# Applying TAM approach to investigate the adoption of mobile banking among Indian students

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**Abstract:** The study in hand investigated factors affecting the adoption of mobile banking services among University students in India. Total 466 undergraduate university students were interviewed at various University campuses in five major cities of national capital region (NCR) of India. The study used factor analysis to identify factors determining the adoption of mobile banking among undergraduate university students in India. Further, it used regression analysis to investigate factors having influence on mobile banking adaption and their predictive ability. The study identified total five factors namely utility benefit, convenience benefit, social benefit, trust benefit, and behavioural benefit determining the adaption of mobile banking. All factors had a significant influence on adaptation intentions and could be used for prediction. Further, trust benefit was identified to have as strongest influence on the adaptation intentions..

**Keywords:** Mobile banking, university students, intentions to adapt, factor analysis, regression

## 1. Introduction

Indian youth have adapted new technologies and IT based solution to their banking needs. Mobile banking may be referred as an act of doing online financial transactions with a mobile phone, tablet or similar devices. It is an application of mobile commerce allowing their users to access bank accounts through mobile devices. Indian Banks quickly adapted mobile banking services as it helped them in providing convenience to customers, cost reduction, and gaining competitive advantages (Kumar et al. 2017). With the help of mobile banking, users can access several banking services such as fund transfer, cheque book request, account information and management, PIN change, balance enquiry, bill payment, etc. (Dahlberg et al., 2008; Shaikh and Karjaluoto, 2015). At the same time, banks with the technology induced banking operations and delivery systems became more efficient in providing customer satisfaction, reducing cost and increasing profitability (Kumar et al. 2017).

Several scholars (Kumar and Lim, 2008; Wei et al., 2009; Liu et al., 2009) have identified the potential of mobile banking and its benefit to the young population in the beginning years of the new millennium. The launch of Reliance Jio 4G services in 2016 brought a revolution with making high speed internet data available, affordable, and accessible to the common Indian. This laid a strong foundation for the rapid growth of numerous mobile application based retailing services including mobile banking.

There are some inherent disadvantages in mobile commerce, and particularly mobile banking (Kim et al., 2010). Users often complaint for inconveniences due to small screen size of device, limited screen resolution, unfriendly keypad/touch screen, etc.

Banking industry was pioneer among indentifying, accepting, and responding to these changes as well as in offering banking solutions through tech-based distribution channels such as ATM, online banking, and mobile banking (Kumar et al. 2017). Today, even traditional bank are endorsing their mobile banking services aggressively (Kumar et al. 2017). Due to huge potential of m-commerce or mobile commerce among young Indian consumers, adaptation of mobile banking got attentions from scholars, researchers, and enthusiasts in the field of banking and consumers.

**Problem Statement:**

*"Undertaking a research study to investigate the adaption of mobile banking among university students in India"*

## 2. Literature Review

To identify variables of the study and examine multiple dimensions of the problem, a rigorous literature review was done. Various online data bases were explored for suitable previous studies and their summary has been presented in the literature review.

Kumar, Mall and Mane (2017) investigated the intentions of management students to use mobile banking in India. The study found that management intention to use mobile banking was affected by four factors namely PU, PEOU, SI, and TP. The study was broadly based on the technology adoption model (TAM), as it adopted two construct namely PU and PEOU from TAM. Further, the TAM was extended and included two additional constructs, namely, SI and TP. Authors emphasised that Indian youth have adopted technology in their day to day

activities. On one hand, computer, internet and smart phones are thoroughly and widely used technology among Indian students. However, mobile banking services are used by very few young banking customers. Abdinoor and Mbamba (2017) used Technology Adaptation Model (TAM) and studied the consumers' adoption of mobile banking services in Tanzania. The study used random sampling technique and interviewed total 200 users and non-users of mobile banking services. They concluded that the adaptation of mobile banking mobile banking service is positively associated to individual awareness (IA), perceived usefulness (PU) and perceived benefit (PB). At the same time, it is negatively associated to cost effects. Further, the study also revealed that demographic characteristics such as sex, age and income level are the moderating factors to the adoption of mobile banking.

