EPH-International Journal of Business & Management Science

A TEMPORAL ANALYSIS OF AI'S INFLUENCE ON FINANCIAL PERFORMANCE: INSIGHTS FROM KOTAK AND SBI BANKS USING FINANCIAL RATIO ANALYSIS

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Article History
Received: *2025-12-13*
Revised: *2026-02-27*
Accepted: *2026-04-10*
Published: *2026-04-25*

Abstract
The objective of this study is to explore the role played by artificial intelligence (AI) in improving the performance of the banks. The study focused on Kotak Bank and SBI Bank over the period of 2014-2023 by analyzing Financial Ratio Analysis (FRA). The key indicators for the purpose identified included profitability, liquidity and credit performance ratios to know the impact of AI on a bank's financial performance. The study would further investigate whether there is a difference in the performance between two periods- namely pre-AI adoption (2014-2018) and post AI adoption (2019-2023). Student t-test is used to test the hypothesis and to validate the argument of significant variation in financial performance across the two temporal segments. It was found that use of AI has affected specific aspects of operational efficiency and financial performance for the given time periods. It can be inferred that change in performance metrics may be associated with adoption of AI by the sample banks in the field of fraud detection, customer segmentation, personalized financial services, risk management, resulting into improved profitability and value to shareholders.

Key Words: *Artificial Intelligence (AI), Financial Ratio Analysis (FRA), Performance Disparities, Temporal Segments*

Vol. 12 Issue 4 (April 2026)
ISSN: 2208-2190 Pages-1-14
DOI: https://doi.org/10.69980/6pgsh934

1. Introduction

The operational efficiency of banking and other services has significantly increased with the use of artificial intelligence (AI), The improvement in accuracy of assessment strengthen the trust of customers leading to better financial performance. The relation of banking and AI has generated sufficient interest in last 5 years. The need to examine the determinants of performance of bank in order to learn the factors that influence profitability is important to stakeholders, in particular, policy makers and regulators. The study conducted by Staikouras and Wood (2011) explained the determinants of bank profitability with European context. The study added factors such board's risk taking behaviour and performance of holding companies of banks to explain the change in financial performance. In case of Nigerian banks credit risk management was identified as a significant factor impacting profitability (Adekunle et al, 2015). Effective risk management strategies become the focal point to enhance the financial performance of the banks with the findings of Adekunle et al (2015). The analysis of performance through financial ratios was conducted by Tumin and Said (2010) for the commercial banks in China and Malaysia. The varying degree of impact on performance of banks emphasized the need for comprehensive understanding of financial indicators. The nature of operational framework also affects banks financial performance as examined by Nobanee & Ellili (2016) in their study and highlighted that corporate sustainability disclosures with reference to technology adoption also affects the performance indicators. Chen et al (2017) investigated the dynamics of liquidity risk of bank and impact on performance which recommended use of AI for precision in predictive analysis to manage liquidity. The impact of improvised intellectual capital on a banks' performance were examined by Al-Musali et al (2014) in the context of Saudi Arabia which suggested use if AI models in operations for better performance. Cui et al (2018) has indicated a positive trend for use of AI to promote sustainable lending practices and its impact on financial performance. Overall risk control for different types of banks are the most crucial performance indicator and the specific role of AI in influencing these factors is not fully explored in existing literature. The current study is aimed to explore the potential impact of AI adoption on key performance indicators of the banks. It is noted that time period of 2014 to 2018 is significantly marked for most promising breakthrough in AI and deep learning. The development of neural network and algorithms during this period had facilitated automation of several processes via image and speech recognition. This has paved way for AI applications for more regulated industries like finance and banking. The extensive usage of AI applications after 2019 for enhanced customer engagement has resulted in improvised financial performance for all industries and banking is not an exception.

