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An Evaluation of Mobile Banking Revolution in India: A Study of Behavioural Matrix through Utaut2 Model

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Authors' contributions

This work was carried out in collaboration between all authors. Author TG designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors PT and KKD managed the analyses and interpretation of the study. All authors read and approved the final manuscript.

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ABSTRACT

Aims: The study aims to comprehensively explores Mobile Banking Revolution in Odisha by utilizing the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) model to analyze the behavioral matrix of individuals' adoption and usage patterns. It also aims to provide insights on what motivates people to use mobile banking services and what keeps them using it.
Sample: Data on individuals' demographic, including gender, age, and education, were recorded using descriptive parameters. 200 from 220 questions that were handed out were returned in complete form. But 192 surveys were reliable enough to use in the statistical analysis.

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Study Design: The study employs a quantitative research approach to investigate the adoption of mobile banking services in the context of India's financial sector.
Place and Duration of the Study: Sample: Residents of Odisha. Between February 2023 to June 2023.
Methodology: The study sampled 192 Odisha residents who used m-banking services as respondents using a questionnaire survey. SmartPLS software was used to analyse the primary data that had been gathered.
Results: All the factors have significant relation with intention in adoption. The application of the UTAUT2 model was demonstrated within the framework of the investigation.
Conclusion: This study focused on the state of Odisha and explored the rapidly changing environment of mobile banking usage in the context of India's financial industry. The study investigated the complex web of factors that influence consumers' behavioural intents and actions in accepting mobile banking services via the perspective of the expanded Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) model.
Recommendation: Through the UTAUT2 model, this study greatly advances our knowledge of the behavioural aspects of India's mobile banking boom. Its recommendations can help researchers, financial institutions, and policymakers maximise mobile banking's potential for widespread adoption and greater financial inclusion.

Keywords: Mobile banking; UTAUT2; behavioural intention; technology; SEM.

1. INTRODUCTION

The banking industry has evolved substantially during the previous decade. The evolution of e - banking services via different electronic channels has enabled the creation of a new kind of additional value for customers, particularly in the retail sector. Innovative service ways, such as ATMs and push-button telephones, are already displacing more traditional electronic channels. Because of the widespread availability of mobile phones, particularly WAP-enabled handsets, the migration of banking related apps to all the mobile phones has become a natural progression in e-banking [39] is a revolutionary service in banks available to customers by FI's such as banks, microfinance, and credit unions that allows them to perform financial transaction using a compact device such as a tablet, smartphone, or mobile phone at any time and from any location [45], [10]. In spite of the numerous advantages of using mobile phones for accessing bank services and performing transactions anywhere, the confidentiality of customers' private and financial information is crucial, & infractions of either, raise consumer distrust and reduce the level of m-banking service uptake.

Banks and businesses in the financial industry have been inspired by the rapid growth and popularity of online shopping to encourage their customers to use online and mobile banking platforms for payments and other relevant banking operations [25]. Currently, the explosive development and related innovative technology, especially the adoption of mobiles, has generated a plethora of opportunities for potential businesses to capitalise on [6], [23]. When it comes to financial advances, it is the breakthrough that made consumers' lives easier with great flexible in the service usage and by providing them convenient access to banking facilities even in places with lower growth in the economy. [24], [36], [52]. Banks, aided by technologies, had reacted on the issues by adopting a new strategy that has focused on creating client happiness by offering improved quality service while simultaneously lowering operational costs [48].

The enhanced use of smartphones, in particular, has prompted a number of more banks, service providers, software firms, and microfinance institutions to offer this cutting-edge service alongside new combinations of applications and products built to improve overall customer reach, build customer loyalty, boost efficiency, increase market share, and create new job opportunities. [45] current rapid increase of the 5G mobile industry, the mobile delivering services has come as a viable option for firms aiming to gain commercial prospects. But, despite the rapid growth of many available wireless services, the utilization of mobile banking services is far less than projected & is currently underutilised [12]. [23], [43] states, the m - banking is still quite modest as to total banking activities [32], [26], [58]. Digital-based information technology (IT) is directly tied to opening an online account via

mobile banking (m-banking). Technology adoption and acceptability by users are also crucial for promoting individual use intents [60]. Despite the fact that mobile banking is likely the first mobile services commercially available, widespread acceptance and extensive usage of cell phones had minimal effect on widespread adoption & widespread use of mobile banking [20]. It was first made available in the early 2000s via network access protocol and short messaging service [14].

