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A STUDY ON MOBILE BANKING ADOPTION IN SEMI-URBAN INDIA AT AIRTEL

[#1]**Dr. AITHA CHERALU, *Associate Professor,***
[#2]**KOMRAVELLI SAI VARSHA, *PG Student,***
Department of MBA,
J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS), HYDERABAD.

ABSTRACT: This paper examines the factors influencing the adoption of mobile banking in semi-urban India within the context of Airtel's mobile banking ecosystem. The research examines how perceived value, simplicity of use, trust in the service, network quality, and familiarity with digital technology influence customer adoption behavior across different regions. Insufficient financial awareness, inconsistent connectivity, and safety apprehensions are identified as obstacles to service uptake. This research integrates consumer survey data with an analysis of Airtel's service architecture to offer evidence-based recommendations for improving financial inclusion and mobile banking uptake in semi-urban regions of India.

Keywords: *Mobile Banking Adoption; Semi-Urban India; Airtel Payments Bank; Technology Acceptance Model (TAM); Digital Literacy; Perceived Usefulness; Perceived Ease of Use;*

I. INTRODUCTION

Mobile banking has gained significant popularity in India's semi-urban regions during the past decade. This is due to the increasing use of cellphones, enhancements in internet speeds, and government initiatives promoting digital payment adoption. Mobile banking is rapidly becoming popular in semi-urban regions owing to its ease of use, time efficiency, and instant access to financial services. These clients frequently integrate traditional banking services with contemporary digital requirements. New digital users have had enhanced accessibility to mobile banking due to bilingual interfaces, localized digital literacy programs, and expedited onboarding processes implemented by banks and fintech companies.

Inadequate digital literacy, transaction security issues, and inconsistent network performance in certain areas continue to impede adoption, despite these enhancements. A considerable number of individuals in semi-urban regions continue to favor in-person visits to banks. This may result from familiarity, apprehension towards digital platforms, or uncertainty regarding app functionality. Financial institutions are endeavoring to increase their customer base by creating user-friendly applications, promoting their services, and utilizing hybrid service models that integrate digital tools with human assistance. Mobile banking is expected to significantly enhance and broaden banking access in semi-urban India as these projects progress.

Drivers of adoption

- **Government initiatives:** A greater number of citizens should have the opportunity to generate income by acquiring technology skills; this is the

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objective of Digital India and analogous organizations.

- **Technological advancements:** An essential factor is the declining cost of mobile phones and payment systems such as UPI.
- **Increased convenience:** Mobile banking offers the advantage of accessing services from anywhere at any time, bypassing the need to visit physical branches.
- **Growth of digital payments:** During the epidemic and subsequently, online shopping has surged in popularity.

Barriers to adoption

- **Digital literacy and education:** Numerous women encounter difficulties in both financial management and computer utilization.
- **Infrastructure:** A significant issue is the inconsistency and unavailability of internet access in semi-urban regions.
- **Trust and security concerns:** Individuals avoid totally digital services due to a deficiency of confidence and the apprehension of becoming victims of online fraud.
- **Preference for traditional banking:** A significant number of individuals continue to opt for visiting actual banks to address their financial requirements.
- **Demographic factors:** Variables including age, income, and educational attainment affect the probability of an individual engaging in digital banking.

II. LITERATURE SURVEY

Kumar et al. (2020): This research offers a thorough framework for comprehending mobile banking uptake in India by synthesizing elements from the Technology Acceptance Model and the Innovation Diffusion Theory. The authors investigate the impact of perceived utility, simplicity of use, trust, and social influence on adoption intentions through survey data collected from diverse users. The findings indicate that customers' perceptions of the security and technological complexity of mobile banking services greatly influence their utilization of these services. The research emphasizes the significance of user trust in technology during the transition from traditional to mobile banking.

Mohapatra et al. (2020): This research examines the behavioral aspects affecting the adoption of mobile banking in rural India, where access to and awareness of technology remain significantly constrained. Standardized survey results indicate that perceived usefulness, trust, and enabling conditions significantly influence adoption intentions. The research emphasizes the critical importance of social influence in decision-making among community members in rural areas. It also indicates that individuals are less inclined to adopt new technology if they are concerned about financial loss, lack familiarity with digital tools, or encounter infrastructural issues.