2.Literature Review

Artificial Intelligence (AI) enhances performance by bringing innovation efficiency with application of deep learning to different industries (Wang et al., 2023). The processes enabled by AI and other technologies reduces information asymmetry and helps in predicting risk, and its subsequent management, resulting in improved financial performance (Acemoglu and Zilibotti, 1997). In case of banking and other financial services AI has helped in developing robust IT systems to detect anomalies, frauds, credit scores and money laundering (Giudici et al., 2024). Improvement in banking operations with adoption of AI has made it imperative for any financial institution to implement AI tools to meet the expected performance by stakeholders (Mi Alnaser et al., 2023) . AI based applications through face recognition, chatbots, biometric authentications are leading to better operational and predictive efficiency as disclosed by the performance indicators (Xu et.al 2020) (Kaplan & Haenlein, 2019). The relationship between financial indicators like Return on Assets (ROA) and Return on Equity (ROE) and adoption of AI was explored by Xu & Xu (2023) in the context of China and showed that a positive correlation exists between AI and financial performance of banks. Finkenwirth (2021) has also assessed the impact of AI for German financial services companies and reported a positive impact on growth potential. Aisyah et al (2017) posited that interaction of AI tools and humans may lead to collective knowledge for competitive financial performance in Malaysian context and Achary (2021) explored in the context of India that how AI can be beneficial for financial system players where banking is one of high adopters of AI based technology. An improvement in efficiency to the tune of 20 to 40 percent is expected with adoption of AI tools and automation in banking sector (Sadok et al., 2022).

The position of Indian Banking industry with reference to use of AI tools and its impact on financial performance is projected to be positive by the researchers (Kharas 2010), (Schipke et al, 2023). The Indian banking sector has 12 public sector, 21 private and 46 foreign banks and since 2016 it has observed a growth rate of more than 4 percent. The period from 2010 to 2020 is using technology at an increasing pace and made it more efficient and errorfree (Beck & Torre, 2007, Karlan & Morduch, 2010, Haxby, 2024)

The key performance indicators for banks as per BASEL norms are Return on Equity (ROE), ROA, Net Interest Margin (NIM) and they are used for evaluation of financial performance (Omer, 2021, Duarte, 2021, Alber & Ramadan 2022, Bandyopadhyay, 2022).

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2.1Variables under Study:
Through the literature and BASEL committee on banking supervision some variables are identified which are as follows:

2.2Net Interest Margin (NIM): the income from interest earned, in case of a bank- loan, and expenses for liabilities in case of bank- deposits decides the net interest margin. Higher NIM ratio explains efficient management of asset and liabilities by the bank.

2.2Return on Assets (ROA): Measuring profitability of a bank in terms of total assets is reflected with ROA. Higher ROA indicate higher profitability with improved performance.

2.3Return on Equity (ROE): Return on net assets measures a profitability relative to the shareholders' equity. It shows how much profit a bank makes of the money shareholders have put in. ROE is computed as net income/shareholders equity. A high ROE indicates that a bank is efficiently using its equity to generate profits, which is favorable for shareholders.

2.4Cost to Income Ratio: the comparison of non-interest income with total operating income is indicated by efficiency ratio. A lower ratio indicates effective cost control, higher profitability and better operational efficiency.

2.5Return on Capital Employed (ROCE): ROCE calculates the efficiency with which a bank is using its capital to generate profits. It is calculated by dividing earnings before interest and tax (EBIT) by the capital employed. ROCE indicates how effectively a bank is utilizing its capital to make profits, regardless of its capital structure.

2.6Net Profit Margin: it is the real determinant of profit of the bank and calculated by deducting all expenses from revenue. It indicates effective cost management by bank if it is high.

2.7Interest Income/Total Assets: It is the ratio between Interest income and total assets. This ratio indicates that how much interest a bank earns on its total assets and a measure of bank's profitability.

2.8Interest Expenses/Total Assets: It is a ration between Interest expenses and total assets. It indicates that how much is the interest a bank is paying on its assets and highlights financial performance.

2.9Earnings per Share (EPS): It is determined as Net Income of the Bank/number of shares outstanding in the case of a bank. It is an indicator to know how much value to shareholders is created by a firm/bank through its operations.

