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A STUDY ON THE IMPACT OF ARTIFICIAL INTELLIGENCE IN TRANSFORMING PUBLIC BANKING OPERATIONS IN INDIA

Chaitanya S[1], Dr. Santhosh M Gowda[2]
[1]*R V Institute of Management*
[2]*R V Institute of Management*

ABSTRACT
This research paper examines the profound impact of artificial intelligence (AI) on the operations of public sector banks in India. With the rapid advancement of AI technologies, public banks in India are increasingly leveraging AI to streamline processes, enhance customer experiences, and improve operational efficiency. Through an analysis of various AI applications and their implications, this study aims to provide insights into the positive and negative impacts of AI adoption in the banking sector. The rapid advancement of artificial intelligence (AI) is profoundly transforming the global banking landscape, and public sector banks in India are no exception. As these institutions strive to modernize and remain competitive in an increasingly digital economy, AI has emerged as a critical enabler of operational efficiency, service innovation, and strategic decision-making. The study employs a mixed-methods approach, combining secondary data analysis, case studies of leading public sector banks, and interviews with key banking officials. This paper offers practical recommendations for policymakers, bank executives, and technology providers. It underscores the importance of a robust digital strategy, continuous employee training, and ethical AI governance to fully leverage the potential of AI while mitigating associated risks. The research also emphasizes the role of AI in advancing financial inclusion and supporting the broader economic goals of India.

KEYWORDS: *Artificial Intelligence, Public Sector Banks, Banking Operations, Customer Service, Automation*

INTRODUCTION
Artificial intelligence is changing the banking industry by improving traditional banking methods and customer interactions. A McKinsey report suggests that AI could become a $1 trillion industry in banking (Building the AI bank of the future, May 2021). Public sector banks in India are using AI to compete better, provide better service, and improve their operations. AI helps banks work more efficiently, make customers happier, and manage risks better. It's a big part of the changes happening in India's banking sector. AI is used in many areas of banking, from managing risks to providing personalized customer service. Chatbots and virtual assistants are also used to help customers 24/7. AI helps banks predict what customers want, recommend products, and improve marketing. It also helps banks detect fraud and protect customer assets by analysing large amounts of data quickly. This research paper looks at how AI is used in public sector banks and how it affects both the banks and their customers.Furthermore, AI-driven solutions enable banks to optimize their marketing strategies by providing insights into customer behaviour and preferences. By analysing vast amounts of data, AI algorithms can identify patterns and trends, allowing banks to tailor their marketing efforts to specific customer segments. This targeted approach helps banks improve customer engagement and maximize the effectiveness of their marketing campaigns. Additionally, AI plays a crucial role in streamlining back-office operations, automating repetitive tasks, and improving overall efficiency. By freeing up human resources from mundane tasks, AI allows bank employees to focus on more value-added activities, such as strategic decision-making and relationship-building with customers.While these advancements have empowered customers to access banking services conveniently anytime and anywhere, they have also brought about challenges for the banking sector. This study offers insights into both the benefits and drawbacks of implementing artificial intelligence in the Indian banking industry. This study is of descriptive nature so all the required and relevant data have been taken up from various journals, magazines for published papers and websites.

OBJECTIVES OF STUDY
1. To examine the effects of artificial intelligence on customers in the public sector banking industry.
2. To study AI's influence on public sector bankers.
3. To assess public sector banking performance post-AI implementation.

LITERATURE REVIEW
Artificial Intelligence (AI) is rapidly transforming the banking industry, with numerous innovations and implementations across institutions in India and globally. One such notable development is the State Bank of India's AI innovation, SIA, which can manage a vast number of customer inquiries, matching the scale of Google's query processing. Developed by the Bangalore-based company Payjo, SIA functions error-free, serving a customer base exceeding 420 million (Pathak & Singh, 2020). In a similar stride, Canara Bank has launched its first digital branch called "CANDI," which features a humanoid robot named "BRO" capable of responding to specific customer questions (Pathak & Singh, 2020).