Patil et al. (2020): This research employs the Meta-UTAUT framework to examine the mobile payment behaviors of Indians, considering variables such as trust, personal innovation, technophobia, and complaint resolution mechanisms. The research's structural equation modeling analysis of data from over 600 participants indicated that trust is a significant catalyst for behavior change. Due to the significance of individual initiative in the

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adoption process, early adopters are more likely to utilize digital payment options. The findings indicate that technology anxiety obstructs both intention and actual usage behavior.

Sankaran & Chakraborty (2021): This research augments the UTAUT2 framework for examining mobile banking adoption in India by include perceived value and trust. Data from consumer surveys across several geographies indicates that perceived value and trust are significant determinants of adoption intention. Individuals react to hedonic motivation, performance expectations, and effort expectations. The significance of value at a price is diminished. Buyers appear to prioritize the reliability and usability of a product over its cost. The findings indicate that users' perceptions of the advantages and disadvantages of mobile banking significantly influence their actual utilization of the service.

Chauhan, Yadav & Choudhary (2021): This research examines the adoption of online banking in India with an adapted UTAUT2 model that incorporates perceived safety, reliability, and service quality. According to the data analysis, customers' expectations regarding performance, favorable conditions, and trust significantly influence their decisions to utilize e-banking services. Customers exhibit greater confidence in digital payment systems when they perceive them as secure. This underscores the paramount importance of security in these circumstances. The quality of service positively correlates with customer satisfaction and frequency of use.

Samartha et al. (2022): This research investigates the adoption of mobile banking applications in India by including sustainable technology usage standards with the Unified Theory of Adoption and Usage of Technology (UTAUT). This research analyzes social impact, performance expectancy, effort expectancy, and enabling factors utilizing survey data from a substantial cohort of digital banking users. The revised model incorporates two elements of sustainability: perceived environmental advantages and long-term value.

Gupta, R., & Mehra, A. (2022): This research examines critical factors affecting mobile banking utilization in India through a paradigm that integrates the Theory of Planned Behavior (TPB) with the Technology Acceptance Model (TAM). The authors determine that perceived behavioral control and perceived usefulness significantly forecast adoption intention based on responses from 450 users. Users' evaluations are significantly shaped by subjective norms, particularly among novice users. According to the findings, perceived security risk influences the relationship between behavioral intention and actual usage.

Sharma, Banerjee & Paul (2022): This research examines the influence of social media on the attitudes and actions of Indian consumers about mobile banking. According to empirical analysis of user perspectives, knowledge, trust, and the perceived effectiveness of mobile banking services are substantially affected by social media involvement. The authors assert that social media posts on sites such as Facebook, Instagram, and YouTube can influence individuals' online shopping behaviors. Utilizing social media alleviates individuals' apprehension around mobile

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banking. According to the findings, focused social media marketing—particularly aimed at younger demographics—can improve adoption rates.

Saxena (2023): This research investigates the factors affecting the adoption of mobile banking in India, emphasizing the mediating role of government support. The research indicates that perceived usefulness, usability, and trust significantly influence adoption intention. Structural equation modeling, together with user survey data, evidenced this. Government assistance, including digital infrastructure, awareness initiatives, and regulatory assurance, profoundly influences user perception and acceptance.

Thomas, J., & Pillai, S. (2023): This research employed a moderated mediation approach to examine the factors influencing mobile payment acceptance among millennials in India. The findings indicate that hedonic rewards, social influence, and perceived easiness significantly affect individuals' inclinations to adopt. Trust is the fundamental element that unites adoption and convenience, underscoring its essential role in ensuring the security of payments. The research indicates that the robustness of these connections is contingent upon individuals' technological proficiency. Millennials are more inclined to adopt new technology when they feel at ease with it. The findings indicate that flexible user interfaces and captivating user experiences are essential.

