# Internet Banking Adoption in an Emerging Economy: Indian Consumer's Perspective

Rahmath Safeena, Hema Date and Abdullah Kammani
National Institute of Industrial Engineering (NITIE), Mumbai, India

**Abstract:** *Information technology Services is considered as the key driver for the changes taking place around the world. Internet banking (IB) is the latest and most innovative service and is the new trend among the consumers. The shift from the formal banking to e-banking has been a 'leap' change. This study determines the factors influencing the consumer's adoption of internet banking in India and hence investigates the influence of perceived usefulness, perceived ease of use and perceived risk on use of IB. It is an essential part of a bank's strategy formulation process in an emerging economy like India. Survey based questionnaire design with empirical test was carried out. The results have supported the hypothesis.*

**Keywords**: *internet banking, perceived usefulness, perceived ease of use, risk, India, emerging economy*

*Received March 2, 2010; Accepted June 28, 2010*

## 1. Introduction

User adoption of a technology has become a crucial or significant measure of the success or effectiveness of that technology. Revolutionary development in Information and Communication Technology (ICT) in the past 20 years has impacted individuals as well as businesses in a profound way. Internet banking (IB) is a radical technological innovation with potential to change the structure and nature of banking. To sustain business competitiveness, more and more banks are transforming from their traditional approach of "bricks and mortar" into a "clicks and mortar" one under the recent emergence of electronic commerce and business [18]. Customer satisfaction and customer retention are increasingly developing into key success factors in e-banking [11]. [45] stated that the diffusion of IB is more determined by customer acceptance than by seller offerings. Though customer acceptance is a key driver determining the rate of change in the financial sector, empirical studies on what is holding customers from acceptance of IB have been few [59]. Not enough is known regarding how customers perceive and evaluate electronically delivered services. [36] have also recently highlighted the need for further research to measure the influence of e-service on customer-perceived service quality and satisfaction [28]. While IB has grown rapidly, there is not enough evidence of its acceptance amongst consumers.

One of the most utilized model in studying information system acceptance is the technology acceptance model (TAM) in which system use (actual behavior) is determined by perceived usefulness (PU) and perceived ease of use (PEU) relating to the attitude toward use that relates to intention and finally to behavior. The reason for TAM's popularity is because of its parsimony and the wealth of empirical support for it [16, 18, 20, 26]. For studying the acceptance of IB, we understand that the original TAM is inadequate because the technology used and the transaction environment in IB are different from that of conventional IT and the normal business environment. Before accepting IB services, users should be aware about benefits, security issues and the risk associated with it, which are important. In this regard, we use an extended TAM model with the addition of an extra variable (perceived risks) to the model to provide a more comprehensive theoretical perspective of user technology acceptance in the context of IB. Prior research has empirically found positive relationship between PU and PEU as critical factors on the use of IB [66-68]. It is suggested that perceived risk is more powerful at explaining consumers' behavior since consumers are more often motivated to avoid mistakes than to maximize utility in purchasing [43]. Previous study suggests that perceived risk is an important ingredient in consumer decision making process regarding the adoption of information technology [13,34,39,44]. The present study aims at examining the impact of PU, PEU and perceived risk (PR) on the acceptance of IB by the consumers.

## 2. Internet banking

IB is the latest in the series of technological wonders of the recent past. ATMs, Tele-Banking, Internet Banking, Credit Cards and Debit Cards have emerged as effective delivery channels for traditional banking products. Banks know that the Internet opens up new horizons for them and moves them from local to global frontiers [42]. IB refers to systems that enable bank customers to get access to their accounts and general information on bank products and services through the use of bank's website, without the intervention or

inconvenience of sending letters, faxes, original signatures and telephone confirmations [64]. It is the types of services through which bank customers can request information and carry out most retail banking services such as balance reporting, inter-account transfers, bill-payment, etc., via telecommunication network without leaving their home/organization [2,19,45,59]. It provides universal connection from any location worldwide and is universally accessible from any internet linked computer [15,51,58,64]. Information technology developments in the banking sector have sped up communication and transactions for clients. It is vital to extend this banking feature to clients for maximizing the advantages for both clients and service providers [56]. Internet is the cheapest delivery channel for banking products as it allows the entity to reduce their branch networks and downsize the number of service staff. The navigability of the website is a very important part of IB because it can become one of the biggest competitive advantages of a financial entity [49]. Bankers consider 'minimizes inconvenience', 'minimizes cost of transactions' and 'time saving' to be important benefits and 'chances of government access', 'chances of fraud' and 'lack of information security' to be vital risks associated with electronic banking [33]. Due to increase in technology usage the banking sector's performance increases day by day. IB is becoming the indispensable part of modern day banking services.

