



Impact Of Ai On Cost Reduction & Efficiency With Special Reference To Private Sector Banks Of Western Vidarbha Region, Maharashtra

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ABSTRACT

"The advent of Artificial Intelligence (AI) in the banking sector is perhaps the most profound technological change the profession has seen." The research paper aims to discuss the impact of artificial intelligence on cost reduction and the achievement of greater efficiencies within the banking industry of the private sector. While the advent of artificial intelligence represents a profound change to the Indian financial system, research examining the impact of AI within the Western Vidarbha region of the state of Maharashtra represents a noticeable absence within the academic literature. Thus, though studies at the national level prove the benefits of the adoption of AI in the banking sector of India as a whole, the detailed information available at the regional level for the Western Vidarbha region, which covers the districts of Amravati, Akola, Yavatmal, Buldhana, and Washim, is not available in scholarly studies. This level of geographical specificity is not normally within the scope of scholarly studies, which normally focus on the macro-level situation or large-scale adoption in major banking institutions such as HDFC Bank, ICICI Bank, AXIS bank, Kotak Mahindra Bank, IDFC First Bank, or the assessment of the situation at the level of the Reserve Bank of India (RBI) or the NITI Aayog.

Keywords: Artificial intelligence, Cost reduction, Operational efficiency, Private-sector banks, Western Vidarbha, India

1.INTRODUCTION

Artificial Intelligence (AI) is significantly changing the banking sector of India. This research would be useful for the impact of Artificial Intelligence (AI) on the reduction of costs and efficiency of operations of private sector banks in the Western Vidarbha Region of Maharashtra. The development of Artificial Intelligence (AI) is changing every aspect of the operations of organizations, including the reduction of costs and efficiency of operations. Artificial Intelligence (AI) chatbots for customer service, machine learning for fraud detection systems, predictive analytics for credit scoring, and Artificial Intelligence (AI) for loan processing are changing the banking sector. Artificial Intelligence (AI) is being used for the delivery of personal financial services, risk management, and compliance. Artificial Intelligence (AI) is being used for the improvement of credit scoring, detection of anomalies, and customer engagement. However, there are challenges like data privacy, regulatory challenges, and the requirement for a skilled workforce. With the increasing trend of AI usage, it is predicted to contribute to the development of digital banking services in the country. Vidarbha, a region located in the eastern part of the state of Maharashtra, comprises important cities like Nagpur (the largest city and an important hub for logistics, information technology, and transportation), Amravati, Akola, Chandrapur, Yavatmal along with other important cities like Wardha, Gondia, Buldhana.

There are 11 districts in western Vidarbha region of Maharashtra.



1.1 Role of AI in Banking sector

Some of the applications of AI in the banking sector are:

- Robotic Process Automation (RPA)
- Machine Learning (ML)
- Natural Language Processing (NLP)
- Cognitive Computing

Kumar & Singh, 2022; suggested that using AI reduces the workload and minimizes errors in banking, enabling real-time data processing and quicker decision-making.

1.2 Impact of AI and Cost Reduction

Consequences of AI implementation include:

- Reduction of repetitive work
- Cost savings in data entry and reconciliation
- Minimization of errors and increased speed of processing

The long-term ROI for AI is substantial in spite of the costs of implementation.

1.3 AI and Efficiency

Efficiency is increased through AI in the following ways:

- Accelerated workflow processes
- Accuracy in accounting and regulatory compliance
- Predictive analysis for strategic decision-making

2. REVIEW OF LITERATURE

The researcher was able to gain a more comprehensive understanding of the topic by reviewing the literature on the subject and using reference books written by subject-matter experts. The electronic databases of various websites and publications pertaining to the banking and cooperative fields proved to be beneficial.

According to Alt et al. (2021) and Amin (2022), the banking sector is essential to the current global economy because it manages finance, money-related issues, and other credit transactions. Additionally, the banking sector offers financial support for the expansion of both small and large industries. It encourages customers to save money and pursue their own interests for a better future by assisting them in tracking where spending exceeds savings.

