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The importance of value and context for mobile CRM services in banking

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Abstract

Purpose – The aim of the paper is to identify interactions existing among the identified factors and understanding how they impact adoption intention so that better CRM strategies for mobile channel can be orchestrated.

Design/methodology/approach – The paper empirically explores the underlying factors by the application of confirmatory factor analysis and structural equation modeling. The study sample consists of 523 respondents with a response rate of 63.9 percent (usable response rate).

Findings – The empirical findings reveal that from the perspective of benefits, perceptions value, perceived usefulness and context were the three critical components significantly influencing adoption intention. On the apprehension side, the effects of perceived security assurance, perceived trust, perceived cost and perceived risk on perceived value as well as perceived usefulness were significant.

Research limitations/implications – The study had a few limitations such as selection of the sample from a limited number of places, and the model was cross-sectional measuring perceptions and intentions at a single point of time.

Practical implications – Based on the findings, banks should focus on increasing the value perceptions of the customers by considering the perceptions of usefulness in various service contexts. The structural assurances and risk mitigation strategies also need attention.

Originality/value – The findings provided insight into the factors that contribute to the acceptance of mobile CRM services in India from new consumers' perspective. This study demonstrated that in the case of mobile CRM, the factors related to service aspect dominate over the technical aspect.

Keywords Customer relationship management, Perceived value, Indian perspective, Mobile CRM, Structural equation modeling

Paper type Research paper

1. Introduction

Mobile devices improve the quality of the service (Dickie, 2011) because clients can perform transactions at their convenience wherever and whenever they want it (Laukkanen, 2007) provided there is a connection. Thus, a mobile banking service can foster stronger relationships to the existing ones between financial institutions and clients. Nevertheless, earlier studies on adoption of mobile banking (Suoranta and Mattila, 2004; Silberer and Schulz, 2010) have not been encouraging. Despite all the benefits, consumers have been reluctant to adopt mobile banking services (MBS), in part because customers have grown comfortable with already a low cost service online (Kwiatkowski, 2010) and because of inferior user experience compared with fixed internet (Gillespie, 2007). Recently, based on a study by KPMG of more than 4,000 people in 19 countries, Seidel (2009) reported that an impressive majority (91 percent) of the US respondents had never tried conducting banking through a mobile device.

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In such a scenario the understanding of customer's perception of mobile customer relationship management (mobile CRM) services is required for assessing the current services being offered and development of new ones (Awasthi and Sangle, 2012). The knowledge about service attraction points for the customers, the formulation of their value perceptions and factors leading to distinguished service preferences would equip the financial institutions for better segmentation and customization (Sangle and Awasthi, 2011). Hence it is crucial to understand the driving forces behind consumers' intentions to use mobile financial services and adapt the services to meet their expectations accordingly (Nysveen *et al.*, 2005; Cruz and Laukkanen, 2010).

In the context of developing countries like India where records show that there is a massive population which creates huge untapped market for extending banking services through mobile phones, this kind of study becomes even more important. The number of wireless subscription in urban areas increased from 594.11 million in February 2012 to 595.90 million at the end of March 2012. During the same period the subscription in rural areas increased from 317.06 million to 323.27 million (TRAI, 2012). This shows higher growth in rural subscription (1.96 percent) than urban subscription (0.30 percent). Along with this wire-line subscriber base declined from 32.33 million at the end of February 2012 to 32.17 million at the end of March 2012. The share of urban subscribers increased from 76.43 to 76.54 percent where as share of rural subscribers declined from 23.57 to 23.46 percent. These figures alone show the wonders mobile CRM can do in financial services. In this regard the current study tends to emphasize the less explored area of consumer's perspective and identify the factors on the backdrop of a developing country.

The aim of the paper is to develop an understanding of:

- What factors can be identified as the guiding force for making better mobile CRM services in banking?
- What kinds of interactions exist among the identified factors and *understand* how they impact adoption intention so that better CRM strategies for mobile channel can be orchestrated?

This study is structured as follows. Section 2 describes the literature review on mobile CRM and concerned areas. Section 3 presents theoretical background for the identification of constructs for this study. Further in Section 4 the research methodology is discussed. Section 5 presents the data analysis and results. Finally Section 6 is based on discussion and managerial implication. Section 7 presents conclusions along with the limitations and future research directions.

2. Research on mobile CRM

Mobile CRM has only recently aroused interest in academic research and thus no formal conceptualization of mobile CRM currently exists (Sangle and Awasthi, 2011). As the conceptual agreement is necessary prerequisite for coherent discussion about the phenomenon (Sinisalo *et al.*, 2007) literature on mobile CRM was referred for establishing a commonly accepted definition. It was found that various researchers have defined mobile CRM in the preview of their research, coming to a consensus that it is application of mobile technologies for managing the relationship with the customer through their life cycle. Camponovo *et al.* (2005) stated that mobile CRM services as those that:

- aim at nurturing customer relationships, acquiring or maintaining customers;
- support marketing, sales or service processes; and
- use wireless networks as the medium of delivery to the customer.

Similar to the previous definition Schierholz *et al.* (2007) defined it as the application of mobile technologies in order to support CRM processes.

According to the definition given by Valsecchi *et al.* (2007) mobile banking deem to be perfect candidate for mobile CRM services as it conform that mobile technology can be employed for creating maintaining and enhancing the relationships with the customers by providing the services on their most personal devices like mobile phones or PDAs. As not many studies are reported in mobile CRM from consumer's perspective (Liljander *et al.*, 2007) specially in banking sector (Sangle and Awasthi, 2011), the literature in other concerned areas like mobile commerce, mobile banking, mobile internet, etc. was reviewed for developing the pool of constructs for current study.

3. Conceptual framework

The constructs from technology acceptance model (TAM) were taken for technological aspect as it has been repeatedly suggested an applicable frame of reference for technology adoption by prior studies (Mallat *et al.*, 2008; Lin, 2011; Bouwman *et al.*, 2012). Apart from the findings of studies based on TAM, study by Ram and Sheth (1989) reports that people resist the use of a new product by creating barriers to adopt at both functional and psychological levels. Thus, for making the construct pool for this study the findings of Ram and Sheth (1989) were carefully heeded. Ram and Sheth (1989) described the functional barriers as usage barrier, value barrier and risk barrier where as psychological barriers involve tradition and image barrier.

3.1 Technology adoption model and its critics

TAM is based on theory of reasoned action (TRA) (Fishbein and Ajzen, 1974) and is popularized as most parsimonious model (Yi and Hwang, 2003; Hong *et al.*, 2006; Khalifa and Shen, 2008; Karjaluoto *et al.*, 2009). TAM was developed for organizational settings (Davis, 1989; Venkatesh and Davis, 2000) where the cost of mandatory adoption was borne by the management. The subjects of the study were employees being purely technology users. The users of mobile banking application are not only technology users but also service consumers (Sangle and Awasthi, 2011). In this case the cost of voluntary adoption and usage is borne by the individuals themselves (Kim *et al.*, 2007b). The disregard to assess the barriers to use the information system (in this case the mobile banking application) and service consumer aspect of the individual renders less likelihood of TAM reflecting the adoption of mobile banking (Luarn and Lin, 2005).

