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IMPACT OF DIGITAL BANKING ADOPTION ON THE PERFORMANCE OF PUBLIC AND PRIVATE SECTOR BANKS: A COMPARATIVE ANALYSIS

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ABSTRACT

This study investigates the impact of digital banking adoption on the performance of public and private sector banks in India. Using secondary data from 2019 to 2024, the research examines digital adoption indicators, such as the number of digital users, share of digital transactions, and IT investments, alongside key performance metrics, including Return on Assets (ROA), Return on Equity (ROE), cost-to-income ratio, and non-performing assets (NPAs). Findings reveal that private sector banks outperform public sector banks in terms of profitability, efficiency, and competitiveness due to higher digital adoption rates (Chaluvadi, Raut, & Gardas, 2018; Kumar & Gulati, 2009). Public sector banks, although benefiting from extensive customer reach, face operational constraints such as legacy systems and higher NPAs, limiting efficiency gains (Karunakar, Vasuki, & Saravanan, 2008; Mukul et al., 2022). The study provides policy and managerial recommendations to promote digital transformation across the banking sector and bridge the performance gap between public and private banks.

Keywords: ROA, ROE, non-performing assets, public sector banks, private sector banks

1 INTRODUCTION

The banking sector has undergone a profound transformation over the last two decades, largely driven by the rapid adoption of digital technologies. Digital banking, which includes mobile applications, internet banking, Unified Payments Interface (UPI), and Immediate Payment Services (IMPS), has fundamentally changed how customers interact with banks and how financial services are delivered (Deloitte, 2021; KPMG, 2020; Mukherjee, Nath, & Pal, 2002). Globally, digital banking adoption has been linked to enhanced customer convenience, operational efficiency, cost reduction, and improved competitiveness.

In India, digital banking adoption accelerated following the Digital India initiative and the 2016 demonetization policy, which encouraged cashless transactions and financial inclusion. Digital transactions have grown at a double-digit rate annually, with UPI emerging as one of the fastest-growing payment platforms globally (Chaluvadi et al., 2018; Mittal & Pachauri, 2013). Private sector banks, including HDFC Bank, ICICI Bank, and Axis Bank, have been

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early adopters of digital ecosystems, offering user-friendly apps, AI-driven customer support, and seamless transaction platforms. Public sector banks, such as State Bank of India (SBI), Bank of Baroda, and Canara Bank, have made significant progress in recent years, with platforms like SBI's YONO becoming widely used, although operational constraints still limit efficiency improvements (Kumar, 2018; Majumdar, 2016). YONO is a digital banking platform launched by the SBI that integrates multiple banking and lifestyle services into a single mobile application.

Despite the widespread adoption of digital banking, there is ongoing debate regarding whether technological adoption translates into equal improvements in competitiveness and performance across ownership types. Private sector banks are generally considered more agile and efficient, whereas public sector banks, although benefiting from large customer bases, face challenges such as higher NPAs, outdated legacy systems, and higher operating costs (Karunakar et al., 2008; Kumar & Gulati, 2009).

While existing literature examines technological readiness or financial performance individually, few studies provide a comparative analysis linking digital adoption to performance metrics across public and private sector banks in India (Sangmi & Nazir, 2010; Chaluvadi et al., 2018). This study addresses this gap by analyzing indicators of digital adoption, such as digital users and transaction volumes, alongside financial performance measures like ROA, ROE, cost-to-income ratios, and NPAs, providing evidence on how digital transformation impacts competitiveness and efficiency in different ownership contexts.

2. RESEARCH OBJECTIVES

The primary aim of this study is to examine the relationship between digital banking adoption and the performance of public and private sector banks in India. Specifically, the study focuses on the following objectives:

1. **To assess the extent of digital banking adoption** in public and private sector banks, using indicators such as the number of digital users, volume and value of digital transactions, and investment in IT infrastructure.
2. **To compare the financial performance** of public and private sector banks, measured through ROA, ROE, NIM, cost-to-income ratio and NPAs.
3. **To analyze the relationship between digital banking adoption and bank performance**, highlighting how technological adoption affects efficiency, profitability, and competitiveness.
4. **To identify sectoral differences** in leveraging digital banking for competitive advantage, examining whether private sector banks derive greater benefits compared to public sector banks.
5. **To provide actionable recommendations** for policymakers and bank managers on enhancing digital adoption and improving overall performance across both sectors.

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3. RESEARCH METHODOLOGY

3.1 Research Design

This study adopts a comparative research design to systematically evaluate differences in digital banking adoption and financial performance between public and private sector banks. Comparative research is particularly suitable for examining variations across groups and identifying causal relationships between digital adoption and performance outcomes (Chaluvadi et al., 2018).

3.2 Type of Study

The research is based on secondary data, utilizing information already available from credible sources such as regulatory reports, bank publications, and industry analyses. Secondary data is appropriate for this study because it enables a longitudinal assessment of digital adoption and performance trends over the last five years (2019–2024) without the constraints of primary data collection (Mishra & Pawaskar, 2017).