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Fintech companies are also playing a pivotal role in reshaping lending practices by leveraging AI. These platforms assess creditworthiness through alternative data and digital footprints, thus offering credit access to individuals traditionally excluded by conventional banks. Such technological evolution not only expands the definition of "creditworthy" but also sets the stage for broader financial inclusion, especially in underserved and remote regions (Malali & Gopalakrishnan, 2020). Similarly, the Dogo Rangsang Research Journal identifies AI's potential in enhancing customer service, fraud detection, and operational efficiency within Indian banks, although it also underscores limitations like inadequate research in rural areas and smaller sample sizes (Singh, n.d.).

In Europe, a study involving 161 Greek bank employees highlighted the acceptance of digital banking, attributing its rise to the need for reduced operational costs and increased flexibility in response to changing economic conditions (Kitsios et al., 2021).

The international banking sector has also seen increased adoption of AI, blockchain, and cloud computing technologies aimed at enhancing efficiency and customer satisfaction. However, this digital transformation brings heightened cybersecurity risks and necessitates a long-term strategic infrastructure for seamless data integration (Roca Florido, n.d.).

The necessity of AI was especially emphasized during social distancing mandates, where digital channels became the primary mode of customer interaction. Banks adopted AI not only to maintain operational continuity but also to gain a competitive edge in customer service. Despite these benefits, concerns remain regarding the decision-making capabilities of machine learning algorithms and their implications (VII6IRJEdT-5 & VPad, 2021). While AI implementation is still nascent in many Indian banks, early adoption trends suggest it significantly improves customer personalization and insights based on behavioral analytics (Suma SR & Anupama S, 2021).

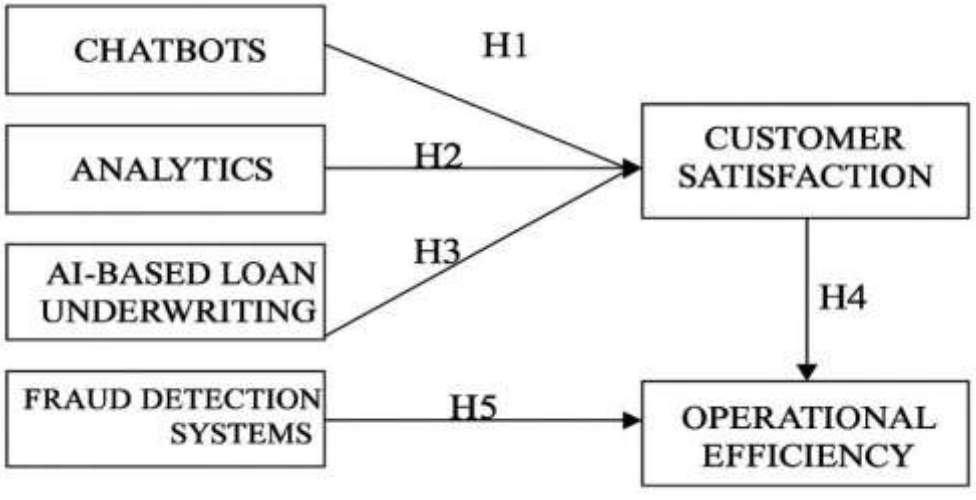
In the banking sector, failure to embrace AI, data analysis, and digital platforms may render traditional institutions obsolete. Digital banking models such as open banking, modular banking, and neobanks are disrupting established systems and emphasizing the role of effective marketing for broader acceptance (Anitha M, 2023).

Nasrin Eni et al. (2023) argue that the integration of AI and big data analytics is revolutionizing the marketing functions of Indian banks. By leveraging real-time data processing and machine learning, banks can offer more responsive, automated, and customer-centric services, thus transforming decision-making and customer engagement. AI is no longer just a supportive tool but a driving force behind digital transformation, offering secure, efficient, and customer-centric services (Ishwarya, 2023).

As organizations seek to reduce expenses and improve productivity, AI is favored over human labor due to its speed, reliability, and minimal error rates. Technologies such as virtual assistants, chatbots, holograms, and robots are becoming mainstream, fueled by the growing volume of critical data that necessitates AI for processing (Krutika Sawant, 2023).

AI continues to be a valuable tool for enhancing client relations and ensuring cybersecurity in banking. Algorithms can detect fraud and data breaches efficiently, demonstrating the critical role of AI in risk mitigation (Soni, n.d. The broader AI landscape in Indian banking underscores the transformative potential of technology, especially when aligned with human-centric service models (Singh, View of The Landscape of AI in Indian Banking Sector).

