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Mobile Banking Growth and Operating Efficiency in Indian Commercial Banks: Evidence from Ten Public and Private Sector Banks, FY2017-18 to FY2024-25

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Abstract. Mobile banking has become a major delivery channel for Indian banks, but its link with bank operating efficiency remains unclear. This study examines ten commercial banks (five public-sector and five private-sector) using Reserve Bank of India (RBI) bank-wise mobile banking statistics for FY2017-18 to FY2024-25 and standalone financial data for FY2024-25. Average monthly mobile banking transactions of the ten banks rose from 106 million to 10,985 million, and annual volume grew by 54.9% a year between FY2021-22 and FY2024-25, although year-on-year growth slowed in each year. Public-sector banks accounted for 68% of FY2024-25 volume. Using a cross-section of the ten banks, usage intensity (monthly transactions per active customer) showed a positive but statistically insignificant association with the cost-to-income ratio (Spearman $\rho = 0.35$, $p = 0.33$), and public-sector and private-sector banks did not differ significantly in their cost-to-income ratios (49.4% against 45.9%, $p = 0.44$). Because financial data were available for one year only and the sample is small, the efficiency results are exploratory and do not indicate causation.

Keywords: *mobile banking; digital banking; operating efficiency; cost-to-income ratio; Indian commercial banks*

1. Introduction

Digital channels have changed how Indian banks serve customers. Mobile banking lets customers transfer funds, pay bills and manage accounts without visiting a branch, and it may allow banks to handle more transactions at a lower cost per transaction. It may also require continuing spending on technology, security and customer support that offsets any saving. Whether the rapid growth of mobile banking has been accompanied by better operating efficiency is therefore an empirical question.

Evidence from India is mixed. Some studies find that digital payment adoption improved bank cost efficiency (Saroy et al., 2023), while others report mixed or negative effects of e-banking and digitisation on performance and technical efficiency (Chauhan et al., 2022; Sharma, 2023). Public-sector and private-sector banks also differ in customer mix, branch networks and technology spending, so the same level of digital activity may be linked to different outcomes (Shaikh & Anwar, 2023).

This paper addresses three questions using ten large banks: (RQ1) How fast has mobile banking grown between FY2017-18 and FY2024-25? (RQ2) Do public-sector and private-sector banks differ in mobile banking usage and in the cost-to-income ratio? (RQ3) Is higher usage intensity associated with a lower cost-to-income ratio? The first question is answered with eight years of data. The other two rely on a single year of financial data and are treated as exploratory.

2. Review of Literature

Hernando and Nieto (2007) show that Spanish banks' overhead expenses fell gradually after they adopted a transactional website, with significant effects after about 18 months, and that the internet channel complemented rather than replaced branches. For India, Malhotra and Singh (2010) find that banks with longer internet banking experience had better operating-efficiency ratios but no significant gain in profitability. More recent Indian panel studies are less uniform. Saroy et al. (2023) combine data envelopment analysis with dynamic panel methods and conclude that digital payment adoption has improved cost efficiency. Shaikh and Anwar (2023), using 32 banks over 2011-2020, find that the public-sector share of digital



transactions fell relative to private banks and that card transactions at ATMs and point-of-sale terminals lowered the cost of funds. By contrast, Sharma (2023) reports mixed effects of e-banking on ROA, ROE and net interest margin for 20 banks (2010-2019), and Chauhan et al. (2022) find an overall negative effect of digitisation on technical efficiency over 2001-2019, with private banks improving more than public banks. Herranz Elvira and De' (2016) show that the most efficient ownership group in India changed over 2009-2014, which suggests that ownership comparisons depend on the period studied.

Two gaps follow. Most Indian studies measure digitisation through aggregate payment volumes or indices, not through how intensively a bank's active customers use mobile banking, and few cover the post-2020 period. This study adds bank-wise mobile banking volumes and active-customer counts up to FY2024-25 and compares public and private banks. Its contribution is descriptive and exploratory; it does not replace the panel evidence above.