3.2 Proposed constructs for research model

Following the critical comments of Legris *et al.* (2003) along with the findings of Ram and Sheth (1989), TAM was taken as the anchoring point of current research and it was also extended with eight additional constructs – perceived value, context, perceived security, perceived security assurance, perceived cost, perceived risk, perceived need and infrastructural support. These constructs were also found relevant during a prior focus

group study. Review of studies was also included for one more construct in this section as one variable was renamed based on the dimension reflected after confirmatory factor analysis.

3.2.1 Perceived usefulness. One of the main reasons for the slow diffusion of mobile applications in general and MBS in particular could be a failure in communicating a clear benefit to potential users. According to diffusion theory, users are only willing to accept innovations if those innovations provide a unique advantage compared to existing solutions (Rogers, 1995). In the context of TAM, this view is reflected by the perceived usefulness construct. A handful of studies (Tang *et al.*, 2004; Amin *et al.*, 2007; Mallat *et al.*, 2009; Riquelme and Rios, 2010; Shen *et al.*, 2010; Tan *et al.*, 2010) have given evidence for the significant impact of perceived usefulness on adoption intention mobile services:

H1. There is a positive relationship between the perceived usefulness of MBS and the intention to use MBS.

3.2.2 Perceived ease-of-use. Given the technical limitations of mobile devices, ease-of-use becomes an imminent acceptance driver of mobile applications (Venkatesh, 2000). This is especially true for MBS, which compete with established banking solutions and thus need to provide benefits when it comes to ease-of-use. It is important to note that, especially for non-users, it is the perception of ease-of-use rather than actual system characteristics which underlie this construct (Venkatesh and Davis, 1996). Further, following prior research (Eriksson *et al.*, 2005), it was proposed that the easier and more intuitive MBS are perceived to be, the more positive the assessment of their usefulness (Venkatesh *et al.*, 2003):

H2. There is a positive relationship between the perceived ease-of-use of MBS and the intention to use MBS.

H3. There is a positive relationship between perceived ease-of-use of MBS and perceived usefulness of MBS.

3.2.3 Context. The concept of context has also gained much attention when discussing the adoption of mobile commerce or other mobile technology related studies (Mallat *et al.*, 2008). As users almost always carry their mobile devices and use these in a variety of environments the use context becomes an important research question in relation to the need and the environment within which it is used (Dourish, 2004).

Previous studies have provided evidence on the effects of use context of mobile services (Zhou, 2008), mobile internet (Lee *et al.*, 2005; Mallat *et al.*, 2008). Wendel and Dellaert (2005) found that consumers consider different media channels and require different benefits from them under different contexts. Lee *et al.* (2005) found significant correlations of contextual factors with specific type of mobile services:

H4. There is a positive relationship between the context of using MBS and the intention to use MBS.

H5. There is a significant relationship between context of MBS usage and perceived ease-of-use for MBS usage.

3.2.4 Perceived value. Consumers' preferences to innovations have been explained through value perceptions and its maximization (Kahneman and Tversky, 1979;

Menon and O'Connor, 2007). In case of financial sector also the development of electronic banking services via multiple electronic channels has made it possible to create new kinds of added value for customers (Laukkanen, 2007). The importance of CRM by value addition in financial services (through personalization and customization) is emphasized by Chen and Ching (2007). It is argued that the ability to identify profitability from customers and customized marketing based on customer value has enabled many banks to maintain their competitive edge (Coltman, 2007). In the presence of a mixed environment a combination of factors acts on individual's value perceptions and decision of adoption (Yen, 2012):

H6. There is a positive relationship between the perceived value of MBS and the intention to use MBS.

H7. There is a positive relationship between the perceived value of MBS and perceived usefulness for MBS.

H8. There is a positive relationship between the context of using MBS and perceived value of MBS.

3.2.5 Perceived risk. To take care of the barriers of adoption as they are not covered by TAM (Luarn and Lin, 2005) the normal environment of service usage through mobile phones was looked upon. We found that the concerns about one's privacy, risk of transaction failure along with the charges of GPRS connections were among prevalent inhibitors of mobile commerce and mobile internet adoption. A study by Wu and Wang (2005) indicated that perceived risk and cost were the variable which significantly affected user behavioral intent along with the two original TAM constructs.

As the technologies have changed with the time, the factors underlying the perception of risks have also changed. Initially they were associated with product related attributes. As the e-commerce came into picture the risk perception got distributed on product as well as internet related characteristics. Relating to mobile banking the factors like bank balances, fraud related to tempering of financial data without the knowledge of customer and theft of pin numbers generated many concerns among the customers. Few other studies also demonstrated the effect of perceived risk on behavioral intention to use in context of online transactions (Forsythe and Shi, 2003; Cho, 2004):

H9. There is a negative relationship between the perceived risk for MBS and intention to use MBS.

H10. There is a negative relationship between the perceived risk of MBS and the perceived usefulness of MBS.

3.2.6 Perceived cost. As TAM was most often used in work related contexts that do not entail any cost to user (Nysveen *et al.*, 2005; Cruz and Laukkanen, 2010), cost was not included in the original TAM model. On the other hand the application of Rogers' (1995) innovation diffusion theory (IDT) in many infrastructural support related studies have constantly showed potential adaptors typically evaluate the relative advantage of a technological innovation in terms of whether the cost of adoption are out weighted by the benefits likely to be received (Premkumar *et al.*, 1994). This evaluation supports the prospect's theory (Kahneman and Tversky, 1979) which proposes that people chose their behavior that lead to the highest payoff between perceived gain and perceived loss.

In context of mobile CRM services in banking costs play duel role. According to Kim *et al.* (2007b), the perceived costs can be of two types – monetary as well as non monetary. The non monetary costs such as search/effort costs, psychological costs, and convenience costs as well as monetary costs of acquiring GPRS connection, additional service costs on transaction or other requests may act on the perceived loss side. Usually the cost of GPRS connection is subscription or "pay as you use" based. False calculation of costs happens due to the lack of experience because the users are charged differently for same services in traditional or internet banking:

H11. There is a significant impact of the perceived cost of MBS on the intention to use MBS.

H12. There is a significant impact of the perceived cost of MBS on perceived value of MBS.

H13. There is a significant relationship of the perceived cost of MBS and context of MBS usage.

H14. There is a significant impact of perceived risk for MBS and the perceived cost of MBS.

3.2.7 Perceived security. Since personal and financial information can be intercepted and used for fraudulent purposes, users need a sense of security when conducting financial transactions (Roca *et al.*, 2009). Laforet and Li (2005) found the issue of security to be the most important factor that motivated Chinese consumer adoption of mobile banking. In the context of electronic services, security has been found to be a particularly critical concern among consumers (Lwin *et al.*, 2007; Schierz *et al.*, 2010). Finally, availing a banking service on mobile is often associated with a relatively high loss potential-related to privacy, personal data, and the transaction itself (Bauer *et al.*, 2005), further increasing the perceived risk of MBS:

H15. There is a positive relationship between perceived security of MBS and the intention to use MBS.