## 3. Internet banking in India

The financial products and services have become available over the Internet, which has thus become an important distribution channel for a number of banks. Banks boost technology investment spending strongly to address revenue, cost and competitiveness concerns. The purpose of present study is to analyze such effects of IB in India, where no rigorous attempts have been undertaken to understand this aspect of the banking business [40]. A study on the Internet users, conducted by Internet and Mobile Association of India (IAMAI), found that about 23% of the online users prefer IB as the banking channel in India, second to ATM which is preferred by 53%. Out of the 6,365 Internet users sampled, 35% use online banking channels in India. This shows that a significant number of online users do not use IB, and hence there is a need to understand the reasons for not using it [23]. Until the advent of ATMs, people were unaware and/or not directly affected by the technological revolutions happening in the banking sector. ATMs became the major revelation for customers, since it offered the facility to avoid long queues in front of the cashiers in banks. It also provided them the flexibility of withdrawing money—anytime, anywhere [61]. In the study by IAMAI, it was found that the people are not doing financial transactions on the banks' Internet sites in India because of reasons such as security concerns (43%), preference for face-to-face transactions (39%), lack of knowledge about transferring online (22%), lack of user friendliness (10%), or lack of the facility in the current bank (2%) [52].

## 4. Consumer acceptance of Internet banking

Technological innovations are having significant importance in human general and professional life. This era can safely be attributed as technology revolution. The quick expansion of information technology has imbibed into the lives of millions of people. Rapid technology advancements have introduced major changes in the worldwide economic and business atmosphere [56]. Research on consumer attitude and adoption of IB showed there are several factors predetermining the consumer's attitude towards online banking such as person's demography, motivation and behavior towards different banking technologies and individual acceptance of new technology. It has been found that consumer's attitudes toward online banking are influenced by the prior experience of computer and new technology [35]. The adoption of IB forces consumers to consider concerns about password integrity, privacy, data encryption, hacking, and the protection of personal information [14]. IB requires perhaps the most consumer involvement, as it requires the consumer to maintain and regularly interact with additional technology (a computer and an Internet connection) [29]. Consumers who use IB use it on an ongoing basis and need to acquire a certain comfort level with the technology to keep using it [60]. In the study by [28], revealed six composite dimensions of electronic service quality, including the provision of convenient/accurate electronic banking operations; the accessibility and reliability of service provision; good queue management; service personalization; the provision of friendly and responsive customer service; and the provision of targeted customer service. PU, security and privacy are the main perusing factors to accept online banking system [56]. According to study conducted by [9], PU, PEU, perceived credibility and computer self-efficacy are the factors affecting adoption of IB.

TAM [21] provides a conceptual framework for this study. In the technology context of use, the frequency of use and duration of experience with the technology have been found to capture the customer's use of technology. In this study consumer attitude or intention to use is evaluated by PU, PEU, PR and usage pattern by frequency and duration of IB use.

### 4.1. Perceived usefulness

Perceived usefulness is one of the components of

Technology Acceptance Model (TAM), which has been widely used by information system researchers. According to [8]"PU is the extent to which a person believes that using a particular system will enhance his or her performance" [6]. [41] defined PU as the extent to which a person deems a particular system to boost his or her job performance. The importance of PU has been widely recognized in the field of electronic banking [1,26,30,38]. It is the primary prerequisite for mass market technology acceptance, which depends on consumers' expectations about how technology can improve and simplify their lives [5]. Empirical studies on TAM have suggested that PU has a positive effect on the adoption of information technology [68].

### 4.2. Perceived ease of use

According to [21] perceived ease of use is the extent to which a person believes that using a particular system will be free of effort [6]. It is a critical factor in the development and delivery of IB services [4,59,63,68]. Perceived ease-of-use is a person's subjective perception of the effortlessness of a computer system, which affects the PU thus having an indirect effect on a user's technology acceptance [57]. Also, the longer an individual has been using IB the more likely they are to find it easy to use [55]. The easier it is for a user to interact with a system, the more likely he or she will find it useful. There is substantial empirical support for this view [9,17,37,57]. It affects the consumers' intentions to use IB [5,6,22]. [53] found that PEU was not positively correlated with online banking use. This indicated that PEU does not statistically significantly affect the use of online banking. In contrast, [67] found that PEU had a significant positive effect on behavioral intention. This finding refers to the fact that users who have a higher computer self-efficacy are likely to have more positive PEU [8]