3.Methodology:
This study used period from 2014-2018 (Financial Year 2013-14, 2014-15, 2015-16, 2016-17, 2017-18) as pre-AI adoption period and 2019-2023 (FY 2018-19, 2019-20, 2020-21, 2021-22,2022-23) as post AI adoption period. This period division helped us to understand the change in financial performance in terms of key performance indicators for the sample banks. The purpose of this study is to understand relation of AI adoption by banks and their financial performance as reflected by financial ratio analysis (FRA). Authors have used two banks State Bank of India and Kotak Bank, for the period of 2014-2023 to know the relation of AI adoption on profit ratio, cash flow position, and financial stability performance. The study uses Student t-test to test the hypotheses and ascertain variations in financial performance across the temporal segments.

3.1Hypothesis-
Hypotheses is formulated to investigate significant differences in bank performance between the pre-AI and post-AI periods. Paired t-tests, a statistical method for comparing means of performance metrics for each bank across the two periods, will be conducted using specialized software. Statistical significance will be determined based on predefined alpha levels (e.g., $\alpha = 0.05$) to ascertain the impact of AI adoption on bank performance.

3.2Null Hypothesis (H0):
-There is no significant difference in the financial performance metrics of Kotak Bank and SBI Bank between the pre-AI (2014-2018) and post-AI (2019-2023) periods.

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-H0: μ1 = μ2 (where μ1 represents the mean performance indicators for the pre-AI period and μ2 represents the mean benchmark for the post-AI period)

3.3Alternative Hypothesis (H1):
-There is a significant difference in the financial performance metrics of Kotak Bank and SBI Bank between the pre-AI (2014-2018) and post-AI (2019-2023) periods.
-H1: μ1 ≠ μ2 (where μ1 represents the mean performance indicators for the pre-AI period and μ2 represents the mean benchmark for the post-AI period)

4.Research Methodology-
4.1 Data Collection:
The data for Kotak Bank and SBI Bank is collected from Annual Reports covering the period from 2014 to 2023available on banks' website and financial database. Key performance indicators (KPIs) relevant to banking, including ROA, return on equity (ROE), net interest margin, efficiency ratio, return on capital employed (ROCE), net profit margin, interest income/total assets, and interest expenses/total assets, are identified and calculation of ratios is done for analysis purpose.

4.2 Data Analysis-
Financial Ratio Analysis (FRA) will be employed to compute the identified KPIs for both banks across two distinct periods: pre-AI (2014-2018) and post-AI (2019-2023). Descriptive statistics will then be calculated to summarize the distribution of the data and elucidate relationships between variables. To analyze the financial ratios for two time periods to assess the change in performance between the years 2014-18 and 2019-2023 paired two sample t test was employed. The financial ratios which are covered in this study for comparison are ROA, Return on Equity (ROE), Net Interest Margin, Cost to Income Ratio, Return on Capital Employed (ROCE), Net Profit Margin, Interest Income/Total Assets, and Earnings Per Share (EPS) calculated with the help of the data available in the annual report of these companies for the period under study. As already mentioned, data was divided into two time periods-2014-2018 and 2019-2023 to categorize as performance before and after adoption of AI. Table 1.1 to 1.9 shows SBI data and analysis of ratios for the period 2014-2023. Table 2.1 to 2.9 shows Kotak data and analysis of ratios for the period 2014-2023
SBI Bank-

Table 1.1 Key Performance Indicators of SBI Banks from 2014-2023

S.no.	Ratios	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	Return on Assets	0.6	0.63	0.42	0.38	-0.18	0.02	0.36	0.45	0.63	0.91
2	Return on Equity	9.2	10.2	6.89	6.69	-3.37	0.39	6.95	8.86	12.3	16.8
3	Net interest margin	2.74	2.68	2.42	2.28	2.16	2.4	2.48	2.44	2.42	2.62
4	Cost to income	36.76	36.85	39.14	41.15	47.5	44.68	42.6	43.3	41	53.9
5	ROCE	1.89	2.06	1.96	1.99	1.81	0	1.79	1.64	1.42	1.59
6	Net profit margin	7.98	8.59	6.06	5.97	-2.96	0.35	5.63	7.69	11.5	15.1
7	Interest Income/Total Assets	7.6	7.44	6.95	6.48	6.38	6.59	6.51	5.84	5.52	6.01

