

DIGITAL TRANSFORMATION IN ACCOUNTING AND ITS IMPLICATIONS FOR MANAGEMENT PERFORMANCE

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Abstract

Digital transformation is reshaping accounting and financial processes in the banking sector through the adoption of artificial intelligence, big-data analytics, blockchain, cloud computing and Internet-of-Things technologies. This study examines the association between accounting-related digital transformation and bank performance among 20 selected NSE-listed banks in India over the period 2015–2024, using 200 bank-year observations. Secondary data were compiled from Reserve Bank of India sources, the Digital Payments Index, bank annual reports, Moneycontrol and CMIE. Digital Transformation in Accounting (DT) is represented by a technology-oriented index capturing the reported adoption of AI, big data, blockchain, cloud computing, IoT and related digital accounting practices. Bank performance is assessed using Return on Assets (ROA) and Return on Equity (ROE), while Operating Cost Ratio (OCR) is examined as a potential transmission mechanism. Bank size and leverage are included as control variables. Panel regression models are used to examine the direct association between DT and performance and the proposed OCR pathway. The reported results show a positive and statistically significant association between DT and both ROA and ROE. DT is also negatively associated with OCR, indicating a relationship between greater digitalisation and lower operating costs relative to operating income. However, OCR is not statistically significant in the ROA model after DT and controls are included; therefore, the reported evidence does not support OCR as a mediator. The study contributes an India-specific empirical perspective on accounting digitalisation and bank performance and highlights the need to distinguish direct performance effects from cost-based transmission mechanisms.

Keywords: *Digital Transformation in Accounting, Management Performance, ROA, ROE, Operating Cost Ratio, Indian Banks, Panel Regression.*

1. INTRODUCTION

Digital transformation in accounting is crucial because banks are increasingly turning to new technologies like artificial intelligence, cloud computing, big data, blockchain, and IoT to strengthen accounting and financial operations. These technologies can be used to improve information processing, reports, transparency and managerial decision making [1]. In addition to cloud computing, big data and artificial intelligence, digital transformation in accounting information systems also enhances accounting processes and information management [2]. Other Internet-based technologies are also transforming the role of the accountant in the traditional aspects of their work, such as access to and use of digital information [3]. Furthermore, blockchain and AI have also provided opportunities for accounting and auditing tasks due to the benefits of transparency, automation and data management [4].

Digital accounting transformation can also have an impact on the quality of decision-making and on the performance of the organisation. The use of cloud-based accounting systems can enhance the effectiveness of accounting and the quality of decision making that is performed, which can make the firm more successful [5]. The greater context of digital transformation has the potential to transform business processes and establish new opportunities for enhancing business performance [6]. Likewise, the capability to develop big data analytics can benefit firm performance as it allows the organisation to generate and utilize information in a better manner [7]. In the context of the banking industry, the technology adoption can affect the operational efficiency, diversification, stability and performance of banks, making digital transformation significant [8]. Empirical studies also show that digital transformation may impact the performance of banks and it is critical to explore the relationship between digitalisation and financial performance metrics like ROA and ROE [9]. Hence this study investigates the effect of Digital Transformation in Accounting on Management performance of selected NSE listed banks in India from 2015 to 2024. Management performance is evaluated by Return on Assets (ROA) and Return on Equity (ROE) and Operating Cost Ratio (OCR) is further explored as a potential mediating variable.

1.1 Research Aim and Objectives

To examine the relationship between Digital Transformation in Accounting and the performance of selected NSE-listed banks in India during 2015–2024, with particular attention to the potential role of Operating Cost Ratio.

- To assess the level and variation of accounting-related digital transformation among the selected NSE-listed banks during 2015–2024.
- To examine the association between Digital Transformation in Accounting and bank performance measured by ROA and ROE.
- To evaluate the relationship between Digital Transformation in Accounting and Operating Cost Ratio.
- To test whether Operating Cost Ratio provides a statistically supported pathway between Digital Transformation in Accounting and ROA.

