

## “Digital Technologies- Innovation and Challenges towards M-Banking using IRT”

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**Introduction:** Digital Banking has seen remarkable growth in both advanced and developing economies, but it is particularly intriguing in a number of emerging nations like India. However, mobile banking systems encounter a number of benefits as well as barriers. The failure of banking clients to embrace mobile banking is a significant challenge. **Purpose:** The study aims to provide light on the skepticism around applications for mobile banking. The present standards for evaluating user resistance to mobile banking apps are modified by this research. The study used the Innovation Resistance Model to examine the relationships between a number of consumer barriers and their behavioral intent to use mobile banking apps, as well as their perception of trust. **Design/Methodology Approach:** Primary data from 500 respondents through questionnaire has been collected through simple random sampling technique. Partial Least Square- Structural Equation Modelling Technique is applied to analyse the results. **Findings:** The study found that the value barrier along with traditional barriers, served as a major deterrent to people's non adoption of mobile banking. The findings suggest that the removal of barriers related with customers' perceptions of value as well as risk in banking are also important factors, followed by the provision of information and awareness programmes by financial institutions. **Practical Implication:** Customers can benefit in a number of ways from mobile banking features, some of which may have far-reaching effects on the digital economy. The study will assist banks in understanding and implementing strategies for the adoption process, enabling them to improve the quality of services offered to their customers. **Theoretical Implication:** This study aims to give an insight on consumers' behavioural intention towards the factors considered as resistance for the adoption of technology under Innovation Resistance Technology Model.

**Keywords:** Digital Innovations, Sustainability, Mobile Banking, Innovation Resistance Model

### Introduction

India is rapidly becoming a mobile banking superpower. According to Forrester's Consumer Asia Pacific Survey 2023, a startling 87% of internet Indian adults want to do all of their banking on their smartphones. This statistic represents the highest percentage among Asia Pacific countries examined. It also emphasizes the critical role that mobile banking apps play in the financial journey of Indian consumers. There are numerous advantages of technological advancement in the

banking industry one of them is Mobile based banking. With the adoption of such technologies the customer bases of the banking institutions have also widened. Comprehensive use of mobile and smart phones has provided the golden opportunity for banks to attract potential consumers in this competitive environment. It includes various advantages such as saving of time and cost, easy accessibility, reduced cost, quick service, reduction of long-awaited queue and many more. Mobile banking has eliminated all the problems and limitations of traditional banking (Ahmadi Danyali, 2018).

During demonetization, service and other charges were exempted as a motivating factor to prompt consumers to transition towards digital payment systems. (Sivathanu, 2019). Digitalisation is blending both digital and physical components to create new value propositions (Kollock & Dellermann, 2018). In today's fast-changing environment, every business is undergoing tremendous technological changes which offers numerous benefits (Ahmadi Danyali, 2018) (J. Abbas et al., 2024). The growth of the global economy and the competition of markets have resulted in substantial changes within the banking sector (M. Abbas et al., 2017). In October 2008, the Reserve Bank of India introduced directives for mobile banking transactions in order to enhance mobile commerce within the nation. Under the supervision of the RBI, the National Payments Corporation of India (NPCI) established a unified mobile banking platform to facilitate convenient, secure, and fraud-resistant transactions (Okazaki & Mendez, 2013) (Goyal et al., 2013). While diffusion research predominantly focuses on the success factors and motivations behind innovation adoption, innovation resistance is often overlooked as a less applied concept (Laukkanen et al., 2007) (Laukkanen & Kiviniemi, 2010) (Yang, 2009).

One of such innovations is mobile banking which is entirely a new digital milestone which offers increased convenience, time and cost savings, simpler access, and speedier service supply also promotes financial inclusion and sustainable development (K. Kumar & Prakash, 2019) (Singh et al., 2017) (Akhisar et al., 2015) (van Klyton et al., 2021) (Ahmadi Danyali, 2018). Mobile banking can provide three levels of service: a static service, an interactive service a transactional service allowing users to pay bills and transfer money (V. Kumar et al., 2017). While the majority of banks provide m-banking to some extent, the technology is still in its early phases of adoption in fact the future development of mobile banking is heavily reliant on the consumer perspective (Mullan et al., 2016) (Giovanis et al., 2019).