H16. There is a positive relationship between the perceived security on MBS and the perceived usefulness of MBS.

H17. There is a positive relationship between the perceived security on MBS and the perceived value of MBS.

H18. There is a negative relationship between the perceived risk of MBS and the perceived security on MBS.

3.2.8 Perceived security assurance. If customers perceive the structures on the internet to be generally adequate for safe transactions, they should be more likely to trust the multi-channel retailer's online operations, and should also be more likely to make online purchases from the multi-channel retailer (Bock *et al.*, 2012). In the mobile banking context, security assurances promise the reliability of financial transactions, the protection of individual privacy and transactional confidentiality (Kim *et al.*, 2007a; Chu and Yao-bin, 2009). Thus, the perceived security assurance would improve customers' initial confidence in a service because clients want to be protected from informational, financial, and other forms of risk and uncertainty.

According to the study (Ranganathan and Ganapathy, 2002), although there were advancements in internet security over the years such as digital signatures, certificates and cryptography, online shoppers were found to be concerned about security issues when purchasing products and services over the internet. Same reference comes for another electronic channel, i.e. mobile channel, which is also taken as connected to internet through GPRS connection:

H19. There is a positive relationship between perceived security assurance for MBS and the intention to use MBS.

H20. There is a positive relationship between the perceived security assurance for MBS and perceived security on MBS.

H21. There is a negative relationship between the perceived security assurance for MBS and perceived risk involved in MBS.

3.2.9 Infrastructural support. There are a number of infrastructural requirements for conducting MBS such as appropriate screen size of mobile phone, Java support for running the application, GPRS connection for establishing the contact with bank. These entire requirements are important from mobile CRM point of view as hurdles related to these requirements will also hinder the intention to download and initial use of application. Feeling of losing the control over the financial activity due small size of the screen (Siau *et al.*, 2001; Chae and Kim, 2004) or instable GPRS connection may lower the intention to use MBS. Consumers may perceive their current mobile phone inadequate for using MBS thus may feel a prerequisite to change their mobile phones. This in turn may generate the cost concerned issues and lower the intention to use mobile banking service.

The poor performance of GPRS services of the communication service provider may create cost and risk concerns in mobile service consumers as the cost incurred for holding a GPRS connection is to be borne by the individual himself. Today's mobile service consumers have internet connection available at their work place due to which they seem less interested in obtaining another connection on their mobile phone after paying extra for it. Along with this holding, GPRS connection also raises risk concerns. Consumers perceive high risk of security and privacy if GPRS connection is utilized on their mobile phone for browsing or other activities like availing banking services:

H22. There is a significant impact of infrastructural support for MBS on the intention to use MBS.

H23. There is significant impact of perceived cost of MBS on infrastructural support acquired for MBS.

H24. There is significant relationship of perceived risk for MBS on infrastructural support acquired for MBS.

3.2.10 Perceived need. The uses and gratifications theory emphasizes how social and psychological needs drive audiences to make use of different media to obtain gratifications (Rubin, 1994). In the literature, two variants of the uses and gratifications theory are particularly pertinent to research. The first is the expectancy-value theory and the second account is offered by Rosengren (1974) for media use as problem-solution theory. There are two preconditions for audiences to seek a particular media source

to fulfill their needs: a perceived "problem" with the existing source and a perceived "solution" (i.e. functional alternative) available. Only when both problem and possible solution are identified will audiences have the motives to attend to the particular media.

The problem-solution theory provides an analytic tool for situations in which there are competing media channels or contents. Combining the two variants, Zhu and He (2002) arrived at a new construct for their study, perceived need for new media, which posited that audiences turn to the new media (for example, internet) only when they feel the conventional media cannot satisfy a certain need that is important for their life goal and the new media will be able to meet the need. Furthermore, a study done by Zhu and Weaver (1989) showed that a category of newspaper subscribers quit the subscription because they were initially attracted to the subscription by some discount offers; however, they eventually found no need for it. Finding of a study by Hoffman *et al.* (1999) showed the functional reasons due to which web users do not shop online included lack of perceived need, interest, knowledge of how to shop online, and the belief that it is faster to shop in stores made of bricks and mortar:

H25. There is a significant relationship between perceived need for MBS and intention to use MBS.

H26. There is a positive relationship between perceived need and perceived value of MBS.

H27. There is a significant relationship of the perceived need of MBS and context of MBS usage.

H28. There is a significant relationship of perceived security on MBS and perceived need for MBS.

3.2.11 Perceived trust. After conducting confirmatory factor analysis perceived security was renamed as perceived trust based on the dimension implied by the remaining items. Thus, literature review was conducted for this construct also and hypotheses were modified and added accordingly.

Due to the great uncertainty and risk involved in online transactions, trust has received considerable attention in the electronic commerce context (Zhou, 2011).Trust has also been found to affect user adoption of various services, such as online news services (Chen and Corkindale, 2008), mobile payments (Chandra *et al.*, 2010), mobile banking (Kim *et al.*, 2007a) and mobile shopping (Lu and Su, 2009), mobile CRM (Sohn *et al.*, 2011). It can differ according to gender and age of the customer (Hamed *et al.*, 2011). Besides this in mobile commerce adoption the concepts of risk and trust have emerged together (Wu and Wang, 2005; Mallat *et al.*, 2008). Users have to disclose their personal information such as telephone numbers, credit card details to the seller (Bhattacherjee, 2002; Grabner-Kräuter and Kaluscha, 2003) which can be an easy access by unauthorized parties. Thus, they perceive a high risk of breach of trust.

Trust appears to be a critical factor in an online context in which the consumer does not have direct control over the actions of the vendor (Roca *et al.*, 2009). Mukherjee and Nath (2007) identified that the privacy and security features of the web site along with shared values are the key antecedents of trust, which in turn positively influences the behavioral intentions of customers. In this sense, the influence of privacy and security on users' acceptance has been supported by several authors in the context of e-banking services (Liao *et al.*, 2007; Poon, 2008).

4. Research methodology

4.1 Measurement development

Most of the instruments were drawn from previous research and re-worded accordingly for our research context, i.e. mobile banking adoption (Table I). As suggested by Moore and Benbasat (1991), the items of each construct were formulated in terms of the perception of performing/adopting MBS. The initial sets of items were proposed and adapted from the literature review. Apart from this, the items for two constructs were specifically developed for this study. These constructs were based on the findings of focus group study carried out before the current study. All the prescribed statistical measures were taken in the development of items of these two constructs to avoid any glitches. Second, field interviews with bank managers were conducted and accordingly modifications were made. They were asked to assess the terminology, clarity of instructions and response format. The questionnaire was