Tan and Lau (2016) applied Unified Theory of Acceptance and Use of Technology (UTAUT) model to examine the adaptation intention for mobile banking services among Generation Y university students. The study applied multiple regression analysis and revealed that performance expectancy (PE) was the strongest predictor, followed by effort expectancy (EE), perceived risk (PR), and social influence (SI). Mohammadi (2015) conducted a study on the usages of mobile banking in Iran. The author found that major factor determining customers' attitude towards adaptation of mobile banking was 'system compatibility'. Further the author held that 'resistance' had a negative determinant on both ease of use and usefulness.

Thakur (2014) investigated satisfaction and loyalty among Indian mobile banking customers.

The study interviewed total 433 mobile banking customers in Mumbai. The study found that customer satisfaction has a positive effect on a customer loyalty. At the same time, usability of interface and customer services pose a positive effect on satisfaction of mobile banking customer. The study highlighted that customer satisfaction and loyalty are main aim for managers. Nyambura and Waema (2013) investigated the acceptance of Internet and mobile phones for various changes in Kenyan Household. Scholars held that new technologies such as internet enabled smart phones bring numerous development outcomes to the society. Further, the study mentioned that development of new technologies and their outcomes is affected by several other factors such as individuals' social factor, economic factor, knowledge factor, and status factor. Wadhe (2013) conducted a study to investigate banking customers' awareness as well as perception towards adaption of mobile banking in India. The study found that majority of the banking customers were aware of mobile banking services provided by their respective banks. Further, the banking customers were also aware of various applications and uses of mobile banking services. The customers had positive perception towards mobile banking services as they admitted that mobile banking can bring convenience as well as flexibility in their banking.

Ishengoma (2011) investigated the financial inclusion of mobile banking in Tanzania. The main objective of the study was to examine the behavior of mobile users towards mobile banking. Respondents were interviewed using a structured questionnaire. The study found that majority of

respondents was users of mobile banking. Further, the study found the literacy affected the use of technology in Tanzania. The Illiterate people found the adaptation of new technology more difficult and complex than literate people. Wessels and Drennan (2010) held that consumers adoption of mobile banking is affected by perceived usefulness, perceived risk, cost, and compatibility. Sharma and Singh (2009) in their research on Indian banking customers found that safety and security was a serious concerns for the users of mobile banking. They further held that one one hand customers were scared of possible frauds, misuse of account information. At the same time, customers were also affected with user friendliness issues such as remembering codes for different transaction, software installation & updating, etc.

**3. Research Questions**

The study in hand investigated factors affecting the adoption of mobile banking services among University students in India. The literature review identified gaps in existing literature and helped in formulating research questions for the present study. The study attempted to answer following research questions-

Research Question 1: What are the major factors determining the adoption of mobile banking among University students in India?

Research Question 2: Can intentions to adapt mobile banking among Indian students be successfully predicted by identified factors?

**4. Research Methodology**

The study was descriptive in nature and used a single cross sectional research design to answer research questions. The respondent students were interviewed at various Universities campuses in National capital region (NCR) of India.

**Sample Design**

National capital region (NCR) is a favourite destination among Indian youths seeking degree in various professional and traditional courses. The whole region is mainly constituted by five adjacent cities namely, Delhi (national capital); Noida and Ghaziabad (Uttar Pradesh); and Gurugram and Faridabad (Haryana). The quality of infrastructure and lifestyle along with enormous growth opportunities make the whole NCR a hotspot for the career oriented youngsters. Total 466 undergraduate students enrolled in various courses in government and private universities in NCR constituted the sample for the study. The study used non probability judgemental sampling technique to draw sample from the population. Students of age group 18-30 years, having enough skills to use smart phones and internet, and having exposure of various banking services were chosen in sample. Students who were using various banking services from at least one year but not yet started using mobile banking services were selected. The sample was composed of 64.16% male and 35.84% female students. Among 466 undergraduate university students total 7.30% were enrolled in Delhi (national capital), 47.85% were enrolled in Noida and Gr. Noida (Uttar Pradesh), and 44.85% were enrolled in Faridabad and Gurugram (Haryana). Majority of selected students were pursuing course in Commerce and Management (44.64%); followed by Engineering Science and Technology 23.39%; Arts and Humanities 22.96%; Pharmacy and Medical 5.57%; others 3.65%.

