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Impact of Digital Banking Services on Financial Inclusion: A Study of Sub-Urban Areas in Chennai

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Abstract

Digital banking has significantly changed the way people access financial services in India. The increasing use of smartphones, internet connectivity, and government initiatives has encouraged the adoption of digital banking platforms such as UPI, mobile banking, internet banking, and ATMs. This study examines the impact of digital banking services on financial inclusion in the sub-urban areas of Chennai. Primary data were collected through a structured questionnaire and analyzed using appropriate statistical techniques. The findings reveal that digital banking has improved access to financial services, promoted cashless transactions, and enhanced financial independence among users. Security, ease of use, and accessibility were found to play an important role in encouraging the adoption of digital banking services. However, challenges such as digital literacy, cybersecurity concerns, and inconsistent internet connectivity continue to affect wider adoption. The study recommends strengthening digital awareness, improving cybersecurity measures, and expanding digital infrastructure to promote inclusive and sustainable financial growth.

Keywords: Digital Banking, Financial Inclusion, UPI, Mobile Banking, Financial Independence, Digital Literacy.

Introduction

The banking industry has witnessed remarkable changes with the rapid advancement of digital technologies. Developments in information and communication technology have transformed conventional banking methods into technology-enabled services that offer greater speed, convenience, and accessibility. Customers can now perform various banking activities, including fund transfers, bill payments, and account management, through digital platforms without visiting a bank branch. In India, government initiatives promoting digital payments and financial inclusion have further accelerated the adoption of digital banking services, making them an integral part of the country's financial ecosystem.

Evolution of Banking Services

The Indian banking system has evolved from traditional, paper-based banking to a modern digital environment. Initially, customers depended entirely on bank branches for financial transactions. Over time, the introduction of Automated Teller Machines (ATMs), internet banking, mobile banking applications, Unified Payments Interface (UPI), and digital wallets has transformed the delivery of banking services. These innovations have made banking more efficient, accessible, and customer-friendly while encouraging greater participation in the formal financial system.

Concept of Financial Inclusion

Financial inclusion refers to ensuring that individuals and businesses have easy and affordable access to essential financial services such as savings, credit, insurance, remittances, and payment facilities. It aims to bring underserved and economically weaker sections into the formal financial system. Digital banking has emerged as a key enabler of financial inclusion by overcoming geographical barriers, reducing transaction costs, and providing convenient access to banking services through digital channels. As a result, more people can participate in economic activities and improve their financial well-being.

Statement of the Problem

Digital banking has expanded rapidly in India, providing faster and more convenient access to financial services. However, the level of awareness, accessibility, and effective use of these services varies across different sections of society. Factors such as limited digital literacy, security concerns, inadequate internet connectivity, and varying socio-economic conditions continue to influence the adoption of digital banking. In sub-urban areas of Chennai, it is important to examine whether digital banking services have effectively improved financial inclusion and identify the factors that encourage or hinder their usage. This study seeks to evaluate the role of digital banking in promoting financial inclusion among residents of these areas.

Objectives of the Study

- To assess the level of awareness of digital banking services among residents of the sub-urban areas of Chennai.
- To examine the usage patterns and frequency of digital banking services among the respondents.
- To identify the major challenges and barriers affecting the adoption and use of digital banking services.
- To analyse the impact of digital banking services on financial inclusion among residents of the sub-urban areas of Chennai.
- To provide suitable suggestions for enhancing the adoption of digital banking and strengthening financial inclusion.

Hypotheses of the Study

H_{01}: There is no significant relationship between the perceived security of digital banking services and financial independence among residents of the sub-urban areas of Chennai.

H_{11}: There is a significant positive relationship between the perceived security of digital banking services and financial independence among residents of the sub-urban areas of Chennai.

H_{02}: There is no significant difference among different age groups in their perception of the role of digital banking services in improving access to financial services.

H_{12}: There is a significant difference among different age groups in their perception of the role of digital banking services in improving access to financial services.

H_{03}: There is no significant difference between male and female respondents in their perception of the impact of digital banking services on financial independence.

H_{13}: There is a significant difference between male and female respondents in their perception of the impact of digital banking services on financial independence.