### 4.3. Perceived risk

The distant and impersonal nature of the on-line environment and the implicit uncertainty of using a global open infrastructure for transactions have rendered risk an inevitable element of e-commerce [50]. The main components of PR are perceived security and trust, which have emerged as the top issues inhibiting IB adoption. This construct reflects an individual's subjective belief about the possible negative consequences of some type of planned action, due to inherent uncertainty which is likely to negatively influence usage intentions. Trust is at the heart of all kinds of relationships [80]. Recent research indicates that trust has a critical influence on users' willingness to engage in online exchanges of money and sensitive personal information [6]. Trust refers to an expectation that others will not behave opportunistically [5, 24]. Consumers' perceived trust in online payment system is defined as consumers' belief that e-payment transactions will be processed in accordance with their expectations [65]. It is defined in terms of the individual's perception of: the security of the system; the service provider's reputation; loss of privacy; and concerns about risks associated with the reliability of IB. Trust can be defined as a user's confident belief in a bank's honesty toward the user. Consumers' trust in their online transactions is important and has been identified as a key to the development of the system [7, 69]. Customer's trust is a function of degree of risk involved in the situation where there is a physical separation between the bank and the customer, circumstances are difficult to predict, and the relationships are difficult to monitor [69]. There are still customers who fear to make use of IB, as they are concerned with security aspects of such a system. Previous research has found the risk associated with possible losses from the online banking transaction is greater than in traditional environments [15, 46 , 67]. Many studies showed PR as an important factor that influences online banking adoption; which is negatively related [3, 25, 54].

## 5. Research Model and Hypotheses

PU and PEU is significant factors affecting acceptance of an information system or new technologies and previous research has empirically found positive relationship between PEU and PU as critical factors on the use of e-banking [9, 35, 50, 53]. Hence an application perceived to be useful perceived to be easier to use than another is more likely to be accepted by users. By applying these into online banking context we hypothesize:

- **H1:** Perceived usefulness has a positive effect on use of IB.
- **H2:** Perceived ease of use has a positive effect on use of IB.

Perceptions of risk are a powerful explanatory factor in consumer behavior as individuals appear to be more motivated to avoid mistakes than to maximize purchasing benefits [43]. Services are inherently more risky than products and the major reason for this is the higher levels of uncertainty which are associated with services [43, 44]. [54] also found that PR was one of the major factors affecting consumer adoption, as well as customer satisfaction of IB services. PR usually arises from uncertainty. Hence we hypothesize:

- **H3:** Perceived risks have a negative impact on use of IB.

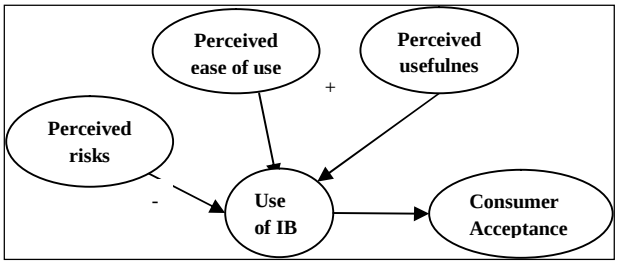


Figure 1. Research model.

## 6. Research Methodology

The key intention of this paper is to evaluate those factors that manipulate the nature of customers towards online banking and their growing tendency towards the online financial institutions. A survey instrument in the form of questionnaire was developed through data collected from previous studies on acceptance of IB.

### 6.1. Sample

The sample for this study is the students from an educational institute. Convenience sampling method was used. The reasons of using this sampling type are twofold. First, it offers an easy way to obtain the raw data for the further analysis. Second, it saves times and costs since the respondents can be randomly selected. Although there are limitations of using students as subjects, they are appropriate in this study for several reasons. First they are good surrogate for banking customers, they are current bank customers have experience with traditional banking services and are most likely familiar with the IB. Second, student sample reflects current and future banking customers [47]. Internet users are generally low with majority of them between 20- 30 ages [62].

A total of 300 questionnaires were distributed by mail to student customers of the institute who use IB services, from which 116 responses were obtained indicating 38.67 percent rate of return. Each questionnaire item was scored on a five-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; and 5 = strongly agree). Factor analysis was performed to assess the validity of the construct and regression analysis was employed to analyze the data.

## 7. Analysis

Statistical Package for Social Sciences (SPSS) version 12 was used as the analysis tool. The demographic profile of the respondents is shown in table 1.

Reliability is determined by Cronbach's coefficient alpha (α), a popular method for measuring reliability [46]; [48] suggests that for any research at its early stage, a reliability score or alpha that is 0.60 or above is sufficient. As shown in Table 2, the reliability scores of all the constructs were found to exceed the threshold; all measures demonstrated good levels of reliability (greater than 0.80).

