

The financial and sustainability impact of fintech on Indian deposit money institutions: a study of the last decade

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Abstract. The study was related to finding out how the financial results of Indian banks are affected by Artificial intelligence. Secondary data from 2017 to 2022 was taken from the Data release of the Reserve Bank of India (Monthly Bank wise ATM/POS/NEFT/Mobile banking) and for Return on Assets, the website of the Indian Banking Association was used. The validity of the data was assessed using a normalcy test, and the Controlled variables passed from the multicollinearity statistic tests and Partial least square (PLS) regression. Results depict that ATM, Mobile banking, and NEFT have a considerable impact on Return on assets (ROA). While point of sale (POS) services have negligible impact. To improve bank performance, the study suggested that Indian deposit money institutions should teach their customers more about how to utilize National Electronic Fund Transfer (NEFT), Mobile banking, and POS, as well as boost the number of Automatic Teller Machines (ATM) withdrawals. Even the different retail outlets must increase options to pay money so that the customers can pay as they want, and POS gets increased. Policymakers got a fair idea from this study regarding how to draft policies relating to fintech and improve the environment or social sustainability.

Keywords: Fintech, Cashless transactions, Digital banking Industry, Multicollinearity statistics, Partial least square regression (PLS), Sustainability.

1. Introduction

Banking is the primary engine of expansion and development in India. The remarkable results inside the industry and on the Stock Exchange market might support this. The electronic financial system, which is known as Fintech, is an innovation in the financial sector. Information and communication technology (ICT) advancements have made it possible for banks to connect with consumers, turning from in-person interactions at bank branches into interactive and virtual settings [1]. Although Today's environment is a digital environment, as the competition increases, important technologies, artificial

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intelligence, and deep learning have been quickly adopted. The sustainability ideology has basic three pillars-profit(economic), planet (environment), and foundation(social). ATM, POS, Mobile Banking, and Online Money Payment Like NEFT technologies are the most used e-payment methods in India, according to a Cashless India report regarding digital payments. The total number of digital payment transactions increased during the last five financial years from 2071(in crore) in 2017-18 to 9092 (in crore) till 31st December 2022 as per the source taken from RBI. This shows a huge increase in Digital transactions and ultimately leads to saving environment from the useless paper pollution.

However, electronic banking (e-banking) has significantly increased risk exposure for the banking sector. Since its implementation in the economy, both the volume of deposits and the fraudulent activities faced by banks have increased [2]. Fintech faces several difficulties, including risks to security, privacy, and trust, as well as a lack of consumer awareness and weak infrastructure. The Indian government is working with numerous public banks and financial institutions to develop an E-banking system that is more dependable, secure, and safe, which leads to social sustainability. Internet banking is acceptable by Indian consumers, according to previous studies, but the rise will undoubtedly take time [3].

The broader banking industry, the economy, and the environment are all benefiting from the E-banking policies. Customers and banks that go digital might be recognized and rewarded by the banking regulator, the RBI. Green rating organizations can be established to evaluate banks based on their participation in digitization. Customers that choose electronic banking may be eligible for tax breaks from the government. By continuing to follow best practices for sustainable growth and development in the banking sector, a banking sector with a strong client base may capture the promise of developing technologies in E-banking [4] and many researchers work on qualitative data and their relationship with the profitability of banks so the area related to quantitative analysis is untapped somewhere.

Commercial banks have been successful in reducing carbon emissions through several green programs. Because of electronic banking, less paper is used, which lowers the carbon footprint of how e-banks operate. To conserve the environment, a new bank initiative called "Think-Green" is encouraging account holders to sign up for e-statements and cease receiving paper statements. This study is based on the objectives that how electronic transactions or green technology impact the profitability and sustainability of the banks and to find out the main factor which raises the Return on assets (ROA) of banks. For this research, ATM, Mobile banking, NEFT, and POS are taken as Controlled variables and ROA is taken as the dependent variable. A test of normality and multicollinearity is conducted on the data, then PLS- regression is used to test the theory of the study.

