

Effect of E-Banking on Operational Performance of Select Private and Public Sector Banks

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Abstract: *The rapid expansion of electronic banking (e-banking) has transformed operational processes and performance outcomes within the global banking sector. This study examines the effect of e-banking—measured through NEFT, RTGS, mobile banking, ATMs, PoS terminals, credit cards, and debit cards—on the operational performance of select private and public sector banks in India over a five-year period. Using secondary data sourced from annual reports and RBI databases, the study employs descriptive statistics, ANOVA, and multiple regression to assess how digital transaction volumes and values influence key indicators such as Return on Assets (RoA), Return on Equity (RoE), Net Interest Margin (NIM), and Cost-to-Income Ratio (CTIR). Findings reveal that while private sector banks demonstrate stronger improvements in profitability metrics, public sector banks show significant gains in transaction volume efficiency. E-banking indicators exhibit a positive and significant impact on NIM and RoE, whereas their influence on RoA and CTIR varies across bank groups. The study contributes to the growing literature on digital transformation in banking by offering empirical insights relevant to policymakers, regulators, and practitioners seeking to strengthen digital banking ecosystems.*

Keywords: E-banking, Operational Performance, Digital Transactions, Commercial Banks, India

I. INTRODUCTION

E-banking has become a cornerstone of modern banking operations, reshaping how financial institutions deliver services, manage costs, and achieve performance efficiencies. As digital platforms increasingly replace traditional branch-centric models, banks are leveraging e-banking tools—such as NEFT, RTGS, mobile banking, ATMs, PoS devices, and card-based payments—to improve service delivery and operational outcomes. Prior research shows that digital banking enhances operational efficiency, cost optimization, and profitability (Isa et al., 2021; Shaikh & Anwar, 2023). In emerging economies such as India, the digital banking ecosystem has expanded rapidly, driven by government initiatives, technological advancements, and changing customer expectations.

Private sector banks, known for their technological agility, have adopted advanced digital platforms earlier and more aggressively than most public sector banks. However, recent reforms, mergers, and digitalization efforts have strengthened the technological capabilities of public sector banks as well. Given this evolving landscape, it becomes essential to compare whether e-banking adoption translates into measurable operational performance gains across both bank groups.

This study investigates the effect of e-banking indicators on operational performance—measured through RoA, RoE, NIM, and CTIR—in select private and public sector banks in India. The findings contribute to academic knowledge and provide practical implications for bank management, regulators, and policymakers.

II. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1 Literature Review

E-banking has been widely studied across global banking environments. Research consistently shows that digital banking improves operational efficiency, reduces transaction costs, and enhances financial performance.

Isa, Hamdan, and Alareeni (2021, 2022) found significant positive effects of digital banking on bank operations, financial performance, and customer engagement, particularly during the COVID-19 pandemic. Chindudzi et al. (2020) demonstrated that digital banking adoption enhances cost efficiency and profitability among Zimbabwean commercial banks. Similarly, Wijayanti et al. (2021) highlighted that digital banking innovation directly improves bank competitiveness and operational performance.

In Africa, Rabiou et al. (2019) and Mugambi (2022) concluded that electronic banking tools significantly improve operational efficiency through faster processing, reduced errors, and expanded service reach. In the context of India, Shaikh and Anwar (2023) provided robust evidence that digital transactions—particularly NEFT, RTGS, and mobile banking—positively affect bank profitability and operational efficiency. A thematic review by Bueno et al. (2024) further emphasized that digitization reduces operational risks and enhances workflow integration across banking operations.

Customer-oriented studies reveal that e-banking also improves service quality and customer experience, which indirectly contributes to performance (Mbama et al., 2018; Wadesango & Magaya, 2021). Historical evidence from Kenya (Ngungi, 2013; Mateka et al., 2016) also confirms positive links between online banking and financial performance.

Collectively, the literature indicates a strong theoretical and empirical foundation for examining the relationship between e-banking usage and operational performance.

2.2 Conceptual Framework

Based on the reviewed literature, the conceptual model proposes that:

E-banking Indicators → Operational Performance Metrics

Where:

- E-banking Indicators include NEFT (inward/outward), RTGS (inward/outward), Mobile Banking (volume/value), ATMs, PoS, Debit Cards, and Credit Cards.
- Operational Performance Indicators include RoA, RoE, NIM, and CTIR.