3. Data and Methodology

Sample and sources. The sample comprises five public-sector banks (State Bank of India, Bank of Baroda, Punjab National Bank, Canara Bank, Union Bank of India) and five private-sector banks (HDFC Bank, ICICI Bank, Axis Bank, Kotak Mahindra Bank, IndusInd Bank). Monthly mobile banking transactions and active customers for April 2017 to March 2025 (960 bank-months) come from RBI's bank-wise mobile banking statistics (RBI, 2024a); the June 2024 figures for all ten banks were checked against the RBI release and match. Standalone operating expenses, net interest income, other income, total assets and net NPA ratios for FY2024-25 come from a compiled workbook based on bank results and secondary sources.

Variables. Mobile banking volume is the sum of monthly transactions in a financial year. Usage intensity (INT) is average monthly transactions divided by average monthly active customers. Operating efficiency is the cost-to-income ratio (CIR) = operating expenses ÷ (net interest income + other income) × 100; a lower value indicates higher efficiency. Total assets (in logs) and the net NPA ratio are used as controls.

Methods. Growth is described using annual totals and compound annual growth rates (CAGR). Public and private banks are compared using Welch t-tests and Mann-Whitney U tests, and the association between INT and CIR is examined using Pearson and Spearman correlations and OLS regression with HC3 robust standard errors. All analysis is cross-sectional (FY2024-25, n = 10; n = 9 where controls are included). With so few observations the tests have low power, so results are reported as associations and not as causal effects.

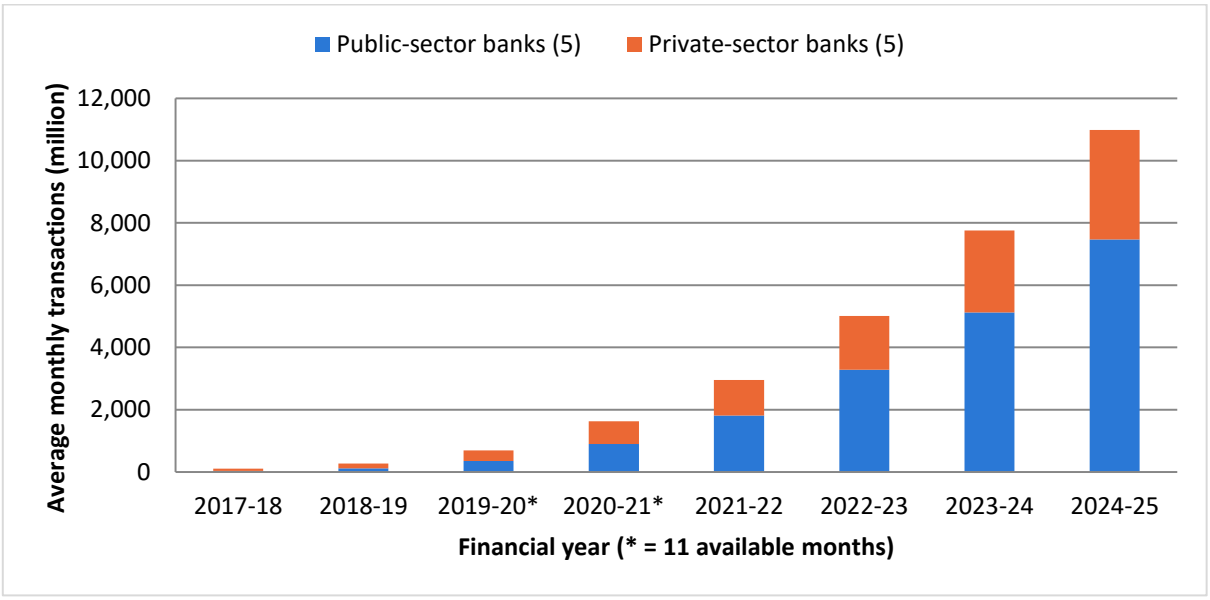
Data limitations. December 2019 and May 2020 are missing for all banks, so the average monthly volume is used for FY2019-20 and FY2020-21. Active-customer counts exist only from March 2022, so usage intensity covers FY2022-23 to FY2024-25. RBI changed the coverage of the series in July 2017, which affects FY2017-18 comparisons. Union Bank of India's active customers fall from 22.5 million to 2.1 million in April 2024, which raises its measured intensity without any evident change in behaviour.