Cruz et al. [12], considering the prevalence of mobile phone use, commercial banks have a significant opportunity to provide m – banking services to those always living in distant areas where just a few PCs are internet connected. Recognizing Internet banking's limitations in the face of heavy use of mobile phones, [14] highlighted that increase in mobile banking might provide financial institutions with a solid commercial chance to provide their services to rural individuals who do not have internet access. Distinction between mobile commerce and other types of electronic trade may have been due to the fact that [14] observation that the major client profiles for mobile banking were not usually the same. Using the acceptance and use of integrated technology theory (UTAUT2) in conjunction with supporting variables including user risk, customer trust, and system security, information technology study was conducted on the intention and usage of mobile banking [38].

Mobile banking's rapidly rising popularity isn't just attributable to the fact that it allows for remote involvement in financial services, but also to specific characteristics of mobile devices used for mobile banking that support concerns about safety for individuals [11], [35], [46]. Furthermore, with a password and fingerprint ID check, a third party has minimal chance of stealing or breaking into the device. Such numerous confidentiality obstacles had made customers more dependent on their mobile devices when using m-banking, which has increased their willingness to employ a m-banking service on a regular basis.

Online banking technology can improve financial systems in emerging Asian economies by forging strong ties between financial institutions and the local population. Studies on technology acceptability are understudied in this field, particularly when it comes to novel models. To close the gap, this research examines how Odisha citizens behave towards the adoption of mobile banking technology using a thorough model of the expanded Unified Theory of Acceptance and Use of Technology (UTAUT2).The purpose of this paper is to examine factors that influence customers to adopt and subsequently use m-banking services in Odisha using the unified theory of acceptance and use of technology 2 (UTAUT2) model.

2. THEORETICAL BACKGROUND

A crucial area of research is the study of user adoption and usage of information technology. A substantial corpus of academic study has concentrated in particular on identifying the variables that influence the acceptance and use of technology. Earlier research attempted to examine individual acceptability of mobile banking using the rationale that technological aspect advance [3]. Five theoretical currents largely dominated in the field among the various models that have been put out up until [54] introduction of the UTAUT [20]. These include the TPB [1], the TRA [1], the TAM [15], TPR [17]. Due to restrictions on behaviours over which persons had limited control, TPB is an extension of TRA [1]. TAM is an easy-to-use conceptual model [41]. The significance of perceived risk as an impediment to adoption has also been noted in prior studies on data systems and consumption patterns [33]. The UTAUT model, which was developed by the author [51], [54] and based on 8 well-known theories, established a solid new framework for acceptance studies. This framework is briefly discussed in the following section [2].

2.1 Performance Expectancy

Relative advantage (IDT), Perceived usefulness (TAM/TAM2), extrinsic incentives (MM), job-fit (MPCU), and outcome expectation affect performance expectancy at UTAUT (SCT). [7] it has been demonstrated through empirical research that mobile banking adoption is more likely the greater the perceived proportional advantage [5], [14], [32], [44], [49] recognised usefulness of perception as a significant element, [58] and [40] by focusing on mobile technology adoption rather than mobile banking, it was discovered that relative benefits had great impact on people's propensity in using mobile banking. [37] using 221 samples, researchers discovered that performance expectations greatly influenced customer’s adoption of mobile devices. You can achieve the same result by employing mobile data services instead of mobile financial services. UTAUT was used as a research

foundation, demonstrating that performance expectations have a significant impact on how individuals consume mobile service.

> H_{01}: Expected performance has an influence on behavioural intent to use mobile banking.