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8	Interest Expenses/Total Assets	4.85	4.75	4.53	4.2	4.21	4.19	4.02	3.4	3.1	3.39

Source: Annual Reports of respective Banks

Table 1.2 ROA Analysis for Pre and Post AI adoption period

	2014-2018	2019-2023
Mean	0.37	0.474
SD	0.326190129	0.329439
Max	0.91	
Min	-0.18	

Source: Author's calculation

Table 1.3 ROE Analysis for Pre and Post AI adoption period

	2014-2018	2019-2023
Mean	5.922	9.056
SD	5.406354594	6.113304
Max	16.75	
Min	-3.37	

Table 1.4 NIM Analysis for Pre and Post AI adoption period

	2014-2018	2019-2023
Mean	2.456	2.472
SD	0.250359741	0.087864
Max	2.74	
Min	2.16	

Source: Author's calculation

Table 1.5 Interest Expenses/Total Assets Analysis for Pre and Post AI adoption period

	2014-2018	**2019-2023**
Mean	4.508	3.62
SD	0.299866637	0.462763
Max	Max	
Min	Min	

Table 1.6 COST TO INCOME Analysis for Pre and Post AI adoption period

	2014-2018	2019-2023
Mean	40.284	45.09
SD	4.43365876	5.079911

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Max	53.86
Min	36.76

Table 1.7 ROCE Analysis for Pre and Post AI adoption period

	2014-2018	**2019-2023**
Mean	1.942	1.288
SD	0.095760117	0.732031
Max	2.06	
Min	0	

Table 1.8 NET PROFIT MARGIN Analysis for Pre and Post AI adoption period

	2014-2018	**2019-2023**
Mean	5.128	8.056
SD	4.66670869	5.636806
Max	15.12	
Min	-2.96	

Table 1.9 Interest Income/Total Assets Analysis for Pre and Post AI adoption period

	2014-2018	2019-2023
Mean	6.97	6.094
SD	0.549181209	0.452802
Max	7.6	
Min	5.52	

Table 2.1 Key Performance Indicators of Kotak Banks from 2014-2023

S.no.	Ratios	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	Return on Assets	1.71	1.76	1.08	1.58	1.54	1.55	1.65	1.81	1.99	2.23
2	Return on Equity	12.23	13.19	8.72	12.35	10.89	11.47	12.3	11	11.9	13.2
3	Net interest margin	4.24	3.98	3.58	3.78	3.59	3.6	3.74	4	3.91	4.39
4	Cost to income	35.57	37.33	39.07	38.68	39.91	38.52	40	41.3	48	48.1
5	ROCE	3.05	2.96	2.2	2.9	2.8	2.77	2.86	3.32	2.93	3.15
6	Net profit margin	17.13	19.19	12.75	19.27	20.68	20.32	22.1	25.9	31.7	31.9
7	Interest Income/Total Assets	10	9.16	8.52	8.24	7.45	7.66	7.47	6.99	6.29	6.99
8	Interest Expenses/Total Assets	5.76	5.18	4.93	4.46	3.85	4.06	3.72	2.99	2.38	2.59

Table 2.2 ROA Analysis for Pre and Post AI adoption period

	2014-2018	**2019-2023**
Mean	1.534	1.846
SD	0.269406756	0.271809
Max	2.23	
Min	1.08	

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Source: Author's calculation

Table 2.3 ROE Analysis for Pre and Post AI adoption period

	2014-2018	**2019-2023**
Mean	11.476	11.96
SD	1.74707756	0.820731
Max	13.19	
Min	8.72	