CONCEPTUAL FRAMEWORK



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HYPOTHESIS FORMULATION

H1: Chatbots enhance customer satisfaction by providing instant, round-the-clock support.
H2: Analytics improve customer satisfaction by enabling personalized and data-driven banking services.
H3: AI-based loan underwriting increases customer satisfaction through faster and more accurate loan approvals.
H4: Higher customer satisfaction leads to improved operational efficiency in public sector banks.
H5: AI-driven fraud detection systems directly contribute to greater operational efficiency by preventing financial losses.

RESEARCH GAP

Existing studies predominantly focus on the banking sector as a whole or specifically on private banks, with limited research dedicated to examining the impact of AI specifically within the public banking sector.

STATEMENT OF PROBLEM

Indian banks have always had a tough time serving customers because of lots of paperwork and following strict rules. But now, there's a chance to make things better with Artificial Intelligence (AI). AI can help banks work better, make services more personal, and keep things safe. However, there are some problems to solve before AI can really help. People worry about their data being kept safe, there aren't enough skilled workers who know about both banking and AI, and some customers aren't sure about using AI in banking. Fixing these problems is really important so that AI can make banking in India much better. Banks need to make sure data is safe, train more people to use AI, and make customers feel comfortable using AI tools. That way, everyone can enjoy a banking experience that's faster, more personal, and safer.

RESEARCH METHODOLOGY

This research paper takes a descriptive and analytical approach to explore how artificial intelligence affects public sector banks in India. It involves examining the applications of AI in banking operations through existing articles and research papers.

SOURCES OF DATA

- Questionnaire responses from customers and bankers
- Research papers and articles on AI in banking
- Press releases and reports from public sector banks in India
- Industry reports and analyst insights

AREA OF STUDY

The primary focus of this study is on public sector banks in India, including State Bank of India (SBI), Bank of Baroda, Canara Bank, and City Union Bank. These banks serve as representative examples of the adoption of AI technologies in the Indian banking sector.

APPLICATIONS OF AI IN PUBLIC SECTOR BANKS

1. **Chatbots and virtual assistants:** These AI-powered tools provide 24/7 customer support, answer frequently asked questions, and resolve basic banking queries.

Innovative AI initiatives in various Indian public banking institutions

- **State Bank of India's SIA Chatbot:** State Bank of India (SBI) has introduced SIA, an AI- powered chat assistant designed to address customer inquiries and assist with everyday banking tasks. Developed by Payjo, SIA responds to millions of queries from thousands of customers, handling nearly 10,000 inquiries per second. SIA continuously learns and improves with each interaction, providing efficient and personalized customer service.
- **Bank of Baroda's Tech-Enabled Digital Branches:** Bank of Baroda has launched tech- enabled digital branches featuring applications and gadgets powered by an AI robot named 'Baroda Brainy'. These branches aim to improve customer experience and offer innovative banking solutions. The bank also intends to establish a digital lab with free Wi-Fi services for customers.

2. **Loan processing:** AI algorithms automate credit scoring, analyse financial data, and assess risk profiles, enabling faster loan approvals and reduced turnaround time.
3. **Fraud detection:** AI can analyse transaction patterns and identify suspicious activities in real-time, minimizing fraudulent transactions and protecting customer accounts.
4. **Robotic process automation (RPA):** RPA automates repetitive back-office tasks such as data entry, account reconciliation, and report generation, improving efficiency and reducing errors.
5. **Enhanced Mobile Wallets/Smart Wallets:** Mobile wallets equipped with intelligence to provide smart services such as instant messaging, booking tickets for buses, cabs, events, movies, and facilitating utility bill payments, among others.
6. **Creditworthiness Assessment:** Artificial intelligence algorithms are employed to evaluate individuals' creditworthiness, analysing factors such as credit history, income, and financial behaviour to determine eligibility for loans, credit cards, and other financial products.
7. **Predictive analytics:** AI can analyse customer data to predict financial needs and suggest personalized financial products and services.
8. **Multilingual Support:** Chatbots are capable of interacting with users in various languages using Natural Language Processing (NLP) to provide effective responses to queries.