**Table 1:** Sample Profile (N = 466)

| S.N | | Item | No. of Respondents | Percentage |
|---|---|---|---|---|
| 1 | Gender | Male | 299 | 64.16% |
| | | Female | 167 | 35.84% |
| 2 | City | Delhi | 34 | 7.30% |
| | | Noida & Gr. Noida | 223 | 47.85% |
| | | Faridabad & Gurugram | 209 | 44.85% |
| 3 | Undergraduate Course | Engineering, Science, & Technology | 109 | 23.39% |
| | | Commerce & Management | 208 | 44.64% |
| | | Arts & Humanities | 107 | 22.96% |
| | | Pharmacy & Medical | 27 | 5.79% |
| | | Others | 17 | 3.65% |

*Source: Survey data*

**Data Collection Design**

The data were collected from the target respondents by using a structured and non-disguised questionnaire. The respondents were spotted and given the questionnaire on various hangout points in the University campuses such as canteen and play ground. The data were collected in the months of January and February, 2020. The questionnaire was divided in two parts. The first part used nominal and ordinal scales to obtain information regarding demographic profile of respondents. The second part used a 5-point likert scale to measure students' response on total 23 selected variables. Most of the study variables were adopted from Technology Adaptation Model (TAM). However, some changes were made in TAM questionnaire to fit in the present study's environment. The pilot testing of questionnaire was done on 29 students in a university premises in Gurugram and some minor changes were made before executing the questionnaire in full swing.

**Data Analysis Design**

After collecting the data, questionnaires were thoroughly reviewed for the correctness as well as completeness of the data. The data were entered in SPSS software version 20.0 for detailed analysis. The study used Factor Analysis to identify factors responsible for the adoption of mobile banking among undergraduate university students. Factors are underlying construct that describe a set of variables (George and Paul 2009). It is a data reduction technique which is prominently used to identify few factors from a pool of variables (George and Paul 2009). Factor Analysis can be applied only after judging the suitability of data for it. The data suitability was ensured by calculating the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's Test of Sphericity (Hair et al, 2008). The study used Bartlett's Test of Sphericity to test the null hypothesis that, the variables are uncorrelated in the population. That is, the correlation matrix is an identity matrix. If hypothesis can't be rejected (i.e. accepted) by the test the appropriateness of factor analysis is questionable (Malhotra, 1993). A large value of test statistics favours the rejection of the null hypothesis. On the other hand, a small value of KMO statistic indicates that the correlation between pairs of variables can't be explained by other variables and that the factor analysis may not be appropriate for the data set. Generally, a KMO value greater than 0.5 is desirable (Malhotra, 1993).

Once, the suitability of factor analysis is determined, an appropriate method should be selected. The study used Principle Component Analysis method. Principle Component Analysis is a popular method and primarily

recommended for determining the minimum number of factors that account for maximum variance in the data. The identified factors are called principle components (Malhotra, 1993). Eigen values were used to determine number of factors to be extracted from the pool of variables. The eigen value for a factor indicates total variance attributes attributed to that factor. Only factors with eigen value 1.0 were considered and other factors are not included in the model (Malhotra, 1993).

An initial or un-rotated factor matrix indicates the relationship between the factor and individual variables, which may be difficult to interpret. Therefore, through rotation, the factor matrix is transformed in to simpler one that is easier to interpret (Malhotra, 1993). The most commonly used method for rotation is the Varimax procedure. This is an orthogonal method of rotation that mininmizes the number of variables with high loadings on a factor. A reliability analysis was also done to check the internal consistency of the factors. Finally, Linear Regression Analysis was performed to examine whether the extracted factors significantly affected the undergraduate university students intention to adopt mobile banking in coming future as well as their degree of influence and strength of prediction.