Scope and Limitations of the Study

Scope of the Study

This study examines the impact of digital banking services on financial inclusion among residents of the sub-urban areas of Chennai. It focuses on the level of awareness, usage patterns, accessibility, and perceived benefits of digital banking services, including UPI, mobile banking, internet banking, and ATM facilities. The study also explores the factors influencing the adoption of digital banking and its contribution to improving financial inclusion. The findings are expected to provide useful insights for policymakers, financial institutions, and researchers in promoting inclusive digital financial services.

Limitations of the Study

The study is confined to selected sub-urban areas of Chennai and was conducted during the academic year 2025–2026. The findings are based on a limited sample selected through the convenience sampling technique and may not fully represent the entire population. In addition, the study relies on self-reported responses, which may be influenced by respondents' personal perceptions and experiences. Therefore, the results should be interpreted within the context of these limitations.

Review of Literature

Digital banking has emerged as an important driver of financial inclusion, particularly in developing countries where access to formal banking services has traditionally been limited. **Ozili (2025)** noted that digital banking helps overcome barriers such as distance, limited banking infrastructure, and restricted banking hours by offering convenient and affordable financial services. The study also emphasized that the success of digital banking depends on the availability of reliable digital infrastructure and the digital literacy of users.

In the Indian context, **Singh (2024)** reported that frequent users of digital banking services were more actively involved in formal financial activities, including savings, borrowing, and insurance. The study identified convenience and easy accessibility as the major factors encouraging adoption, while concerns about security and limited technological knowledge discouraged many potential users.

The growing popularity of the **Unified Payments Interface (UPI)** has further accelerated digital financial inclusion. **Sahoo (2024)** observed that UPI has gained widespread acceptance not only in metropolitan cities but also in sub-urban and semi-urban regions because of its simplicity, speed, and seamless integration with bank accounts. Supporting this view, **Haque (2025)** found that user-friendly mobile applications have enabled even individuals with limited educational backgrounds to participate in digital financial transactions.

Research has also highlighted the positive role of mobile banking in improving personal financial management. **Patel (2025)** concluded that the increasing availability of smartphones and affordable internet services has encouraged the use of mobile banking, resulting in better saving habits and financial planning. Similarly, **Nair (2024)** reported that digital banking contributes to greater financial independence by allowing users to manage their financial activities more efficiently.

Despite these benefits, several studies have identified challenges that continue to hinder the wider adoption of digital banking. **Trotta (2025)** and **Verma (2024)** pointed out that inadequate digital literacy, poor internet connectivity, and concerns regarding cybersecurity and transaction safety remain significant barriers. Overall, the literature suggests that while digital banking has considerable potential to strengthen financial inclusion, sustained efforts in improving digital awareness, infrastructure, and security are essential for achieving inclusive financial development.

Research Methodology

Research Design and Analytical Approach

The study adopts a **descriptive and analytical research design** to examine the impact of digital banking services on financial inclusion among residents of the sub-urban areas of Chennai. The descriptive aspect focuses on understanding the demographic profile of respondents, their awareness, and usage of digital banking services. The analytical component evaluates the relationship between digital banking and financial inclusion using appropriate statistical techniques. Respondents' perceptions were measured using a **five-point Likert scale**, ranging from **1 (Strongly Disagree)** to **5 (Strongly Agree)**.

Quantitative Approach

This research follows a **quantitative approach**, as the data collected through the structured questionnaire were converted into numerical values for statistical analysis. The study employs Percentage Analysis, Pearson Correlation, Multiple Regression, One-Way ANOVA, Independent Sample t-test, Chi-square Test, and Factor Analysis to analyse the collected data. All statistical analyses were carried out using **Microsoft Excel**, with the level of significance set at **5% (α = 0.05)**.

Sources of Data

The study is based on both **primary and secondary data**. Primary data were collected from respondents through a structured questionnaire comprising **18 questions** related to demographic characteristics, awareness and usage of digital banking services, banking accessibility, and financial inclusion. Secondary data were obtained from research journals, books, Reserve Bank of India (RBI) reports, National Payments Corporation of India (NPCI) publications, government reports, and other reliable academic sources to support the study.