2. Literature review:

The environmental, social, and governance facets of banking activities are impacted by e-banking sustainability considerations. The evaluation technique that is suggested incorporates financial or statistical ratios from the three major groups: age group Living area 259 composite indices (like NRI), statistical indicators (usage of the e- banking technological environment and attributes of user segments) are some of the factors that

will contribute to the sustainable development of fintech in Lithuania and Hungary [5]. E-payment has considerably favorable results in financial performance, and the size of the bank strengthens this association. Results show that e-payment innovation can boost bank financial performance. So, as a competitive tactic, banks must pay attention to innovation in financial services [6]. Online banking is a factor of invention that is closely related to sustainability. competitive advantage has a evidentiary impact on bank finance decisions fintech is an effective strategy that helps businesses increase their sustainability and acquire a competitive advantage [7]. Automated teller machines (ATM) have a favorable and considerable influence on deposit money institutions' financial results, whereas points of sale (POS) have a detrimental effect. Additionally, there was a negative correlation between financial performance and the overall value of mobile payment transactions. According to the report, deposit money institutions should put in more ATMs to shorten lineups. To counteract the detrimental effects of mobile payment on deposit money the financial results of deposit money banks should work with telecoms network providers and security forces to stop and imprison hackers [8]. Saving money banks in Nigeria experience major financial performance changes as a result of electronic banking. Descriptive statistics and a multicollinearity test were performed to reach the results. An ex-post facto research design and a normality test were undertaken to determine the quality of the collection. To improve bank performance, the study advised Nigerian banks to teach their clients more about how to utilize NEFT, WEB, and POS, as well as to boost the number of ATM withdrawals [9].

The growth, security, and sustainability of commercial banks are all positively affected by the rise of internet finance while harming their liquidity. Additionally, Internet finance has aided in the expansion of Chinese commercial banks' overall business performance [10].

The authors discovered that there was a strong correlation between the profitability of Ghanaian banks and the cheque code line clearing, machine-driven financial organization, inter-bank agreement, and GH-Link. On the other side, the profit of the banks was negatively impacted by mobile money and E-zwich. To increase sales of their digital banking products and maximize profits, it was advised that banks should increase their marketing and education activities [11]. According to the data study, Bank performance metrics, such as revenue margin, profits after taxes, the return on assets, and return on equity, vary when they adopt e- payment systems. The link between adoption and bank revenue serves as evidence of this. The return on assets (ROAE), gross margins, and profits after tax (PAT) performance indicators of the examined banks were also affected by the four e- payment modalities of ATM, WEB, POS, and mobile banking. Data was accessed by using panel logistic regression [12]. Electronic banking had a considerable overall influence on retail banks' profitability. The study suggests that retail banks step up their efforts to expand the number of ATM delivery points and improve their effectiveness and efficiency, and that regulatory agencies work with the banks to set up an enabling operating environment and regulatory framework to ensure the most effective delivery of these services to customers [13]. The operation of banks is harmed by electronic banking because the performance of these institutions has not increased as a result of electronic banking. Customers of Jordanian banks rely on conventional channels to conduct their financial transactions. As a result, the expenses of implementing online banking remain higher than the income generated by the sale of electronic services. Therefore, banks should concentrate on increasing client confidence in e-banking services and encourage the use of these facilities. Accounting data were

utilized to assess the performance of the institutions, and key variables were regressed using OLS in this study [14]. Increasing fintech has a appreciable and favorable effect on Sepah's earnings. According to the study, Market concentration, bank size, and the number of terminal branches all have a beneficial impact on a bank's earnings; still, the number of terminal branches had the greatest impact. Total ROA was regarded as the response variable for this purpose and the size of the banking concern, the market concentration, the ATMs, terminal branches, and point of sales (POS), were all taken into consideration as Controlled variables. The Auto-regressive Distributed Lag model (ARDL) method was in use for the outcome in that study [15]. For Indian banks, implementing "Green Banking" as a booming venture presents potential and trouble both. If done candidly, green banking will function as a cost-efficient ex-ante deterrent for the contaminate sectors that snub the other institutional regulatory systems. Asian nation banks should immediately adopt green banking as a business model to practice sustainable banking [16]. According to the regression study, there is zero discernible effect of fintech services on the ROA and ROE of banks. It is a sign of the higher costs and costs related to using these services. It is heavily impacted by e-banking services, unlike Margin [17].

3. Hypothesis and objectives:

H_1 : Fintech has a negligible effect on bank profits.

H_2 : The impact of key variables on banks' ROA is minimal.

3.1 Objectives:

1. To ascertain the impact of fintech on financial performance which leads to the sustainability of banks that accept deposits.
2. To identify the key factors that influence ROA.