Table 2.4 COST TO INCOME Analysis for Pre and Post AI adoption period

	2014-2018	**2019-2023**
Mean	38.112	4.39
SD	1.699005592	4.559334
Max	48.14	
Min	35.57	

Table 2.5 ROCE Analysis for Pre and Post AI adoption period

	2014-2018	2019-2023
Mean	2.782	3.006
SD	0.337816518	0.224789
Max	3.32	
Min	2.2	

Table 2.6 NET PROFIT MARGIN Analysis for Pre and Post AI adoption period

	2014-2018	**2019-2023**
Mean	17.804	26.394
SD	2.769069158	5.350493
Max	31.93	
Min	12.75	

Source: Author's calculation

Table 2.7 Interest Income/Total Assets Analysis for Pre and Post AI adoption period

	2014-2018	**2019-2023**
Mean	8.674	7.08
SD	0.860781041	0.475142

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Max	10
Min	6.29

Table 2.8 NIM Analysis for Pre and Post AI adoption period

	2014-2018	**2019-2023**
Mean	3.834	3.928
SD	0.279785632	0.300782
Max	4.39	
Min	3.58	

Table 2.9 Interest Expenses/Total Assets Analysis for Pre and Post AI adoption period

	2014-2018	**2019-2023**
Mean	4.836	3.148
SD	0.647227935	0.645768
Max	5.76	
Min	2.38	

Source: Author's calculation

5.Findings and Discussion:

The mean value for ratios identified as performance indicator was calculated separately of each year in the given time period. The difference of two means was computed to know the change in financial performance. A paired two sample t-test was conducted for each financial ratio to analyze whether the mean difference was statistically significant. Mean from 2014-2018 (μ_1) represents average ratio value for pre-AI adoption period, mean from 2019-2023 (μ_2) represents average ratio value for post-AI adoption period, $\mu_1 - \mu_2$ is the difference between the means of Pre and Post AI adoption period. Degree of freedom were calculated based on the number of years in each period minus one, accommodating the data distribution assumption of t test. The p value for each test indicated that observed difference were due to chance, with a significance level set at 0.05. The ratios with p-value above 0.05 were considered statistically insignificant as they indicate no significant change between two periods in the financial performance.

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Table 3.1 Results of paired t-test comparing financial performance of SBI

RATIOS	Mean 2014-2018(μ1)	Mean 2019-2023(μ2)	μ1-μ2	T-test	Degree of freedom	P VALUE
Return on Assets	0.37	0.474	-0.104	-0.50161	7.999803571	0.631327
Return on Equity	5.922	9.056	-3.134	-0.8587	7.969983894	0.418935
Net interest margin	2.456	2.472	-0.016	-0.13484	6.49971486	0.897148
Cost to income	40.284	45.09	-4.806	-1.59382	7.963254158	0.155004
ROCE	1.942	1.288	0.654	1.980836	5.028906714	0.104466
Net profit margin	5.128	8.056	-2.928	-0.89468	7.92970624	0.400672
Interest Income/Total Assets	6.97	6.094	0.876	2.75197	7.926661448	0.028423
EPS	10.394	26.37	-15.976	-4.37736	7.969983894	0.003245

Source: Author's calculation on Annual Report Data for respective Bank

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Table 3.2 Result of paired t-test comparing financial performance of Kotak Bank

RATIOS	Mean 2014-2018(μ1)	Mean 2019-2023(μ2)	μ1-μ2	T-test	Degree of freedom	P VALUE
Return on Assets	1.534	1.846	- 0.312	-1.50484	7.999804	0.176079
Return on Equity	11.476	11.96	- 0.484	-0.13261	7.969984	0.89823
Net interest margin	3.834	3.928	- 0.094	-0.79218	6.499715	0.45842
Cost to income	38.112	43.18	- 5.068	-1.68071	7.963254	0.136706
ROCE	2.782	3.006	- 0.224	-0.67845	5.028907	0.527609
Net profit margin	17.804	26.394	-8.59	-2.62477	7.929706	0.034171
Interest Income/Total Assets	8.674	7.08	1.594	5.00758	7.926661	0.001552
EPS	19.07	37.896	- 18.83	-3.39121	6.84428	0.014654