Category	Component	Details
Period of the study	Data collection period	Academic year 2025-2026
Sampling Design	Method	Convenience sampling
	Sample size	76 valid Responses
	Area	Sub-urban areas of Chennai
	Instrument	Structural questionnaire (google form)
Research variables	Dependent Variable	Financial Independence
	Independent Variables	Access to Services, Cash Dependence, Saving Habits, Security Perception
	Demographic Variables	Gender, Age, Education, Occupation, Income

ANALYSIS AND INTERPRETATION

Objective 1: To examine the level of awareness of digital banking services among residents of sub-urban areas of Chennai

Digital Banking Service	Number of Respondents Aware	Percentage (%)
ATM Services	75	98.68
UPI	73	96.05
Mobile Banking Apps	67	88.16
Internet Banking	54	71.05
Digital Wallets	33	43.42
AEPS	17	22.37

Objective 2: To analyse the usage patterns and frequency of digital banking services among respondents

Frequency	Number of Respondents	Percentage (%)
Daily	73	96.05
Weekly	1	1.32
Monthly	2	2.63
Total	76	100.00

Objective 3: To identify key challenges and barriers faced by respondents in adopting digital banking services

Education Level	Internet Issues (1)	Security Concerns (2)	Complex Interface (3)	Lack of Trust (4)	No Difficulty (5)	Total
No Formal / Higher Secondary (1–2)	2	2	2	0	1	7 (incl. No Formal Edu.)
Graduate (3)	1	15	16	5	22	59

Postgraduate (4)	0	3	2	2	3	8 (incl. No Formal)
Column Total	3	20	20	7	26	76

Hypothesis 1: There is a significant positive relationship between perceived security of digital banking and financial independence among sub-urban residents of Chennai.

Variable	Security Perception	Financial Independence
Security Perception	1	0.566
Financial Independence	0.566	1

Hypothesis 2: There is a significant difference among age groups in their perception of digital banking's ability to improve access to financial services.

Source of Variation	SS	df	MS	F	p-Value	F Critical
Between Groups	125.29	1	125.29	99.16	0.000	3.904
Within Groups	189.53	150	1.264	-	-	-
Total	314.82	151				

Hypothesis 3: There is no significant difference between male and female respondents in their perception of digital banking's impact on financial independence.

Statistic	Male (n=49)	Female (n=27)
Mean	4.184	4.296
Variance	0.570	0.524
t-Statistic	-0.639	-

p-Value (two-tail)	0.525	0.263
t-Critical (two-tail)	2.003	-

2.1. Combined Table

Objective / Hypothesis	**Statistical Tools and Results**	**Key Finding**	**Interpretation (Linked to Research Theme)**
Objective 1: To examine the level of awareness of digital banking services among residents of sub-urban areas of Chennai	**Percentage Analysis:** ATM (98.68%), UPI (96.05%), Mobile Banking Apps (88.16%), Internet Banking (71.05%), Digital Wallets (43.42%), AEPS (22.37%)	Awareness is extremely high for ATM, UPI, and mobile banking, while awareness is considerably lower for AEPS and digital wallets.	Digital banking awareness is widespread in sub-urban Chennai, especially for commonly used services like UPI and ATMs. However, the low awareness of AEPS indicates that services specifically designed for financial inclusion have not reached their full potential, highlighting the need for targeted awareness programmes.
Objective 2: To analyse the usage patterns and frequency of digital banking services among respondents	**Percentage Analysis:** Daily use – 73 respondents (96.05%), Weekly – 1 (1.32%), Monthly – 2	The vast majority of respondents use digital banking services daily.	Digital banking has become deeply integrated into the everyday financial behaviour of respondents. Frequent usage reflects strong adoption of convenient platforms such

	(2.63%)		as UPI and mobile banking, indicating that digital banking is already playing a major role in expanding financial access.
Objective 3: To identify key challenges and barriers faced by respondents in adopting digital banking services	**Chi-Square Test:** p-value = 0.0508 (>0.05) indicating no significant association between education level and type of difficulty.	Difficulties such as security concerns, interface complexity, internet issues, and trust problems are experienced across all education levels.	Digital banking barriers are not limited to less educated users; even highly educated individuals face similar challenges. This suggests that improving **platform usability, security assurance, and trust mechanisms** is essential to strengthen financial inclusion.
Hypothesis 1: There is a significant positive relationship between perceived security of digital banking and financial independence	**Regression:** Security perception $\beta = 0.540$, $t = 4.785$, $p < 0.001$ (significant). Other variables not significant.	Security perception is the only significant predictor of financial independence.	Perceived security plays a critical role in encouraging users to rely on digital banking for financial activities. When users feel that digital transactions are safe, they are more likely to engage independently in financial management, strengthening financial inclusion outcomes.
Hypothesis 2: Significant difference among age groups in perception of digital banking	**ANOVA:** $F = 99.16$, $p < 0.001$ (significant difference between age groups).	Age significantly influences how individuals perceive digital banking accessibility.	Younger users perceive digital banking as more accessible due to greater familiarity with digital technology, while older users may face usability

