Factors Affecting Adoption of Mobile Banking: An Empirical Study in the State of Odisha

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Abstract

The purpose of this paper is to investigate m-banking adoption in Odisha; a service relatively new in the region. This empirical study aims to investigate the factors that influence consumer’s intention to adopt mobile banking by extending the renowned framework of Technology Acceptance Model (TAM). The aim is to gauge awareness level and identify those factors that inhibit or motivate m-banking usage in Odisha. A self-administered questionnaire had been developed and distributed in Cuttack and Bhubaneswar. Out of the 300 questionnaires, only 170 useable questionnaires were returned, yielding a response rate of 56.67 percent. Results were subsequently analyzed by using multiple regression and correlation analysis. Factors such as Perceived Usefulness (PU), perceived ease of use (PEOU), Relative Advantages (RA) and Personal Innovativeness (PI) were found positively related with the intention to adopt mobile banking services. As expected, Perceived Risks (PR) was negatively associated with the mobile banking adoption. The study has practical implications for local banks offering mobile banking services in Odisha.

Keywords

Mobile Banking, Technology Acceptance Model, Odisha, Correlation, Multiple Regression.

I. Introduction

Mobile banking is the latest addition to the technology-enabled banking. As the mobile phone penetration in India is quite high with an annual growth rate of about 83.17% mobile banking has immense potential to be a cost effective method of conducting banking transactions by the Indian customers including the rural population. Asian countries such as China, Indonesia, India and Philippines are high growth markets for mobile telephones. The number of mobile subscribers has become 875.48 millions in India as per the telecom subscription data dated October 31st 2013. Mobile banking refers to the provisioning and availability of banking and financial services through the mobile technology. Mobile banking can be provided as a value-added service for the existing customers and at the same time it has the potential to be used as a means to bring into the banking fold the unbanked and under banked segment of the population. Mobile banking facilitates a wide range of services such as account balance enquiry, account statement enquiry, cheque status enquiry, cheque book request, fund transfer between accounts, credit/debit alerts, minimum balance alerts, bill payment alerts, bill payments, recent transaction history, information requests on interest rates/ exchange rates and so on are offered through mobile banking.

At the present scenario 86 banks have been approved for the conduct of mobile banking in India as per 31st March, 2014. During February 2012, more than 2.8 million transactions for close to Rs. 1961.23 million were transacted; a 300% increase in volume and more than 200% in value terms as compared to 0.7 million transactions for close to Rs. 616.19 million during February 2011. Many researchers have found that customers will consider adopting mobile banking as long as it is perceived to be useful and perceived to be easy to use. But the most critical factor for the customer is cost; the service should be affordable and the degree of security. Furthermore, the mobile banking service providers, both the banks and mobile network providers, should be trusted. This research involves the study of adoption of ‘mobile banking’ by the customers and the factors responsible for the adoption of this technology among the customers.

This paper aims to bridge the gap by extending the Technology Acceptance Model (TAM) to investigate mobile banking acceptance in Odisha. More specifically, the objective of this study is to examine the relationships between constructs of perceived usefulness, perceived ease of use, social norms, perceived risks, perceived innovativeness, and perceived relative advantages towards behavioural intention in adopting mobile banking. The structural flow of this paper begins with overview of the mobile banking in Odisha and followed by literature review. Thereafter, based on review of literatures, we developed our hypotheses and research framework. Then, the data analysis and followed by the findings and discussion. Lastly, this paper ends with the implications, limitations and future research recommendations.

II. Literature Review

Laukkanen and Kiviniemi (2010) define m-banking as an interaction through which a customer is connected to a bank via a mobile device. The interaction does not necessarily involve performing transactions such as paying bills and transferring money but can, in its simplest form, be the sending of an SMS (Short message system) for account balance inquiry. Steadman (2011) advocates that technology is the enabling factor that allowed m-banking to emerge. The “always-on” connectivity demand by customers coupled with the fact the internet has evolved from fixed wired through wireless to mobile connection, meant that financial institutions had to pursue alternative channels to provide their services in order to meet customers’ expectations (Puschel et al, 2010).

