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Digital Transformation of Indian Companies: A Comparative Analysis of Pre and Post Pandemic Strategies & Financial Performance

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ABSTRACT: The COVID-19 pandemic provided a significant new momentum for Indian businesses, where approximately ten years of planned digital implementation were done over a period of months due to the operational needs of the situation. This research employed a series of paired two-sample t-tests ($df=7$, $\alpha=0.05$) and one-way ANOVA tests on eight years of audited financial data (FY2016-17 to FY2023-24) from six of India's most significant corporations - TCS and Infosys from Information Technology (IT), HDFC Bank and the State Bank of India from BFSI, as well as Tata Motors and Maruti Suzuki from Manufacturing to assess if there were statistically significant impacts of digital transformation on financial strength and operational effectiveness. Findings uncovered a Digital Divide by sector with IT and BFSI were found to have significantly improved profitability and productivity, whereas Manufacturing was not found to have significant short-term benefits of digital transformation, demonstrating a J-curve maturity lag. Further, Researchers identified a Paradox of Efficiency, through which the ratio of Revenue / Employee increased significantly for both service sectors but there was no change in the Employee Cost Ratio. One-Way ANOVA yielded $F=40.49$, $p<0.001$, $\eta^2=0.90$ indicating that 90% of the variance in post-pandemic profitability is attributed to sector and represents very large magnitude effect using Cohen's benchmarks (1988).

KEYWORDS: Digital Transformation, Financial Performance, Efficiency Paradox, Sectoral Variance, J-Curve Effect, India.

I. INTRODUCTION

Digital transformation has gone from being a technology upgrade with respect to IT infrastructure, to a complete transformation of how value is generated and delivered by companies within all industries. Vial (2019) describes this as an event that occurs when digital technology disrupts a company and requires it to develop different strategic methods for generating value. In the case of India, the beginning of digital transformation was mainly incremental. The process was driven by companies using digital technology for increased efficiency and not intended to completely change the business model, which Westerman, Bonnet & McAfee (2014) coined as 'digital optionality'. Kane et al (2015) pointed out that success in digitally transforming a company is primarily due to the effective application of strategy, not just based on the implementation of technology.

The COVID-19 pandemic changed this course of development considerably. LaBerge et al. (2020) documented how the pandemic pushed companies to move past the technology tipping point and to implement in less than 6 weeks what had been planned to be implemented over the course of several years. In India, this event resulted in a permanent change in structure as the definition of 'doing digital' changed to the definition of 'being digital', where companies perform their operations in the cloud, analyze the data they have collected using artificial intelligence, and offer contactless banking; all of which will be considered standard practice in performing business, rather than considered competitive advantages (NASSCOM, 2021; Kolluru et al., 2021). However, since there are very few empirical accounts of the financial impact of forcing this to occur in India, there are not many data-supported examples that have demonstrated improvements to profitability, liquidity, or operational efficiency for companies in India that have used these technologies to expand their operations into these digital platforms, especially for companies within these three sectors (Sharma et al., 2025; Suman et al., 2022). This paper addresses that gap.

II. LITERATURE REVIEW

According to Vial's systematic review (2019) of 282 papers regarding digital transformation, the authors created an informative process model outlining how digital technologies act as disruptors and require strategic responses, thus modifying structural and value creation frameworks. Verhoef et al. (2021) further developed this body of research by framing digital transformation as an organizational, multidisciplinary challenge that requires change to both internal operations and customer touch points at once. Four critical dimensions comprise a coherent digital transformation strategy: effective technology use, changes in value creation, structural reorganization, and financial governance (Matt, Hess, & Benlian, 2015). The established frameworks dispel the myth that digital transformation is a series of IT projects outside of a company's overall strategic commitment (Fitzgerald et al., 2014).

According to Sharma et al. (2025), who performed a study using data from 233 NSE-listed companies over the period 2012-2024, digital transformation produces significant improvements in financial performance, with Total Factor Productivity being the predominant mediating mechanism driving this relationship. Additionally, Suman et al. (2022) provided evidence of the existence of sector-level heterogeneity because of the post-COVID financial recovery of India's Healthcare, IT and Automotive industries, forming the basis for a comparative design of this current study. Huang (2025) introduced the J-curve model, which illustrates that there is a non-linear and time-lagged relationship between digital investments and returns on investment for listed companies, a finding that was echoed by Keerthi and Narasaiah (2025) for the Indian FMCG sector.