1.2 Research Questions

- What is the level and variation of accounting-related digital transformation among the selected NSE-listed banks during 2015–2024?
- How is Digital Transformation in Accounting associated with ROA and ROE?
- How is Digital Transformation in Accounting associated with Operating Cost Ratio?
- Does Operating Cost Ratio provide a statistically significant pathway between Digital Transformation in Accounting and ROA?

2. LITERATURE SURVEY

[10] explored the link between digital transformation and firm performance and concluded that investing in digital transformation is beneficial for business performance, as it helps enhance operational processes and utilize digital technologies effectively. They discovered that digital transformation can play a role in improving performance by altering the way in which business processes are approached and enhancing the capabilities of the organisation. [11] examined the correlation between digitalisation and bank efficiency and found that digital technology can impact bank institutions' efficiency. Their research underscores the digitalization value for banks to boost operational efficiency and enable them to better utilize resources. In particular, [12] focused on finding out if digital transformation enhances the cost effectiveness of commercial banks. Their research shows that digital transformation can lead to a better cost efficiency, which suggests that the introduction of technology could enable banks to better manage operating costs. This adds support for the operating cost as an important mechanism to look at when discussing the implications for performance when considering digital transformation.

Further, [13] analyzed digitalisation and the performance of commercial banks, and concluded that the effect of digitalisation on the performance of commercial banks can vary by type of commercial bank. The study shows that the impact of digital transformation could vary depending on bank-specific conditions and characteristics. [14] have examined the factors that influence the scope of digital transformation in banking and concluded that organisational and technological factors are crucial in the implementation of digital transformation. They found that there are a number of internal and external factors which can shape the level and impact of technology adoption, depending on the success of digital transformation within banks. Vial [15] offered a more general conceptual framework of digital transformation and defined the digital transformation as changes in the value-creation mechanisms, organizational structure and processes, due to digital technologies. This lens offers a theoretical ground for insight on the impact of digital transformation in accounting on operational processes and management performance.

2.1 Research Gap

Although previous studies have established that digital transformation can influence organisational performance, efficiency and decision-making, several gaps remain in the context of accounting digitalisation within the Indian banking sector. Existing research has largely examined digital transformation at the broader organisational or banking level, with comparatively less emphasis on the specific role of Digital Transformation in Accounting, particularly the integration of AI, big data, blockchain, cloud computing and IoT into accounting and financial processes. Furthermore, prior studies have provided evidence from different international banking contexts, including China and Europe, but there is limited empirical evidence focusing specifically on NSE-listed banks in India over a consistent ten-year period. Another important gap concerns the mechanism through which digital transformation may influence bank performance. While previous research suggests that digitalisation can improve cost efficiency, limited attention has been given to whether Operating Cost Ratio acts as a mediating pathway between accounting digital transformation and financial performance. Therefore, this study addresses these gaps

by examining the relationship between Digital Transformation in Accounting and bank performance using ROA and ROE, while additionally testing Operating Cost Ratio as a potential mediator, with bank size and leverage incorporated as control variables within a panel-data framework.

3. RESEARCH METHODOLOGY

3.1 Research Design

This study follows a quantitative research approach with a panel data regression analysis design to analyze the implications of digital transformation in accounting for management performance of NSE listed banks in India. The study spans the years 2015-2024 and compares the digital transformation and bank performance levels of the selected years. Panel regression is suitable for analyzing variations in individual panels as well as time-based variations. A panel regression analysis has also been applied in previous studies to analyze the relationship between financial digital transformation and performance.