Majority of studies about ‘intention to adopt’ were conducted based on research models and frameworks traditionally used within the information system literature. Among the different models that have been proposed, the Technology Acceptance Model (TAM) (Davies, 1989) has been widely used by various scholars for explaining technology adoption intentions. TAM points out that perceived ease of use and perceived usefulness affect the intention to use. Davis (1989) defines perceived ease of use as “the degree to which a person believes that using a particular system would be free from effort” and perceived usefulness as “the degree to which a person believes that using a particular system would enhance his or her job performance”. Some scholars even suggested that there are other possible factors that might affect mobile banking adoption (Riquelme and Rios, 2010). Various efforts to extend the technology acceptance model (TAM) by adding variables such as trust (Gu, et al. 2009; Luarn and Lin, 2005), perceived risk (Chung, Kwon, 2009; J.Donner and C.A. Tellez, 2008), perceived uncertainty (Laukkanen, 2007), perceived system quality (Kleijnen et al., 2004, Luarn and Lin, 2005)}
2005) etc were all found valid in the previous studies. In view of the different constructs being used, this paper extends the TAM by including relative advantages, perceived risk, and personal innovativeness in which these constructs are believed to affect the behavioural intention to adopt mobile banking services.

A. Perceived Usefulness (PU)
Perceived usefulness is the degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989). That is, potential adopters assess the consequences of their adoption behaviour based on the underlying desirability of usefulness. Other constructs that capture the notion of perceived usefulness are complexity and effort expectancy (Rogers, 1995; Venkatesh et al., 2003). Perceived ease of use is also known as performance expectancy (Venkatesh et al., 2003). Perceived usefulness is recognized as having strong positive effects on the intention of adopters to use the innovation.

B. Perceived Ease of Use (PEOU)
Perceived ease of use is the degree to which a person believes that using a particular system would be easy to use (Dholakia and Dholakia, 2004). Other constructs that capture the notion of perceived ease of use, are complexity and effort expectancy (Venkatesh et al., 2003). Perceived ease of use may contribute towards performance, and therefore, near-term perceived usefulness and the lack of it can cause frustration, and therefore, impact adoption of innovations (Davis, 1989; Taylor and Todd, 2001; Venkatesh, 1999; Venkatesh and Davis, 2000). The impact of perceived ease of use on a user’s intention to adopt an innovation either directly or indirectly through perceived usefulness has been documented well in literature.

C. Relative Advantages (RA)
Relative advantages are the identified merits of using a particular product or service. As compared to other banking channels, mobile banking offers convenient benefits in terms of mobility, which are not availed by traditional off-line banking and non-mobile internet banking (Anckar and D’Incuc, 2002; Lee and Benbasat, 2003; Looney, Jessup and Valacich, 2004). It is postulated that there is a significant positive relationship between relative advantages and adoption of mobile banking technology.

D. Perceived Risk (PR)
Perceived risk is the uncertainty about the outcome of the use of the innovation (Gerrard and Cunningham, 2003). Benamati and Serva (2007) suggest that the adoption of electronic banking forces consumers to consider concerns about password integrity, privacy, data encryption, hacking, and the protection of personal information. Perceived risks of information loss during mobile banking transactions are also an important factor that customers will consider while accessing mobile phone based services (Laforet and Li, 2005; Luarn and Lin, 2005; Mallat 2007; Gu et al., 2009). It is proposed that perceived risk has a negative influence on mobile banking adoption.

E. Personal Innovativeness (PI)
Personal innovativeness is the innate willingness of an individual to try out and embrace new technologies and their related services for accomplishing specific goals (Rao and Toshani, 2007). Personal innovativeness represents a confluence of technology-related beliefs which jointly contribute to determining an individual’s pre-disposition to adopt mobile devices and related services. Therefore, given the same level of beliefs and perceptions about an innovation, individuals with higher personal innovativeness are more likely to develop positive attitudes towards adopting it than less innovative individuals (Agarwal and Prasad, 1998). From prior researches (Agarwal and Prasad, 1998; Lockett and Littler, 1997; Hung, Ku and Chang, 2003), it is concluded that personal innovativeness has a strongly positive influence on mobile banking adoption. The relationship implies that innovative users tend to accept new technology more positively.