Current Scenario

- The Indian public banking sector is witnessing a gradual but steady increase in AI adoption.
- State Bank of India (SBI), Bank of Baroda, City Union Bank and Allahabad Bank are at the forefront of AI implementation.
- SBI launched a national hackathon called **"Code For Bank"** to encourage developers, startups, and students to propose innovative ideas and solutions forthe banking sector. The hackathon focuses on technologies such as predictive analytics, fintech/blockchain, digital payments, IoT, AI, machine learning, BOTS, and robotic process automation.
- **Mitra and Candi**, the humanoid robots deployed by Canara Bank in Bengaluru, serve as innovative customer care assistants, offering assistance in multiple languages and contributing to the bank's digitization efforts.

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- Challenges include the high cost of AI technology, lack of skilled personnel, and concerns around data privacy and security.

Chart showing implementation of chatbots in Nationalized Banks

SL. No.	Name of Bank	Chatbot Name	Year of implementation
1	State Bank of India (SBI)	SBI Intelligent Assistant (SIA)	2017
2	Union Bank of India	UVA (Union Bank's Virtual Assistant)	2017
3	Indian Bank	ADYA	2021
4	Punjab National Bank(PNB)	PIHU	2017
5	Central Bank of India	NA	NA
6	UCO Bank	Uma	2020
7	Bank of Maharashtra	BoMy	2022
8	Canara Bank	Mitra and Candi Robot	2017
9	Bank of India	NA	NA
10	Indian Overseas Bank(IOB)	NA	NA
11	Bank of Baroda	ADI	2023
12	Punjab and Sind Bank	NA	NA

Positive Impacts on Banks and Customers

- **For Banks**
  1. Enhanced operational efficiency and productivity
  2. Reduced costs through automation and streamlined processes
  3. Improved risk management and fraud detection
  4. Increased customer satisfaction with 24/7 availability and personalized services
  5. AI is currently employed to assess bank performance, particularly in accounting, auditing, and assurance.
- **For Customers**
  1. Convenient and faster banking services through chatbots and virtual assistants
  2. Personalized financial product recommendations based on AI analysis
  3. Improved security features and fraud protection
  4. 24/7 access to banking services through mobile apps

Negative Impacts

1. **Job displacement:** AI innovations in banking are changing traditional roles, making some jobs, like manual passbook updating, obsolete. While automation may reduce jobs in some areas, it can also lead to redeployment of employees to new roles. This transformation improves productivity but may also result in certain banking jobs disappearing over time.
2. **Potential biases:** AI algorithms trained on biased data can perpetuate discrimination in loan approvals or other services.
3. **Ethical considerations:** Data privacy and security concerns need to be addressed as AI relies heavily on customer data.

ANALYSIS OF CUSTOMER DATA

We gathered 155 responses from customers of public banks. Our study focuses on operational efficiency as the dependent variable. We've selected three independent variables (Chatbots, Satisfaction Level, Customer experience) that show strong correlations with operational efficiency.

Correlation

	Operational Efficiency	Chatbots	Satisfaction Level	Customer experience
Operational Efficiency	—			
Chatbots	0.545	—		
Satisfaction Level	0.561	0.587	—	
Customer experience	0.601	0.626	0.544	—

Chatbots: The correlation coefficient of 0.5449 indicates a significant positive relationship between operational efficiency and chatbots. This suggests that banks with the resources to manage AI effectively can enhance efficiency by automating tasks and freeing up employees for more complex work

Satisfaction Level: The correlation coefficient between operational efficiency and customer satisfaction level is 0.5605. This indicates a positive and statistically significant correlation.

Customer Experience: The correlation coefficient between operational efficiency and customer experience is 0.601. This indicates a positive and statistically significant correlation. In other words, banks with higher operational efficiency tend to also have a better customer experience.

The positive correlation between operational efficiency, chatbots, customer satisfaction, and customer experience suggests AI improves customer service in banks. Chatbots

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provide 24/7 support, handle tasks quickly, and personalize interactions. Efficient processes lead to faster loan approvals, fewer errors, and quicker issue resolution, boosting customer satisfaction and experience. This supports the idea that AI helps banks achieve greater ease, speed, and efficiency, partially aligning with H1.