4. Results

4.1 Growth of mobile banking

Average monthly mobile banking transactions of the ten banks rose from 106 million in FY2017-18 to 10,985 million in FY2024-25 (Figure 1). Early years are affected by reporting changes, so the cleaner comparison is FY2021-22 to FY2024-25, when annual volume rose from 35.5 billion to 131.8 billion, a CAGR of 54.9%. Year-on-year growth slowed every year, from 80.9% in FY2021-22 to 69.4%, 54.9% and 41.6%. Public-sector banks accounted for 68% of the group's FY2024-25 volume. Bank-level CAGR over FY2021-22 to FY2024-25 ranged from 24.6% (Axis Bank) to 69.9% (Kotak Mahindra Bank) and exceeded 50% for eight of ten banks.

Figure 1: Growth in mobile banking transactions, FY2017-18 to FY2024-25



*Source: RBI bank-wise mobile banking statistics; authors' calculations. Average monthly transactions of the ten banks (million). * Average of the 11 available months.*

4.2 Usage intensity and efficiency by bank

Table 1 shows usage intensity and the cost-to-income ratio by bank. Intensity averaged 205 transactions per active customer per month in FY2024-25, from 29.5 (SBI) to 534.2 (Punjab National Bank). This spread mostly reflects the size of the reported active-customer base: SBI reports 133.8 million active customers, the other four public-sector banks 1.5-2.8 million, and HDFC Bank, ICICI Bank and Kotak Mahindra Bank 16.8-20.0 million. The mean cost-to-income ratio was 47.7%, ranging from 38.6% (ICICI Bank) to 60.2% (IndusInd Bank).

Table 1: Mobile banking usage and cost-to-income ratio, FY2024-25

Bank	Group	Volume (million)	Active customers (million)	Usage intensity	CIR (%)
State Bank of India	Public	47,353	133.77	29.5	51.6
Bank of Baroda	Public	12,021	2.81	356.9	47.9
Punjab National Bank	Public	9,692	1.51	534.2	54.6
Canara Bank	Public	9,006	2.53	297.1	47.3
Union Bank of India	Public	11,554	2.43	395.8	45.5
HDFC Bank	Private	15,267	19.96	63.7	40.5
ICICI Bank	Private	7,566	16.84	37.5	38.6
Axis Bank	Private	8,738	4.95	147.0	47.1
Kotak Mahindra Bank	Private	8,766	16.86	43.3	43.3
IndusInd Bank	Private	1,851	1.06	146.0	60.2
Public sector, mean		**17,925**	**28.61**	**322.7**	**49.4**
Private sector, mean		**8,438**	**11.93**	**87.5**	**45.9**
Public sector, median		**11,554**	**2.53**	**356.9**	**47.9**
Private sector, median		**8,738**	**16.84**	**63.7**	**43.3**

Source: RBI bank-wise mobile banking statistics and compiled standalone financials; authors' calculations. Usage intensity = monthly transactions per active customer. Kotak's FY2024-25 other income includes a one-off gain, which lowers its ratio.