This paper aims to close the gap by extending the Technology Acceptance Model (TAM) to investigate mobile banking acceptance in Odisha since very few notable works have been done regarding the adoption of mobile banking technology in Odisha.

III. Hypotheses
This study has postulated to test the following hypotheses which have been developed from the review of literature.

- H1: Perceived Usefulness has a positive relationship towards mobile banking adoption.
- H2: Perceived Ease of Use has a positive relationship towards mobile banking adoption.
- H3: Relative Advantages have a positive relationship towards mobile banking adoption.
- H4: Perceived Risks have a negative relationship towards mobile banking adoption.
- H5: Personal Innovativeness has a positive relationship towards mobile banking adoption.

IV. Research Methodology
In this section, we discuss the sampling and data collection procedures followed by variables operational measurement and statistical tests used to evaluate hypotheses.

A. Sampling and Data Collection
The objective of this study is to explore the influential factors which influence the consumers’ adoption of mobile banking in Odisha. Target respondents of this study were adults, who owned mobile telephones, with their mobile telephone device linked to their bank accounts residing in urban centres of Bhubaneswar and Cuttack. Both online survey and mail survey method were used for data collection. The mix methods were applied to minimize the coverage bias resulting using only one data collection method. A sampling size of 300 questionnaires was equally distributed by using stratified random sampling in each of the two areas, resulting in 150 respondents per chosen stratum. Out of the 300 questionnaires that sent out, 170 were completed and returned, recording a response rate of 56.67%. A pre-test was performed which involved 30 lecturers who are familiar in information system area to access survey’s items sequences and contextual relevance. Feedbacks were collected and solicited to improve the overall design and understanding of items in questionnaires.

B. Independent Variables
Independent variables in this study were accessed with items adapted from existing literature. There are five independent variables used in this study. They are Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Relative Advantages (RA), Perceived Risk (PR) and Personal Innovativeness (PI). Each of these variables measured between three to six questions which tailored within mobile banking adoption context. Hence, a total of
20 questions were constructed and captured the intention to adopt mobile banking. Responses to these questions were measured by a five-point Likert scale. For example, “1” denoted as strongly disagree, “2” denoted as disagree, “3” denoted as neutral, “4” as agree, and “5” as strongly agree.

C. Dependent Variables
Behavioural Intention (BI) to adopt mobile banking services by the consumers was the dependent variable. A five-point Likert scale was applied to measure the responses, ranging from scale “1” as strongly disagree to scale “5” as strongly agree.

V. Data Analysis
A. Profile of Respondents
The profile from surveyed respondents is shown in Table 1. The gender distribution of respondents is 54.11% percent for males and 45.89% for females. The breakdown of age groups is dominated by the group of 21-30 which consist of 52.35 percent. This is followed by age group 31-40 with 30 percent. Majority of respondents have master degree qualification with 46.47 percent, bachelor degree with 36.47 percent, Ph.D degree with 8.8 percent and rest 28.6 percent do not have a college degree. In this research, most of the respondents own smart phone with 50.58 percent. Second highest ranked by 3G mobile phone with 28.82 percent. The data also showed that among the respondents, only 34.11 percent of them are regular users of mobile banking services (more than five transactions per month). Rest 65.89 percent of the respondents also use mobile banking services but they are not as regular and frequent users of the mobile banking services (maximum up to five transactions per month). The demographic profile from surveyed respondents is shown in Table 1.