The framework assumes that higher digital transaction activity results in:

- Improved cost efficiency,
- Enhanced income generation, and
- Stronger profitability.

III. RESEARCH METHODOLOGY

3.1 Statement of the Problem

Despite rapid digital transformation, the actual impact of e-banking on operational performance across Indian banks remains insufficiently examined. Private and public sector banks differ in technological adoption, scale, and service structures, raising the question of whether digital banking yields similar performance outcomes across both groups.

3.2 Research Questions

- How have e-banking indicators evolved in private and public sector banks in India?
- Do e-banking indicators significantly affect operational performance metrics?
- Are there differences in the impact of e-banking on operational performance between private and public sector banks?

3.3 Research Objectives

- To analyze the trends in e-banking activities across selected private and public sector banks.
- To examine the effect of e-banking indicators on RoA, RoE, NIM, and CTIR.
- To compare operational performance outcomes between private and public sector banks.
- To provide recommendations for enhancing digital banking performance.

3.4 Hypotheses

(As provided in your formulation—H01 series for private banks, H02 series for public banks, H03 series comparing both groups.)

3.5 Data and Methods

- Data type: Secondary data from annual reports (FY 2019–20 to FY 2023–24) of 10 major Indian banks.
- Tools used: Descriptive statistics, ANOVA, multiple regression analysis.
- Software: SPSS and MS Excel.
- Variables:
- Independent Variables: NEFT, RTGS, Mobile Banking, ATMs, PoS, Credit Cards, Debit Cards.
- Dependent Variables: RoA, RoE, NIM, CTIR.

IV. RESULTS AND DISCUSSION

This section presents the empirical findings derived from the operational indicators of select private and public sector banks for the period 2020–2024. The results include descriptive statistics, ANOVA, and multiple regression analyses for RoA, RoE, NIM, CTIR, and e-banking indicators. All data are extracted from Chapter-5 and presented in tabular form for clarity.

4.1 Return on Assets (RoA) – Private vs Public Sector Banks

Table 1: RoA of Private and Public Sector Banks (2020–2024)

Year	Axis	HDFC	ICICI	IDBI	Kotak	BoB	Canara	PNB	SBI	UBI
2020	0.178	1.716	0.722	-4.297	1.651	0.074	-0.309	0.041	0.367	-0.530
2021	0.661	1.781	1.316	0.457	1.816	0.072	0.222	0.160	0.450	0.270
2022	1.108	1.787	1.654	0.809	1.996	0.064	0.463	0.263	0.635	0.440
2023	0.727	1.789	2.013	1.103	2.233	0.068	0.788	0.172	0.911	0.660
2024	1.683	1.681	2.185	1.551	2.296	0.080	0.976	0.528	0.988	0.980

Summary Statistics

Bank	Mean	SD	CV (%)
Axis	0.871	0.561	64.42
HDFC	1.751	0.049	2.82
ICICI	1.578	0.584	37.01
IDBI	-0.075	2.394	-3174
Kotak	1.998	0.273	13.64
BoB	0.072	0.0062	8.70
Canara	0.428	0.504	117.79
PNB	0.233	0.183	78.66
SBI	0.670	0.274	40.91
UBI	0.364	0.565	155.46

RoA shows no significant mean differences between private and public banks, as variability is uneven but overall mean values are comparable. Private banks maintain higher and more stable RoA, whereas public banks, especially IDBI and UBI, show volatility.

4.2 Return on Equity (RoE)

Table 2: RoE of Private and Public Sector Banks (2020–2024)

Year	Axis	HDFC	ICICI	IDBI	Kotak	BoB	Canara	PNB	SBI	UBI
2020	1.916	15.356	6.807	-37.877	12.133	1.916	2.892	0.539	6.245	-8.577
2021	6.485	15.274	10.977	3.693	10.929	6.485	3.411	2.223	8.040	4.507

2022	11.309	15.395	13.688	5.855	11.826	11.309	3.495	3.620	11.309	7.413
2023	7.638	15.742	15.891	8.043	13.098	7.638	3.730	2.511	15.333	10.766
2024	16.458	13.813	17.151	11.295	14.249	16.458	3.723	7.743	16.190	14.075

Private sector banks show consistently strong RoE, with HDFC, ICICI, and Kotak demonstrating industry-leading shareholder value. Public sector banks show moderate improvement, with SBI outperforming other PSBs.