Table 1: Profile of respondents

| **Demographics** | **Items** | **No. of respondents** | **Percent** |
|---|---|---|---|
| Gender | Male<br>Female | 70<br>46 | 60.3<br>39.7 |
| Age group | 21-24<br>24-27<br>27-30<br>> 30 | 66<br>27<br>21<br>02 | 56.9<br>23.3<br>18.1<br>01.7 |
| Class | Post graduate<br>Fellow<br>Program<br>Other | 103<br>11<br>02 | 88.8<br>09.5<br>01.7 |

Table 2: Reliability Statistics

| **Determinants** | **No. of items** | **Reliability for this sample** |
|---|---|---|
| PU | 9 | .942 |
| PEU | 5 | .897 |
| PR | 11 | .978 |

Table 3: Rotated Component Matrix

| | **Components** | | |
|---|---|---|---|
| | PR | PU | PEU |
| PR11 | .975 | -.087 | -.061 |
| PR5 | .951 | -.102 | -.072 |
| PR1 | .939 | -.101 | -.070 |
| PR3 | .933 | -.093 | -.061 |
| PR2 | .930 | -.150 | -.040 |
| PR9 | .910 | -.068 | -.060 |
| PR7 | .871 | -.050 | -.036 |
| PR4 | .870 | -.001 | .023 |
| PR6 | .868 | -.030 | -.026 |
| PR8 | .853 | -.033 | -.073 |
| PR10 | .811 | -.162 | -.177 |
| PU3 | -.061 | .919 | .065 |
| PU4 | -.111 | .913 | .185 |
| PU8 | -.017 | .892 | .039 |
| PU7 | -.134 | .872 | .062 |
| PU5 | -.015 | .854 | .040 |
| PU2 | -.093 | .812 | .215 |
| PU6 | -.190 | .643 | .197 |
| PU9 | -.149 | .635 | .573 |
| PU1 | .014 | .589 | .298 |
| PEU1 | -.081 | .270 | .890 |
| PEU4 | -.092 | .092 | .819 |
| PEU2 | -.061 | .275 | .813 |
| PEU5 | -.130 | .096 | .758 |
| PEU3 | -.100 | .165 | .565 |
| Eigen value | 9.206 | 6.240 | 3.9425 |
| % of variance | 28.769 | 19.502 | 12.321 |
| Cumulative % | 28.769 | 48.272 | 76.109 |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 5 iterations.

Items in the questionnaire were relevant to factor analysis. To determine the underlying structure, the correlation matrix was initially examined to determine how appropriate it was for factor analysis. The Kaiser-Meyer-Oklin (KMO) value was .873, which is higher than the recommended minimum of 0.6 [32] indicating that the sample size was adequate for applying factor analysis. In addition, the value of the test statistic for sphericity [10] on the basis of a Chi-squared transformation of the determinant of the correlation matrix was large. Bartlett's test of sphericity was significant, supporting the factorability of the correlation matrix and the associated significance level was extremely small (0.000). For factor extraction, principal component method was used, under the restriction that the eigen value of each generated factor was more than one. A factor analysis was conducted to develop constructs that will help analyze the questionnaire responses and to evaluate factors that will influence customer's usage of IB. Three factors were generated, which explained 76.11% of the variability of the data. The extracted factors were then rotated using variance maximizing method (Varimax). These rotated factors with their variable constituents and factor loadings are given in Table 3. The factors identified were PU, PEU and PR. The dependent variable IB use was formed by summing up the use of basic and other banking services. This was done, because it gives better view of the use of online banking with the data used [53]. IB use refers to the customers' usage behavior for IB. It consists of two questions which concerns how long they have been using IB and how often they used IB [22].

The regression analysis was conducted to reveal how different factors affect the use of online banking. Out of the variables considered only PR ($t = -3.800$, $p < 0:001$), PU ($t = 3.087$, $p < 0:01$) and PEU ($t=2.041$, $p< 0.05$) are statistically significant, the overall model was also statistically significant ($R^2 = .213$, $p < 0.001$). We have an Adjusted R Square value of 0.185 we can say that our model has accounted for 18.5% of the variance in the dependent variable. In table 8 a beta value of 0.260 indicates that a change of one standard deviation in the use of IB will result in a change of 0.260 standard deviations in the PU variable. Here F-value is 7.521($p<0.000$) which is highly significant. Regression results are shown in tables 4 and 5.

We finally run a correlation analysis to further test our hypotheses. The results indicate that PU ($p<.01$) and PEU ($p<.05$) are positively correlated with use and PR ($p<.01$) is negatively correlated.

In sum, PU and PEU clearly have a positive effect on the use of online banking and PR has negative effect. Based on our data analysis H1, H2 and H3 were supported statistically.