<table>
<thead>
<tr>
<th>Demographic Variables</th>
<th>Groups</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>92</td>
<td>54.11</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>78</td>
<td>45.89</td>
</tr>
<tr>
<td>Age (in years)</td>
<td>21-30</td>
<td>89</td>
<td>52.35</td>
</tr>
<tr>
<td></td>
<td>31-40</td>
<td>51</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>40 and above</td>
<td>30</td>
<td>17.65</td>
</tr>
<tr>
<td>Academic Qualification</td>
<td>Bachelor’s Degree</td>
<td>62</td>
<td>36.47</td>
</tr>
<tr>
<td></td>
<td>Master’s Degree</td>
<td>79</td>
<td>46.47</td>
</tr>
<tr>
<td></td>
<td>Ph.D</td>
<td>15</td>
<td>8.8</td>
</tr>
<tr>
<td></td>
<td>No College Degree</td>
<td>14</td>
<td>8.26</td>
</tr>
<tr>
<td>Adopted Device</td>
<td>Smart Phone</td>
<td>86</td>
<td>50.58</td>
</tr>
<tr>
<td></td>
<td>3G Mobile Phone</td>
<td>49</td>
<td>28.82</td>
</tr>
<tr>
<td></td>
<td>Basic Phone</td>
<td>35</td>
<td>20.60</td>
</tr>
<tr>
<td>Mobile Banking Usage Frequency</td>
<td>More than 5 transactions per month</td>
<td>58</td>
<td>34.11</td>
</tr>
<tr>
<td></td>
<td>Maximum upto 5 transactions per month</td>
<td>112</td>
<td>65.89</td>
</tr>
</tbody>
</table>

B. Correlation Analysis
The purpose of Pearson correlation analysis is to examine the bivariate relationships among variables. Table no 2 represents correlation coefficients among dependent variable and independent variables. The highest correlation shown in the table is 0.389. According to Field, correlation coefficient should be below 0.8 to avoid multi co linearity. Hence, there is no multi co linearity problem in this study. The associated pairs of RA and PI are significant at level 0.01 and PU, PEOU and PR are significant at level 0.05.

Table 2: Correlation Analysis of the Independent Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Perceived Usefulness</th>
<th>Perceived Ease of Use</th>
<th>Relative Advantage</th>
<th>Perceived Risk</th>
<th>Personal Innovativeness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Usefulness (PU)</td>
<td>1</td>
<td>0.279</td>
<td>0.274</td>
<td>-0.009</td>
<td>0.287</td>
</tr>
<tr>
<td>Perceived Ease of Use (PEOU)</td>
<td>0.279</td>
<td>1</td>
<td>0.151</td>
<td>-0.032</td>
<td>0.321</td>
</tr>
<tr>
<td>Relative Advantages (RA)</td>
<td>0.274</td>
<td>0.151</td>
<td>1</td>
<td>-0.079</td>
<td>0.389</td>
</tr>
<tr>
<td>Perceived Risk (PR)</td>
<td>-0.009</td>
<td>-0.032</td>
<td>-0.079</td>
<td>1</td>
<td>-0.053</td>
</tr>
<tr>
<td>Personal Innovativeness (PI)</td>
<td>0.287</td>
<td>0.321</td>
<td>0.389</td>
<td>-0.053</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: RA and PI- Correlation is significant at 0.01 level (2-tailed); PU, PEOU and PR- Correlation is significant at 0.05 level (2-tailed).
C. Multiple Regression Analysis

Multiple regression analysis was carried out to analyze the relationship between one dependent variable to several independent variables. Therefore, multiple regression analysis was an appropriate method to examine the relationships between independent variables and dependent variable in this study. The F-statistics for this study was significant at 1 percent level (Sig. F<0.01), showing the fitness of the model. For the coefficient of determination, R² stated 0.382, indicating that 38.2 percent of the changes in behavioral intention to adopt m-banking can be explained by the changes in the five variables. The individual model variables indicate that PU (ρ < 0.05), PEOU (ρ < 0.05), PR (ρ < 0.05), RA (ρ < 0.01), and PI (ρ < 0.01) positively and significantly affect the behavioral intention to adoption of m-banking.