Construct	Definition	Adapted from
Perceived usefulness (PU)	It is defined as the extent to which individuals believe that using the mobile banking will enhance their task performance	Davis *et al.* (1989)
Perceived ease-of-use (PEOU)	It is defined as the degree to which an individual believes that using a mobile banking will be free of effort	Davis (1989)
Context (CON)	It is defined as any information that can be used to characterize the situation of entities (i.e. whether a person, place, or object) that are considered relevant to the interaction between a user and an application, including the user and the application themselves	Mallat *et al.* (2008)
Perceived value (PV)	It is the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given	Kim *et al.* (2007b)
Risk (RIS)	The user's subjective expectation of suffering a loss in pursuit of the desired outcome of using mobile CRM services on mobile phone	Wu and Wang (2005)
Cost (COS)	The possible expenses of using mobile CRM services, i.e. equipments costs, access cost, and transaction fees	Wu and Wang (2005)
Perceived security assurance (PSA)	In the case of mobile channel it can be defined as the belief that structures of the mobile communication are in place to promote successful mobile transactions	Casaló *et al.* (2007)
Perceived security (PS)	A threat that creates a circumstance, condition, or event with the potential to cause economic hardship to data or network resources in the form of destruction, disclosures, modification of data, denial of service, and/or fraud, waste and abuse	Kalakota and Whinston (1997)
Infrastructural support (IS)	In the context of current research it was defined as the hardware and communication connection support like GPRS connection acquired by the customer	Developed
Perceived need (NEE)	A requirement of using innovation (mobile banking in present context) felt by the customer due to the various reasons These needs may be deflated by the user's ignorance or rejection of services	Developed

Table I.
Theoretical constructs identified for the study and their definitions

modified and pretested on some customers ($n = 35$) so that further problems with the measures and response format could be detected.

Improved by the literature review, field interviews and pretest, 35 items for ten constructs were finally selected. For TAM, perceived ease-of-use is measured by three items (PEOU-3), perceived usefulness by six items (PU-6). Apart from the determinants of TAM the other constructs like perceived value and perceived security were measured by four items each (PV-4, PS-4). In addition to this, each of the six more constructs namely context (CON-3), perceived security assurance (PSA-3), perceived risk (PR-3), infrastructural support (INFR-3), perceived need (PN-3) and perceived cost (PC-3) were measured by three items each (see Table I and the Appendix).

4.2 Sampling and data collection

The surveys for this study were collected from Mumbai, Pune, Delhi, Bangalore, Hyderabad, Chennai between May 2010 and July 2010. These cities were selected based on the availability of the infrastructure required for the services. Also these cities were pioneers in the introduction of innovative self-service technologies. The surveys were distributed in malls, institutions, housing societies and super markets. As the users of the advance concepts like mobile CRM are more likely to be available in shopping mall, institutions, housing societies and super markets, these places were chosen for distribution of surveys. For users who did not want to fill in the questionnaire, e-mail addresses of these users were requested and the survey form was emailed to them.

The target population of this study included individuals who were mobile device users. The reason why these users were considered was due to the fact that they were considered to be more likely to opt for mobile services and be a part of CRM facilities than those without a mobile device. The sampling method used was purposive sampling where certain properties of the respondents were kept in mind before approaching them. The respondents were screened on the basis of questions like their qualifications, understanding of English language, possession of mobile phone and bank account. These questions ensured that the respondents understood the questionnaire and had the opportunity of using mobile CRM services provided by their bank (Figure 1).

A total of 675 hardcopy surveys were distributed in person while another 143 softcopy surveys were sent via e-mail. Out of total distributed questionnaires 552 were retuned giving a response rate of 67.5 percent. Out of these 29 samples were rejected due to partial response and/or missing data, thus giving a total response rate of 63.9 percent. The gender distribution of the study subjects was 80 percent males and 20 percent females, respectively. Respondents between the ages 21 and 30 formed the largest age group (73 percent). A good majority of respondents had sound educational background (63 percent postgraduates, 33 percent graduates). Table II lists the demographic characteristics of the sample. There was a large portion of younger people with higher educational background in the sample which made a good sample as they are generally known to be quite willing to adopt new technologies (Cho and Jung, 2005). Yang (2005) stated that university students are likely to be the first customer segment to adopt mobile commerce because of their high educational level and income potential.

4.3 Common methods variance

Common methods variance (CMV) can be a major source of measurement error for survey studies, especially when variables are latent and measured using the same

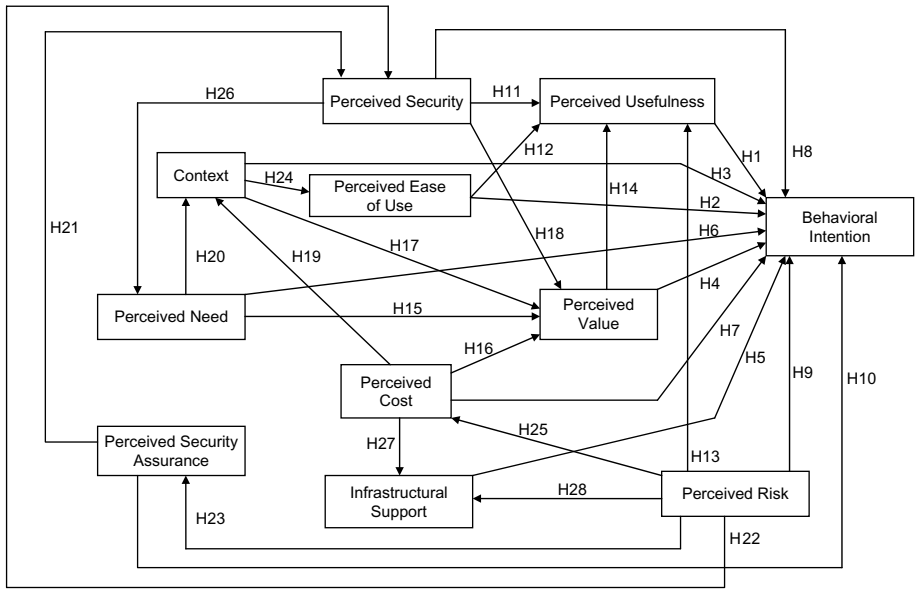

Figure 1.
Proposed research model

survey at one point in time. CMV could potentially inflate the true correlations among latent constructs and threaten the validity of our conclusions. We took stepwise procedure to address this issue. First, we arranged the measurement scales in the questionnaire so the measures of the dependent variable followed, rather than preceded, those of the independent variables (Salancik and Pfeffer, 1977). To check the extent of CMV, we first examined the correlation matrix among latent constructs. We found that only low to moderate correlations exist among those latent constructs, indicating the minimal influence of CMV. Harman's single-factor test was further used to assess the extent of CMV (Podsakoff and Organ, 1986). CMV is present if the factor analysis results in a single factor or if one general factor accounts for more than 50 percent of the covariance. All items in our measurement model were first entered simultaneously into an exploratory factor analysis, which yielded ten factors with an eigen value above one. The first factor accounted for 12.53 percent of the variance and all ten factors account for 75.882 percent of the total variance. All these tests confirmed that CMV was not a major concern in this study.