Table 4: Model Summary

| R | R Square | Adjusted R Square | F | Sig. | Std. Error of estimate |
|---|---|---|---|---|---|
| 0.462 | 0.213 | 0.185 | 7.521 | .0001 | 0.94180 |

Table 5: Coefficients

| | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | 2.086 | .087 | | 23.858 | .000 |
| PR | -.334 | .088 | -.320 | -3.800 | .000 |
| PU | .271 | .088 | .260 | 3.087 | .003 |
| PEU | .179 | .088 | .172 | 2.041 | .044 |

## 8. Discussion and Findings

This study examines the influence of PEU, PU and PR of IB. As expected, the results have supported the hypothesis that PU and PEU have positive effect on the use of IB and PR have negative effect on the use of IB. The results of the regression analysis conducted on the factors indicate that PR, PU and PEU on online banking were found to be the most influential factors explaining the use of online banking services. The result shows that PR is negatively related to the adoption of IB use which supports the hypothesis and is in line with the previous studies [12, 13, 31, 70]. Also it shows that PU and PEU has positive relation with IB use supporting the hypotheses. This finding refers to the fact that consumers use online banking for the benefits and also due to its easiness in use which provides in comparison to other banking delivery channels. This finding is in line with other studies [20, 27, 29, 37].

When online banking is perceived as useful, customer's intention to adopt it would be greater. Likewise bank customers are likely to adopt IB when it is easy to use. This shows that bank customers anchor their online banking adoption intention to the beneficial outcomes and ease of use process of the system. Although IB provides flexibility in performing financial transaction, fast and easy, however individuals are still reluctant to adopt the system because of the risk associated with it. Security and privacy are two elements in the PR. Customers are not ready to take any risk on using the new system.

Practical implication of these results is that banks need to highlight the benefits of IB, make IB easy to use, and enhance IB security to improve consumers' trust. They also need to make the consumers aware about the system by providing them about the details of the benefits associated with it and also ensuring security of the system. Banks can highlight benefits such as IB conveniences in their promotional and advertising activities. The IB interface could be made simple. Banks also need to engage in security enhancement activities such as encryption, firewall, and user protection and authenticity. Trust is one of

the more influential factors, implying that controlling the risk of online banking is more important than providing benefits. This finding is particularly important for managers as they decide how to allocate resources to retain and expand their current customer base. However, building a risk-free online transaction environment is much more difficult than providing benefits to customers. Therefore, online banking companies need to search for risk-reducing strategies that might assist in inspiring high confidence in potential customers. This study suggests that they should consider focusing on the prevention of intrusion, fraud and identity theft. In addition, this study suggests that online banking companies could develop trust-building mechanisms to attract customers, such as statements of guarantee, increased familiarity through advertising, and long-term customer service. The proposed model makes an important contribution to the emerging literature on e-commerce, especially with regard to online banking.

## 9. Conclusion

The result of this study shows that PU, PEU and PR are the important determinants of online banking adoption. This study meets the desired objective; but it suffers from one setback. The relatively small size of the sample limits generalization of the outcome of the study.This study was conducted to explore the factors influencing intentions to adopt IB services. As such, there is still room for further investigation into the adoption of IB services. The replication of this study on a wider scale with more IB customers and with different national cultures is essential for the further generalization of the findings. By using a longitudinal study in the future, we could investigate our research model in different time periods and make comparisons, thus providing more insight into the phenomenon of online banking adoption.

## References


[1] Agarwal, R, Rastogi, S & Mehrotra, A., "Customers 'perspectives regarding e-banking in an emerging economy," *Journal of Retailing and Consumer Services*, vol. 16, pp. 340–351, 2009.

[2] Aladwani, A., "Online Banking: A Field Study of Drivers, Development Challenges, and Expectations," *International Journal of Information Management*, vol. 21, pp. 213-225, 2001.

[3] Aldas-Manzano, J, Lassala-Navarre, C, Ruiz-Mafe, C & Sanz-Blas, S., "The role of consumer innovativeness and perceived risk in online banking usage," *International Journal of Bank Marketing*, vol. 27, no. 1, pp. 53-75, 2009.

[4] Al-Hajri, S & Tatnall, A., "Technological Innovation and the Adoption of Internet Banking in Oman," *The Electronic Journal for Virtual Organizations and Networks*, vol. 10, pp. 59-83, 2008.

[5] Al-maghrabi, T & Dennis, C., "Driving online shopping: Spending and behavioral differences among women in Saudi Arabia," *International Journal of Business Science and Applied Management*, vol. 5, no. 1, pp. 30-47, 2010.

[6] Alsajjan, B & Dennis, C., "Internet Banking Acceptance Model: Cross-Market Examination," *Journal of Business Research*. 2009.