2.2 Effort Expectancy

Venkatesh et al. [53] In order to represent effort expectations, the level of easiness attached with technology use, TAM/TAM2, complexity (MPCU), and ease-of-use (IDT) characteristics were recorded. Previous empirical research on this service of banking through mobile uptake [5], [14], [40] consumers are influenced to utilise mobile banking by perceived simplicity of usage. According to UTAUT, [37], to investigate what drives person intention to accept mobile technology and data services, three constructs were used: effort expectancy social influence, and performance expectancy. Both researchers found that human intention to use mobile technologies or services was highly influenced by effort expectation.

> H_{02}: The likelihood of effort influences the behavioural purpose to use mobile banking.

2.3 Social Influence

Venkatesh et al. [55], social influence was employed to reflect subjective norm, social elements and image in IDT. Social influence, according to their definition, is the idea that a person should use technology from the perspective of influential people. In a study of 158 respondents of a large Malaysian bank, individuals intent to use m-banking [5] was proven to be significantly influenced by those around them empirically. [47] revealed that family and friends affected individual inclinations to embrace mobile banking services. [40], [56], [57] showed that the subject's standard had a big impact, while [14], [26] it was shown that a person's perceived image had a substantial impact on how likely they were to use mobile banking.

> H_{03}: The behavioural purpose to accept m-banking is influenced by social influence.

2.4 Facilitating Conditions

Consumers' certainty of the existence of amenities and assistance systems to employ an innovation is referred to as a facilitative condition [53]. According to research on older clients, absorbing new or complicated information can be more difficult for them, which can hinder their ability to acquire new technology [34]. More knowledge structures and acquaintance with the technology can result through experience, which can help users learn [4].

> H_{04}: The behavioural intention to use m-banking is influenced by facilitating circumstances.

2.5 Hedonic Motivation

The satisfaction derived from employing a technology is referred to as hedonic motivation. [8]. In the study, this Performance Expectance idea is considered to impact user adoption and usage of an invention [51], [50]. Hedonic motivation has become recognised as a crucial element in the development and implementation of technology in the client environment (for instance, see [8]. Age, experience and gender, can all have a mitigating influence on the effect of hedonic incentive on intention to adopt as a result of variations in customer novelty seeking, innovativeness and perceptions of a given technology's originality. When customers first start using a new technology, they are more interested in its originality [21]. Technology is used by users for more beneficial purpose as their experience grows.

> H_{05}: The behavioural intention for use of mobile banking is affected by hedonic motivation.

2.6 Price Value

Price Value is described as a person's rational trade-off investigation that compares the perceived advantage to the economic cost of utilising a certain innovative service or technology for more pragmatic goals [8]. The term is described as an individual's rational trade-off investigation as to perceived advantage to the economic cost of using a certain innovation or technology for more pragmatic goals [61]. When the value of the product outweighs the financial cost, new technologies seem to be more likely to be embraced by people. Price Value is valued differently by men and women, and by younger and older people, according to social role theories [16].

H_{06}: The Behavioural Intention is influenced by price value to adopt m-banking.

2.7 Habit

Limayem et al. [30] states that the automation of behaviour from the nascent stage of learning to frequent usage of the technology is referred to as a habit. In terms of normal practise, the habit impacts technology use [27] in connection with behavioural intention by diversifying the influence of actual use of technology [30]. Habit is a potent indicator of upcoming technology use, as is past usage [30]. As people get older, gender disparities in learning of technology was observed over the period. The ability to process information declines with age. Aging causes a decrease in information processing capability. Women perceive data more precisely and delicately than men [13].

H_{07}: The Behavioural Intention is influenced by habit to use mobile banking.

2.8 Behavioral Intention

Users' projected likelihood to use something in a specific context is what is meant by Behavioural Intention. Users' intentions to adopt or not to accept the newly developed system & use it are significantly influenced by thei r knowledge of the new system's operations, be nefits, features, & how other people perceive this new system [31].