improving access to financial services			barriers. This highlights the importance of **age-specific digital literacy initiatives** to expand financial inclusion.
Hypothesis 3: No significant difference between male and female respondents in perception of digital banking's impact on financial independence	**T-Test:** t = -0.639, p = 0.525 (>0.05). Female mean = 4.296, Male mean = 4.184.	No statistically significant gender difference in perceptions of financial independence.	Digital banking appears to provide similar empowerment benefits to both male and female users. The slightly higher female mean suggests that digital banking may support **women's financial autonomy**, aligning with broader financial inclusion goals.

Major Findings

The study examined the impact of digital banking services on financial inclusion among residents of the sub-urban areas of Chennai. The findings indicate a high level of awareness and adoption of digital banking services. ATM and UPI emerged as the most widely recognized and frequently used digital banking platforms, whereas awareness of the Aadhaar Enabled Payment System (AEPS) was comparatively lower.

The analysis revealed that most respondents use digital banking services on a daily basis, reflecting the growing acceptance of digital financial transactions. Regression analysis identified perceived security as the most influential factor affecting financial independence. The ANOVA results showed significant differences among various age groups in their perception of the accessibility of digital banking services. The independent sample *t*-test indicated no statistically significant difference between male and female respondents regarding the impact of digital banking on financial independence. In addition, the chi-square analysis showed that security concerns and the complexity of digital banking interfaces remain common challenges across different educational groups.

Overall, the findings suggest that digital banking has made a positive contribution to financial inclusion by improving access to financial services and encouraging greater participation in the formal banking system. However, enhancing digital security, simplifying user interfaces, and increasing awareness of lesser-known digital banking services are essential for achieving broader financial inclusion.

Suggestions

Based on the findings of the study, the following suggestions are proposed to enhance the effectiveness of digital banking services and promote financial inclusion:

- **For the Government:** Government agencies should strengthen digital literacy programmes, particularly for senior citizens and individuals with limited digital skills, to improve their confidence in using digital banking services. Efforts should also be made to enhance cybersecurity infrastructure and establish efficient grievance redressal mechanisms to build public trust. In addition, awareness campaigns on digital banking facilities, especially the Aadhaar Enabled Payment System (AEPS), should be expanded in sub-urban areas to encourage greater financial inclusion.
- **For Financial Institutions:** Banks and fintech companies should develop user-friendly digital banking platforms with simple interfaces, multilingual support, and accessible customer assistance. They should also educate customers about safe digital banking practices through regular awareness programmes and ensure robust security measures to protect users from cyber fraud. Continuous innovation and customer-centric services will further improve the adoption and effective use of digital banking.
- **For Customers:** Customers should actively improve their digital financial literacy by participating in awareness programmes and adopting safe online banking practices. Regularly updating passwords, enabling two-factor authentication, and remaining cautious about fraudulent messages and phishing attempts can help ensure secure and confident use of digital banking services.

Conclusion

The study concludes that digital banking services have significantly contributed to promoting financial inclusion in the sub-urban areas of Chennai by improving access to formal financial services and encouraging the adoption of cashless transactions. The high level of awareness and regular use of digital banking platforms reflects their growing acceptance among the public. Nevertheless, challenges such as security concerns, limited awareness of services like the Aadhaar Enabled Payment System (AEPS), digital literacy gaps, and variations in accessibility across different age groups continue to affect the wider adoption of digital banking. Addressing these challenges through stronger cybersecurity measures, targeted digital literacy initiatives, user-friendly banking applications, and effective awareness programmes will further enhance financial inclusion. Continued collaboration among the government, financial institutions, and customers will be essential to building a secure, accessible, and inclusive digital banking ecosystem that supports sustainable economic development.

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