The following section of the document offers a summary of prior studies, coupled with a proposal for a comprehensive and integrated conceptual model. Subsequently, the findings are examined, considering both theoretical implications and real-world applications. Finally, recommendations for further research are presented, along with an evaluation of the study's limitations.

## Theoretical Background and research model development

Today, researchers and practitioners have increasingly focused their attention on innovation initiatives within the digital sector (Ferreira et al., 2019). In the banking sector, digital transformation (DT) involves identifying the variables that have the most significant effects on banking performance (António Porfírio et al., 2024). The literature on consumer response to innovation acknowledges two main research paradigms, as outlined by Laukkanen (2016): (1) innovation adoption and (2) resistance to innovation. (Mani, n.d.) (Park & Choi, 2019). The adoption literature has primarily centered around a novelty-seeking paradigm, with relatively less emphasis placed on resistance to innovation as a framework for understanding and predicting adoption-related behavior (Chemingui & Lallouna, 2013) (Heidenreich & Handrich, 2015), (Bin Mohtar & Abbas, 2014). They emphasize on pinpointing the precise hurdles that consumers encounter when they seek to access thorough product information (Antioco & Kleijnen, 2010). Today every bank or any other service strives to develop consumer-centric innovative products and make deliberate efforts for adoption, they often encounter difficulties and failures in getting consumers to accept these innovations. (Danneels, 2003; Moore, 2002) (Laukkanen et al., 2007). Also, they place a high priority on offering consumers comprehensive product information (Zollo et al., 2021). Innovation Resistance Theory aids in understanding behaviors where consumers resist or oppose advances from users. In simpler terms, it helps comprehend resistance-oriented behavior from consumers towards user initiatives (Cornescu & Adam, 2013) (Kaur et al., 2021). It also helps to proficiently tackle and eradicate the limitations and challenges linked with traditional banking approaches (Ahmadi Danyali, 2018). Resistance commonly precedes either acceptance or rejection of a decision (Kuisma et al., 2007). However, it's also possible for both acceptance and resistance to occur simultaneously (Ram, 1987) (Laukkanen & Kiviniemi, 2010) (Kaur et al., 2020).

All innovations inherently encompass a degree of uncertainty and may entail potential side effects that are difficult to predict in advance (Ram & Sheth, n.d.). Innovation is a sustainable strategy for preserving the core competence. However, despite continual and substantial investments in innovation, success is not assured (Sun, 2021) (Bartels & Reinders, 2011) (Jahanmir & Cavadas, 2018) (Matsuo et al., 2018). Here innovation plays a crucial role in fostering the growth and sustainability of the banking sector (M. Abbas et al., 2017) (Jansukpum & Kettem, 2016) while Resistance has been seen as a major factor causing the hindrance or delay in the diffusion of innovations (M. Abbas et al., 2017) (Yang, 2009). Consumers' resistance to adopt technological innovations can be influenced by various factors, ranging from the psychological and functional barriers to emotional aspects of it (Tommi Laukkanen (Ram & Sheth, n.d.) (Santos & Ponchio, 2021). An innovation involves a process with unpredictable results, successful can

enhance a company's market position, the flip side is that unexpectedly low revenues from these innovations damage to the overall performance of the brand (Joachim et al., 2018) (Giovanis et al., 2019)). Resistance to innovation occurs when a new idea challenges the established and satisfactory norms or belief system of consumers (Jansukpum & Kettem, 2016). Understanding the factors that impact consumers' decisions to adopt or decline new technologies is crucial from both theoretical and managerial perspectives (Santos & Ponchio, 2021). However, the suggestion is that innovation resistance should no longer be viewed solely as a negative characteristic of target markets for new goods and services. Instead, it should be seen as a rational response based on informed choices (Szmigin & Foxall, 1998).