3. MATERIALS AND METHODS

The study's target audience consisted of Odisha residents who used m-banking services. The target group for the data collection was the population of Odisha who owns 1 or maybe more smart phones and has one or even more accounts with a state or the nationalised bank that provides web-based & m-based banking related services. The decision to adopt mobile banking services in a consumer setting is made entirely voluntarily.

A team of information systems academics developed an English questionnaire based on the study model and examined it for content validity. It was divided into two parts: (i) UTAUT2 data components, and (ii) generic information and demographics. The [52] measures and elements were modified for the UTAUT2 constructs. Each of the constructs or elements was measured with a 5-point Likert scale, ranging from “Strongly disagree” - “Strongly agree”. The behavioural variables include people's prior performance as well as their present and upcoming goals. The study chose Odisha m-banking users using a non-probability sampling approach. The likelihood of acquiring accurate and trustworthy information regarding the topic under study is increased by the snowball sampling approach, which was deemed to be the best sampling strategy for this study. Additionally, it enables the researchers to select respondents who are qualified and experienced to provide their opinion on mobile banking. The source of data collection is primary data, which is collected from respondents via structured questionnaires. Data on individuals’ demographic, including gender, age, and education, were recorded using descriptive parameters. 200 out of the 220 questionnaires that were handed out were completed and returned. But 192 surveys were reliable enough to suggest the application of statistical tools. [18] states from his finding there is extensive use of statistic at the initial stages of research in social science and humanities.

Nearly 52.3% of those who responded were male, 38.4% were between the ages of 25 and 35, and 54.7% had a bachelor's degree. Table 1 displays comprehensive descriptive information on the traits of the respondents.

Table 1. Demographic profile of the respondents

Measure	Value	%
Gender	Male	52.3
	Female	47.7
Age	< 25 years	25.6
	25 to 35 years	38.4
	36 to 45 years	26.7
	> 45 years	9.3
Education	Lower than bachelor	3.5
	Bachelor	54.7
	Master or higher	41.9
Income	Upto 2.5 lakhs	27.9
	2.5 lakhs- 5 lakhs	40.7
	Above 5 lakhs	31.4
Locale of residence	Urban	54.7
	Rural	45.3

Source: Compiled from collected data

4. RESULTS

Wold et al. [57] states that PLS provides a platform for original investigation of UTAUT. The

PLS, created by Herman World in the 1960s, is used for exploratory study along with MLR (Multiple Linear Regression) [60]. It is especially helpful for building predictive models where there may be collinearity among factors.

4.1 Measurement Model

The convergent validity was evaluated using factor loadings, composite reliability, & the average variance extracted (AVE), as suggested by [28], [59] while the discriminant validity was evaluated by determining whether or not the square roots of AVE exceed the correlations between constructs, as suggested by [53]. As all factor loadings were larger than 0.7, all composite reliability surpassed the acceptable threshold of 0.6, & all AVEs were higher than 0.5, T-4 demonstrates every components of the model fit had satisfactory convergent validity and reliability. The square roots of AVE are used as the diagonal elements in Table 5, and correlations between other constructs are used as the off-diagonal elements. The discriminant validity & reliability were supported because Table 5 shows that all parameters were greater than the off-diagonal elements in the corresponding rows & columns and that all Composite Reliability values are above 0.727.

Using(i) Fornell-Larcker and (ii)cross loadings criterion, discriminant validity was examined. In Table 3, the square root of the AVE is displayed in bold along the diagonals, supporting the claim made by [19] that it must be bigger than the correlation between constructs.

For the variations explained by behavioural intention, the R^2 adjusted was 0.933. The empirical findings substantially validate the modified UTAUT2 in predicting individual intents & behaviours of mobile banking adoption, and this work therefore illustrates the application of UTAUT2 to a mobile banking scenario.

4.2 Structural Model and Hypotheses Testing

Based on a study of standardised paths, correlations between hypotheses and constructs were analysed. Following the Rule of the Thumb technique, a thorough bootstrapping procedure was conducted to verify the importance of the structures. Path coefficient values with a 10% probability error were deemed statistically significant for this investigation. A 93.8% of the difference in behavioural intention is explained by the model. All the hypotheses were shown to be statistically supported by the findings that effort expectation (EE), performance expectancy (PE), price value (PV), facilitating conditions (FC), social influence (SI), habit (HB) and hedonic motivation (HM) were statistically significant in explaining behavioural intention.