Multiple Regression

Model Fit Measures

					Overall Model Test			
Model	**R**	**R^2**	**Adjusted R^2**	**RMSE**	**F**	**df1**	**df2**	**p**
1	0.673	0.453	0.442	0.511	41.5	3	150	< .001

Model Coefficients - Operational Efficiency

Predictor	**Estimate**	**SE**	**t**	**p**
Intercept	0.497	0.3383	1.47	0.144
Satisfaction level	0.291	0.0826	3.52	< .001
Chatbots	0.178	0.0895	1.99	0.048
Customer experience	0.378	0.0875	4.32	< .001

Reliability Analysis

Scale Reliability Statistics

	Cronbach's α
scale	0.845

The multiple regression analysis evaluates the impact of three predictors - satisfaction level, chatbots, and customer experience on operational efficiency in public banks in India. The fit measures for the model are as follows:

R (Correlation Coefficient) (0.673): This indicates a strong positive correlation between the predictors and operational efficiency.

R^2 (Coefficient of Determination) (0.453): This suggests that approximately 45.3% of the variance in operational efficiency can be explained by the model. While this indicates a moderate level of explanatory power, there is still 54.7% of the variance that might be explained by other variables not included in the model.

Adjusted R^2 (0.442): This value adjusts R^2 for the number of predictors in the model, providing a more accurate measure of the model's explanatory power. The adjusted R^2 being close to R^2 indicates that the predictors are relevant and the model is not overfitting.

RMSE (Root Mean Square Error) (0.511): This metric measures the average magnitude of the residuals, indicating the average prediction error. A lower RMSE value signifies a better fit, but the acceptability of this value depends on the context and scale of the data.

F-test (41.5): The F-statistic tests the overall significance of the model. The high F- value and the p-value being less than 0.001 indicate that the model is statistically significant, and the predictors collectively have a significant effect on operational efficiency.

p- value: The p-values for satisfaction level (< .001), chatbots (0.048), and customer experience (< .001) indicate that all three predictors are statistically significant in predicting operational efficiency. This means that satisfaction level, chatbot usage, and customer experience all have a meaningful impact on operational efficiency.

Reliability Analysis Cronbach's α: 0.845

Cronbach's alpha measures the internal consistency or reliability of the scale used to assess operational efficiency. A value of 0.845 indicates good reliability, suggesting that the items on the scale are measuring the same underlying construct consistently.

The multiple regression model provides a strong indication that satisfaction level, chatbots, and customer experience are significant predictors of operational efficiency in public banks in India. The model explains 45.3% of the variance in operational efficiency, with all three predictors showing positive relationships with the dependent variable. The overall model is statistically significant, and the reliability of the scale used for measuring operational efficiency is high.Therefore, the results indicate that the alternative hypothesis (H1) is supported. Customers using banks with AI-powered transaction processes, which include elements like chatbots and enhanced customer experience, are significantly more satisfied compared to those using traditional methods.

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ANOVA

	Sum of Squares	df	Mean Square	F	p
Satisfaction Level	3.32	1	3.320	12.38	< .001
Chatbots	1.07	1	1.066	3.97	0.048
customer experience	5.00	1	5.003	18.66	< .001
Residuals	40.23	150	0.268		

This ANOVA table shows how much each factor - satisfaction level, chatbots, and customer experience affects operational efficiency:

Satisfaction Level: It has a significant impact on operational efficiency, meaning higher satisfaction tends to improve efficiency ($p < .001$).

Chatbots: They also affect efficiency, but their impact is less pronounced compared to satisfaction level ($p = 0.048$).

Customer Experience: This factor strongly influences efficiency, indicating that better customer experiences lead to more efficient operations ($p < .001$).

These results suggest that focusing on improving satisfaction and customer experience can notably enhance operational efficiency in this context. Given that the p-values for satisfaction level, chatbots, and customer experience are all below 0.05. We accept the (H1). This means that customers using banks with AI-powered transaction processes are significantly more satisfied with the ease, speed, and efficiency compared to those using traditional methods.