**Table 1 Constructs of Innovation Resistance Theory**

	Factors	Definitions
<b>Consumer Resistance to Innovation</b>	Usage Barrier	Degree to which an innovation is perceived as requiring <b>changes in consumers' routines</b> (Ram and Sheth 1989)
	Value Barrier	Degree to which an innovations' <b>value-to-price ratio</b> is perceived in relation to other product substitutes (e.g., Molesworth and Suortti 2002)
	Risk Barrier	Degree of <b>uncertainty</b> in regard to financial, functional and social consequences of using an innovation (e.g., Posavac et al. 2007)
	Traditional Barrier	Degree to which an innovation forces consumers to accept <b>cultural changes</b> (Day and Herbig 1992)
	Image Barrier	Degree to which an innovation is perceived as having an <b>unfavorable image</b> (e.g., Ram and Sheth 1989)

### Hypothesis Development

- 1.1 Relationship between innovation resistance and Usage barrier: The prevailing cause of customer resistance to innovation often stems from its lack of compatibility with established workflows, practices, or habits of its usage. If the product's usage is not simplified, it will persistently encounter opposition (Ram & Sheth, n.d.).

- Ha1. Usage barrier has positive influence on IR towards M-Banking
- 1.2 Relationship between innovation resistance and Value barrier: When innovation provides a robust performance-to-price ratio in comparison to product alternatives, customers lack motivation to switch(Ram & Sheth, n.d.). Indeed, a substantial factor leading to the failure of many products and services is the hesitancy of "pragmatists," individuals who view the costs associated with learning a new innovation, like new technology, as outweighing the potential benefits it could provide for them(Laukkanen et al., 2007). Therefore, similar to internet banking, some consumers might perceive mobile banking as being too expensive(Laukkanen et al., 2007).
- Ha2. Value barrier has positive influence on IR towards M-Banking
- 1.3 Relationship between innovation resistance and Risk barrier: Customers may hesitate to adopt an innovation promptly due to uncertainty and the potential for unforeseen side effects(Ram & Sheth, n.d.). As per Ram and Sheth (1989), risk can be categorized into several types, which highlights the diverse dimensions of risk that individuals may consider when evaluating the adoption of innovations such as physical risk, economic risk, functional risk and social risk(Ram & Sheth, n.d.).
- Ha3 Risk barrier has positive influence on IR towards M-Banking
- 1.4 Relationship between innovation resistance and Traditional barrier: - The reluctance to embrace innovation frequently arises from the cultural shift it imposes on customers. When an innovation demands a departure from established traditions, customers are more likely to exhibit resistance(Ram & Sheth, n.d.).
- Ha4. Traditional barrier has positive influence on IR towards M-Banking
- 1.5 Relationship between innovation resistance and Image barrier:The image barrier presents a perceptual challenge rooted in stereotyped thinking, creating obstacles for the innovation(Ram & Sheth, n.d.). The image barrier can be viewed as the overall perception of electronic and mobile banking services(Laukkanen et al., 2007).
- Ha5. Image barrier has positive influence on IR towards M-Banking

### Statement of the problem

Our research aims to explore the impact of consumer resistance to innovation, specifically concentrating on five barriers—usage, value, risk, tradition, and image—identified in previous studies. We have centred our investigation on the domain of mobile banking services, which, despite not achieving widespread adoption, provide genuine mobility, ubiquity, and flexibility in service consumption across different temporal and spatial dimensions. This study holds significance from two perspectives: firstly, it delves into the underexplored realm of mobile banking within financial services and secondly, it applies innovation

resistance theory, a viewpoint often overlooked in adoption and dissemination literature.

### Research Methodology

The study seeks to explore the impact of diverse factors on behavioral intentions regarding the adoption of mobile banking (M-Banking) by applying the Innovation Resistance Model. Here's a breakdown of the key elements involved in this research endeavour.