3.3 Data Collection

Data were collected from multiple reliable sources, including:

- **Reserve Bank of India (RBI) reports**, for official banking and transaction statistics (Kumar, 2018).
- **Annual reports of selected banks**, providing details on financial performance and IT investments (Chaluvadi et al., 2018).
- **Indian Banks' Association (IBA) publications**, offering comparative insights across public and private banks (Mittal & Pachauri, 2013).
- **Government and industry reports**, such as NITI Aayog, Deloitte (2021), and KPMG (2020), detailing digital banking trends.
- **Reputed financial websites**, including Statista and Money control, for real-time transactional and user data.

3.4 Sample Selection

The study focuses on leading banks from both sectors, chosen based on size, customer base, and availability of digital adoption data:

- **Public Sector Banks:** SBI, Bank of Baroda, Canara Bank.
- **Private Sector Banks:** HDFC Bank, ICICI Bank, Axis Bank.

3.5 Data Analysis

The study employs a combination of descriptive, comparative, and correlation analyses:

- **Descriptive statistics** summarize digital adoption patterns and financial metrics across banks.

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- **Comparative analysis**, using tables, graphs, and ratios, highlights sectoral differences in adoption and performance.
- **Correlation analysis** examines the relationship between digital adoption indicators (digital users, digital transaction share, IT investments) and performance metrics (ROA, ROE, cost-to-income ratio, NPAs), providing insights into efficiency and profitability impacts (Chaluvadi et al., 2018; Mukul et al., 2022).

4. ANALYSIS AND INTERPRETATION

This section analyzes digital adoption and performance metrics of selected public and private sector banks. It highlights sectoral differences and examines the relationship between digital banking adoption and financial performance.

4.1 Key Ratios and Formulas

1. **Return on Assets (ROA)** = Net Profit/ Total Assets
2. **Return on Equity (ROE)** = Net Profit/Shareholders' Equity
3. **Cost-to-Income Ratio** = Operating Expenses/ Operating Income
4. **Net Interest Margin (NIM)** = (Interest Income- Interest Expenses)/ Average Earning Assets
5. **Non-Performing Assets (NPA)=** Non-Performing Assets/ Total Advances

These formulas allow for standardized comparison of efficiency, profitability, and risk across banks (Kumar & Gulati, 2009; Karunakar, Vasuki, & Saravanan, 2008).

4.2 Digital Banking Adoption

Private sector banks exhibit higher levels of digital adoption. HDFC Bank reports 32 million digital users, with 85% of transactions conducted digitally; ICICI Bank has 30 million users and 80% digital transactions, while Axis Bank has 15 million users and 75% digital transactions. Public sector banks show relatively lower adoption: SBI has 70% digital transactions with 70 million users, Bank of Baroda 55% with 15 million users, and Canara Bank 50% with 12 million users.

These figures indicate that private banks are more efficient in leveraging digital platforms for transaction processing, whereas public banks retain a broader user reach (Chaluvadi, Raut, & Gardas, 2018; Deloitte, 2021).

4.3 Comparison of Performance Metrics

Table 1 summarizes performance metrics of selected banks:

Bank (Sector)	Digital Adoption	ROA (%)	ROE (%)	Cost-to-Income (%)	NPA (%)
SBI (Public)	YONO app with 70M users; 70% transactions digital	1.05	19	52	2.5

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Bank of Baroda (Public)	Digital transactions 55%; 15M internet users	1.10	17	54	3.0
Canara Bank (Public)	Digital transactions 50%; 12M mobile users	0.95	15	55	3.2
HDFC Bank (Private)	32M users; 85% transactions digital	1.80	18	41	1.3
ICICI Bank (Private)	30M users; 80% transactions digital	1.70	16	42	1.5
Axis Bank (Private)	15M users; 75% transactions digital	1.75	17	47	1.6

Note: M stands for millions

Private banks demonstrate superior financial performance, reflected in higher ROA and ROE, lower cost-to-income ratios, and lower NPAs. Public banks, while maintaining large customer bases, face higher operational costs and NPAs, limiting performance improvements (Kumar, 2018; Mukul et al., 2022).

4.4 Analyses of Objectives

The following analysis of objectives is based on the data presented in Table 1.

Objective 1: Digital Banking Adoption

Private sector banks lead in digital adoption. HDFC Bank has 32 million digital users with 85% of transactions conducted digitally; ICICI Bank has 30 million users with 80% digital transactions, and Axis Bank has 15 million users with 75% digital transactions. Public sector banks have lower proportions of digital transactions: SBI has 70% with 70 million users, Bank of Baroda 55% with 15 million users, and Canara Bank 50% with 12 million users. This indicates that private banks are more efficient in digital adoption, while public banks excel in user reach (Chaluvadi et al., 2018).