4. Data and methodology

The financial reports of the banks under consideration for a period of six years, from 20017 to 2022, and the data release of the Reserve Bank of India (Monthly Bank wise ATM/POS/NEFT/Mobile banking) for Controlled variables and the website of Indian Banking Association for Return on Assets as a depended variable provided the data for each variable in this study. Return on Assets is the metric used to measure the tested variable, financial performance, while Mobile banking, NEFT, Web Banking (WEB), ATM, and POS are the metrics used to measure the predictor variable, electronic banking. Kolmogorov-Smirnov test (KS test) was used to establish time series stationarity, and since the study's time frame will span over a long period, it was also used to determine whether the test results are statistically reliable. PLS regression is used for further hypothesis testing.

4.1 Model

The following models were created to ensure that the hypotheses were properly analyzed:

ROA= f(ATM,POS,MOBILE BANKING,NEFT)

(1)

ROA=

$$B_0 + B_1ATM + B_2POS + B_3MOBILEBANKING + B_4NEFT$$

5. Data presentation

Table 1 shows the data concentrated from the yearly reports of the Reserve bank of India. Data comprise the total of Public and Private bank annual electronic transactions from ATM, POS, Mobile banking, NEFT, and ROA from 2017 to 2022.

Table 1. Electronic payments from 2017-2022 in Indian Commercial banks

Year	ATM (Debit card)	POS (Debit card)	Mobile banking	NEFT (Inward credit)	ROA (%)
2017	2243193.4	344184.6	1699767355	13273713.55	6.57
2018	2643040.5	404137.8	1108760318	17868741.44	- 11.56
2019	2832869.9	508320.4	3932748553	22079018.5	- 20.39
2020	24116866	4611057	4667059951	184496085.1	- 20.78
2021	27866024	6490613	10219052748	201973491.8	15.8
2022	2788774951	212518	222643111	288532944.3	25.11

Source: Data release of RBI

For the parametric data, it is necessary to pass the normality test. So that is not up to 10 years. This test of distribution was employed to confirm the decency of the data variables utilizing the KS test to encourage the stationarity test.

5.1 Normality test

The normality test is a crucial step in choosing the measures of central tendency and statistical techniques for data analysis for continuous data. When our data have a normal distribution, parametric tests are employed to compare the groups; otherwise, non-parametric procedures are used [18]. The degree of customariness was evaluated using the KS test. The Shapiro-Wilk test, Anderson- Darling test, Lillie/ors test, and Kolmogorov-Smirnov test are the most effective normalcy tests, respectively. All four tests still have a low level of power due to the tiny sample size [19]. An ATM in Table 2 shows that the data are not normally distributed, with a test statistic of.487 and a p-value of 0.000*, which is less than 0.05. Shapiro-Wilk test statistics, which had a measure value of 0.000, likewise ruled out the data's normality. But a bell-shaped histogram is shown. The KStest probability value for the Point of Service (POS) is 0.006 in Table 2, which is less than 0.05 and signifies that the data is not normal. Since the histogram has a bell- shaped structure, the Shapiro-Wilk test p-value of.013 does not disprove the normalityof the data (see Figure 1). According to the KS test (see Table 2), mobile banking hasa p-value of 0.200*, which is high than the 0.05 threshold that denotes data normalcy.The data's normality was validated by the Shapiro-Wilk test p-value

of.255. The probability value for NEFT is 0.103*, higher than the 0.05 value showing data normality, according to the KS test (see Table 2). The data's normality was validated by the Shapiro-Wilk test p-value of 119. Return on Assets (ROA) in Table 2 has a test statistic of.208 and a higher-than-0.05 p-value of 0.200*, demonstrating that the data is Gaussian distributed. The normality of the data was further supported by the Shapiro-Wilk test statistic, which had a p- value of 0.352.

Table 2. Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
ATM (Debit card)	.487	6	.000	.505	6	.000
POS (Debit card)	.385	6	.006	.731	6	.013
Mobile banking	.222	6	.200*	.877	6	.255
NEFT (Inward credit)	.298	6	.103	.835	6	.119
ROA (%)	.208	6	.200*	.896	6	.352

*. This is a lo
a. Lilliefors Significance Correction were bound of the true significance.