4.3 Public-sector versus private-sector banks

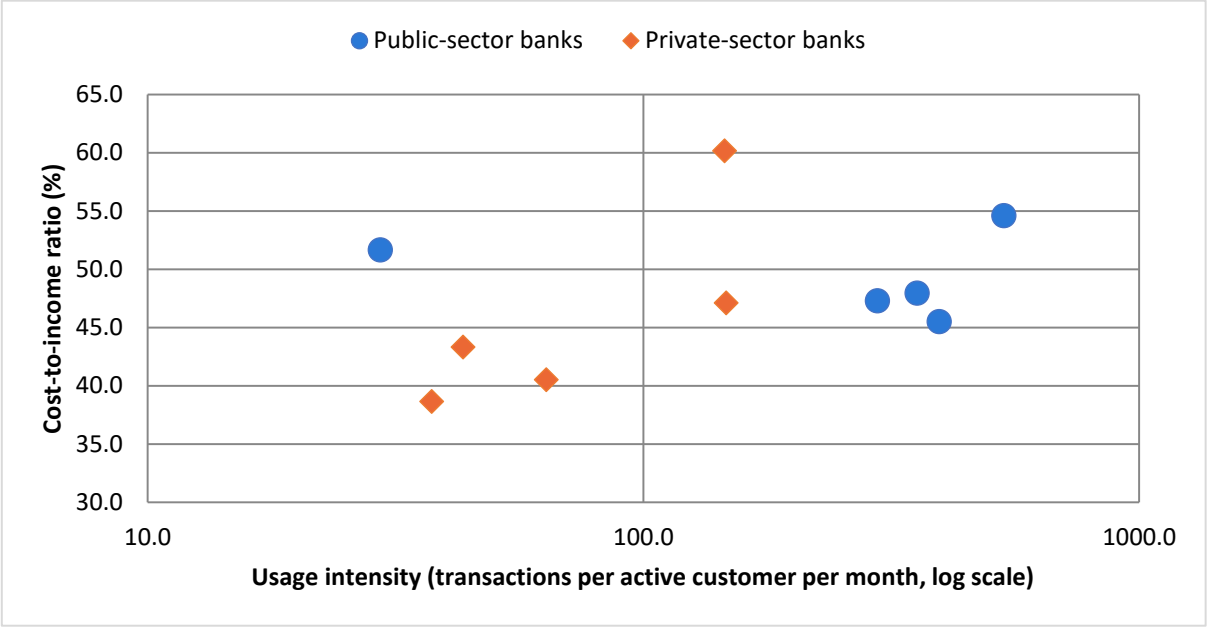
Public-sector banks had a higher mean cost-to-income ratio than private banks (49.4% against 45.9%), but the 3.4-point gap is not statistically significant (Welch $p = 0.44$; Mann-Whitney $p = 0.22$). The pattern is similar in the following year, FY2025-26 (49.7% against 47.2%; $p = 0.61$), which lies outside the study period and is used only as a check. Mean usage intensity is higher in public-sector banks (323 against 88; Welch $p = 0.045$, Mann-Whitney $p = 0.15$), but because active customers are not counted on a uniform basis this should not be read as a behavioural difference.



4.4 Usage intensity and the cost-to-income ratio

Usage intensity is positively, not negatively, associated with the cost-to-income ratio (Pearson r = 0.35, p = 0.31; Spearman ρ = 0.35, p = 0.33; Figure 2), but the association cannot be distinguished from zero. In the OLS model, a one-unit rise in ln(INT), about a 2.7-fold increase in intensity, is associated with a cost-to-income ratio 2.3 percentage points higher (p = 0.29). When ln(total assets) and the net NPA ratio are added (n = 9) the coefficient falls to 0.8 (p = 0.88). Net NPA is the strongest correlate of CIR (r = 0.59) but is also not significant (p = 0.10). The result is not driven by one bank: the Spearman correlation ranges from 0.23 to 0.74 when SBI, Union Bank or Kotak are excluded.

Figure 2: Usage intensity and cost-to-income ratio, FY2024-25



Source: RBI bank-wise mobile banking statistics and compiled standalone financials; authors' calculations. n = 10; horizontal axis on log scale.

5. Discussion

Mobile banking volume has grown rapidly but at a decreasing rate, which is consistent with a channel moving from early adoption towards maturity. The efficiency results do not show that higher usage goes with lower cost-to-income ratios. A positive sign appears, but it is small relative to its standard error and may reflect bank type: public-sector banks other than SBI report small active-customer bases relative to their volumes, which raises measured intensity, while also having higher cost ratios. The result is consistent with Indian studies reporting mixed or negative efficiency effects of digitisation (Chauhan et al., 2022; Sharma, 2023). It does not contradict studies that find cost savings after adoption (Hernando & Nieto, 2007; Saroy et al., 2023), because those studies observe changes within banks over time, whereas a single cross-section compares different banks at one point. The size of the public-private gap resembles the ownership differences reported earlier (Shaikh & Anwar, 2023) but could easily arise by chance with five banks per group.

6. Conclusion and Limitations

Mobile banking in ten large Indian banks grew strongly between FY2017-18 and FY2024-25, with growth slowing in recent years. In the one year for which financial data were available, higher usage intensity was not associated with a lower cost-to-income ratio, and public-sector and private-sector banks did not differ significantly in efficiency. These findings are exploratory: they rest on ten observations, one year of financial data, an active-customer measure that is not comparable across banks, and financial figures drawn partly from secondary sources. The mobile banking series may also overlap with UPI payments made through bank apps. Mergers during the period were not adjusted for, and the results show association, not causation.

The practical message for banks and regulators is to define active customers consistently, so that usage ratios can be compared across banks. Future research should add annual-report data for FY2017-18 to FY2023-24 and estimate bank and year fixed-effects models with lagged usage, widen the sample to all scheduled commercial banks, and separate mobile banking from UPI.



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