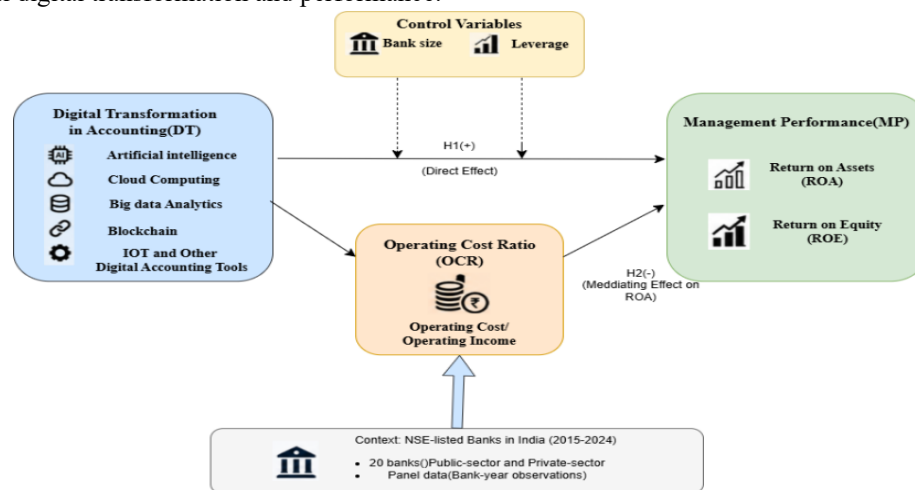


Figure 3.1: Proposed Research Framework

3.2 Hypothesis Development

The expected relationship between accounting digital transformation and performance follows from the potential for digital systems to improve information quality, processing speed, automation and managerial decision support. Accordingly:.

H1: Digital transformation of accounting has a positive significant impact on management performance.

H2: Operating cost plays a significant role in the relationship between digital transformation in accounting and ROA.

Digital transformation may also reduce operating costs by automating repetitive activities, improving process integration and reducing manual intervention. If operating costs subsequently influence ROA, OCR could form a transmission pathway. However, mediation must be tested rather than inferred solely from the DT–OCR relationship.

3.3 Sample Selection

The study has been conducted on NSE listed banks of India comprising of public-sector banks and private-sector banks in the period of 2015-2024. The banks are picked because they provide regular reporting of financial and digital transformation-related information. If banks are not sufficiently or fully observed, they are not included in the final dataset. The observations are then arranged in a panel dataset for the bank-year.

3.4 Data Sources and Dataset

The study is secondary data based on data gathered from RBI, Digital Payments Index (DPI), bank annual reports, Moneycontrol and CMIE. Annual reports are used to discover bank-level digital transformation initiatives and accounting-related digital practices, and financial databases are used to provide information needed to measure the performance of management and operating costs. The final dataset includes digital transformation indicators along with performance measures and operating cost data, and bank-level control variables across the banks selected for the study over the 10-year period.

Source	Primary use in the study
Reserve Bank of India (RBI)	Banking and financial-sector information

Digital Payments Index (DPI)	Contextual evidence on banking digitalisation
Bank annual reports	Identification and coding of bank-level digital initiatives and accounting-related digital practices
Moneycontrol	Financial statement and ratio information
CMIE	Firm-level financial and accounting variables

3.5 Variable Measurement

Digital Transformation in Accounting (DT) is an independent variable while Management Performance (MP) is dependent variable that is measured based on ROA and ROE. A digital transformation proxy is a set of baselines derived from the banking industry's examples of technology-enabled accounting and financial process, such as AI, big data, blockchain, cloud and IoT. The mediating variable in this study is Operating Cost Ratio (Operating Cost / Operating Income) in line with the previous studies that found that digital transformation is a bridge between operating cost reduction and financial performance improvement. The following control variables are included: bank size, leverage.

Variable	Role	Operationalisation
Digital Transformation in Accounting (DT)	Independent	Composite score based on reported technology-enabled accounting/financial practices involving AI, big data, blockchain, cloud computing, IoT and related digital systems.
ROA	Dependent	Return on Assets (%)
ROE	Dependent	Return on Equity (%)
Operating Cost Ratio (OCR)	Potential mediator	Operating Cost / Operating Income, expressed as a percentage.
Bank Size	Control	Natural logarithm of the selected bank-size measure used in the dataset.
Leverage	Control	Leverage ratio reported/constructed for each bank-year observation.