4.3 Net Interest Margin (NIM)

Table 3: NIM (%) of Banks (2020–2024)

Bank	Mean	SD	CV (%)
Axis	3.882	0.466	12.01
HDFC	3.476	0.283	8.14
ICICI	3.491	0.433	12.39
IDBI	3.118	0.599	19.22
Kotak	4.08	0.276	6.77
BoB	2.65	0.162	6.11
Canara	2.54	0.258	10.17
PNB	2.318	0.186	8.04
SBI	2.508	0.088	3.50
UBI	2.418	0.145	5.98

NIM shows significant mean differences between private and public sector banks. Private banks consistently outperform PSBs, primarily due to stronger pricing power, higher retail lending, and efficient funding.

4.4 Cost-to-Income Ratio (CTIR)

Table 4: CTIR (%) of Banks (2020–2024)

Bank	Mean	SD	CV (%)
Axis	27.966	6.681	23.89
HDFC	14.40	1.178	8.18
ICICI	24.046	1.475	6.14
IDBI	26.60	1.649	6.20
Kotak	30.078	3.189	10.60
BoB	23.854	2.267	9.50
Canara	21.590	1.446	6.69
PNB	22.483	2.247	9.99
SBI	26.888	1.689	6.28
UBI	21.122	2.150	10.18

CTIR shows that public sector banks operate at higher cost levels, though some—like Canara and PNB—show improving cost efficiency.

4.5 Regression Results – Effect of E-Banking on Performance

The following models summarize the impact of e-banking indicators on performance.

Table 5: Model Summary for RoA (Private vs Public Banks)

Model	R	R ²	Adj R ²	Std. Error	F	p-value	Result
RoA	.691	.477	.224	.917	1.883	0.061	Accept H03.1 (No significant impact)



Table 7: Model Summary for RoE

Model	R	R ²	Adj R ²	F	p-value	Result
RoE	.710	.504	.263	2.093	0.036	Reject H03.2 (Significant impact)

Table 8: Model Summary for NIM

Model	R	R ²	Adj R ²	F	p-value	Result
NIM	.892	.796	.697	8.061	0.000	Reject H03.3 (Strong significant impact)

Table 9: Model Summary for CTIR

Model	R	R ²	Adj R ²	F	p-value	Result
CTIR	.838	.703	.559	4.883	0.000	Reject H03.4 (Significant impact)

Discussion

RoA shows no significant influence from e-banking, implying profitability from assets is driven more by lending quality and risk management than transaction digitalization. RoE and NIM strongly improve with e-banking adoption, confirming findings from Isa et al. (2021) and Shaikh & Anwar (2023). Public sector banks show significant differences in all digital indicators, reflecting uneven adoption levels. Private banks outperform public banks in NIM and RoE due to stronger digital integration and customer segmentation capabilities. CTIR improvements suggest digital adoption reduces operational costs, although benefits vary across banks.

V. IMPLICATIONS

5.1 Practical Implications

Banks should strengthen digital infrastructure to improve efficiency and profitability. Investment in mobile banking interfaces and real-time payment platforms can significantly improve customer experience and income diversification.

5.2 Policy Implications

Regulators must encourage uniform adoption of secure digital technologies across all banks. Public sector banks may require targeted digital transformation programs to bridge technological gaps.

5.3 Academic Implications

The study provides a robust empirical foundation for further analysis of digital transformation and operational efficiency, contributing to ongoing scholarly debates.

VI. CONCLUSION

E-banking has become an essential driver of operational performance in the Indian banking sector. While private banks show higher efficiency gains, public sector banks demonstrate strong progress in digital transaction growth. The study confirms that e-banking significantly contributes to RoE and NIM, whereas effects on RoA and CTIR depend on bank-specific digital maturity. Overall, digital banking is vital for enhancing competitiveness, efficiency, and customer value.

VII. LIMITATIONS AND SCOPE FOR FUTURE RESEARCH

Limitations

- The study focuses on five-year secondary data, limiting real-time behavioural insights.
- Only 10 banks were included, which may not capture the full diversity of India's banking sector.
- Some digital indicators (e.g., UPI, IMPS) were excluded due to reporting inconsistencies.

Future Research

- Expanding the study to include fintech partnerships and customer adoption metrics.
- Conducting primary surveys to understand customer perceptions of digital banking.
- Examining the impact of cybersecurity spending and digital risk management on performance.
- Comparative cross-country studies in emerging markets.

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