5. Data analysis

Following Anderson and Gerbing (1988), a two-step approach was utilized for data analysis. First, the reliability of the measurement instrument was examined using the measurement model that specifies the relationship of latent variables and observed indicators. Thereafter, the hypotheses were tested using structural equation modeling (SEM). SEM is a statistical technique for testing and estimating causal relations using a combination of statistical data and qualitative causal assumptions. It allows both confirmatory and exploratory modeling, meaning they are suited for both theory testing and theory development. The analysis was performed using Amos

Measures	Items	Frequency	Percent
Gender	Male	345	66
	Female	178	34
Age	21-30	382	73
	31-40	73	14
	41-50	41	8
	Above 50	27	5
Occupation	Salaried	335	64
	Self employed	20	4
	Self employed professionals	18	3
	Retired	6	1
	Student	144	28
Education	HSC	12	2
	Graduation	170	33
	Post graduation	332	63
	Other	9	2
Income group	Less than 10,000	168	32
	10,001-20,000	63	12
	20,001-30,000	64	12
	30,001-40,000	62	12
	40,001-50,000	39	7
	50,001-60,000	19	4
	60,001-70,000	28	5
	70,001-80,000	7	1
	80,001-90,000	11	2
	90,001-1 Lac	23	4
	More than 1 Lac	39	7
Frequency of banking services usage	Daily	58	11
	Weekly	308	59
	Monthly	140	27
	Quarterly	17	3
Awareness about MBS	Aware	330	63
	Not aware	193	37
Usage of online banking	Use	337	64
	Do not use	186	36

Note: MBS – mobile banking services

Table II.
Demographic details

17.0 software. In the hypothesis testing, p-values less than 0.05 were considered statistically significant.

5.1 Confirmatory factor analysis

In the CFA, measurement items that shared a significant residual variance (the part of the variance that does not load on its assigned factor) with other measurement items were deleted one at a time and the CFA rerun after each item was deleted until good fit indexes were achieved, according to the method outlined by Anderson and Gerbing (1988). In this process altogether seven items were deleted as listed in Table III.

When each item was dropped, it was verified that in addition to sharing residual variance, it also shared meaning with the other items it shared residual variance with. Dropping the items was by no means only an exercise in statistics without regard to item wording. This led to renaming of constructs in two cases:

(1) perceived security; and
(2) infrastructure.

The wordings of remaining items in perceived security were pointing more towards customers' confidence ascribed to mobile banking. Thus, it appeared more convincing to name it as perceived trust. Similarly another construct – infrastructural support was renamed as GPRS connection support as the remaining items of this construct indicated directly towards the availability of the connection on their mobile phones. Conforming change in names of the constructs, seven hypotheses (*H8*, *H11*, *H18*, *H21*, *H22*, *H26*, *H27*, and *H28*) were also changed accordingly (as presented in Section 5.2). Deleting items with a high degree of shared residual variance is necessary as this method of analysis also examines the extent to which residual variance is shared among the items (Hair *et al.*, 1998) and the unidimensionality of the scales (Anderson and Gerbing, 1988).

The resulting 28-item scale showed good fit indexes: RMR = 0.045, GFI = 0.939, AGFI = 0.919, NFI = 0.955, CFI = 0.982. The ratio of χ^2 to degrees of freedom was 1.6 which was also found within the acceptable limits. The accepted threshold for these statistics is:

- below 0.05 for RMR;
- above 0.80 for AGFI; and
- 0.90 and above for the other statistics (Gefen *et al.*, 2000).

5.1.1 Change in hypotheses according to renaming of constructs after CFA

- There is a significant relationship between perceived trust on MBS and the intention to use MBS.
- There is a positive relationship between the perceived trust on MBS and the perceived usefulness of MBS.
- There is a positive relationship between the perceived trust on MBS and the perceived value of MBS.
- There is a positive relationship between the perceived trust on MBS and the need of using MBS.
- There is a positive relationship between the perceived security assurance for MBS and perceived trust on MBS.
- There is a negative relationship between the perceived risk of MBS and the perceived trust on MBS.
- There is a significant impact of the perceived cost of MBS on acquisition of GPRS connection support for MBS.
- There is a significant impact of the perceived risk of MBS on acquisition of GPRS connection support for MBS.

Table III. Measurement items deleted during CFA

Perceived usefulness			Perceived security		Infrastructural support	Perceived value
PU3	PU5	PU6	PS3	PS4	INF2	PV4

5.2 Reliability and validity of the measurement instrument

Crucial part of any research is to establish reliability, content validity, and construct validity of scale before utilizing it in one's research (Straub, 1989).

5.2.1 Reliability. Further evidence of the scale reliability was checked in the second stage at time of running CFA, through which composite reliability (CR) was calculated (Table V). CR over the cutoff point of 0.70 is suggested in the literature (Hair *et al.*, 1998). All the reliability coefficients were above the suggested threshold. Average variance extracted (AVE) was also measured to inform about the amount of variance accounted by the hypothesized factors. The AVE ranged from 0.51 to 0.89 with the majority of them above the recommended minimum of 0.50 (Hair *et al.*, 1998).

5.2.2 Validity. Construct validity was established in this study by establishing the convergent validity and discriminant validity. Convergent validity was assessed by examining the factor loadings and AVE of the constructs as suggested by Fornell and Larcker (1981). All the indicators had significant loadings onto the respective latent constructs ($p < 0.001$) with values varying between 0.501 and 0.982 (Table V). In addition, the AVE for each construct was greater than or equal to 0.50 (Table VI), which further supports the convergent validity of the constructs. From Tables IV and V it can be inferred that the square root of the AVE values of every construct is greater than the inter-construct correlations which supports the discriminant validity of the constructs (Table VI; Fornell and Larcker, 1981).

5.3 Measurement model assessment

A ten-construct measurement model was first established before modeling the structural relationships defined by the hypotheses. Overall, the fitted measurement model provides a fairly reasonable fit ($\chi^2/\text{df} = 1.600$, GFI = 0.939, NFI = 0.955, RFI = 0.945, IFI = 0.983, CFI = 0.982, RMSEA = 0.034). Composite reliabilities of the constructs ranged from 0.6 to 0.96 and AVE varied from 51 to 89 percent. The composite reliabilities and AVE can be considered acceptable in this context.

5.4 Structural model assessment

For evaluating structural model maximum likelihood method of estimation was utilized to analyze the data. Overall fit of the structural model was checked initially by examining the χ^2 statistics. Other measures of fit compensating for sample size

	PS	PV	PN	PEOU	PSA	PR	Con	PC	Infra
PS									
PV	0.308								
PN	0.299	0.393							
PEOU	0.151	0.197	0.117						
PSA	0.328	0.151	0.07	0.101					
PR	−0.192	0.007	−0.019	−0.05	−0.225				
Con	0.101	0.438	0.171	0.233	0.116	0.039			
PC	−0.006	0.157	0.106	−0.11	−0.092	0.257	−0.196		
Infra	−0.026	0.104	0.065	−0.07	−0.034	0.256	−0.105	0.377	
PU	0.38	0.493	0.386	0.233	0.173	−0.13	0.36	−0.02	−0.044

Note: Perceived security was renamed as perceived trust and infrastructural support was renamed as GPRS connection support after CFA but the item names were retained to avoid inadvertent mistakes