In the banking, financial services and insurance (BFSI) space, Bhatia and Kumar (2025) found that due to COVID-19, the profitability, return on equity and non-performing asset ratios of 31 Indian banks were affected negatively and significantly in the short term based on a System GMM model. Likewise, Shabir et al. (2023) determined that the net interest margin of 2,073 banks from 106 different countries was structurally stable despite being disrupted by digital technologies. Furthermore, Kumar and Prakash (2025) asserted that the growth experienced by State Bank of India following the pandemic was primarily driven by digital transactions by YONO. In terms of manufacturing, Jones et al. (2020) indicated that financial returns from Industry 4.0 investments will typically occur three to five years after the initial investment, while Singh (2025) found that most Indian manufacturers were still in the proof-of-concept phase of what would eventually become their Industry 4.0 investments.

III. NEED OF THE STUDY

The review of the existing literature reveals that while there have been numerous studies regarding the relationship between digital transformation and financial performance, most studies focus solely on one sector in isolation, majority of studies employ some form of composite of digital maturity index, and use a cross-sectional research design to examine financial and operational effects of digital transformation over time, with no consideration made for the multiple observations that comprise a study. To my knowledge, no research study has been conducted that tests the financial and operational effects of digital transformation on companies operating within India using longitudinal paired datasets and formal statistical inference methods similar to those used to test MGNREGS data as demonstrated by Gnyaneswer (2023), who used paired t-test analysis procedures.

IV. OBJECTIVES OF THE STUDY

The main objective of this study is to assess the financial and operational impact of digital transformation on the select Indian firms before and after COVID-19. Specifically:

1. To study the changes in financial health metrics of select Indian firms before and after COVID-19.
2. To study the changes in operational efficiency metrics of select Indian firms before and after COVID-19.
3. To study whether there is significant sectoral variance in post-pandemic Net Profit Margin across the IT, BFSI, and Manufacturing sectors.

V. HYPOTHESIS

1. **H01:** There is no significant difference between the financial indicators being measured before and after the COVID19 pandemic.
2. **H02:** There is no significant difference between the operational efficiency indicators being measured before and after the COVID19 pandemic.

3. **H03:** There is no significant difference between the net profit margin of the three different sectors (IT, BFSI, and Manufacturing) after the pandemic.

VI. SCOPE OF THE STUDY

There have been eight financial years of study: Financial Years 2016-17 through 2023-24. Four years will comprise the pre-COVID-19 years (2017-2020; establish how performance was measured) and four years will comprise the post-COVID-19 years (2021-2024; capture digital acceleration and recovery). The sample includes six firms representing three industries/business sectors: Information Technology (TCS, Infosys); Banking, Financial Services, and Insurance (HDFC Bank, SBI); and Manufacturing (Tata Motors, Maruti Suzuki).

VII. RESEARCH METHODOLOGY

Research Design: This study adopts a quantitative and longitudinal design. Secondary financial data were collected and analyzed across two pre-defined periods to test formally stated null hypotheses using inferential statistics, consistent with established practice in pre/post-event corporate financial research in India (Gnyaneswer, 2023; Suman et al., 2022).

Sample: The approach used in this research to establish a sample for the analysis of market leading companies was to utilize purposive sampling techniques. To illustrate this point, six (N=6) major corporations were selected based on their relative market capitalization, employee size, as well as acknowledged digital maturity.

Sector	Sample Company 1	Sample Company 2
IT Sector	Tata Consultancy Services (TCS)	Infosys Ltd.
BFSI Sector	HDFC Bank	State Bank of India (SBI)
Manufacturing	Tata Motors	Maruti Suzuki India Ltd.

Source of Data: All data utilized in the research were obtained exclusively from the audited consolidated Annual Reports of the six sample companies. The authors calculated the financial ratios using data directly from the primary income statement and balance sheet of the sample companies.