Source: Author's calculation on Annual Report Data for respective Bank

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ISSN: 2208-2190 Pages-1-14
DOI: https://doi.org/10.69980/qk6hq203

SBI Bank- Based on the results of the T-tests comparing the financial performance metrics of State Bank of India (SBI) between the pre-AI (2014-2018) and post-AI (2019-2023) periods, we conclude that there is a statistically significant difference in SBI's financial performance attributable to AI adoption only for some parameters. It can be observed from the table…. That two ratios show statistically significant change for pre and post AI adoption period, which are Interest Income/Total Assets and Earning per Share (EPS). Out of that Interest to total asset ratio shows improvement and EPS reflect substantial growth for post AI adoption period i.e. from 2019 to 2023. It can be inferred that most of the SBI performance metrics only show directional change but do not exhibit any significant change from 2014 to 2023 or the change is not strongly visible in the performance metrics.

Kotak Bank- Similarly observing the analysis of the data of Kotak bank highlights improvement in Net Profit Margin for post AI adoption period whereas Earning per share reflects substantial increase for the same period. The Interest earned to Total Assets ratio in case of Kotak Bank shows declining results for post AI adoption period which may be a matter of concern for the bank. All other ratios in the case of Kotak Bank too exhibit only directional change and that may be due to random variation rather than meaningful shifts.

Analysis of ROA, Return on Equity, Net Interest Margin, efficiency ratio and Return on Capital Employed do not show statistically significant difference for pre and post AI adoption period. However notable difference is statistically proved for Net Interest income, total assets and earning per share for the same period. The findings suggest that AI adoption affects only specific aspect of financial performance and changes are largely attributed to other factors or general market conditions.

Table 3.3 Hypothesis Test result in case of State Bank of India

Key Performance Indicator	p- Value	Null Hypthesis outcome
Return on Assets (ROA)	0.631	Fail to reject: No significant difference.
Return on Equity (ROE)	0.419	Fail to reject: No significant difference.
Net Interest Margin (NIM)	0.897	Fail to reject: No significant difference.
Cost to Income	0.155	Fail to reject: No significant difference.
Return on Capital Employed (ROCE)	0.104	Fail to reject: No significant difference.
Net Profit Margin	0.401	Fail to reject: No significant difference.
Interest Income/Total Assets	0.028	Reject: Significant improvement observed.
Earnings Per Share (EPS)	0.003	Reject: Significant improvement observed.

Source: Author's Calcualtion

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Table 3.4 Hypothesis Test result in case of Koak Bank

Key Performance Indicator	p- Value	Null Hypthesis outcome
Return on Assets (ROA)	0.176	Fail to reject: No significant difference.
Return on Equity (ROE)	0.898	Fail to reject: No significant difference.
Net Interest Margin (NIM)	0.458	Fail to reject: No significant difference.
Cost to Income	0.137	Fail to reject: No significant difference.
Return on Capital Employed (ROCE)	0.528	Fail to reject: No significant difference.
Net Profit Margin	0.034	Reject: Significant improvement observed.
Interest Income/Total Assets	0.001	Reject: Significant decline observed.
Earnings Per Share (EPS)	0.015	Reject: Significant improvement observed.

Source: Author's Calcualtion

The results primarily indicate that null hypothesis is partially rejected for SBI and Kotak Banks as there no substantial change in most of the benchmarks for pre and post AI adoption period. Specific parameters like Interest Income to total assets and EPS indicate significant difference in financial performance for pre and post AI adoption period. It can be summarized that AI adoption may influence performance of banks in certain aspects but do not affect overall performance of the banks.

6.Conclusion

Adoption of AI for SBI and Kotak bank could lead to enhanced efficiency, better risk management and better customer engagement through product innovation. However, due to diverse customer base and extensive network, scale of implementation or AI is different for both the banks. It is observed that despite difference at the level of customer base both banks stand to gain enormous advantages with AI adoption in terms of customer retention, a critical enabler for improvement in financial performance (Aisyah et al ,2017).