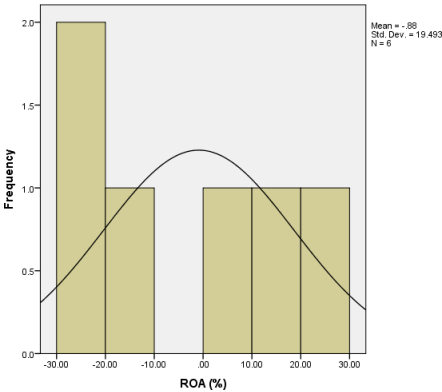


Fig. 1. Normality test histogram for ROA

5.2 Multicollinearity test

When there are numerous factors included in a multiple linear regression analysis that have a strong correlation with both the dependent variable and each other as well, this is known as multicollinearity. Some of the significant study variables become statistically insignificant due to multicollinearity [20]. When two or more predictors are associated, with a phenomenon known as multicollinearity, the standard error of the coefficients rises. The coefficients for any or all Controlled variables maybe found to be significantly different from 0 when the standard errors are increased [21]. Table 3 of the correlation matrix shows all the Controlled variables are highly correlated. Table 4's collinearity data demonstrate that while the variance inflation factors (VIF) are all significantly higher than 10 and the tolerance values are all less than 1 that means confirming the

existence of multicollinearity.

We are unable to use the ordinary least square (OLS) regression method because of the presence of multicollinearity. So, in our research, we used a partial least square (PLS) regression model.

Table 3. Correlation matrix:

Variables	ATM (Debit card)	POS (Debit card)	Mobile banking	NEFT(Inward credit)	ROA (%)
ATM (Debit card)	1	-0.327	-0.452	0.696	0.655
POS (Debit card)	-0.327	1	0.904	0.442	0.038
Mobile banking	-0.452	0.904	1	0.216	0.021
NEFT (Inward credit)	0.696	0.442	0.216	1	0.576
ROA (%)	0.655	0.038	0.021	0.576	1

Table 4. Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	ATM (Debit card)	.008	131.888
	POS (Debit card)	.007	149.399
	Mobile banking	.067	15.023
	NEFT (Inward credit)	.006	161.152

a. Dependent Variable: ROA (%)

5.3 Partial least square regression results:

One of the several covariance-based statistical techniques known as structural equation modeling, or SEM, is partial least squares. When there is a limited sample size, missing values, or multicollinearity in the data, it was made to deal with multipleregression [22]. The general guideline for choosing pertinent variables is a VIP score value greater than 1 [23]. Only two variables—ATM and NEFT—from the VIP plot are above the cut-off value of 0.8 and 1, thus special attention should be paid to these, and the remaining variables should beleft out of the model.

Table 5. Variable Importance in the Projection (VIP)

Variable	VIP (1)	Standard deviation	Lower bound (95%)	Upper bound (95%)
ATM (Debit card)	1.501	0.840	-0.658	3.659
NEFT (Inward credit)	1.318	0.420	0.239	2.398
POS (Debit card)	0.088	0.727	-1.782	1.958
Mobile banking	0.047	0.970	-2.446	2.541

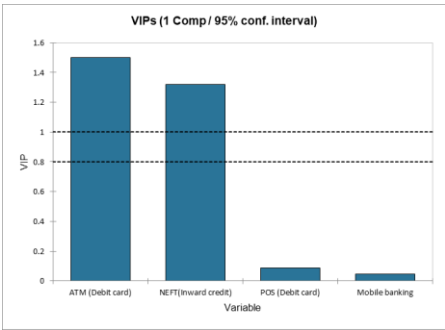


Fig. 2. Variable importance point

5.4 Equation of the model

$$\text{ROA (\%)} = -11.4245252303334 + 6.68394894729054\text{E-}09 \cdot \text{ATM (Debit card)} + 1.6230730981194\text{E-}07 \cdot \text{POS (Debit card)} + 6.58133994221551\text{E-}11 \cdot \text{Mobile banking} + 5.5998861047871\text{E-}08 \cdot \text{NEFT (Inward credit)}$$

The findings from table no 6 suggest that the profitability of Indian banking sector will decrease by -11.42 units when all the variables are set to zero. If all other Controlled variables remain the same, an increase in ATM payments by one unit will result in an increase in ROA of 6.683 (66.83%). Additionally, it can be noted that a unit change in payment through Mobile banking will result in an increase of 6.581 (65.81%) in the profitability of Indian banks. The profitability of the institutions will grow by 55.99% (5.599) for every percentage point increase in the number of payments made through NEFT. Additionally, Pos increase Indian banks' ROA by 1.623 (16.23%), which is very less as compared to other fin-tech applications.