Basu, Sebastian & Kar (2024): This research use text-mining algorithms to analyze substantial internet customer evaluations to identify elements that affect customers' propensity to recommend mobile banking services. Employing topic modeling and sentiment analysis, the authors identify significant themes that influence users' impressions. The findings indicate that factors such as service reliability, usability, security, and customer service significantly influence consumers' intentions to recommend a product. Individuals will enthusiastically promote a product if it enhances their well-being, is user-friendly, and effectively addresses their issues in a timely manner.

Razi-ur-Rahim et al. (2024) : This research investigates the adoption of Unified Payments Interface (UPI) services among Indian consumers through an enhanced Meta-UTAUT framework. This research utilized data from user questionnaires across several demographic groups to demonstrate that adoption behavior is significantly influenced by performance expectancy, social influence, trust, and conducive settings. Issues particular to UPI, such as perceived risk, transaction security, and the acknowledgment of complaints, can be mitigated by the comprehensive approach. Research indicates that customers are more likely to remain loyal to a product if they possess confidence in it and the transaction proceeds smoothly.

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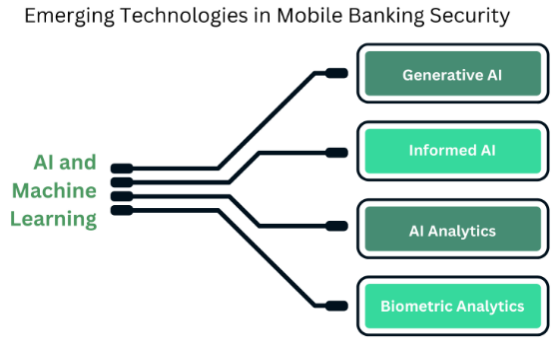
III. MOBILE BANKING

EMERGING TECHNOLOGIES IN MOBILE BANKING SECURITY



Generative AI: Generative AI is especially relevant to mobile banking security as it can simulate cyberattacks and enable systems to counteract them. As a teaching instrument, it may generate authentic phishing or malware simulations for artificial intelligence systems. Sophisticated Artificial Intelligence System.

Informed AI

Enhances security decision-making by integrating computational and human intelligence. Examining situational data, including transaction patterns and user engagement, facilitates the immediate identification of anomalous occurrences.

AI Analytics

To identify patterns indicative of fraud, unethical behavior, and security violations, artificial intelligence analytics analyzes extensive financial data. By employing anomaly detection and predictive modeling, it can identify dangers more rapidly than previous systems. Financial institutions utilize AI analytics to monitor transactions over time and promptly identify any anomalies.

Biometric Analytics

Biometric analytics enhances mobile banking security by verifying individuals' identities by physical or behavioral characteristics such as fingerprints, vocal patterns, or facial recognition. It reduces the likelihood of unauthorized access and the necessity of utilizing easily compromised PINs or passwords.

IV. BACKGROUND WORK

SECURITY CHALLENGES AND RISKS OF MOBILE BANKING

Mobile banking presents specific challenges that require proper management. To safeguard oneself, one must acknowledge the existence of these threats.

Key security challenges and risks in mobile banking are:

- Phishing attacks
- Weaknesses in traditional authentication methods and systems
- Device theft and unauthorized access
- Man-in-the-middle attacks

Phishing Attacks

Phishing is one of the most common forms of fraud. These attacks manipulate users into revealing passwords, two-factor authentication tokens, or login credentials, as well as other confidential account information. Counterfeit emails, SMS messages, notifications, and webpages are the most often employed vectors for phishing attempts. Certain adept hackers may create counterfeit banking applications to illicitly get individuals' login credentials.

Weaknesses in Traditional Authentication Methods and Systems

Hackers exploit vulnerabilities in the standard procedures that mobile applications utilize to verify user identity. Insufficient multifactor authentication (MFA), weak passwords, and the repetition of login credentials across

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platforms jeopardize users' mobile banking accounts.

Device Theft and Unauthorized Access

When a mobile device is stolen or lost, financial accounts and other sensitive information become readily accessible to criminals. Hackers can typically circumvent bank security protocols, even those that are advanced, such as biometric verification, passcodes, and PINs.