ANALYSIS OF BANKERS DATA

We gathered 20 responses from bankers working at public banks, specifically SBI and Canara Bank. Our research focuses on operational efficiency as the dependent variable. We've identified five independent variables that demonstrate strong correlations with operational efficiency.

Correlation

	Operational Efficiency	Man-hour Reduction	Performance of Bank	Fraud Reduction	Impact of Chatbots	Job displacement
Operational Efficiency	—					
Man-hour Reduction	0.782	—				
Performance of Bank	0.774	0.535	—			
Fraud Reduction	0.805	0.630	0.587	—		
Impact of Chatbots	0.655	0.880	0.420	0.716	—	
Job displacement	0.587	0.391	0.587	0.578	0.489	—

- **Man-hour Reduction (0.782)**: There is a strong positive correlation between man-hour reduction and operational efficiency, indicating that as man-hours are reduced, operational efficiency tends to improve significantly.
- **Performance of Bank (0.774)**: There is a strong positive correlation between the performance of the bank and operational efficiency, suggesting that higher bank performance is associated with greater operational efficiency.
- **Fraud Reduction (0.805)**: This shows the strongest positive correlation with operational efficiency among all variables, indicating that reducing fraud is highly associated with improved operational efficiency.
- **Impact of Chatbots (0.655)**: There is a strong positive correlation, implying that the positive impact of chatbots on customer satisfaction is linked to higher operational efficiency.
- **Job Displacement (0.587)**: There is a moderate positive correlation between job displacement and operational efficiency, suggesting that while job displacement is associated with improved operational efficiency, the relationship is less strong compared to other variables.

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Multiple Regression

Model Fit Measures

					Overall Model Test			
Model	R	R^2	Adjusted R^2	RMSE	F	df1	df2	p
1	0.949	0.901	0.863	0.152	23.6	5	13	< .001

Model Coefficients - Operational Efficiency

Predictor	Estimate	SE	t	p
Intercept	-0.531	0.516	-1.03	0.323
Man-hour Reduction	0.856	0.235	3.64	0.003
Performance of Bank	0.212	0.135	1.57	0.041
Fraud Reduction	0.486	0.140	3.47	0.004
Impact of Chatbots	0.568	0.241	2.36	0.035
Job displacement	0.130	0.119	1.09	0.095

Reliability Analysis

Scale Reliability Statistics

	Cronbach's α
scale	0.884

R: The correlation coefficient (R) of 0.949 suggests a very strong relationship between the predictors and the dependent variable.

R^2: The coefficient of determination (R^2) of 0.901 indicates that 90.1% of the variance in the dependent variable (operational efficiency) is explained by the predictors.

Adjusted R^2: The adjusted R^2 of 0.863 adjusts for the number of predictors in the model, suggesting robust explanatory power even when considering model complexity.

RMSE: The root mean square error (RMSE) of 0.152 indicates the average deviation of the model's predictions from the actual values of operational efficiency.

p-value: The p-value (< .001) suggests that the overall model is statistically significant, meaning that the predictors collectively have a significant impact on operational efficiency.

Reliability Analysis

Cronbach's α: 0.884

A Cronbach's α of 0.884 suggests high internal consistency among the variables: operational efficiency, man-hour reduction, performance of the bank, fraud reduction, and impact of chatbots on customer satisfaction. This indicates that these variables collectively measure a cohesive construct reliably.

The results indicate that the alternative hypothesis (H1) is supported. Bankers' workload is significantly reduced after implementing AI-powered solutions for transaction processing, allowing them to focus on more complex tasks. Hence, the null hypothesis (H0) is not fulfilled.

ANOVA

	Sum of Squares	df	Mean Square	F	p
Man-hour Reduction	0.4481	1	0.4481	13.28	0.003
Performance of Bank	0.0831	1	0.0831	2.46	0.041
Fraud Reduction	0.4068	1	0.4068	12.06	0.004
Impact of Chatbots	0.1878	1	0.1878	5.56	0.035
Job displacement	0.0402	1	0.0402	1.19	0.095
Residuals	0.4387	13	0.0337		

Man-hour Reduction: The p-value (0.003) is less than the significance level of 0.05, indicating a significant effect. The F-value (13.28) is high, showing a strong influence on reducing bankers' workload.