Table IV.
Construct correlations matrix

Construct	Items	Loadings	CR	AVE
Perceived usefulness	PU1	0.828	0.89	0.71
	PU2	0.829		
	PU3	0.871		
GPRS connection support[a]	PS1	0.809	0.82	0.69
	PS2	0.853		
Perceived cost	PC1	0.503	0.68	0.51
	PC2	0.542		
	PC3	0.684		
Perceived risk	PR1	0.975	0.95	0.87
	PR2	0.967		
	PR3	0.845		
Perceived security assurance	PSA1	0.959	0.96	0.88
	PSA2	0.908		
	PSA3	0.942		
Perceived ease-of-use	PEOU1	0.651	0.66	0.56
	PEOU2	0.769		
	PEOU3	0.589		
Perceived need	PN1	0.958	0.91	0.77
	PN2	0.777		
	PN3	0.881		
Context	Con1	0.945	0.96	0.89
	Con2	0.955		
	Con3	0.932		
Perceived trust[b]	PS1	0.982	0.94	0.89
	PS2	0.899		
Perceived value	PV2	0.935	0.84	0.66
	PV1	0.949		
	PV3	0.556		

Table V.
Convergent validity

Notes: [a]Infrastructural support was renamed as GPRS connection support after CFA but the item names were retained to avoid inadvertent mistakes; [b]perceived security was renamed as perceived trust after CFA but the item names were retained to avoid inadvertent mistakes

(which affects chi square statistics) were also applied. The fit measures for the structural model showed satisfactory values (χ^2/df = 1.417; GFI = 0.935; AGFI = 0.920; CFI = 0.985; NFI = 0.951; TLI = 0.982; RMSEA = 0.028). Finally, the R^2-value of model indicated that the model highlights important factors associated with the behavioral intension of customers. Together, the ten predictors, it explained 57 percent of the variance in the major dependent variable, intention to adopt mobile baking services.

5.5 Hypothesis testing

Table VII shows the results of hypotheses. 21 out of the 28 hypotheses exhibited a p-value less than 0.05, while the remaining seven were not significant at the 0.05 level of significance. *H1-H10* examined the direct impact of all the ten factors on behavioral intention. Perceived usefulness ($\gamma = 0.208$, $p = 0.001$), perceived value ($\gamma = 0.453$, $p = 0.001$) and context ($\gamma = 0.235$, $p = 0.001$) were found to influence behavioral intention positively at 0.001 level of significance where as other factors like perceived ease-of-use, need, perceived cost, perceived risk, perceived security assurance, GPRS

Correlations from CFA			Squared correlations	AVE
Con	↔	PEOU	0.054	0.89
Con	↔	PN	0.029	
Con	↔	PS[b]	0.01	
Con	↔	PR	0.002	
Con	↔	PSA	0.013	
Con	↔	PV	0.192	
PC	↔	Con	0.038	0.51
PC	↔	PEOU	0.012	
PC	↔	PN	0.011	
PC	↔	PS[b]	0	
PC	↔	PR	0.066	
PC	↔	PSA	0.008	
PC	↔	PV	0.025	
PEOU	↔	PN	0.014	0.56
PEOU	↔	PS[b]	0.023	
PEOU	↔	PV	0.039	
Infra[a]	↔	Con	0.011	0.69
Infra[a]	↔	PC	0.142	
Infra[a]	↔	PEOU	0.005	
Infra[a]	↔	PN	0.004	
Infra[a]	↔	PS[b]	0.001	
Infra[a]	↔	PR	0.066	
Infra[a]	↔	PSA	0.001	
Infra[a]	↔	PV	0.011	
PN	↔	PS[b]	0.089	0.77
PN	↔	PV	0.154	
PU	↔	Con	0.13	0.71
PU	↔	PC	0	
PU	↔	PEOU	0.054	
PU	↔	Infra	0.002	
PU	↔	PN	0.149	
PU	↔	PS[b]	0.144	
PU	↔	PR	0.017	
PU	↔	PSA	0.03	
PU	↔	PV	0.243	
PR	↔	PEOU	0.003	0.87
PR	↔	PN	0	
PR	↔	PS[b]	0.037	
PR	↔	PSA	0.051	
PR	↔	PV	0	
PSA	↔	PEOU	0.01	0.88
PSA	↔	PN	0.005	
PSA	↔	PS[a]	0.108	
PSA	↔	PV	0.023	
PV	↔	PS[b]	0.095	0.66

Notes: [a]Infrastructural support was renamed as GPRS connection support after CFA but the item names were retained to avoid inadvertent mistakes; [b]perceived security was renamed as perceived trust after CFA but the item names were retained to avoid inadvertent mistakes

Table VI. Discriminant validity – comparison between squared correlations and AVE

Hypotheses	Causal path			Path coefficient	Test result
H1	Perceived usefulness	>	Behavioral intention	0.208^{***}	Supported
H2	Perceived ease-of-use	>	Behavioral intention	−0.02	Not Supported
H3	Context	>	Behavioral intention	0.235^{***}	Supported
H4	Perceived value	>	Behavioral intention	0.453^{***}	Supported
H5	GPRS connection support	>	Behavioral intention	0.017	Not Supported
H6	Perceived need	>	Behavioral intention	0.054	Not Supported
H7	Perceived cost	>	Behavioral intention	0.001	Not Supported
H8	Perceived trust	>	Behavioral intention	0.055	Not Supported
H9	Perceived risk	>	Behavioral intention	−0.023	Not Supported
H10	Perceived security assurance	>	Behavioral intention	−0.015	Not Supported
H11	Perceived trust	>	Perceived usefulness	0.224^{***}	Supported
H12	Perceived ease-of-use	>	Perceived usefulness	0.130^{**}	Supported
H13	Perceived risk	>	Perceived usefulness	-0.087^{*}	Supported
H14	Perceived value	>	Perceived usefulness	0.414^{***}	Supported
H15	Perceived need	>	Perceived value	0.252^{***}	Supported
H16	Perceived cost	>	Perceived value	0.242^{***}	Supported
H17	Context	>	Perceived value	0.439^{***}	Supported
H18	Perceived trust	>	Perceived value	0.201^{***}	Supported
H19	Perceived cost	>	Context	-0.239^{***}	Supported
H20	Perceived need	>	Context	0.185^{***}	Supported
H21	Perceived security assurance	>	Perceived trust	0.301^{***}	Supported
H22	Perceived risk	>	Perceived trust	-0.123^{**}	Supported
H23	Perceived security assurance	>	Perceived risk	-0.225^{***}	Supported
H24	Context	>	Perceived ease-of-use	0.246^{***}	Supported
H25	Perceived risk	>	Perceived cost	0.229^{***}	Supported
H26	Perceived trust	>	Perceived need	0.303^{***}	Supported
H27	Perceived cost	>	GPRS connection support	0.346^{***}	Supported
H28	Perceived risk	>	GPRS connection support	0.177^{***}	Supported

Note: Significant at: $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Table VII.
Test result of hypotheses testing

connection support, perceived trust did not have any significant influence on behavioral intention. These seven factors were found to be influencing behavioral intention through the other three factors.