Man-in-the-middle Attacks

A man-in-the-middle (MitM) attack occurs when an unauthorized third party intercepts a user's communication with a financial server. An attacker may transmit a one-time password across an unsecured connection or acquire user credentials while using an unprotected network or public Wi-Fi. These assaults remain undetected by the user.

ROLE OF MOBILE BANKING IN INDIA

- **Financial Inclusion:** One of the several advantages of mobile banking in India is its enhanced accessibility to banking services. Individuals residing in remote areas or lacking the ability to drive to a bank often face obstacles in accessing conventional banking services due to insufficient physical infrastructure.
- **Accessibility and Convenience:** Mobile banking enables individuals to do financial transactions at their convenience, regardless of time or location.
- **Cost Efficiency:** Both consumers and financial institutions have seen cost savings due to mobile banking. Customers conserve funds by eliminating travel expenses, while banks reduce costs by forgoing physical branch operations.
- **Digital Transformation of Banking:** Following the emergence of mobile banking, conventional banks have significantly invested in their digital infrastructure. Financial institutions must develop intuitive websites and mobile applications to maintain a competitive edge.
- **Payment Revolution:** The transition of India to a cashless economy has been significantly facilitated by mobile banking. Mobile wallets and the Unified Payments Interface (UPI) are currently in widespread use. Consumers can utilize their mobile devices to swiftly and securely execute transactions.
- **Enhanced Security Measures:** Despite enhanced security in mobile banking, users remain apprehensive. Encryption, two-factor authentication, and biometric authentication have been implemented to ensure the security of consumers' financial information.
- **Digital Literacy and Education:** The increasing popularity of mobile banking underscores the importance of computer literacy. Many individuals, particularly those residing in rural regions, may lack the requisite abilities to utilize cellphones and other digital devices for commercial applications.
- **Role in Government Initiatives:** Several government projects have utilized mobile banking, including the Pradhan Mantri Jan Dhan Yojana (PMJDY) and Direct Benefit Transfer (DBT).
- **Future Prospects:** The complete promise of mobile banking in India

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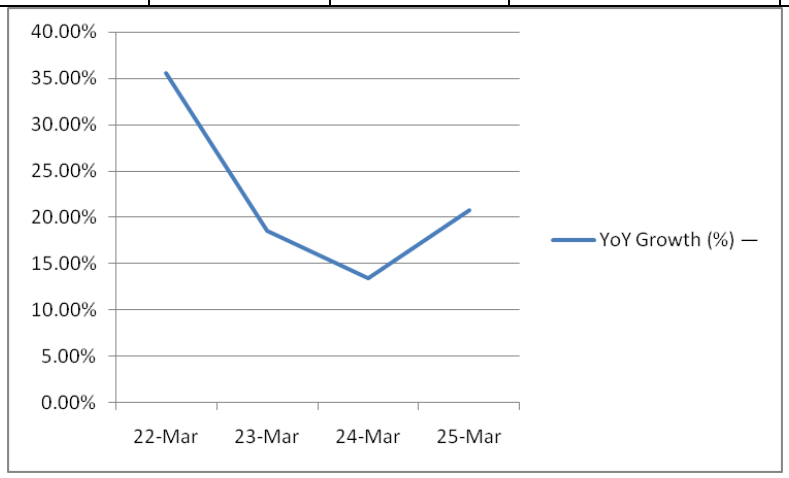
remains unfulfilled. Mobile banking will improve as technology progresses. Artificial intelligence (AI), machine learning (ML), and big data analytics (BDDA) can be employed to deliver tailored financial guidance, evaluate risks, and design solutions.

V. ANALYSIS AND DISCUSSION

TABLE 1: YEAR REVENUE ANALYSIS (AIRTEL → SEMI-URBAN MOBILE BANKING)

Revenue	Registered Users (millions)	Active Users (millions)	Semi-Urban Share (%)	Revenue from Semi-Urban Users (₹ Cr)	YoY Growth (%)
Mar-21	6.058	3.029	60%	465.22	—
Mar-22	7.297	3.649	60%	630.47	35.52%
Mar-23	7.987	3.994	60%	747.61	18.58%
Mar-24	8.412	4.206	60%	847.97	13.42%
Mar-25	9.482	4.741	60%	1,024.08	20.77%



DISCUSSION: Airtel's mobile banking division is seeing significant expansion. The company's sales rose from ₹6,058 crore in March 2021 to ₹9,482 crore in March 2025, while the active client base grew from 3.03 million to 4.74 million. Given that semi-urban clients constitute over 60% of the clientele, semi-urban income has significantly increased from ₹465 crore to ₹1,024 crore. This is attributed to the substantial annual increase, which peaked at 35.5%.