3.6 Model Specification

The study estimates panel regressions to determine the direct and indirect links.

Model 1 – Direct Effect:

$$MP_{it} = \beta_0 + \beta_1 DT_{it} + \beta_2 Controls_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Model 2 – Operating Cost:

$$Cost_{it} = \beta_0 + \beta_1 DT_{it} + \beta_2 Controls_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Model 3 – Mediation:

$$ROA_{it} = \beta_0 + \beta_1 DT_{it} + \beta_2 Cost_{it} + \beta_3 Controls_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

These models consider whether the direct effects of accounting digital transformation on management performance exist and whether operating-cost reduction also has a direct effect on ROA.

3.7 Diagnostic Tests

Prior to regression estimation, the study performs VIF, the Panel unit-root test, Hausman and F-test. To detect multicollinearity VIF is used and the unit-root test is used to test for stationarity of the panel variables. The Hausman test is used to check whether the Fixed Effects model or the Random Effects model is appropriate and the F-test is used to check the relevance of the bank-specific effects.

3.8 Regression and Hypothesis Testing

The main specification used to estimate the selected panel regression model is Fixed Effects, which is appropriate for the study purposes of controlling for time-invariant bank-specific characteristics that are not observed. The coefficient and p-value are used to analyze the relationships estimated by the model, and the R^2 is used to analyze

the ability of the model to explain the phenomenon. The higher and more significant the DT coefficient, the more in favor of H1. While a significant relationship between Digital Transformation and Operating Cost Ratio would be indicative of mediation, the relationship between Digital Transformation and ROA would not be sufficient evidence of mediation for H2.

4. RESULTS AND ANALYSIS

4.1 Descriptive Statistics

Descriptive statistics of variables used for the analysis of the relationship between DT in Accounting and Management Performance of the selected NSE listed banks in India are presented in Table 4.1. The analysis covers 200 bank-year observations for the period 2015–2024.

Table 4.1 Descriptive Statistics of Study Variables

Variable	Mean	Std. Dev.	Minimum	Median	Maximum
Digital Transformation (DT)	37.14	11.06	17.01	35.62	64.00
Operating Cost Ratio (%)	40.40	5.24	27.02	41.09	53.65
ROA (%)	1.23	0.32	0.55	1.22	2.23
ROE (%)	10.44	2.70	4.48	10.49	16.97
Size	11.82	0.36	10.86	11.87	12.36
Leverage	0.892	0.026	0.850	0.890	0.940

The descriptive statistics show that, on average, the Digital Transformation score is 37.14 with standard deviation of 11.06, highlighting the variation in the level of digital transformation in the selected banks and years. The mean ROA is at 1.23% and the mean ROE is 10.44% which is the overall management performance of the selected banks. The Operating Cost Ratio has an average of 40.40%, which means that the ratio of operating costs to operating income.

4.2 Correlation Analysis

Table 4.2 presents the correlation matrix for Digital Transformation, Operating Cost Ratio, ROA and ROE.

Table 4.2 Correlation Matrix of Key Study Variables

Variable	DT	Cost Ratio	ROA	ROE
DT	1.000	−0.862	0.808	0.813
Cost Ratio	−0.862	1.000	−0.694	−0.726
ROA	0.808	−0.694	1.000	0.686
ROE	0.813	−0.726	0.686	1.000

The Digital Transformation is positively correlated with ROA ($r = 0.808$) and ROE ($r = 0.813$) and negatively correlated with Operating Cost Ratio ($r = -0.862$) which gives initial support for the hypotheses tested in this study. These relationships are confirmed using regression analysis, controlling for other bank-level factors.

4.3 Diagnostic Tests

The suitability of the panel data structure and the explanatory variables were evaluated with the diagnostic tests before estimating the regression models. The methodology sets VIF, panel unit root, Hausman and Hausman F-test for this.