Table 6. ROA

Observations	Controlled variables	ROA
		Coefficients of original data
1	Intercept	-11.42
2	ATM	6.683
3	POS	1.623
4	Mobile banking	6.581
5	NEFT	5.599

6. Results and testing of hypothesis:

6.1 Hypothesis 1 testing:

According to table no 7 the ability of a controlled variable to explain the outcome variable is measured by the coefficient of determination (R2). The study model's R-Squared value is 0.452, or 45.22%. This indicates that only 45.2% of the outcome variable (ROA) can be explained or influenced by the controlled variable and the remaining 54.78 is influenced by the other variables.

Table 7. Coefficient of determination (Variable ROA(%):

Observations	6.000
Sum of weights	6.000
DF	4.000
R ²	0.452
Std. deviation	16.128
MSE	173.406
RMSE	13.168

6.2 Hypothesis 2 testing

The findings of the second hypothesis test (see Table 8) indicate that ATMs and NEFT are significant and positive, indicating that ATM influences deposit money banks' ROA in India. The ROA of the banks may noticeably alter depending on the amount of ATM and NEFT transactions and Mobile banking have a statistical coefficient of 0.002349 and .012. This indicates that POS and Mobile banking is unable to affect the banks' ROA.

Table 8. Standardizes coefficients (Variable ROA (%):

Variable	Coefficient	Std. deviation	Lower bound (95%)	Upper bound (95%)
ATM (Debit card)	0.389	0.299	-0.379	1.157
POS (Debit card)	0.023	0.217	-0.535	0.580
Mobile banking	0.012	0.216	-0.542	0.566
NEFT (Inward credit)	0.342	0.239	-0.274	0.957

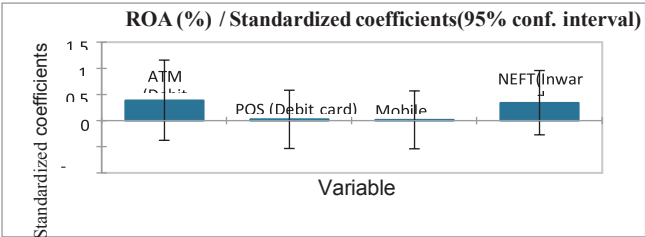


Fig. 3. ROA (%) / Standard coefficients

7. Conclusions and suggestions

The major goal of the study was to determine how web banking affected the profit and sustainability of Indian deposit money institutions. Most respondents utilize fiscal inclusion services based on fintech regularly, and they accept that doing so has improved their gain and savings and they will be able to send money cheaply to anyone in the world [24]. If the profits through fintech increases that means resources get utilized properly and that enhances the environment as well as social sustainability. The research's primary goal was to use ordinary least square multiple regression to analyze the link between these banks' return on assets and their digital banking products. The Controlled variables were found to be highly correlated following a preliminary test on the data set, which would harm the prediction's accuracy. To cope with multiple regression when the data set has a limited sample, missing values, or multicollinearity, a partial least square was chosen as the method.

The predicted PLS regression results showed a optimistic relationship between the profit of Indian commercial banks and ATM, NEFT, and Mobile banking. Unexpectedly, the gainfulness of the banks was less correlated with POS. The lack of machines at vantage points and the fees associated with mobile money may be to blame for the bad association. Customers are not having different options like UPI, Paytm, Google Pay, Paypal, etc to payout their money, and some customers are worried about forgetting passwords during the time they make transactions. This will also impact social sustainability. Because if the customers get an education in finance they can save, invest and utilize their money accordingly and poverty and illiteracy risk get decrease and the country will achieve social sustainability.

8. Future scope of the study

As fresh companies and profession have changed the way we think about finance and wealth, fintech has grown rapidly in recent years. Experts predict that the rising of fintech will involve even more creativity, with a greater focus on providing smooth, all-around financial services and removing barriers like high charges, strict policies, and lack of security [25]. The findings of this study have opened the door for additional fact-findings utilizing the PLS regression method as a new dimension for examining the link between profitability and digital banking. On the same side, researchers can work on how profitability and digital transactions lead to long-term viability of banks.

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