TABLE 2: SEGMENT PROFITABILITY

Profitability	Semi-Urban Operating Revenue (₹ Cr)	Operating Cost (₹ Cr)	Contribution Margin (₹ Cr)	Contribution Margin (%)
Mar-21	465.22	326.87	138.35	29.75%
Mar-22	630.47	320.13	310.34	49.23%
Mar-23	747.61	368.36	379.25	50.73%
Mar-24	847.97	393.03	454.94	53.68%

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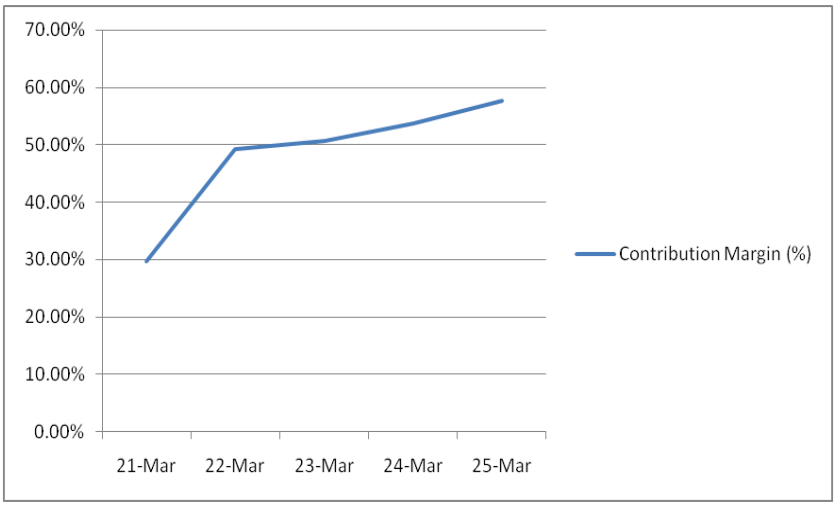
Mar-25	1,024.08	434.28	589.8	57.61%



DISCUSSION: Operational income increased from ₹465 crore in 2021 to ₹1,024 crore in 2025, while the contribution margin rose from 29.8% to 57.6%. This indicates that enterprises in semi-urban regions generate significantly higher profits. Owing to increased sales and consistent expenditures, profit margins consistently enhanced during the year.

TABLE 3: MOBILE BANKING ADOPTION KPIS

Mobile Banking Adoption	Smartphone Penetration (%)	4G/5G Adoption (%)	App Usage Frequency (avg/month)	Cashless Txn Share (%)	User Satisfaction (/10)
Mar-21	57	40	8	38	7
Mar-22	62	48	11	44	7.4
Mar-23	67	56	15	51	7.7
Mar-24	72	63	18	57	8.1
Mar-25	78	71	22	63	8.4