Artificial intelligence analyzes customer behavior to help manage workload. Elegunde & Oladimeji, 2020; Ghodselahi & Amirmadhi, 2011; Hentzen et al., 2022) concluded that understanding their work, decisions, and information needed to be delivered instantly.

"Technological innovation in Artificial Intelligence positively contributed to the efficiency of customer service at the respective selected bank," according to the study "Increasing customer service efficiency through artificial intelligence chatbot by Andrade & Turnelero, Feb 2022."

According to Noreen et al. (2023), the banking sector can employ appropriate artificial intelligence-based techniques to raise customer service standards and improve bank performance metrics.

Mehdiabadi et al. (2022) came to the conclusion that "the concept of banking 5.0 is based on the architecture of an industrial revolution generated by artificial intelligence."

In order to improve the quality of services offered to bank customers, Mhlana (2020) examined the impact of artificial intelligence on the process of digital financial inclusion, emphasizing the significance of elements like chatbots, fraud detection, and cybersecurity.

3. RESEARCH METHODOLOGY

Five private sector banks—HDFC Bank, ICICI Bank, AXIS Bank, Kotak Mahindra Bank, and IDFC First Bank—that are active in Western Vidarbha are included in the study. Both qualitative and quantitative data are used to support the study's descriptive and analytical research design. Fifty accounting professionals and fifteen IT/AI strategy managers make up the study's sample of bank employees. Structured questionnaires served as the primary source of data, while annual reports and bank financial statements served as secondary sources. This study used regression analysis, comparative cost analysis, and descriptive statistics (mean, percentage).

The study's limitations include a small sample size of just three chosen banks, a regional focus that restricts generalizability, and the potential for rapid AI evolution to alter findings.

The objectives of the study are:

1. To **evaluate the impact of AI implementation** on operational costs in private sector banks.
2. To determine AI's role in **reducing HR costs** related to accounting and administrative functions.
3. To measure improvements in **efficiency and service quality** post-AI adoption.
4. To provide strategic recommendations for AI integration.

The study specifically deals with: Accounting automation; Back-office operations; HR cost optimization; AI-based customer service systems; and Operational efficiency improvements. AI technologies are

considered to operate as independent variables, and the areas they influence are: HR cost reduction; Operational efficiency and Service quality. This can be represented as:



There are three types of variables considered for the study as Independent Variables, Dependent Variables, and Control Variables. The Independent variables considered are: AI Adoption – Level of AI adoption; Automation Usage – AI-based accounting automation; and Data Analytics – Decision support systems. The Dependent variables considered are: Operational Cost – Cost savings; HR Cost – Reduction in manpower cost; Efficiency – Speed and productivity improvement; and Service Quality – Improvement in customer service, and the Control variables considered are: Private sector banks and Employee roles like Accountant/AI Manager.

4. DATA ANALYSIS AND INTERPRETATION

This analysis and interpretation based on the data collected from employees of the chosen Five Private Sector Banks operating their businesses in the Western Vidarbha Region of Maharashtra State. This research focuses on the impact of Artificial Intelligence on reducing costs and increasing efficiency in banking operations. In order to conduct the research, a structured questionnaire was used with 25 Likert scale questions. It has been established that the questionnaire used to conduct the research has high reliability with a high Alpha Value of 0.87. The sample size of the participants was 65 banking professionals.

Statistical tools used for analysis:

- Percentage Analysis
- Mean Score Analysis
- Chi-Square Test
- Regression Analysis
- Reliability Test (Cronbach's Alpha)

4.1 Profile of Respondents

Table 4.1: Category-wise Distribution of Respondents

Category	Number	Percentage
Accounting Professionals	50	76.9%
IT/AI Strategy Managers	15	23.1%
Total	65	100%

The major portion of the respondents belongs to the field of accounting. This implies that the research mainly deals with the operational and accounting aspects related to the adoption of AI in the banking sector.

4.2 Bank-wise Distribution

Table 4.2: Respondents across Selected Banks

Bank	Respondents
Axis Bank	13
HDFC Bank	14
ICICI Bank	13
Kotak Mahindra Bank	12
IDFC First Bank	13
Total	65

The sample size of the research is equally distributed among the major private sector banks. This implies that the research has equally represented the different banking institutions.