Performance of Bank: The p-value (0.041) is less than 0.05, indicating a significant effect. However, the F-value (2.46) is relatively lower, suggesting a moderate influence on workload reduction.

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Fraud Reduction: The p-value (0.004) is less than 0.05, indicating a significant effect. The F-value (12.06) is high, showing a strong influence on reducing bankers' workload.
Impact of Chatbots: The p-value (0.035) is less than 0.05, indicating a significant effect. The F-value (5.56) suggests a moderate influence on workload reduction.
Job Displacement: The p-value (0.095) is greater than 0.05, indicating no significant effect on bankers' workload. The F-value (1.19) is low.
Given that multiple predictors (Man-hour Reduction, Performance of Bank, Fraud Reduction, and Impact of Chatbots on Customer Satisfaction) have significant p-values (<0.05) and relatively high F-values, it indicates that AI-powered solutions significantly impact the reduction of bankers' workload. Therefore, the alternative hypothesis (H1) is supported, indicating that bankers' workload is significantly reduced after implementing AI-powered solutions for transaction processing. Hence, the null hypothesis (H0) is not fulfilled.

FINDINGS

Findings from Customer Data Analysis

Our study focused on understanding the impact of artificial intelligence (AI) on operational efficiency in public banks through customer perspectives. We analyzed 155 responses and identified three key variables - chatbots, satisfaction level, and customer experience—that strongly correlate with operational efficiency.

The presence of AI-powered chatbots showed a significant positive relationship with operational efficiency. Banks equipped with efficient AI systems capable of automating routine tasks tend to operate more efficiently, freeing up resources for more complex customer interactions. Similarly, higher levels of customer satisfaction and positive customer experiences were found to align with increased operational efficiency. This suggests that banks focusing on enhancing customer satisfaction through improved service delivery also see improvements in their operational effectiveness.

Our multiple regression analysis further supported these findings, indicating that satisfaction level, chatbot usage, and customer experience collectively explain a significant portion of the variance in operational efficiency. The analysis revealed a robust relationship between these variables and operational outcomes in public banks. The analysis also confirms that the alternative hypothesis (H1) is accepted, demonstrating a significant impact of AI on customer satisfaction.

Findings from Bankers Data Analysis

In examining the impact of AI on operational efficiency from the perspective of bankers at public banks, our analysis of 20 responses highlighted several influential factors. Key variables such as man-hour reduction, performance of the bank, fraud reduction efforts, impact of chatbots on customer satisfaction, and to a lesser extent, job displacement, emerged as significant correlates of operational efficiency.

Bankers reported that AI-driven reductions in man-hours and improvements in overall bank performance were strongly associated with enhanced operational efficiency. This suggests that AI technologies, including chatbots and automated processes, enable bankers to streamline operations, reduce manual errors, and focus on higher-value tasks. Additionally, efforts to combat fraud through AI tools were positively linked with improved operational outcomes, indicating a critical role for AI in enhancing security and efficiency within banking operations.

Our regression and ANOVA analyses supported these observations, indicating strong explanatory power of these variables in predicting operational efficiency among bankers. These findings underscore the transformative potential of AI in optimizing resource allocation and operational workflows within public banks, despite challenges such as potential job displacement and the need for ongoing employee upskilling. The analysis also confirms that the alternative hypothesis (H1) is accepted, demonstrating a significant impact of AI on reducing the workload of bankers.

CONCLUSION

Artificial intelligence (AI) is revolutionizing banking systems through algorithms, driving success in custom management services, credit information services, frequently asked questions (FAQ) services, financial assistance services, and more. Today, AI is pivotal in enhancing overall banking performance across various fields such as cybersecurity, risk control, fraud control, sales, internal audit, financial assistance, asset management, loan management, and customer management.

In conclusion, the study emphasizes the transformative impact of artificial intelligence on public sector banks in India. The adoption of AI has resulted in notable enhancements in operational efficiency and customer service. However, it also brings forth challenges that demand attention. Public banks must navigate the opportunities and risks associated with AI implementation, ensuring ethical and responsible usage. As AI continues to evolve, it will reshape the banking landscape in India, influencing the future of banking operations and customer experiences.