Table 3: Results of Multiple Regression Analysis

<table>
<thead>
<tr>
<th>Model</th>
<th>Standardized Coefficients (β)</th>
<th>t value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.124</td>
<td>1.348</td>
<td>0.175</td>
</tr>
<tr>
<td>Perceived Usefulness (PU)</td>
<td>0.157</td>
<td>2.332</td>
<td>0.022</td>
</tr>
<tr>
<td>Perceived Ease of Use (PEOU)</td>
<td>0.163</td>
<td>2.428</td>
<td>0.028</td>
</tr>
<tr>
<td>Relative Advantages (RA)</td>
<td>0.216</td>
<td>3.177</td>
<td>0.001</td>
</tr>
<tr>
<td>Perceived Risk (PR)</td>
<td>-0.151</td>
<td>-2.369</td>
<td>0.019</td>
</tr>
<tr>
<td>Personal Innovativeness (PI)</td>
<td>0.288</td>
<td>4.065</td>
<td>0.000</td>
</tr>
<tr>
<td>R²</td>
<td>0.382</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.360</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Significant F</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-value</td>
<td>16.552</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: RA and PI- Correlation is significant at 0.01 level (2-tailed) ; PU, PEOU and PR- Correlation is significant at 0.05 level (2-tailed).

The resultant equation that predicted the adoption or Behavioural Intention (BI) to use mobile banking service is as follows:

\[ BI = 0.124 \text{ (constant)} + 0.157 \text{ (PU)} + 0.163 \text{ (PEOU)} - 0.151 \text{ (PR)} + 0.288 \text{ (PI)} + 0.216 \text{ (RA)} \]

VI. Discussion and Summary of Findings

A. Relationship Between PU, PEOU and BI

Our findings revealed that PU has indeed a positive relationship in influencing the respondents’ intention to adopt mobile banking services in Odisha. The findings were consistent with studies from Chung and Kwon (2009), Lee et al. (2008) and Luarn and Lin (2005). This result implies that if mobile banking is useful and beneficial, users are more likely to adopt mobile banking services. Therefore, banks should emphasize the benefits in the aspects of cost savings, ubiquity, flexibility, and mobility by using mobile banking services. Eventually, banks might educate users the benefits of using mobile banking services through promotional mix such as personal selling, advertisements, sales promotions, and public relations. In addition, banks may continue to innovate more useful features and services. Similarly, PEOU was found to have positive correlation with a respondents’ behavioural intention to adopt mobile banking.

This finding is consistent with the prior studies such as (Amin, et al., 2008), (Chung and Kwon, 2009), (Luarn and Lin (2005). The ability of the MNOs to should provide adequate information and clearer guidance on the use of mobile banking services encourages users to adopt the same. Cohen argued that “bankers have to move beyond thinking of mobile banking as a subset of transactions from online banking that they can simply move to the mobile phone”. In fact, banks should simplify the usage of mobile banking services and continue to design more user-friendly system interface. In addition, banks should provide adequate information and clearer guidance to encourage user to use the service. For example, the demonstration can be performed by uploading the steps to perform mobile banking services on bank official websites, social networking sites, or video-sharing sites like “Youtube”. Once users have learnt the fundamental skills on how to operate mobile banking, a positive ease of use feeling will be developed among users.

B. Relative Advantages

Relative advantages were found to be very significant in determining the intention to use mobile banking. The results were consistent with Pikkarainen et al. (2004) and Venkatesh and Davis (2001). Practically, users are more likely to adopt mobile banking if they believe using mobile banking will gain more relative advantages as compared to other traditional banking channels such as ATM or non-mobile internet banking. Hence, banks should emphasize the benefits that they can offer through this alternative banking channel. Therefore, the more relative advantage perceived by users, the higher possibility consumer will be attracted to adopt mobile banking service.