Period of Study: To eliminate one-time fluctuations, we had a period of eight financial years (from FY2016–17 to FY2023–24) in which we will assess data longitudinally. The baseline for the pre-pandemic period consists of four years (FY2016–17 to FY2019–20) and the post-pandemic period consists of four years (FY2020–21 to FY2023–24), thus these time frames all have the same length and can be compared directly and paired resulting in a degree of freedom ($n = 7$) for each t-test performed.

VIII. ANALYSIS AND INTERPRETATION

Table-1: Paired t-Test Results: Financial Health (H01) and Operational Efficiency (H02)

Variable	Pre-Mean (FY17–20)	Post-Mean (FY21–24)	t-Stat.	df	p-value	H0 Decision
IT SECTOR						
Net Profit Margin (%)	20.75	18.56	5.43	7	0.001	Rejected
Return on Equity (%)	28.50	36.54	-6.43	7	0.001	Rejected
Current Ratio	3.68	2.39	5.26	7	0.001	Rejected
Revenue/Employee (Rs. Lakh)	34.20	38.92	-4.41	7	0.003	Rejected
Employee Cost Ratio (%) [EP]	54.42	55.22	-0.86	7	0.416	Retained
BFSI SECTOR						
Net Profit Margin (%)	9.64	14.85	-3.40	7	0.012	Rejected
Return on Assets (%)	1.02	1.40	-3.04	7	0.019	Rejected
Net Interest Margin (%)	3.61	3.57	0.27	7	0.797	Retained
Revenue/Employee (Rs. Lakh)	125.54	167.20	-2.98	7	0.020	Rejected
Employee Cost Ratio (%) [EP]	10.77	11.39	-1.06	7	0.324	Retained
MANUFACTURING SECTOR						
Net Profit Margin (%)	3.43	3.14	0.11	7	0.918	Retained
Asset Turnover	1.13	1.07	0.69	7	0.510	Retained
Inventory Turnover (×)	16.08	17.78	-1.26	7	0.248	Retained

Source: Computed by author from audited Annual Reports of TCS, Infosys, HDFC Bank, SBI, Tata Motors, and Maruti Suzuki (FY2017–2024). MS Excel Data Analysis ToolPak.

H01: There is no statistically significant difference between the financial health metrics recorded before and after COVID-19.

A t-test of dependent means was performed in order to assess the effect of Digital Transformation on the measure of financial health for each of the three industries. For the IT industry, there was a statistically significant reduction in Net Profit Margin for TCS and Infosys when comparing the mean Net Profit Margin before COVID-19 (20.75% pre-COVID-19) to the mean Net Profit Margin after (18.56% post-COVID-19), $t^7 = 5.43$, $p \leq 0.001$. This reduction is illustrated by the impact of dual pressures that were placed on IT organizations including (1) increased capital expenditures to accommodate their digital infrastructure needs, and (2) inflation in expenses associated with technology talent, which occurred during the Great Resignation, when TCS had reached 20.1% peak attrition in FY23 and Infosys was at 27.7% peak attrition in FY22.

There was also a statistically significant improvement in Return on Equity for TCS and Infosys when comparing their mean Returns on Equity before COVID-19 (28.50%) vs. after COVID-19 (36.54%). $t^7 = -6.43$, $p \leq 0.001$; However, the Return on Equity for both organizations must be evaluated together with the effects of their share buyback programs, which caused a mechanical reduction in share value by decreasing equity outstanding and, therefore, resulted in an increase in their Returns on Equity when calculated.

Finally, the Current Ratio for TCS and Infosys also decreased significantly, from an average of 3.68 pre-COVID -19 to an average of 2.39 post-COVID -19. $t^7 = 5.26$, $p \leq 0.001$. This change reflects the redeployment of available liquid reserve funds toward capital expenditures that are necessary for their continued digital transformation. Therefore, the null hypothesis H01 is completely rejected for the IT industry.