## 5. Results and Discussion

The main aim of the study in hand was to investigate factors responsible for the adoption of mobile banking among undergraduate university students in India. The data were analyzed using factor analysis and linear regression analysis. Since, factor analysis can be applied on data only after confirming suitability for it. The data suitability was confirmed by checking values for Kaiser-Meyer-Olkin Measure (KMO) of sampling adequacy and Bartlett's Test of Sphericity measure of multivariate normality (Table 2).

**Table 2:** KMO and Bartlett's Test

| **Test** | | **Test Statistic** |
|---|---|---|
| Kaiser Meyer Olkin Measure of Sampling Adequacy | | 0.878 |
| Bartlett's Test of Sphericity | Approx. Chi – Square | 215.283 |
| | d.f | 335 |
| | Sig. | 0.000 |

The KMO value 0.878 indicated that distribution of values was meritoriously adequate enough to run factor analysis on sample respondents. And, significance value .000 ($p < .05$) for Bartlett's Test of Sphericity indicated that sample data differ significantly from identity matrix i.e., do not produce an identity matrix. Thus, sample data was multivariate normal and completely acceptable for factor analysis.

Table 3 exhibited factor loading for each variable under study (total 23). Using the criteria of an eigenvalue greater than one, SPSS extracted total five factors or principal components contributing to most of the total variance. Each factor was given a name suitable to the group of variables it represented.

**Table 3:** Factor Loadings: Intention to Use Mobile Banking among Students in India

| **Factors** | **Factor Name** | **Variable Name** | **Factor Loadings** | **Cronbach's Alpha** |
|---|---|---|---|---|
| I | Utility Benefit | I can save my travelling expenses to the bank | 0.873 | .732 |
| | | I can save my precious time | 0.756 | |
| | | I can keep a record of my finances | 0.787 | |
| | | I can conveniently use it anywhere any time | 0.639 | |
| II | Convenience Benefit | I can easily learn to use mobile banking | 0.684 | .865 |
| | | It would provide user friendly interface | 0.656 | |
| | | Instruction for using mobile banking are easy to follow | 0.618 | |
| III | Social Benefit | I would tell my near ones that I use mobile banking | 0.789 | .875 |
| | | I would use mobile banking if my near ones use it | 0.767 | |
| | | I would tell the features of mobile banking to my near ones | 0.718 | |
| | | I would use mobile banking if my near ones convince me | 0.689 | |
| | | It is prestigious to use mobile banking | 0.676 | |
| | | Absence of human interface makes mobile banking dull and boring | 0.659 | |
| IV | Trust Benefit | It would maintain my privacy | 0.891 | .847 |
| | | It would be safe and secure | 0.878 | |
| | | It is as trustworthy as branch banking | 0.818 | |
| | | It would maintain confidentiality of my personal information | 0.810 | |
| | | It would be risky as phones can be easily lost or misplaced | 0.808 | |
| | | It would be risky as mobile network and hardware are not reliable | 0.737 | |

| | | | | |
|---|---|---|---|---|
| V | Behavioral Benefit | I am willing to use mobile banking | 0.819 | .751 |
| | | I will surely use mobile banking | 0.788 | |
| | | I am interested in new technologies | 0.776 | |
| | | It is expensive to use the mobile banking | 0.668 | |