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QUESTIONNAIRE

A Study on the Impact of Artificial Intelligence on Revolutionizing the Operations of Public Banks in India (To the Customers)

1. Name
2. Age

   Below 20 21 – 30 31 – 40 41 – 50 50 and Above
3. Gender

   Male Female Prefer not to say
4. Which of the following income brackets best describes your household income? (Monthly)

   < 10,000 10,001- 25,000 25,001 - 50,000 50,001 - 100,00 >100,000
5. How often do you visit your bank branch in person?

   Multiple times a month Once a month A few times a year Rarely Never
6. In the past 12 months, how satisfied were you with the services provided by your bank?

   Very satisfied Satisfied Neutral Dissatisfied Strongly Dissatisfied
7. Do you find chatbots helpful in solving queries immediately? (A chatbot is an automated virtual assistant designed to interact with users and answer questions)

   Strongly Agree Agree Neutral Disagree Strongly Disagree
8. Which of the following banking services do you utilize the most?

   ATM withdrawals Online banking Mobile banking Money transfers Credit card services Loans Investment services
9. Do you think Artificial Intelligence can improve the efficiency and accuracy of banking operations? Yes No Not Sure
10. Would you be comfortable interacting with an AI-based virtual assistant for your banking inquiries? Yes, very comfortable Yes, somewhat comfortable No, not comfortable
11. To what extent do you trust AI-powered technology in the banking sector?

    Completely trust Somewhat trust Neutral Somewhat distrust Completely distrust
12. Which of the following concerns do you associate with Artificial Intelligence intervention in Indian banks?

    Data privacy Job security Transparency
    Reliability Ethical concerns Loss of personal touch
13. Do you believe Artificial Intelligence in Indian banks will lead to enhanced customer experience?

    Strongly believe Somewhat believe Neutral Somewhat disagree Strongly Disagree
14. Which of the following AI-powered features would you find valuable in your banking

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experience? Smart financial planning and recommendations Fraud detection and prevention
Personalized assistance Efficient customer support Automated processes

15. How has the use of Artificial Intelligence in public banks improved your banking experience? Significantly improved Moderately improved
Slightly improved No improvement

A Study on the Impact of Artificial Intelligence on Revolutionizing the Operations of Public Banks in India (To the Bankers)

1. Name
2. Age
21-30 years 31-50 years 51-60 years above 60 years
3. Name of the bank
4. Designation
5. Are you currently using Artificial Intelligence solutions in your banking operations? (Chatbots, Credit Scoring & Fraud Detection)
Already Implemented Intend to pursue but not yet started Not planning to implement
6. Have Artificial Intelligence applications streamlined routine banking processes?
Yes, greatly Yes, somewhat Not sure No, not at all
7. Did the use of Artificial Intelligence in the bank lead to reduction in the Man-hours? Strongly Agree Agree Neutral Disagree Strongly Disagree
8. Do you observe a significantly positive impact of Artificial Intelligence on the performance of your bank?
Strongly Agree Agree Neutral Disagree Strongly Disagree
9. Do you find Artificial Intelligence difficult to access because it is technical?
Strongly Agree Agree Neutral Disagree Strongly Disagree
10. Do you believe Artificial Intelligence helps the bank to reduce fraud and error s? Strongly Agree Agree Neutral Disagree Strongly Disagree
11. Will using chatbots for online support increase customer satisfaction? (A chatbot is an automated virtual assistant designed to interact with users and answer questions) Strongly Agree Agree Neutral Disagree Strongly Disagree
12. What potential benefits do you foresee from the implementation of Artificial Intelligence in public banks?
Improved efficiency and productivity Enhanced customer experience Better risk management Cost savings
13. Does Artificial Intelligence improve the efficiency of customer service in handling inquiries and complaints?
Strongly Agree Agree Neutral Disagree Strongly Disagree
14. What challenges do you anticipate in the implementation of Artificial Intelligence technology in public banks
Technical complexity Resistance from employees
Regulatory compliance Integration with existing systems
15. Do you think Artificial Intelligence in public banks will lead to job displacement?
Very likely Somewhat likely Neutral Not very likely Not likely
16. In what ways do you believe Artificial Intelligence can enhance the efficiency of loan processing in banks?
Speeding up approval processes Automating document verification Personalizing loan offers All of the above