C. Perceived Risk

Our findings show that there is a fairly strong negative correlation between perceived risks and mobile banking adoption. This implies that if individuals perceived higher risks and uncertainty such as issues of loss and theft of financial information due to system hacking, this would discourage adoption of mobile banking by the consumers as they are risk averse. Significantly, these findings were found to be consistent with Luo et al. (2010), Mitchell (1999), Safeena, et al., (2011); Benamati and Serva (2007); Laforet and Li, (2005); Luarn and Lin, (2005); Mallat, (2007) and Gu, et al., (2009) who all perceive risk is one of the critical factors to be focused while designing and developing a mobile banking service. Therefore, it is important for banks and service providers to project higher security when providing mobile banking services in order to yield higher consumers’ acceptance. In fact, banks and service providers should continuously innovate and offer better security and reliable applications to enhance users’ confidence towards adoption and continuous usage of mobile banking services.

D. Personal Innovativeness

Numerous studies found that PI has significant influence on the acceptance on IT, internet shopping, web broadcasting. In this study, our findings revealed that PI has positive significant relationship towards the intention to adopt mobile banking services. The results were consistent with Lee et al.’s studies. This simply means that those users with high innovativeness are more likely to explore and adopt mobile banking services.

Generally, high innovative individuals are usually the trendsetters along with high social economic status, hence, banks should formulate the marketing strategy (i.e. buzz marketing) to attract ‘innovators’ and ‘early adopters’.
VII. Implications of the Study

In this section, we articulate the implication of this study. From theoretical point of view, firstly this study successfully extended TAM in the context of mobile banking with the inclusion of three new constructs namely; relative advantages, perceived risk and personal innovativeness. The extended model of TAM provides clearer understanding of the factors influencing mobile banking adoption in Odisha. Secondly, the findings significantly contribute to the existing mobile banking literature. Interestingly, the construct personal innovativeness (PI) has been found as the most influencing factor in the adoption of mobile banking technology. As expected, perceived risk was found to have negative relationship with the adoption.

After reviewing the findings of this study, there are several important implications suggested for banks, service developers and software engineers in order to provide better strategic insight to design and implement mobile banking services that yield higher consumer acceptance in Odisha. As PU, PEOU, RA and PR were found to be the factors that influence consumers’ behavior intention in adopting mobile banking, service developers and software engineers should focus on the development of mobile banking facilities. This can be achieved by developing better functions in terms of flexibility, security and accessibility features to enhance consumers’ confidence to adopt mobile banking services. Since the perceived risk greatly influence consumers behavioral intention, thus security is one of the important factors to stimulate customers’ confidence level to adopt mobile banking services. The mobile banking service providers should enhance the security features consistently by practicing transparency management during the process of monetary transactions. In this sense, it is important to build trustworthy business reputation in a long term perspective.

In order to enhance customers “PEOU” in mobile banking, service providers must, therefore, be willing to engage in massive civic education to ensure unproblematic usage and secure good patronage. Banks should develop applications which clients can download on their mobile phones to effect their banking transactions. This would no doubt boost up the number of transactions and number of people using m-banking services. Bank clients would no longer have to access the website of the bank to transact with the bank. In order to increase the adoption rate, service providers should focus on current non-users with mobile handset usage experience. This would help service providers to cover the majority of non-user customers who have experience using mobile phones.

Lastly, in the views of personal innovativeness demonstrates a positive-significant relationship towards mobile banking adoption; thus the banks can promote and create awareness to the public through highlighting the benefits or advantages that can be gained from the mobile banking services to stimulate the adoption level among the mobile users. Instead, such promotion also provides better exposure and awareness to the non-mobile banking users to have positive impression towards mobile banking.

VIII. Conclusion

In conclusion, the paper aims to investigate the factors that influence the adoption of mobile banking in Odisha. The findings of this study revealed that perceived usefulness, perceived ease of use, relative advantages, perceived risks and personal innovativeness were the factors affecting the behavioral intention of mobile users to adopt mobile banking services in Odisha. Meanwhile, as expected, the perceived risk was the only factor found to have negative relationship with the adoption of mobile banking in this study which the other factors are positively correlated. Thus, this research has provided valuable knowledge and information to banks, service developers, and software engineers to enhance consumers’ intention to use mobile banking services in future.

References


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