The net profit margin of the BFSI sector increased from 9.64% to 14.85% as a result of SBI's ability to regain profitability through the digital migration of YONO and the systematic resolution of NPAs (Kumar & Prakash, 2025) and the continued performance of the margin for HDFC Bank. The return on assets also increased significantly from 1.02% to 1.40%, $t(7) = -3.04$, $p = 0.019$. However, the net interest margin did not show a significant change, decreasing marginally from 3.61% to 3.57%, $t(7) = 0.27$, $p = 0.797$, indicating that the structural insulation of the core interest yield-cost spread has been unaffected by digital disruption (Shabir et al., 2023); thus, H01 is partially rejected for the BFSI sector. In the manufacturing sector, there were no metrics that approached statistical significance; the net profit margin decreased from 3.43% to 3.14%, $t(7) = 0.11$, $p = 0.918$. Therefore, H01 is fully accepted for the manufacturing sector, consistent with the maturation lag of the J-curve, as predicted by Jones et al. (2021).

H02: The Operational Efficiency Metrics of a Company Will Not Demonstrate Significant Change Pre-Post-COVID-19.

Impact of digital transformation was assessed using a paired sample t-test (two-tailed) comparing the mean results of IT Sector revenue on a per Employee basis (Rs. 34.20 Lakh vs. 38.92 Lakh) indicated significant Improvement ($t(7) = -4.41$, $p = 0.003$) suggesting measurable increase in productivity derived from borderless workspace deployments. In contrast, no significant change in Employee Cost Ratio was observed from 54.42% to 55.22% ($t(7) = -0.86$, $p = 0.416$). This finding constitutes the Efficiency Paradox in terms of increased productivity while office space savings associated with remote working have been fully absorbed by premiums for Technology talent and new costs associated with Cloud Services and Higher paying digital jobs replacing automated positions (Kolluru et al, 2021; NASSCOM, 2021). These findings also replicate the IT Sector in the BFSI Sector as Revenue per Employee increased from Rs. 125.54 Lakh to 167.20 Lakh ($t(7) = -2.98$, $p = 0.020$) and Employee Cost Ratio remained statistically unchanged from 10.77% to 11.39% ($t(7) = -1.06$, $p = 0.324$), thus partially rejecting H02 for both the IT & BFSI sectors. In comparison there was no statistically significant change to Asset Turnover ($t(7) = 0.69$, $p = 0.510$) or to Inventory Turnover ($t(7) = -1.26$, $p = 0.248$) therefore fully accepting H02 for Manufacturing; although notable record Inventory Turnover results from Maruti Suzuki during FY24 of 34.21 times versus Pre-Pandemic mean of 24.78 times are indicative of the J-curve recovery process (Jones et al, 2021).

Table-2: One-Way ANOVA: Post-Pandemic Sectoral Net Profit Margin (FY2021–24): H03

Source / Group	n	Avg. NPM (%)	SS	df	MS	F	P-value
IT Sector (TCS & Infosys)	4	18.56	—	—	—	—	—
BFSI Sector (HDFC Bank & SBI)	4	14.86	—	—	—	—	—
Manufacturing (Tata Motors & Maruti Suzuki)	4	3.14	—	—	—	—	—
Between Groups	—	—	518.40	2	259.20	40.49	0.000032
Within Groups	—	—	57.61	9	6.40	—	—
Total	—	—	576.02	11	—	—	—

Source: Computed by author from audited Annual Reports of TCS, Infosys, HDFC Bank, SBI, Tata Motors, and Maruti Suzuki (FY2021–2024). MS Excel Data Analysis ToolPak.

H03: There would not be a significant difference in post-pandemic Net Profit Margin across the three industries of information technology (IT), banking, financial services and insurance (BFSI), and manufacturing.

A one-way analysis of variance (ANOVA) was performed to evaluate differences in post-pandemic Net Profit Margin by sector ($n = 4$ observations per sector for the fiscal years 2021 – 2024). The analysis found that there were, indeed, large differences across sectors: $F(2, 9) = 40.49$ and $p = 0.000032$, which is approximately ten times greater than a critical value of 4.26.

Additionally, eta-squared (0.90) was calculated as $SS \text{ between} (518.40) / SS \text{ total} (576.02)$ to indicate that 90% of the observed post-pandemic variance in profitability across the twelve observations per sector and year can be attributed to sector membership alone. Only 10% of the variation can be attributed to firm- or year-level differences. Given Cohen's

(1988) criteria, the strength of the effect size was classified as "large" and, therefore, provides direct empirical support for Vial's (2019) theoretical argument that the underlying asset structure of a firm is primary in determining their digital transformation financial results. Given that the post-pandemic average Net Profit Margins for IT (18.56%) are nearly six times larger than manufacturing (3.14%), with BFSI being intermediate (14.86%) and exhibiting the most positive trend over the time period examined (due to corporate recovery from non-performing assets and digital technologies), H03 is rejected conclusively.