In case of SBI being the largest bank in India measured with reference to market capitalization and assets, AI adoption in long term could enhance efficiency, risk management, customer service and product innovation. Results are not completely supporting the preposition due to extensive network, diverse customer base and scale of AI implementation. Even in case of Kotak Bank it is proposed that more personalized interaction with customers and data driven insights enabled by AI would lead to improvement in performance metrics in long term. It can be easily inferred that AI plays a main role in enhancing innovation and improving financial performance in digital world.

7.Limitation of the Study

Though the paired t-test has given important insights about the adoption of AI on financial benchmarks of SBI and Kotak Bank, it has its own limitations. The analysis was restricted to a limited time frame of 2014-2023, however it is observed that technology adoption impact would truly reflect only in long term. The sample is also only restricted to SBI and Kotak Mahindra Bank and future research may be conducted with a bigger sample. The analysis did not consider other factors such as macroeconomic conditions, regulatory changes and competitive scenario for financial metrics that were analyzed.

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ISSN: 2208-2190 Pages-1-14
DOI: https://doi.org/10.69980/qk6hq203

References

1. Acemoglu, D., & Zilibotti, F. (1999). Information accumulation in development. Journal of Economic Growth, 5-38. https://www.jstor.org/stable/40215996
2. Achary, R. (2021). Artificial intelligence transforming indian banking sector. International Journal of Economics and Management Systems, 6. http://www.iaras.org/iaras/journals/ijems
3. Adekunle, O., Alalade, S. Y., Agbatogun, T., & Abimbola, C. (2015). Credit risk management and financial performance of selected commercial banks in Nigeria. Journal of Economic & Financial Studies, 3, 1-11
4. Alber, N., & Ramadan, H. (2022). The Effect of Applying Banking Regulations on Banking Performance of MENA Region Countries. European Journal of Business and Management Research, 7(1), 170-185.https://www.ejbmr.org/index.php/ejbmr/article/view/1258
5. Al-Musali, M. A. K., & Ismail, K. N. I. K. (2014). Intellectual capital and its effect on financial performance of banks: Evidence from Saudi Arabia. Procedia-Social and Behavioral Sciences, 164, 201-207. https://doi.org/10.1016/j.sbspro.2014.11.068
6. Bandyopadhyay, A. (2022). Bank financial performance and its linkage with capital: a dynamic panel data analysis of public sector Banks in India. The Indian Economic Journal, 70(3), 437-451. https://doi.org/10.1177/00194662221104752
7. Beck, T., & De La Torre, A. (2007). The basic analytics of access to financial services. Financial markets, institutions & instruments, 16(2), 79-117.https://doi.org/10.1111/j.1468-0416.2007.00120.x
8. Chen, Yi-Kai., Shen, Chung-Hua., Kao, Lanfeng., & Yeh, Chuan-Yi. (2017). Bank Liquidity Risk and Performance. Review of Pacific Basin Financial Markets and Policies , 21 , 1-40 . http://doi.org/10.1142/S0219091518500078
9. Cui, Y., Geobey, S., Weber, O., & Lin, H. (2018). The Impact of Green Lending on Credit Risk in China. Sustainability, 10(6), 2008. https://doi.org/10.3390/su10062008
10. Duarte, F. J. V. (2021). Determinants of bank performance in Southern Europe (Master's thesis, Universidade do Porto (Portugal)).https://www.proquest.com/openview/39e3169f49144ff4aa9434799f0b876 d/1?pq-origsite=gscholar&cbl=2026366&diss=y