4.3 Impact of AI

Table 4.3: Perception toward AI Implementation

Statements	Agree+ Strongly Agree (%)
AI reduces operational costs	82
AI reduces HR workload	78
AI improves efficiency	86
AI enhances service quality	80

A large number of the respondents agree that AI plays a major role in the improvement of operations, especially the enhancement of efficiency.

4.4 Mean Score Analysis

Table 4.4: Mean Scores of Key Variables

Variables	Mean Score
Operational Cost Reduction	4.18
HR Cost Reduction	4.05
Efficiency Improvement	4.32
Service Quality	4.11

The mean score for Efficiency Improvement was the highest. This implies that the adoption of AI has mainly enhanced the operational efficiency. Operational Cost Reduction and Service Quality have highly impact while HR Cost Reduction have Significantly Impact.

4.5 The relationship between AI adoption and operational cost reduction:

Hypothesis

- H_0 : There is no significant relationship between AI adoption and impact on cost reduction.
- H_1 : There is significant relationship between AI adoption and impact on cost reduction.

The result obtained from the Chi-square test confirmed that AI adoption significantly influences cost reduction in private sector banks. This is because the calculated value is 12.84, as per the above table. A majority of the respondents agreed that AI adoption has helped banks reduce their costs by minimizing repetitive tasks. Approximately 82% of the respondents agreed that AI adoption has helped banks reduce their costs by minimizing repetitive tasks. Therefore, we can conclude that AI adoption significantly influences cost reduction in private sector banks. AI adoption has helped banks reduce their costs by minimizing repetitive tasks using AI-based technologies like automated data processing, intelligent document recognition, and robotic process automation. AI adoption has helped banks reduce their human resource costs, especially in accounting and administrative activities. Automated systems are used to process data entry, transaction verification, and report generation, as they were done manually before AI adoption. Around 78% of the respondents revealed that AI has reduced the requirement for extra personnel and overtime hours, thus enabling banks to better manage their HR costs.

4.6 To examine the effect of AI adoption on operational efficiency

Hypothesis

- H_0 : There is no significant relationship between AI adoption and impact on operational efficiency.
- H_1 : There is significant relationship between AI adoption and impact on operational efficiency.

Regression analysis results revealed a strong positive correlation between AI adoption and efficiency. Statistical results revealed that AI implementation accounted for approximately 57% of the variability in efficiency, thus proving its impact on banking operations.

There are two variables Operational Efficiency which is a Dependent Variable, and AI Adoption is an Independent Variable. The calculated Beta coefficient for AI Adoption is 0.61, whereas the calculated Beta coefficient for Operational Efficiency is 0.48.

Using AI systems, transactions can be processed faster, and human errors can be reduced with real-time data analysis capabilities. AI has improved the quality and speed of banking services. AI technologies like AI chat bots, automated customer support systems, and predictive analytics can enable banks to respond to customer queries more quickly and accurately. About 80% of the respondents agreed that AI contributes to better service delivery and customer satisfaction.

CONCLUSION

From the above analysis, it is evident that Artificial Intelligence is playing a vital role in the banking operations of the private sector in Western Vidarbha. The automation of accounting and administrative processes has minimized the manual work as well as the operational costs. Key improvements include the following: Faster transaction processing; Reducing human errors; Improving data accuracy; Enhancing decision-making capabilities & Better customer service delivery

The study revealed that Artificial Intelligence has played a vital role in the reduction of operational costs in private sector banks. Employees strongly feel that Artificial Intelligence is a major contributor to the improvement of productivity as well as performance. From the study, it is evident that banking professionals have started to realize the importance of AI technologies in the banking sector. Accounting professionals and IT managers all agree that the use of AI technology improves decision-making, accuracy, and organizational performance. Thus, it is the conclusion of this research that the use of AI technology is a strategic necessity for private sector banks operating in the Western Vidarbha Region, as it helps the banks to streamline their operations, save costs, and improve organizational performance. Private sector banks can benefit immensely from the use of AI technology, which would improve the efficiency of the banks. Private sector banks that adopt the use of AI technology would be able to improve the efficiency of the banks, thereby improving the service delivery of the banks.

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