Table 2. Factor loadings

Model constructs	Items	Loadings
PE (Performance Expectancy)	PE-1	0.910
	PE-2	0.828
	PE-3	0.851
	PE-4	0.803
EE (Effort Expectancy)	EE-1	0.897
	EE-2	0.821
	EE-3	0.929
	EE-4	0.879
SI (Social Influence)	SI1	0.724
	SI2	0.856
	SI3	0.656
FC (Facilitating Conditions)	FC1	0.886
	FC2	0.872
	FC3	0.749
	FC4	0.658
HM (Hedonic Motivation)	HM-1	0.870
	HM-2	0.911
	HM-3	0.919
H (Habit)	HB-1	0.872
	HB-2	0.847
	HB-3	0.902
PV (Price Value)	PV1	0.623
	PV2	0.734
	PV3	0.883
	PV4	0.994
BI (Behavioural-Intention)	BI-1	0.848
	BI-2	0.737
	BI-3	0.859

Source: Compiled from collected data, (2023)

Table 3. Composite reliability & AVE

Model Constructs	AVE	Composite Reliability
Performance-Expectancy	0.712	0.914
Effort-Expectancy	0.779	0.935
Social-Influence	0.563	0.805
Facilitating-Conditions	0.635	0.884
Hedonic-Motivation	0.810	0.928
Price-Value	0.889	0.915
Habits	0.764	0.907
Behavioural Intention	0.667	0.861

Source: Compiled from collected data, (2023)

Table 4. Discriminant reliability

	BI	EE	FC	HB	HM	PE	PV	SI
BI	0.816							
EE	0.803	0.882						
FC	0.820	0.834	0.797					
HB	0.831	0.596	0.667	0.874				
HM	0.817	0.726	0.712	0.729	0.900			
PE	0.789	0.917	0.731	0.491	0.632	0.849		
PV	0.836	0.809	0.782	0.527	0.728	0.830	0.821	
SI	0.689	0.698	0.783	0.548	0.762	0.627	0.769	0.750

Source: Compiled from collected data, (2023)

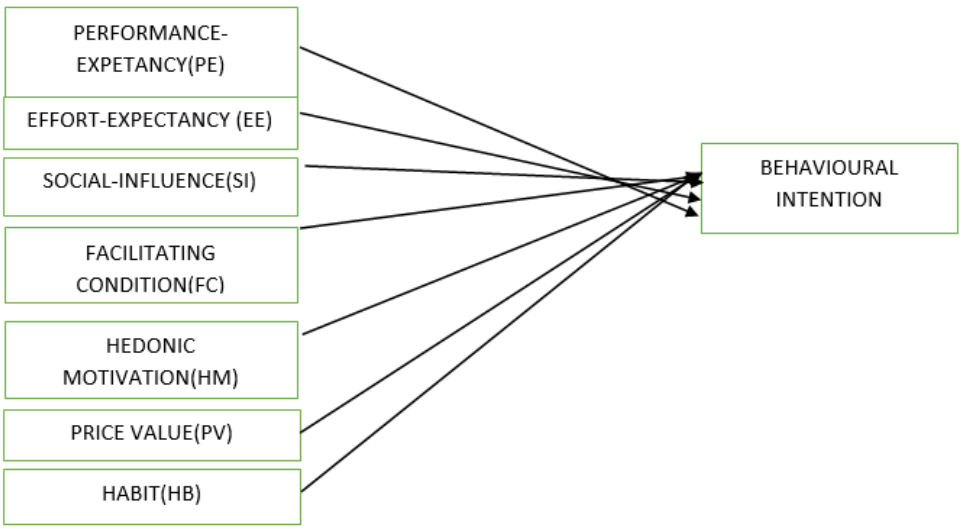

Fig. 1. UTAUT2 model
Source:(Venkatesh et al., [55])

