funds and purchase items. Mobile phone users can turn the handset into a 'mobile wallet' topped up with cash, enabling them to transfer money seamlessly and make payments in seconds. Similarly, an UNCTAD study found that an enormous number of people, including taxi drivers and tradesmen, now rely on mobile phones to run their small businesses - well over 80% in Egypt and South Africa alone (Anderson, 2007).

Our empirical study answers the questions regarding: firstly, what drives mobile phone usage; and secondly, what are the main concerns of the users of mobile phones before widespread use of such devices for conducting financial transactions is possible.

Implications for regulators

From a regulatory perspective mobile banking is fraught with difficulties. So long as the mobile banking service is provided by banks, the money in circulation remains under the radar of the central bank. However, many private players such as telecommunications companies could enter the mobile banking market, thus making it difficult for the regulator to monitor them. Building on this theme, information security in an end-to-end network is yet another issue from the regulatory as well as banking perspective. Banks are required to keep details of their customers secure as there are also issues concerning privacy laws, however, where security is less stringent information security could be compromised. The OECD identifies information security as a major regulatory issue in mobile banking, among others.

Implications for marketing

Mobile phone banking will provide an opportunity for banks to promote their services to present and potential clients in the easiest, quickest and most efficient way involving minimal costs to them as well as to their customers. This will also ensure better and standardized quality services to clients irrespective of where they are. It will also ensure overall satisfaction of customer needs in terms of providing access to services round the clock. Finally, cost savings will increase banks' competitiveness in the market. The ease of transactions over the mobile phone will also result in customers engaging more effectively with service providers. This may reinforce social bonding with the client and lead to increased customer loyalty in the long term.

Implications for the economy

Mobile phone banking has implications for the economy. It has been found that as the use of mobile phone increases so does economic growth. Anderson (2007) cites a 2005 London Business School study which concluded that an increase in 10 mobile phones per 100 people would increase GDP growth by 0.6 percent. Consulting firm Deloitte found that GDP can increase by as much as 1.2 per cent when mobile phones are used (Anderson, 2007). Our

study finds that several factors such as security - if addressed properly - would lead to more mobile phone banking and add to economic growth. For example, the Australian Capital Territory is rapidly growing and it has witnessed a rapid rise in population resulting from new jobs created at the federal level. This has positive effects on income generation for Canberra's population and led to higher standards of living in the metropolitan area. Obviously, an expanding economy such as Canberra will require banking industries providing efficient, flexible and convenient services through innovative technology. Mobile phone banking is definitely an option for both banks and customers to explore.

8. Conclusion

The study has uncovered some interesting facts about the drivers of mobile phone usage behaviour in Australia which can be considered as advancement over the extant research in the related field. In particular, the paper has empirically established that perceived usefulness, ease of use, perceived credibility, trust and intention, system quality and social influence have a positive and significant impact on the behavioural intention and usage of mobile phones in Australia. These findings facilitate the advancement of the theory of reasoned action (TRA) and the technology acceptance model (TAM) in an Australian setting. While the above determinants are well established in the literature in reference to technology adoption in general, these factors are rarely explored empirically in terms of usage of mobile phones particularly in financial transactions in Australia. Social influence has emerged as the most striking determinant of intention to use mobile phones. This finding is consistent with that of previous research on technology adoption. Financial institutions can capitalize on this finding to popularize the mobile phone usage in banking transactions using customer's relationships with their peers in various social media which is currently witnessing a rapid growth in Australia. This strategic approach would be appropriate for exploiting the sentiments of users and especially the young cohort of customers who are professional and innovative in their approaches to new technology.

The other important determinant emerging from this research also warrants discussion as this determinant is crucial for banking institutions to consider strategically. Since customers are increasingly becoming conscious of the best use of their time through access to technology at their own convenience, the usefulness issue is likely to be crucial in the diffusion of mobile technology in the mobile-driven financial market segment. Although ease of use as a determinant is not new in the technology adoption literature, this issue is more relevant in the case of financial transactions. A user-friendly system is becoming more widely accepted by customers in this era of technological revolution and in the case of mobile banking this is even more true. Customers love to use a system which is less cumbersome and complex to use. In this sense the issue of user-friendliness also constitutes a strategically important one for the finance sector where businesses must seriously consider when promoting their mobile phone banking products. The credibility issue is also relevant to the promotion of mobile technology because customers prefer to use a system that is reliable and trustworthy in terms of its efficiency and method of operation.

9. Limits and avenues of future research

The study has a few limitations that need to be noted when generalizing the findings across Australia and beyond. This study is based on data collected only from the city of Canberra in the Australian Capital Territory. A broad-based future study taking data across several states would contribute to the generalization of the findings at the national level. Furthermore, the study can be extended to the international level through testing the model using data collected from Western countries. Furthermore the study can be replicated in emerging markets making it possible to generalize the model beyond the developed world. Finally, a more sophisticated statistical technique such as structural equation modelling (SEM) or partial least square (PLS) can be used to further capture the complexities associated with the usage behaviour of mobile technology in the finance service sector.

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