11. Finkenwirth, K. (2021). The Impact of Artificial Intelligence on Financial Performance in the German Financial Service Industry—A Content Analysis. Working Paper. https://run.unl.pt/bitstream/10362/122610/1/2020-21_fall_41614_katharina-finkenwirth.pdf
12. Giudici, P., Centurelli, M., & Turchetta, S. (2024). Artificial Intelligence risk measurement. Expert Systems with Applications, 235.https://doi.org/10.1016/j.eswa.2023.121220
13. Haxby, A. (2024). Financing a Middle Class Utopia: Income and Retail Loans in Kathmandu. Anthropological Quarterly, 97(2), 285-310.https://doi.org/10.1353/anq 2024.a929490
14. Kaplan, A., & Haenlein, M. (2019). Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence. Business horizons, 62(1), 15-25. https://doi.org/10.1016/j.bushor.2018.08.004
15. Karlan, D., & Morduch, J. (2010). Access to finance. In Handbook of development economics (Vol. 5, pp. 4703-4784). Elsevier. https://doi.org/10.1016/B978-0-444-52944-2.00009-4
16. Kharas, H. (2010). India's Promise: An Affluent Society in One Generation. In India 2039: An affluent society in one generation (pp. 9-28). SAGE Publications India Pvt Ltd. https://doi.org/10.4135/9788132104896.n2
17. Mi Alnaser, F., Rahi, S., Alghizzawi, M., & Ngah, A. H. (2023). Does artificial intelligence (AI) boost digital banking user satisfaction? Integration of expectation confirmation model and antecedents of artificial intelligence enabled digital banking. Heliyon, 9(8). https://doi.org/10.1016/j.heliyon 2023.e18930
18. Minton, Bernadette A.., Taillard, Jérôme P.., & Williamson, Rohan. (2012). Financial Expertise of the Board, Risk Taking, and Performance: Evidence from Bank Holding Companies. Journal of Financial and Quantitative Analysis, 49 , 351 - 380 . http://doi.org/10.1017/S0022109014000283
19. Nobanee, H., & Ellili, N. (2016). Corporate sustainability disclosure in annual reports: Evidence from UAE banks: Islamic versus conventional. Renewable and Sustainable Energy Reviews, 55, 1336-1341. https://doi.org/10.1016/j.rser.2015.07.084
20. Omar, S. A., Hasbolah, F., & Ulfah, M. Z. (2017). The diffusion of artificial intelligence in governance of public listed companies in Malaysia. International Journal of Business, Economics and Law, 14(2), 1-9. https://www.ijbel.com/wp-content/uploads/2018/01/BUS-17.pdf
21. Sadok, H., Sakka, F., & El Maknouzi, M. E. H. (2022). Artificial intelligence and bank credit analysis: A review. Cogent Economics and Finance, 10(1). https://doi.org/10.1080/23322039.2021.2023262
22. Schipke, M. A., Turunen, M. J., Choueiri, M. N., & Gulde, M. A. M. (Eds.). (2023). India's Financial System: Building the Foundation for Strong and Sustainable Growth. International Monetary Fund.
23. Staikouras, C. K., & Wood, G. E. (2011). The Determinants of European Bank Profitability. International Business & Economics Research Journal Vol 3, Number 6, PP 57-68 http://doi.org/10.19030/IBER.V3I6.3699
24. Tumin, M. H.., & Said, R.. (2010). Performance and Financial Ratios of Commercial Banks in Malaysia and China. . http://doi.org/10.2139/SSRN.1663612

25. Wang, J., Wang, K., Dong, K., & Zhang, S. (2023). Assessing the role of financial development in natural resource utilization efficiency: Does artificial intelligence technology matter? Resources Policy, 85. https://doi.org/10.1016/j.resourpol.2023.103877
26. Xu, Q., & Xu, C. (2023). The Impact of Artificial Intelligence Strategy on Corporate Financial Performance—An Empirical Analysis Based on Listed Companies Panel Data (pp. 365–371). https://doi.org/10.2991/978-94-6463-010-7_38
27. Xu, Y., Shieh, C. H., van Esch, P., & Ling, I. L. (2020). AI customer service: Task complexity, problem-solving ability, and usage intention. Australasian marketing journal, 28(4), 189-199. https://doi.org/10.1016/j.ausmj.2020.03.005