**Objective:** The primary objective of the study is to understand the factors that affect consumers' behavioral intentions toward adopting mobile banking services. It seeks to explore the reasons behind consumers' resistance or acceptance of innovation in the banking sector.

**Sample Size and Data Collection:** The study distributed a structured questionnaire to 510 respondents who are users of mobile banking services. Out of these, 464 responses were deemed suitable for analysis, ensuring a robust dataset. A commonly cited rule of thumb suggests that the minimum sample size for a Partial Least Squares (PLS) model should be determined by the greater of the following criteria: either ten times the highest number of reflective indicators utilized to measure a single construct, or ten times the greatest number of inner model paths aimed at a specific construct within the inner model (Barclay et al., 1995). (PLS SEM)

**Questionnaire Format and Measurement:** The questionnaire employed a closed-ended format, indicating that respondents selected answers from predefined options rather than providing open-ended responses. The Likert scale, ranging from "strongly disagree" to "strongly agree," was used to measure respondents' attitudes and opinions regarding various aspects of mobile banking services. This scale allows for nuanced responses and provides insight into the intensity of respondents' opinions.

**Secondary Data Incorporation:** In addition to primary data collection through the questionnaire, the study utilized secondary data from various articles, journals, and websites. This approach indicates a comprehensive literature review, where existing research findings were synthesized and integrated with the primary data to enrich the analysis.

**Methodological Approach:** The data's dependability and internal consistency were evaluated using the Cronbach's alpha coefficient. In order to guarantee the accuracy of the data, this statistical metric assesses the consistency of replies across questionnaire items.

**Data Analysis Technique:** The main data analysis was conducted using partial least squares (PLS) structural equation modelling (SEM). It is one of the modern techniques which is widely used in behavioural sciences (Hox & Bechger, n.d.)



In summary, the study aims to contribute to the existing knowledge of consumer behavior in the context of mobile banking adoption by applying the Innovation Resistance Model. By investigating the impact of various factors on behavioral intentions, the research seeks to provide insights that can inform the development of effective strategies to encourage M-Banking adoption and usage.

### Data Analysis and Interpretation

**Table 2 Internal Consistency, Reliability and Validity**

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Behavioural Intention	0.903	0.953	0.963	0.841
Image Barrier	0.891	0.907	0.924	0.752
Risk Barrier	0.779	1.119	0.855	0.666
Traditional Barrier	0.767	0.838	0.858	0.671
Usage Barrier	0.916	0.917	0.947	0.856
Value Barrier	0.852	0.853	0.91	0.772

The above table explains the metrics which offer important insights on the validity and reliability of the constructs being measured.

Cronbach's alpha is a measure of internal consistency reliability. In this table, BI has a Cronbach's alpha of 0.903, indicating high internal consistency among its items and IB has a Cronbach's alpha of 0.891, also indicating high internal consistency. Secondly Composite reliability evaluates the extent to which a latent variable (construct) is consistent. In this table

Constructs have a higher internal consistency. AVE is a measure of convergent validity. It quantifies the amount of variance captured by the construct relative to the amount of variance due to measurement error. BI has an AVE of 0.841, indicating strong convergent validity whereas VB has an AVE of 0.772, also indicating good convergent validity.

**Table 3 Discriminant Validity**

	BI	IB	RB	TB	UB	VB
Behaviour Intention	0.917					
Image Barrier	-0.407	0.867				
Risk Barrier	-0.201	0.686	0.816			

Traditional Barrier	-0.228	0.749	0.629	0.819		
Usage Barrier	0.713	-0.362	-0.139	-0.145	0.925	
Value Barrier	0.658	-0.251	-0.046	-0.053	0.765	0.879

The above table 2 displays the correlations between different constructs or variables. Each row and column header represents a construct, labelled as BI, IB, RB, TB, UB, and VB. The values within the table represent the correlations between pairs of constructs. For instance, the correlation between BI and IB is 0.917, IB and RB is 0.686 and TB and UB is -0.145.