*Source: Survey data*

The first factor, Utility Benefit was highly loaded on total four variables namely- save travelling expenses, save time, keep record of finances, can be conveniently used anywhere any time with factors loadings 0.873, 0.756, 0.787 and 0.693 respectively. The second factor, Convenience Benefit was highly loaded on total three variables namely- can easily learn to use, would provide user friendly interface, and instruction are easy to follow with factor loading 0.68, 0.656 and 0.618 respectively. The third factor, Social Benefit was highly loaded on total six variables namely- tell my near ones, would use if my near ones use, would tell features to my near ones, would use if my near ones convince, it is prestigious, and absence of human interface makes it dull with factor loadings 0.789, 0.767, 0.718, 0.689, 0.676 and 0.659 respectively. The forth factor, Trust Benefit was highly loaded on total six variables namely maintain privacy, safe and secure, trustworthy as branch banking, maintain confidentiality, risky as phones can be easily lost or misplaced, risky as mobile network and hardware are not reliable with factor loadings 0.891, 0.878, 0.818, 0.810, 0.808, 0.737 respectively. Finally the fifth factor, Behavioral Benefit was highly loaded on total four variables namely- willingness to use mobile banking, surely use mobile banking, interested in new technologies, and expensive to use with factor loadings 0.819, 0.788, 0.776 and 0.668 respectively.

Table 3 also depicted the value of Cronbach's Alpha for each factor representing a set of variables. The Cronbach's alpha value for factors Utility Benefit, Convenience Benefit, Social Benefit, Trust Benefit, and Behavioral Benefit were 0.732, 0.865, 0.875, 0.847, and 0.751 respectively. All the factors exhibited high internal consistency as the Cronbach's alpha value for each factor was above the acceptable level (0.7).

Finally, Linear Regression Analysis was performed on the factor scores to examine whether the extracted factors significantly affected the University students intention to adopt mobile banking in coming future. The R-square (strength of association) was 4.97 i.e. 49.7% of the variation in dependent variable (intention to adopt mobile banking) can be explained from five independent variables namely Trust benefit, Convenience Benefit Utility Benefit Social Benefit and Behavioral Benefit. F ratio in ANOVA test indicate that the overall regression model is good fit for the sample data ($F= 59.26$, $p<.05$). i.e., Independent variables statistically significantly predict the dependent variable.

The results of regression analyses are summarized in table 4.

**Table 4:** Regression of Adaptation Intentions on Extracted Factors (N = 466)

| S.N | Factors | Unstandardised Coefficient | | Standardised Coefficient Beta | t value | Sig |
|---|---|---|---|---|---|---|
| | | B | SE | | | |
| 1 | Trust Benefit | 0.54 | 0.09 | 0.59 | 4.66 | .00 |
| 2 | Convenience Benefit | 0.49 | 0.08 | 0.50 | 4.31 | .00 |
| 3 | Utility Benefit | 0.39 | 0.17 | 0.43 | 3.98 | .00 |
| 4 | Social Benefit | 0.22 | 0.15 | 0.24 | 2.89 | .00 |
| 5 | Behavioral Benefit | 0.19 | 0.12 | 0.21 | 2.77 | .00 |

*Dependent variable: Intention to adopt mobile banking*

The t-value and its significance indicated that all five factors had a significant influence on 'adaptation intentions' and can be used to predict it. Further, the Beta coefficient indicated the degree of influence and the strongest predictor of dependent variable 'adaptation intentions'. It can thus be seen that the 'trust benefit (0.59) had strongest the maximum influence and was the strongest predictor of adaptation intentions. It was followed by convenience benefit (0.50), utility benefit (0.43), social benefit (0.24), and behavioral benefit (0.21) respectively.

## 6. Conclusion

Mobile banking users perform operations such as fund transfer, bill payment, balance enquiry at anytime from anywhere. After the launch of Reliance Jio 4G in India, the whole retailing scenario witnessed a huge change. A very low priced and deeply penetrated high speed 4G internet services entirely changed the way Indian companies were delivering and customers were using various services. The main aim of the study was to identify factors that may determine the adoption of mobile banking and to investigate which factor had maximum influence on the adoption of mobile banking among University students in India. Factor analysis reduced total 23 variables to five factors namely Utility Benefit, Convenience Benefit, Social Benefit, Trust Benefit, Behavioral Benefit respectively. Linear regression analysis concluded that all identified factors had a significant influence on adaptation intentions and can be used to predict it. Further, it was also identified that trust benefit It can thus be

concluded that the 'trust benefit had maximum influence and was the strongest predictor of adaptation intentions, followed by convenience benefit, utility benefit, social benefit, and behavioral benefit respectively.

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