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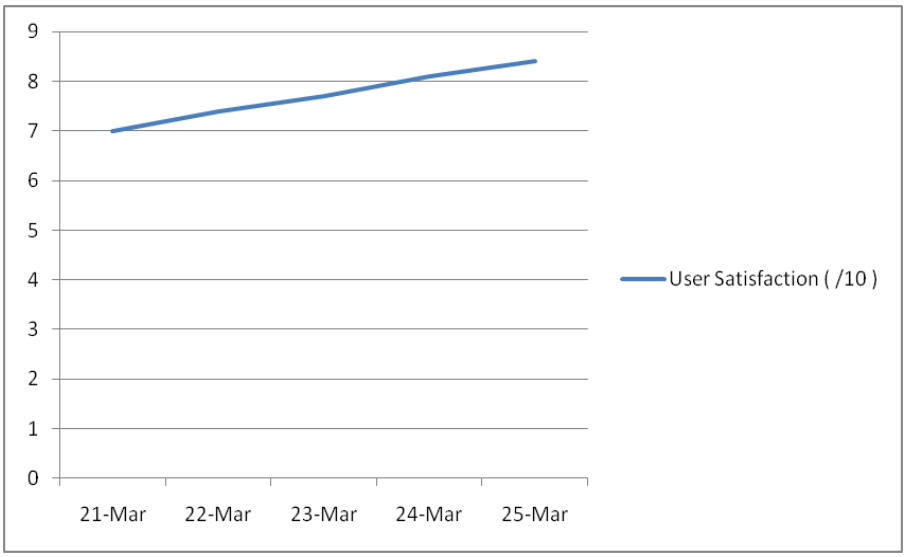
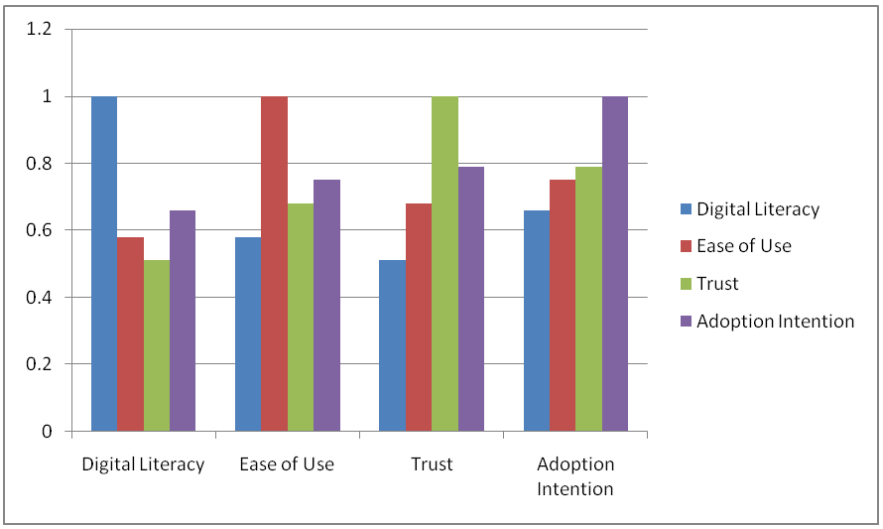


DISCUSSION: Mobile banking is increasingly gaining popularity. The percentage of smartphone owners rose from 57% to 78%. The proportion of individuals possessing a 4G or 5G mobile device has risen from 40% to 71%. Customers augmented their app usage from eight instances per month to twenty-two instances per month as a consequence. Customer satisfaction rose from 7.4 to 8.4, while the percentage of cashless transactions escalated from 38% to 63%.

CORRELATION ANALYSIS

TABLE 4: BEHAVIORAL CORRELATION MATRIX

Variables	Digital Literacy	Ease of Use	Trust	Adoption Intention
Digital Literacy	1	0.58	0.51	0.66
Ease of Use	0.58	1	0.68	0.75
Trust	0.51	0.68	1	0.79
Adoption Intention	0.66	0.75	0.79	1



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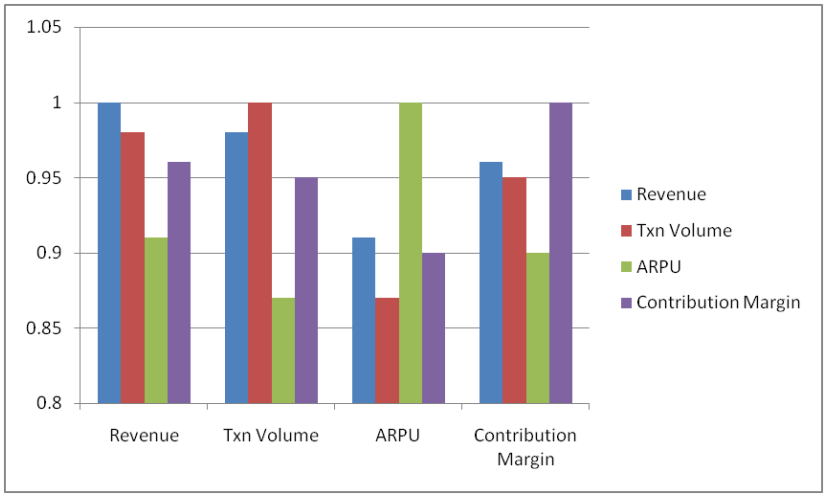
DISCUSSION: The correlation matrix indicates that all variables are significantly interrelated. Trust (0.79) and usability (0.75) are the two primary factors influencing an individual's willingness to accept anything. Moreover, technological proficiency is essential (0.66). This suggests that individuals who excel in, trust, and perceive mobile banking as beneficial are more inclined to use it.