5. DISCUSSION

The expanded UTAUT2 by [54] is combined in the theoretical model that is being presented to analyze acceptance pattern of mobile banking. The study model accounts for 58.7% of the diversity in the banking through mobiles usage patterns. All the factors positively influence the behavioural intention. Among the most important precursors of behavioural intentions, according to respondents, is performance expectancy. The association between hedonic motivation and the findings is same with past studies [42], [54]. Participants still consider mobile banking applications entertaining, despite the fact that the majority of them are merely transactional or utilitarian in nature. The respondents' plans to accept mobile banking are positively persuaded by the favourable feeling, feeling of personal fulfilment, & community feeling they produce. According to some past studies, consumer habit has a major role in predicating intention [29].

Table 5. Path co-efficient

Model constructs	P- values	Decision
EE- > BI	0.000	SUPPORTS
FC- > BI	0.000	SUPPORTS
HB-> BI	0.000	SUPPORTS
HM-> BI	0.000	SUPPORTS
PE-> BI	0.000	SUPPORTS
PV-> BI	0.000	SUPPORTS
SI-> BI	0.000	SUPPORTS

Source: Compiled from collected data, (2023)

Our findings did support the importance of the four UTAUT2 constructs of social-influence, effort-expectancy, price value & enabling environments, having impact on behavioural - intention. The effort expectancy result is consistent with findings from other investigations, such as [9], [22], however it is not consistent with certain earlier studies [63]. Customers in Odisha consider mobile banking to be user-friendly, therefore this is probably because mobile

devices are so widely used there, anticipate few issues, and rapidly get used to it.

6. IMPLICATIONS OF THE STUDY

Adoption and utilisation of services as mobile banking are impacted by the cultural differences between various groups and nations. There is apparent merit in conducting more cross-cultural research as we progress toward globalisation. The findings of the current paper have repercussions for academics & professionals. This study provides a starting point for further research for academics that can be used to further develop individual models of acceptance. To help create, enhance, and roll out mobile banking solutions that receive high levels of client approval, practitioners must have a thorough understanding of the major constructs in the suggested research model. In order to maximise benefits, both foreign and domestic banks in India will be able to advance by modifying their marketing plans, service innovations, designs, and educational resources that use technology, elevate acceptance, strengthen use, and increase channel penetration by comprehending the key components that affect acceptance of user & usage of services of mobile banking, restrictions, & specificities. Indian mobile banking service providers ought to keep telling customers how practical, convenient, and other instant benefits the service offers.

7. CONCLUSION

The potential of the mobile banking market, in India is immense. To encourage people to use it we need to make sure that even rural areas have access to it. In our study we built upon research. Expanded the UTAUT2 model to identify important factors that confirm its relevance. Our research focuses on how people use banking and what barriers they face in adopting it in India. We found both similarities and unique aspects compared to studies.

To ensure adoption it is crucial to employ security measures like third party encryption, which helps build trust. Regular analysis of technological strategies is also important for ensuring the safety of data.

Banks need to provide support and user-friendly interfaces along with instructions on how to use mobile banking through mass communication channels. This will help boost client confidence. Interestingly our research shows that users aged 25-35 who have bachelors or masters' degrees are more likely to accept banking targeted service optimization can be done for this group. Offering tailored services empowers users by aligning them with their needs and the advantages of banking.

8. LIMITATION AND FUTURE SCOPE FOR THE STUDY

This study has a number of shortcomings that call for more analysis and investigation. Cultural norms can differ both inside and between nations. The within-country variability is ignored by giving any country a single score. Future study using various cultural characteristics, like contributing willingness. [37], could be fruitful. The potential and possibilities, for research in this study are exciting and diverse. With technology and user behaviours constantly evolving it would be valuable to expand the analysis to explore how patterns change over time. By examining the impact of user design, data security and privacy concerns we can gain an understanding of mobile banking adoption. Additionally conducting an analysis, across demographic segments and geographical regions can provide valuable insights into the different challenges and effects experienced [62].

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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