[7] Al-Somali, S, Gholami, R & Clegg, B., "An Investigation into the Acceptance of Online Banking in Saudi Arabia," *Technovation*, vol. 29, pp. 130–141, 2009.

[8] Amin, H., "An Analysis of Online Banking Usage Intentions: An Extension of the Technology Acceptance Model," *International Journal of Business and Society*, vol. 10, no. 1, pp. 27-40, 2009.

[9] Amin, H., "Internet Banking Adoption among Young Intellectuals," *Journal of Internet Banking and Commerce*, vol. 12, no. 3. 2007.

[10] Barlett, M., "A note on the multiplying factors for various chi square approximations," *Journal of the Royal Statistical Society*, vol. 16, pp. 296-298, 1954.

[11] Bauer, H, Hammerschmidt, M & Falk, T., "Measuring the Quality of E-Banking Portals," *International Journal of Bank Marketing*, vol. 23, no. 2, pp. 153-175, 2005.

[12] Bauer, KJ., "Perceived Risk and Internet Banking," 2002.

[13] Belkhamza, Z & Wafa, S., "The Effect of Perceived Risk on the Intention to Use E-commerce: The Case of Algeria," *Journal of Internet Banking and Commerce*, vol. 14, no. 1. 2009.

[14] Benamati & Serva., "Trust and Distrust in Online Banking: Their Role in Developing Countries," *Information Technology for Development*, vol. 13, no. 2, pp. 161-175, 2007.

[15] Bradley, L & Stewart, K., "Delphi Study of Internet banking," *Marketing intelligence and planning*, vol. 21, no. 5, pp. 272-281, 2003.

[16] Chau, P., "An Empirical Assessment of a Modified Technology Acceptance Model," *Journal of Management information Systems*, vol. 13, no. 2, pp. 185–204, 1996.

[17] Chau, P., "Influence of Computer Attitude and Self-Efficacy on It Usage Behavior," *Journal of End User Computing*, vol. 13, no. 1, pp. 26-33, 2001.

[18] Chau, P & Lai, V., "An Empirical Investigation of the Determinants of User Acceptance of Internet Banking," *Journal of Organizational Computing and Electronic Commerce*, vol. 13, no. 2, pp. 123-145, 2003.

[19] Daniel, E., "Provision of Electronic Banking in

the UK and the Republic of Ireland," *International Journal of Bank Marketing*, vol. 17, no. 2, pp. 72-82, 1999.

[20] Davis, FD., *A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results*, MIT, Boston, 1986.

[21] Davis, FD., "Perceived Usefulness, Perceived Ease of Use and User Acceptance of Information Technology," *MIS Quarterly*, pp. 319-340, 1989.

[22] Eriksson, K, Kerem, K & Nilsson, D., "Customer Acceptance of Internet Banking in Estonia," *International Journal of Bank Marketing*, vol. 23, no. 2, pp. 200 – 216, 2005.

[23] Geetika, Nandan, T & Upadhyay, AK., "Internet Banking in India: Issues and Prospects," *The Icfai Journal of Bank Management*, vol. 7, no. 2, pp. 47-61, 2008.

[24] Gefen, D, Karahanna, E & Straub, D., "Trust and TAM in Online Shopping: An Integrated Model," *MIS Quarterly*, vol. 27, no. 1, pp. 51-90, 2003.

[25] Gerrard, P & Cunningham, JB., "The Diffusion of Internet Banking Among Singapore Consumers," *International Journal of Bank Marketing*, vol. 21, no. 1, pp. 16-28, 2003.

[26] Guriting, P & Ndubisi, N., "Borneo online banking: evaluating customer perceptions and behavioural intention.," *Management Research News*, vol. 29, no. 1/2, pp. 6-15, 2006.

[27] Hua, G., "An Experimental Investigation of Online Banking Adoption in China," *Journal of Internet Banking and Commerce*, vol. 14, no. 1. 2009.

[28] Ibrahim, E, Joseph, M & Ibeh, K., "Customers' Perception of Electronic Service Delivery in the Uk Retail Banking Sector," *International Journal of Bank Marketing*, vol. 24, no. 7, pp. 475-493, 2006.

[29] Jane, M, Hogarth, J & Hilgert, M., "The Adoption of Electronic Banking Technologies by US Consumers," *International Journal of Bank Marketing*, vol. 22, no. 4, pp. 238-359, 2004.

[30] Jaruwachirathanakul, B & Fink, D., "Internet Banking Adoption Strategies for a Developing Country: The Case of Thailand," *Internet Research*, vol. 15, no. 3, pp. 295-311, 2005.