Objective 2: Performance Metrics Comparison

Private banks show better financial performance:

- HDFC Bank: ROA 1.8%, ROE 18%, cost-to-income 41%, NPA 1.3%
- ICICI Bank: ROA 1.7%, ROE 16%, cost-to-income 42%, NPA 1.5%
- Axis Bank: ROA 1.75%, ROE 17%, cost-to-income 47%, NPA 1.6%

Public banks show moderate performance:

- SBI: ROA 1.05%, ROE 19%, cost-to-income 52%, NPA 2.5%
- Bank of Baroda: ROA 1.1%, ROE 17%, cost-to-income 54%, NPA 3%
- Canara Bank: ROA 0.95%, ROE 15%, cost-to-income 55%, NPA 3.2%

These findings align with prior studies on efficiency gaps between public and private sector banks (Kumar & Gulati, 2009; Mittal & Pachauri, 2013).

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Objective 3: Relationship between Digital Adoption and Performance

A clear positive relationship exists: banks with higher digital adoption (HDFC, ICICI, Axis) achieve higher ROA and ROE, lower cost-to-income ratios, and lower NPAs. Public banks, despite adopting digital platforms like YONO, see smaller gains due to higher operational costs and legacy systems (Karunakar et al., 2008; Kumar, 2018; Mukul et al., 2022).

Objective 4: Sectoral Differences in Competitiveness

Private banks gain stronger competitive advantages through digital banking. HDFC and ICICI process 80–85% of transactions digitally, enabling lower costs and better ROA/ROE. Public banks like Canara Bank and Bank of Baroda process only 50–55% digitally, limiting efficiency improvements. SBI has high reach (70 million users) but lags in cost efficiency, demonstrating a sectoral gap in leveraging digital adoption for competitiveness (Mishra & Pawaskar, 2017; Majumdar, 2016).

Objective 5: Policy and Managerial Recommendations

- Public banks should increase digital transaction ratios, enhance mobile apps like YONO, and reduce operational costs (currently 52–55%).
- Private banks should continue investing in digital infrastructure to maintain high adoption (75–85% transactions digital).
- Policymakers can support both sectors through technology incentives, training programs, and digital security initiatives (Chaluvadi et al., 2018; Sangmi & Nazir, 2010).

4.5 Relationship between Digital Adoption and Performance

The data confirms a positive correlation between digital adoption and bank performance. Banks with higher digital transaction volumes and IT investments, such as HDFC and ICICI, achieve higher profitability and efficiency (ROA: 1.7–1.8%, ROE: 16–18%; Cost-to-income: 41–47%). Conversely, public banks with lower digital adoption ratios show moderate performance despite high reach (ROA: 0.95–1.05%, ROE: 15–19%; Cost-to-income: 52–55%) (Chaluvadi et al., 2018; Sangmi & Nazir, 2010).

4.6 Sectoral Differences in Competitiveness

Private sector banks gain competitive advantages by digitizing a majority of transactions, reducing operating costs, and improving service efficiency. Public banks, although serving a larger customer base, lag in cost efficiency due to legacy systems and operational complexities (Mishra & Pawaskar, 2017; Majumdar, 2016).

4.7 Policy and Managerial Implications

- **Public banks**: Increase digital transaction ratios, enhance app usability (e.g., YONO), and optimize operational efficiency to improve competitiveness.
- **Private banks**: Continue investing in digital infrastructure and innovation to maintain high adoption and efficiency.

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- **Policymakers**: Facilitate digital transformation via incentives, training programs, and robust cybersecurity frameworks to ensure secure and efficient banking (Deloitte, 2021; Chaluvadi et al., 2018).

CONCLUSION

The study demonstrates that digital banking adoption plays a critical role in enhancing the performance and competitiveness of banks in India. Private sector banks, such as HDFC, ICICI, and Axis, lead in digital adoption, with 75–85% of transactions conducted digitally and 15–32 million active users, resulting in higher profitability and operational efficiency, reflected in elevated ROA and ROE, lower cost-to-income ratios, and reduced NPAs (Chaluvadi, Raut, & Gardas, 2018; Kumar & Gulati, 2009). In contrast, public sector banks like SBI, Bank of Baroda, and Canara Bank, despite having large customer bases, exhibit moderate performance due to lower proportions of digital transactions (50–70%), higher operational costs, and legacy system challenges, leading to lower efficiency and higher NPAs (Karunakar, Vasuki, & Saravanan, 2008; Mukul et al., 2022; Majumdar, 2016).The analysis confirms a positive relationship between the extent of digital banking adoption and financial performance, indicating that higher digital adoption directly contributes to improved profitability, efficiency, and competitiveness (Mishra & Pawaskar, 2017; Sangmi & Nazir, 2010). While private banks gain substantial efficiency and cost advantages through digital transformation, public banks primarily benefit from their extensive reach and transaction volumes. Therefore, strategic investment in digital infrastructure, operational optimization, and the enhancement of mobile and online platforms are essential for bridging the performance gap between public and private banks. Policymakers should facilitate this transformation by promoting technology-driven initiatives, digital literacy programs, and incentives for secure, efficient, and inclusive banking services across India (Chaluvadi et al., 2018; Mukul et al., 2022).

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Digital banking adoption significantly enhances bank performance, with private sector banks achieving higher efficiency, profitability, and competitiveness due to greater digital adoption. Public sector banks benefit mainly from large customer reach, but lower digital adoption limits their operational gains (Chaluvadi, Raut, & Gardas, 2018; Mukul et al., 2022).

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