H11-H14 explicate the impacts of four factors perceived usefulness. Perceived usefulness was significantly influenced by perceived ease-of-use ($\gamma = 0.130$, $p = 0.01$), perceived value ($\gamma = 0.414$, $p = 0.001$), perceived trust ($\gamma = 0.224$, $p = 0.001$) and perceived risk ($\gamma = -0.087$, $p = 0.05$). Thus, the four hypotheses were supported. *H15-H18* postulate the impact of perceived need, perceived cost, context and perceived

trust on perceived value. Results showed that perceived value ($\gamma = 0.453$, $p = 0.001$) was the most influential factor affecting behavioral intention and was in turn affected most by context ($\gamma = 0.439$, $p = 0.001$). The other three factors perceived need ($\gamma = 0.252$, $p = 0.001$), perceived cost ($\gamma = 0.242$, $p = 0.001$), and perceived trust ($\gamma = 0.201$, $p = 0.001$) also affected perceived value very significantly. *H19* and *H20* explicate the association of context with perceived need and perceived cost. Context was found to be negatively affected by perceived cost ($\gamma = -0.239$, $p = 0.001$) and positively affected by need ($\gamma = 0.185$, $p = 0.001$).

H21 and *H22* explicate the association between perceived trust and perceived security assurance as well as perceived risk. Perceived security assurance ($\gamma = 0.301$, $p = 0.001$) affected positively where as the postulated negative effect of perceived risk ($\gamma = -0.123$, $p = 0.01$) on perceived trust of the customers was also supported. The inverse association between perceived security assurance and perceived risk (*H23*) was also supported as perceived security assurance influenced perceived risk negatively ($\gamma = -0.225$, $p = 0.001$). The context affected perceived ease-of-use ($\gamma = 0.246$, $p = 0.001$) positively (*H24*). Another association (*H25*) positing high perception of cost fueled by high perceived risk ($\gamma = 0.229$, $p = 0.001$) was also supported significantly. Perceived trust ($\gamma = 0.303$, $p = 0.001$) was found affecting need positively (*H26*). Association of GPRS connection support with perceived cost ($\gamma = 0.346$, $p = 0.001$) and perceived risk ($\gamma = 0.177$, $p = 0.001$) were posited in *H27* and *H28* both of which were supported.

6. Discussion

The objective of this study was to develop a groundwork model of MBS adoption that can present the base for making strong CRM strategies. The results indicate that key determinants of behavioral intention in mobile banking were perceived usefulness, perceived value and context. In contrast to a general expectation, we found that no other variable except these three variables had direct significant effect on behavioral intention. Although rest of the seven variables namely perceived ease-of-use, perceived cost, perceived risk, perceived need, perceived security assurance, perceived trust and GPRS connection support impacted perceived usefulness, perceived value and context significantly.

In line with the previous studies (Turel *et al.*, 2007; Sangle and Awasthi, 2011; Yen, 2012) the results demonstrated that perceived value had strongest influence on intention to use MBS. The results revealed that context had a significant influence on customer's value perception followed by need, trust and perceived cost. This means that the majority of customers had concerns about the additional value they could receive by availing reliable services for their different needs in a competitive cost. Along with this, perceived value impacted perceived usefulness very significantly indicating that consumers having an intention to use MBS not only rely on their affective feeling to use but also base their decision on a cognitive judgment of how use of MBS will help them attain a valued goal (Hsu *et al.*, 2011; Figure 2).

Consistent with previous earlier research (Riquelme and Rios, 2010; Tan *et al.*, 2010; Deng *et al.*, 2010) perceived usefulness was identified as another important determinant of behavioral intention to adopt MBS. We found that perceived usefulness was positively affected by perceived value, perceived trust, perceived ease-of-use, and negatively affected by perceived risk. Users would be willing to use mobile banking if

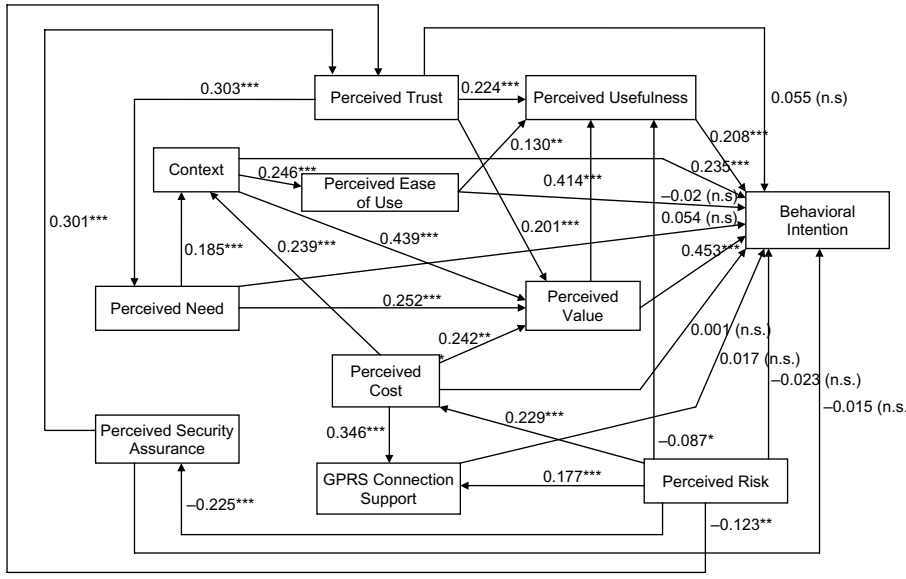

Figure 2.
Results of structural equation model

Notes: Significant at: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; n.s. – insignificant at 0.05 level

they would find it useful for them in comparison to the other available banking options. It also suggested that even though the services should be well designed towards easy to understand and navigate, more attention must be paid to other factors evaluation of usefulness (Yen, 2012).

Perceived ease-of-use was found to have no direct significant effect on behavioral intention yet it affected perceived usefulness corroborating the findings of Zhou (2011). This is in contrast with previous research (Tan *et al.*, 2010). This means that the majority of customers still perceive MBS to be difficult to use and due to which they do not find the usefulness of these services so pressing. If the use of mobile banking will entail lengthy connecting procedures, long searching response time, low availability, error transactions, then its benefits would be decreased greatly tarnishing the usefulness (Hsu *et al.*, 2011).

Consistent with previous trust based TAM research (Zhou, 2011), trust was found to be crucial in increasing behavioral intention of mobile banking through its impact on perceived usefulness, perceived value and need. Confirming the results of Chang and Chen (2008), this study also showed that there was a negative relationship between perceived trust and perceived risk and the level of trust changed with the variations of perceived risk. Mobile banking based on wireless networks involves great uncertainty and risk. Thus, users need to rely on structural assurances to ensure their payment security and build their trust in mobile banking. Besides this, the service required through MBS would require accuracy, relevancy and timeliness as the use of MBS might be directed through some critical need. Quality information will signal service providers' trustworthiness (Zhou, 2011).