[31] Jih, W, Wong, S & Chang, T., "Effects of Perceived Risks on Adoption of Internet Banking Services: An Empirical Investigation in Taiwan," *International Journal of E-Business Research*, vol. 1, no. 1, pp. 70-88, 2005.

[32] Kaiser, H., "An index of factorial simplicity," *Psychometrika*, vol. 39, no. 1, pp. 31-36, 1974.

[33] Kaleem, A & Ahmad, S., "Bankers' Perceptions of Electronic Banking in Pakistan," *Journal of Internet Banking and Commerce*, vol. 13, no. 1. 2008.

[34] Kim, K & Prabhakar, B., "Initial Trust, Perceived Risk, and the Adoption Of Internet Banking," in *Proceedings of the twenty first international conference on Information systems*, Association for Information Systems Atlanta, GA, USA, Brisbane, Queensland, Australia, pp. 537 - 543, 2000.

[35] Laforet, S & Li, X., "Consumers' attitudes towards online and mobile banking in China," *International Journal of Bank Marketing*, vol. 23, no. 5, pp. 362-380, 2005.

[36] Lee, G & Lin, H., "Customer Perceptions of E-Service Quality in Online Shopping," *International Journal of Retail & Distribution Management*, vol. 33, no. 2, pp. 161-176, 2005.

[37] Lee, M., "Factors Influencing the Adoption of Internet Banking: An Integration of Tam and Tpb with Perceived Risk and Perceived Benefit," *Electronic Commerce Research and Applications*, vol. 8, pp. 130–141, 2009.

[38] Liao, Z & Cheung, M., "Internet-based E-Banking and Consumer Attitudes: An Empirical Study," *Information & Management*, vol. 39, pp. 282-295, 2002.

[39] Liebermann, Y & Stashevsky, S., "Perceived risks as barriers to internet and e-commerce usage," *Qualitative Market Research: An International Journal*, vol. 5, no. 4, pp. 291-300, 2002.

[40] Malhotra,, P & Singh, B., "The Impact of Internet Banking on Bank Performance and Risk: The Indian Experience," *Eurasian Journal of Business and Economics*, vol. 2, no. 4, pp. 43-62, 2009.

[41] Mathwick, C, Rigdon & Malhotra,, N., "The Effect of Dynamic Retail Experiences on Experiential Perceptions of Value:an Internet and Catalog Comparison," *Journal of Retailing*, vol. 78, no. 1, pp. 51–60., 2001.

[42] Mavri, M & Ioannou, G., "Consumers' Perspectives on Online Banking Services," *International Journal of Consumer Studies*, vol. 30, no. 6, pp. 552-560, 2006.

[43] Mitchell, V., "Consumer perceived risk: conceptualizations and models," *European Journal of Marketing*, vol. 33, no. 1/2, pp. 163-195, 1999.

[44] Mitchell, V & Greatorex, M., "Perceived risk and risk reducing strategies across product classification," in *Proceedings of 23rd MEG Conference*, Oxford, 1990.

[45] Mols, N, Bukh, P & Neilsen, J., "Distribution Channel Strategies in Danish Retail Banking," *International Journal of Bank Marketing*, vol. 27, no. 1, pp. 37-47, 1999.

[46] Mukherjee, A & Nath, P., "A Model of Trust in Online Relationship Banking," *International Journal of Bank Marketing*, vol. 21, no. 1, pp. 5-15, 2003.