**Table 4 Model Fit Index**

	Saturated model	Estimated model
SRMR	0.051	0.051
d_ULS	0.61	0.61
d_G	0.377	0.377
Chi-square	1066.542	1066.542
NFI	0.864	0.864

In the above table, values of two models are shown: an estimated model and a saturated model. These models are used in structural equation models, or SEMs in order to check the goodness of fit index. Here, SRMR (Standardized Root Mean Square Residual) evaluates the model fit. A better fit is indicated by a lower SRMR value, with values nearer 0 indicating a better fit. Likewise, d\_ULS (Unweighted Least Squares discrepancy) and d\_G (Gower's generalized discrepancy) lower value indicates a better fit, value which is closer to 0. The Normalized Fit Index (NFI) calculates the proportionate improvement in fit. A value nearer 1 denotes a better match. NFI values vary from 0 to 1.

**Table 5 Coefficient of Determination**

	R-square	R-square adjusted
Behaviour Intention	0.568	0.563

The independent variables in the regression model account for roughly 56.8% of the variability in the dependent variable (BI), as denoted by the R-square value of 0.568 in the table. Additionally, the adjusted R-square value of 0.563 implies that after adjusting for the number of predictors and the sample size, the independent variables in the model explain about 56.3% of the variation in the dependent variable (BI).



**Table 6 Path Coefficients and Hypothesis Testing**

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ( O/STDEV )	P values	Hypothesis Results
Image Barrier -> Behaviour Intention	-0.148	-0.144	0.065	2.285	0.022	Rejected
Risk Barrier -> Behaviour Intention	-0.002	-0.006	0.052	0.037	0.971	Accepted
Traditional Barrier -> Behaviour Intention	-0.037	-0.04	0.044	0.845	0.398	Accepted
Usage Barrier -> Behaviour Intention	0.435	0.433	0.072	6.022	0	Rejected
Value Barrier -> Behaviour Intention	0.286	0.29	0.065	4.397	0	Rejected

The statistical hypothesis test findings for the relationships between the variable BI and the other variables (IB, RB, TB, UB, and VB) are shown in the above table No. 5

The results show that the correlations between UB -> BI, VB -> BI and IB -> BI, are statistically significant, as evidenced by the low p-values. On the other hand, the correlations between RB -> BI, and TB -> BI are not statistically significant since their p-values exceed the specified significance level (e.g., alpha = 0.05).

### Discussion and Conclusion

One of the main forces behind business success in the modern world is the incorporation of sustainability into corporate strategy. This observation is intriguing, especially in light of the fact that numerous banks discontinued their mobile services in the early 2000s, despite the availability of technology for WAP-based mobile banking. The survey revealed conflicting perspectives, suggesting that customer influence on sector diversity might not be substantial. This implies that technological forces could exert a more significant influence on bank acceptance in the future than customer demand (Mullan et al., 2016).

The findings also carry significant implications for management, emphasizing the importance of understanding consumer resistance to innovation and the underlying

mechanisms. This understanding is crucial for devising communication strategies that can minimize the likelihood of a new invention failing (Santos & Ponchio, 2021).

Digital payment service providers must prioritize overcoming barriers like UB (Usage Barrier), VB (Value Barrier), RB (Risk Barrier), TB (Traditional Barrier), and IB (Image Barrier) by enhancing the user-friendliness of digital payment technologies. It is crucial to alleviate concerns regarding security and privacy risks associated with digital transaction systems. Additionally, service providers need to play an active role in enhancing customer awareness and digital literacy. This can be achieved through advertising campaigns that emphasize the advantages of cashless digital payment systems. (Sivathanu, 2019).

The study's findings could offer practical implications for banks and financial institutions aiming to encourage the uptake of mobile banking services. By understanding the factors that influence consumers' attitudes and intentions, banks can develop targeted marketing strategies, improve service offerings, and address potential barriers to adoption.

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