4.3.1 Variance Inflation Factor (VIF)

Table 4.3 Variance Inflation Factor

Variable	VIF
Digital Transformation	5.153
Operating Cost Ratio	3.923
Size	2.130
Leverage	1.006

The Digital Transformation ($VIF = 5.153$) is slightly higher than the traditional value of 5, which fits well with the negative correlation coefficient with Operating Cost Ratio ($r = -0.862$). But none of the values indicates serious MC that can hinder the inclusion of the variables in the regression models.

4.3.2 Panel Unit-Root Test

A series of panel unit root tests were performed to determine the stationarity of the variables in the analysis. The test is crucial as the regression relationship can be misleading due to non-stationary variables. The results were taken into account prior to running the panel regression analysis.

Variable	Fisher χ^2	df	p-value	Decision
DT	33.709	40	0.748	Non-stationary
Cost Ratio	88.328	40	<0.001	Stationary
ROA	109.381	40	<0.001	Stationary
ROE	95.831	40	<0.001	Stationary

The variables Operating Cost Ratio, ROA and ROE are stationary and do not have a unit root ($p < 0.05$); ROE and Operating Cost Ratio are also positively correlated and negative correlated, respectively, with Digital Transformation, which is stationary and has a unit root ($p = 0.748$). The year fixed-effects are used to control for this trend in the regression models.

4.3.3 Hausman Test and F-test

The Hausman test was applied to check for the difference between the coefficient estimates of Fixed Effects and Random Effects and to see if the coefficient estimates obtained using the two were different systematically.

	FE coefficient	RE coefficient
DT	0.0220	0.0224
Size	0.1322	0.0340
Leverage	0.8631	0.8478

Given the test statistic $\chi^2 = 0.618$, degrees of freedom = 3, $p = 0.892$, the null hypothesis is not rejected and thus the conclusion is that the data supports the Random Effects model. For the main analysis, however, Fixed Effects is maintained to account for bank-specific, unobserved characteristics that are time-invariant such as the differences in institutional and governance structures between public- and private-sector banks. Random Effects results are reported as robustness comparison.

Table: Panel Model Selection Tests

Test	Statistic	df	p-value	Reported implication
Hausman	$\chi^2 = 0.618$	3	0.892	Random Effects not rejected
F-test for bank effects	F = 1.251	19	0.222	Bank effects not statistically significant

The Hausman test was conducted to determine the appropriate panel regression specification between the Fixed Effects and Random Effects models. The results show a chi-square statistic of 0.618 with 3 degrees of freedom and a p-value of 0.892. Since the p-value is greater than 0.05, the null hypothesis is not rejected, indicating that the Random Effects model is not statistically different from the Fixed Effects model and is therefore not rejected. In addition, the F-test for bank-specific effects produced an F-statistic of 1.251 with 19 degrees of freedom and a p-value of 0.222. As this p-value is also greater than 0.05, there is no statistically significant evidence of bank-specific effects relative to the pooled specification. Overall, these diagnostic results suggest that the evidence for bank-specific Fixed Effects is limited, and the Random Effects and pooled models should therefore be considered as comparison specifications when selecting the final panel regression model.

4.4 Regression Results

4.4.1 Model 1 – Direct Effect of Digital Transformation on Management Performance (H1)

ROA and ROE are used to measure the bank's performance and the direct effect of Digital Transformation on the bank's performance is investigated. Bank size and leverage are also included as control variables in the model, to help control for other factors that can affect management performance. Table 4.4 shows the regression results.

Table 4.4 Direct Effect of Digital Transformation on Management Performance

Variable	ROA Coefficient	ROA p-value	ROE Coefficient	ROE p-value
Digital Transformation	0.0214	<0.001***	0.1934	<0.001***

Size	0.0789	0.813	4.6705	0.088
Leverage	0.8447	0.132	8.7155	0.035*
R²	0.713	—	0.732	—
Observations	200	—	200	—

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. As per the results, Digital Transformation has positive and statistically significant impacts on both ROA and ROE. The coefficient of Digital Transformation is significant at the 1% level with values of 0.0214 for ROA and 0.1934 for ROE. The models account for high percentages of the variation in management performance, with R^2 values of 0.713 and 0.732 for the two models. Thus, the hypothesis (H1) is accepted.