IX. SUGGESTIONS

The findings from this study conclude that Revenue per Employee increased significantly, but the Employee Cost Ratio did not show any statistically relevant change, confirming that the Efficiency Paradox exists in both the software and banking and finance industries. Therefore, it is recommended that CFOs and Corporate Managers monitor Revenue per Employee as a separate key performance indicator than Employee Cost Ratio. Digital Transformation Budgets should be allocated to capability investment programmes rather than as reducible costs, because the savings in office space will not yield the same proportionate reductions in the employee cost base.

With regards to Manufacturing, there were no statistically significant changes in either metric during the four-year period evaluated after the pandemic, so it is suggested that Boards of Directors and Investors in the Manufacturing sector formally establish a three- to five-year financial maturation horizon for ROI on their investments in Industry 4.0 prior to making ROI evaluations (Jones et al., 2021; Huang, 2025). In addition, Board-level reporting frameworks should account for the unique expectations of the J-curve, and only assess Financial KPIs after their maturation period is complete.

The results of ANOVA analysis indicate that sector membership is responsible for almost all (90%) of the variation in profitability following the COVID-19 pandemic ($F = 40.49$, $p < 0.001$, $\eta^2 = 0.90$). Therefore, institutional investors and fund managers should utilize different benchmarks based on sectors to evaluate their financial performance in the post-COVID era, rather than consistent digital transformation scorecards developed for multiple sectors. For example, comparing asset-light services to asset-heavy manufacturing on the same timeline of digital ROI would be misleading because structural variation in asset composition rather than management quality has been the main driver of disparate returns across those two types of businesses.

X. SCOPE FOR FURTHER RESEARCH

This study is an ongoing procedure that requires more study due to the fact that there is always new information and changes. This study has only examined two companies per sector, whereas the proposed research should have 8-10 companies per sector to reach a more reliable conclusion (Sharma et al., 2025). The projected expansion of this study beyond FY 2028-29 would likely result in statistically significant returns from the manufacturing sector's Industry 4.0 investments, based on the assumption that the J-curve has matured (Singh, 2025). Another area of future research would be to investigate casual identification designs using methods such as an instrumental variable methodology or a difference-in-difference method to identify the causal relationship; the use of panel data methodologies (fixed effect models or system diminished means model) would allow for additional control for unobserved firm heterogeneity.

XI. CONCLUSION

Evidence indicates that Digital Transformation has had an impact on financial metrics across two distinct industry sectors. The Digital Transformation effect is associated with notable differences in the Financial Metrics of Net Profit Margin, Return on Equity, Current Ratio and Revenue per Employee (IT/BFSI). Therefore, the results provide strong evidence to suggest that Digital Transformation is highly correlated with Financial Performance in the Services Sector both pre and post COVID-19.

Conversely, no significant differences were observed for Financial Metrics in the Manufacturing Sector (e.g. Net Interest Margin, Employee Cost Ratio) between pre and post COVID-19. Thus, there is limited evidence to support a short-term financial correlation within asset-intensive sectors.

Moreover, the improvements in Operational Productivity resulting from Digital Transformation do not necessarily lead to a decrease in Employee Cost Burden (The Efficiency Paradox). The One Way Analysis of Variance (ANOVA) demonstrated that, controlling for Management Decisions, the sector from which a company operates is the most

significant predictor of Financial Performance post COVID-19 ($F = 40.49$, $p = 0.000032$, $\eta^2 = 0.90$); therefore the sector of registration (i.e. Service or Manufacturing) has greater bearing on Financial Performance than any Management Decision made over a four-year horizon.

These findings are consistent with a defining Digital Divide creating a Structural Digital Divide between asset-light Service sector companies and asset-heavy Manufacturing Sector Companies, post COVID-19, within the India Corporate Environment.

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