[47] Nor, KM., "An Empeirical Study of Internet

Banking Acceptance in Malaysia: an Extended Decomposed Theory of Planned Behaviour," 2005.
[48] Nunnally, JC., *Psychometric Theory*, McGraw-Hill, New York, 1978.
[49] Ortega, BH, Martínez, JJ & Hoyos, JMD., "An Analysis of Web Navigability in Spanish Internet Banking," *Journal of Internet Banking and Commerce*, vol. 12, no. 3. 2007.
[50] Pavlou, P., "Consumer acceptance of electronic commerce: Integrating trust and risk with the Technology Acceptance Model," *International Journal of Electronic Commerce*, vol. 7, no. 3, pp. 101-134, 2003.
[51] Perumal, V & Shanmugan., "Internet Banking: Boone or Bane," *Journal of Internet Banking and Commerce*, vol. 19, no. 3. 2004.
[52] Phan, D., "E-Business Development for Competitive Advantages: A Case Study," *Information & Management*, vol. 40, pp. 581–590, 2003.
[53] Pikkarainen, T, Pikkarainen, K, Karjaluoto, K & Pahnila, S., "Consumer Acceptance of Online Banking: An Extension of the Technology Acceptance Model," *Internet Research*, vol. 14, no. 3, pp. 224-235, 2004.
[54] Polatoglu, V & Ekin, S., "An Empirical Investigation of the Turkish Consumer's Acceptance of Internet Banking Services," *International Journal of Bank Marketing*, vol. 19, no. 4, pp. 156-165, 2001.
[55] Prompattanapakdee, S., "The Adoption and Use of Personal Internet Banking Services in Thailand," *The Electronic Journal on Information Systems in Developing Countries*, vol. 37, no. 6, pp. 1-31, 2009.
[56] Qureshi, T, Zafar, M & Khan, M., "Customer Acceptance of Online Banking in Developing Economies," *Journal of Internet Banking and Commerce*, vol. 13, no. 1. 2008.
[57] Rigopoulos, G & Askounis, D., "A TAM Framework to Evaluate Users' Perception towards Online Electronic Payments," *Journal of Internet Banking and Commerce*, vol. 12, no. 3. 2007.
[58] Rotchanakitumnuai, S & Speece, M., "Barriers to internet banking adoption: a qualitative study among corporate customers in Thailand," *International Journal of Bank Marketing*, vol. 21, no. 6, pp. 312-323, 2003.
[59] Sathye, M., "Adoption of Internet banking by Australian consumers: an empirical investigation," *International Journal of Bank Marketing*, vol. 17, no. 7, pp. 324-334, 1999.
[60] Servon, L & Kaestner, R., "Consumer Financial Literacy and the Impact of Online Banking on the Financial Behavior of Lower-Income Bank Customers," *The Journal of Consumer Affairs*, vol. 42, no. 2, pp. 271-395, 2008.
[61] Sharma, D., "India's Leapfrogging Steps from Bricks-and-Mortar to Virtual Banking: Prospects and Perils," *The IUP Journal of Management Research*, vol. 8, no. 3, pp. 45-61, 2009.
[62] Tan, M & Teo, T., "Factors influencing the adoption of internet banking," *Journal of the Association for Information Systems*, vol. 1, no. 5, pp. 1-38, 2000.
[63] Taylor, S & Todd, P., "Assessing IT Usage the Role of Prior Experience," *MIS Quarterly*, vol. 19, no. 4, pp. 561-570, 1995.
[64] Thulani, D, Tofara, C & Langton, R., "Adoption and Use of Internet Banking in Zimbabwe: An Exploratory Study," *Journal of Internet Banking and Commerce*, vol. 14, no. 1. 2009.
[65] Tsiakis, T & Sthephanides, G., "The concept of security and trust in electronic payments," *Computers and Security*, vol. 24, pp. 10-15, 2005.
[66] Venkatesh, V & Davis, F., "A Model of the Antecedents of Perceived Ease of Use: Development and Test," *Decision Sciences*, vol. 27, no. 3, pp. 451-481, 1996.
[67] Wang, Y, Wang, Y, Lin, H & Tang, T., "Determinants of User Acceptance of Internet Banking: An Empirical Study," *International Journal of Service Industry Management*, vol. 14, no. 5, pp. 501-519, 2003.
[68] Yiu, C, Grant, K & Edgar, D., "Factors Affecting the Adoption of Internet Banking in Hong Kong-Implications for the Banking Sector," *International Journal of Information Management*, vol. 27, pp. 336–351, 2007.
[69] Yousafzai, S, Pallister, J & Foxall, G., "A proposed model of e-trust for electronic banking," *Technovation*, vol. 23, no. 11, pp. 847–860, 2003.
[70] Zhao, AL, Lewis, NK, Lloyd, SH & Ward, P., "Adoption of Internet Banking Services in China: Is It All About Trust?," *International Journal of Bank Marketing*, vol. 28, no. 1, pp. 7-26, 2010.

**Rahmath Safeena** is a Ph.D. student in the National Institute of Industrial Engineering, (NITIE) Mumbai. She is a Masters Degree holder in Computer Network engineering, from NIE, Mysore. Her current research interest includes E-business, E-service, E-banking, and Technology Innovation.

**Hema Date** is Associate Professor, National Institute of Industrial Engineering (NITIE), Mumbai. She received her PhD from NITIE Mumbai. She has been involved in various research and consultancy projects, related to field of Information Technology and Management. Her area of interest is Expert System, Knowledge Management, Decision Support System, Data mining, Data warehousing, Business Intelligence, ERP and EAI.

**Abdullah Kammani** is a Ph.D. student in the National Institute of Industrial Engineering, (NITIE) Mumbai. He is a Masters Degree holder in Information Technology & Management, from Periyar University, Tamil Nadu. He is a member of various knowledge societies and groups, both offline and online. His current research interest includes Knowledge Management Capability, ICT Innovation and adoption, Strategic Management and Productivity.