4.4.2 Model 2 – Effect of Digital Transformation on Operating Cost (H2 – Stage 1)

In this model, it is checked whether there is an association between the Digital Transformation in Accounting and Operating Cost Ratio of the selected banks. Bank size and leverage are used as control variables to adjust for bank characteristics. The results of the regression analysis are presented in Table 4.5.

Table 4.5 Effect of Digital Transformation on Operating Cost Ratio

Variable	Coefficient	Std. Error	t-statistic	p-value
Digital Transformation	-0.4942	0.0733	-6.742	<0.001*
Size	-5.2289	4.898	-1.068	0.286
Leverage	-9.9140	7.159	-1.385	0.166
R²	0.788	—	—	—
Observations	200	—	—	—

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. The Operating Cost Ratio ($\beta = -0.4942$, $p < 0.001$) has a significant negative relationship with digital accounting use, indicating that the use of digital accounting can lead to an increase in operational efficiency by reducing the relative cost.

4.4.3 Model 3 – Mediation Test (H2)

This model explores the possibility of establishing a relationship between Digital Transformation in Accounting and Operating Cost Ratio. Bank size and leverage are combined with the Digital Transformation and Operating Cost Ratio, which are being used to evaluate the proposed mediation relationship. Table 4.6 shows regression results.

Table 4.6 Mediation Effect of Digital Transformation and Operating Cost on ROA

Variable	Coefficient	Std. Error	t-statistic	p-value
Digital Transformation	0.0204	0.0050	4.058	<0.001*
Operating Cost Ratio	-0.0021	0.0054	-0.389	0.697
Size	0.0680	0.335	0.203	0.839
Leverage	0.8240	0.565	1.458	0.145
R²	0.713	—	—	—
Observations	200	—	—	—

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. When Operating Cost Ratio ($\beta = 0.0204$, $p < 0.001$) is added to the model, Digital Transformation is still significant, and Operating Cost Ratio is not significant ($\beta = -0.0021$, $p = 0.697$). So Operating Cost Ratio does not play a significant role as a mediator, H2 does not hold true.

4.5 Discussion of Findings

The reported findings provide three main observations. First, accounting-related digital transformation is positively associated with both ROA and ROE. This is consistent with the literature suggesting that digital technologies can improve information processing, decision support and organisational capabilities [5–7]. In banking, the result also aligns with research linking digitalisation with efficiency and performance [8,9]. Second, DT has a statistically significant negative association with OCR. This finding is consistent with the argument that automation, integrated information systems and technology-enabled processing can be associated with improved operating efficiency [11,12]. However, the magnitude should be interpreted in the units of the DT index and OCR measure, and the model should be estimated with robust standard errors before making a strong inferential claim.

Third, OCR is not statistically significant in the full ROA model. Thus, the reported results distinguish between a relationship with operating costs and a mediation pathway to performance. Digital transformation can be associated with lower OCR without OCR statistically transmitting that relationship to ROA in the specified model. This distinction strengthens the interpretation of the findings and avoids equating cost efficiency with mediation.

5. Conclusion

This study examined the relationship between Digital Transformation in Accounting and the performance of selected NSE-listed banks in India during 2015–2024 using 200 bank-year observations. The reported regression results show positive and statistically significant associations between DT and both ROA and ROE. DT is also negatively associated with Operating Cost Ratio, suggesting an association between greater digitalisation and lower operating costs relative to operating income. However, OCR is not statistically significant in the ROA model after DT and control variables are included, so the reported evidence does not support OCR as a mediator of the DT–ROA relationship. Overall, the study indicates that accounting-related digital transformation is associated with bank performance, while the precise mechanisms through which this relationship operates require further investigation. Strengthening the DT measurement, resolving the stationarity issue, aligning estimator selection with the diagnostic results, and implementing a formal indirect-effect test would materially improve the empirical credibility and reproducibility of the study.

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