TABLE 5: FINANCIAL & OPERATIONAL CORRELATION MATRIX

Variables	Revenue	Txn Volume	ARPU	Contribution Margin
Revenue	1	0.98	0.91	0.96
Txn Volume	0.98	1	0.87	0.95
ARPU	0.91	0.87	1	0.9
Contribution Margin	0.96	0.95	0.9	1



DISCUSSION: The data indicates that revenue and contribution margin (0.96), as well as transaction volume (0.98), have substantial positive connections. This indicates that the net benefits arise from the more direct application of the product. A strong correlation of 0.91 exists between scalability and ARPU, indicating that both are essential for revenue production.

TABLE 6: CHI-SQUARE TEST

Test Item	χ^2 Value	df	p-Value
Digital Literacy × Adoption	23.68	4	0.00009
Network Quality × Satisfaction	19.42	2	0.00006
Trust × Intention	27.55	2	0.000001

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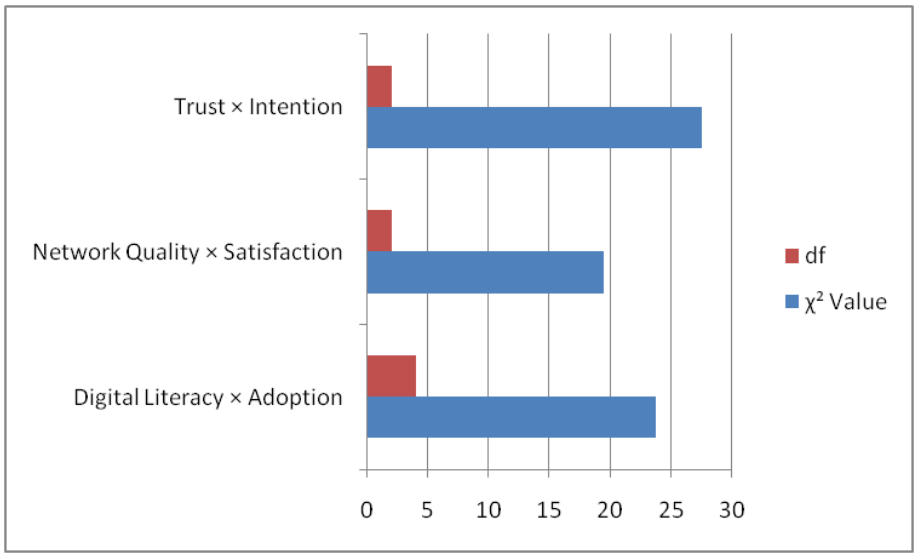

DISCUSSION: Digital literacy influences adoption (χ^2=23.68), network quality affects enjoyment (χ^2=19.42), and trust significantly impacts intention (χ^2=27.55). Each chi-square test demonstrates statistically significant associations, with robust correlations shown by low p-values.

VI. CONCLUSION

In conclusion, mobile banking is increasingly common in semi-urban regions of India; yet, substantial enhancements in infrastructure, awareness, digital literacy, and trust are still necessary. Numerous individuals hesitate to utilize it, notwithstanding its accessibility, ease of usage, and potential to enhance financial management. This stems from their limited technological proficiency and concerns about security. Networks, online education, mobile banking applications, and enhanced customer service can all accelerate service consumption. Expanding the mobile banking user base in semi-urban regions is essential for India's economic prospects and the country's shift towards a more transparent and digital economy.

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