There can be certain critical situations where the tradeoffs between mobile banking and other means of banking can generate a need to use handheld device like mobile

phone or PDA for banking. If a person would feel the need to use MBS, identification of the different purposes (contexts) where MBS could be used, would become easier for him/her, which would further enhance the perception of usefulness of MBS and strengthen the intention to use MBS. Moreover, the understanding that MBS can be used in crucial situations would also enhance the value perception about MBS and increase the behavioral intention to adopt the later.

Further significant relationship was found between contexts (purposes) and perceived ease-of-use, also between perceived ease-of-use and perceived usefulness. A possible explanation for this could be that if a customer identified a purpose to use MBS and felt that learning to use MBS in that context will be easier, the perception of usefulness of MBS would enhance, which would positively motivate the person to adopt MBS. The context was impacted by a feeling of need as well as perceived cost. It showed an effect of cost benefit analysis in customer's mind. If a customer feels the need of using MBS and perceives a high cost of using MBS in that particular context, the value perception about MBS will be lower as compared to other option of banking which will further decrease the perception of usefulness and demotivate the customer for adoption.

Perceived cost did not have a direct significant effect on behavioral intention corroborating the results of Hsu *et al.* (2011). These findings were contradictory to the empirical findings of Wu and Wang (2005) and Deng *et al.* (2010). From this it could be inferred that the cost might not be a big deal for adoption if customer had a high perception of value and usefulness of MBS. For users who had urgent financial need to obtain the service benefit, the expense of MBS would be relatively small (Hsu *et al.*, 2011). Furthermore, perceived cost was found to have a significant effect in predicting customers' value perception, and this was in consensus with the previous research on consumer perceptions of price and value (Dodds *et al.*, 1991).

As shown in our findings, perceived risk did not have significant influence on behavioral intention. This contradicts prior research on online sales (Law and Leung, 2002; Ranganathan and Grandon, 2002). The possible reasons might be that more and more customers had online experiences, and were aware of the existence of potential risk thus might avoid high risk associated with MBS or they had strong confidence in online payment procedures because online security and privacy problems had been gaining much improvement in the past years. In addition, a number of advantages in using MBS still entice customers to have value perception so as to ignore the mental sacrifice of MBS though they perceive some potential risk.

Furthermore, in the context of MBS, excluding monetary cost, it is difficult to measure perceived need, perceived value and usefulness, ease in making effort, perceived trust and perceived risk quantitatively because they are intangible. Therefore, the real value of adopting MBS for consumer relies on consumer's personal cognitive psychology and interpretative process toward the MBS system because technology acceptance is individually different (Turel *et al.*, 2007).

Contrary to the consensus among researchers that good security plays important role in determining the adoption of mobile banking (Tan *et al.*, 2010), the results indicate that perceived security assurance does not directly motivate consumers to use MBS but it directly affects perceived trust and has negative relationship with perceived risk. That means high perceived security assurances increased the trust perception in consumers whereas lower the risk perceptions. In a way perceived security assurance influenced behavioral intention through adjusting risk perceptions of the customers.

Rationally MBS is considered as an alternative channel for financial transactions only if it is thought to be safe (Hsu *et al.*, 2011).

There was no direct significant impact of GPRS connection support on behavioral intention indicating that acquiring GPRS connection was not a factor in availing MBS. This might be due to much importance played by other factors in decision making and after taking the decision acquiring GPRS connection might not be a great task for the customers. Although it was reflected that perceived cost and risk perception affected the acquisition of GPRS connection.

7. Conclusion, limitations and future research directions

The major contributions of this study can be described as below. First, the proposed research model was different from other adoption models because it included both benefits evaluation factors as well as apprehension drivers that seemed to be highly relevant to the acceptance of MBS. From the perspective of benefits, perceptions value, perceived usefulness and context were the three critical components significantly influencing adoption intention. On the apprehension side, the effects of perceived security assurance, perceived trust, perceived cost and perceived risk on perceived value as well as perceived usefulness were significant. Finally, the significant antecedents of behavioral intention explained about 57 percent of the variance in customer's adoption intention. This suggested that the model relative and adequately provided the insights for mobile CRM and can be further extended to investigate the new technology adoption.

Even though rigorous research procedures were used, this study had some limitations that could be addressed in future studies. First, data collection was geographically limited to India, and about 28 percent of our subjects were students. In future studies researchers should randomize their sample to include other nationalities and geographical areas outside of India to make more generalizations from the data. Second, the model was cross-sectional, in that it measured perceptions and intentions at a single point of time. However, perceptions change over time as individuals obtain experience. Future studies may be devoted to understand the behavior of MBS users having initial experience of usage.

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Appendix

List of items by construct (*denote the items retained for data analysis).

Perceived usefulness

PU1 Using mobile banking services makes it easier to do my task*.

PU2 Using mobile banking services improves my task performance*.

PU3 Using mobile banking services enables me to accomplish tasks more quickly.

PU4 Using mobile banking services saves me time and effort in performing tasks*.

PU5 Mobile banking services is useful in performing my task.

PU6 Using mobile banking services enhances my task effectiveness.

Context

CON1 Using mobile application would be suitable for me to know about my account details*.

CON2 I would like to use mobile application if I am in a hurry or need the account information fast*.

CON3 I would like to use mobile application if I am far from the branch*.

Perceived security assurance

PSA1 I believe that my personal information provided through mobile application will not be misused*.

PSA2 When I send data through mobile, I am sure that it will not be intercepted by unauthorized third parties*.

PSA3 I think mobile banking application has sufficient technical capacity to ensure that the data I send will not be intercepted by hackers*.

Perceived risk

PR1 I feel using mobile application in monetary transactions would be risky*.

PR2 I would not feel totally safe providing personal privacy information through mobile banking application*.

PR3 I feel using mobile application would put my privacy at risk*.

Perceived security (*renamed as perceived trust after CFA*)

PS1 Mobile application would be reliable for banking*.

PS2 I feel very confident about mobile application for banking tasks*.

PS3 Mobile is a secure means through which to send sensitive information.

PS4 I feel secure managing my personal finances with the bank's mobile banking.

Infrastructure (*renamed as GPRS connection support after CFA*)

INF1 I do not use mobile banking services due to instable GPRS connection*.

INF2 I do not use mobile banking services due to small screen size of my mobile.

INF3 I do not use mobile banking services as I will have to take a GPRS connection which I do not have currently*.

Perceived need

PN1 I have compelling reason to use mobile banking services*.

PN2 I feel a need of using mobile banking services*.

PN3 I cannot do without mobile banking services*.

Perceived value

PV1 Compared to the effort I need to put in, I think the use of mobile application would be beneficial to me*.

PV2 I think that the use of mobile application would deliver me good value*.

PV3 Compared to the fee I need to pay, I think the use of mobile application would offer value for money*.

PV4 Compared to the time I need to spend, I think the use of mobile application would be worthwhile to me.

Perceived cost

- I feel the access cost is expensive for using mobile application*.
- I feel that I will have to use an expensive phone to use the mobile application*.
- I feel the banking service charges might be costly for using mobile application*.

Perceived ease-of-use

PEOU1 I feel learning to use the mobile application would be easy*.

PEOU2 I feel it would be easy to use mobile application*.

PEOU3 It is convenient to access mobile application*.

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