Economic Sciences
https://economic-sciences.com
ES (2025) 21(4S), 86-91| ISSN:1505-4683

The Impact of Artificial Intelligence (AI) on Banking Operations and Customer Service

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ABSTRACT:
The use of Artificial Intelligence (AI) has brought about a revolution in the banking industry because it enhances the efficiency of the process and it has altered how customers are served. The paper will discuss the use of AI in banking operations and customer service as it relates to efficiency, accuracy, personalization, and client satisfaction. The questionnaire was administered in structured questionnaire and to a sample of 385 respondents who are the customers of the bank. Statistical tools, correlation, and regression, were employed to analyze the sufficient effects of AI-enabled services on operational efficiency, decision making skills and customer satisfaction. Upon analysis it was discovered that, The implementation of AI has a strong positive influence on the performance of banks and decision-making abilities. Continuing with the analysis, it was discovered that the customer satisfaction remained unchanged with the introduction of the AI among the banks. The paper highlights how banks should strive to engage in a moderated practice that integrates technological advancement and human intervention in a bid to introduce trust and inclusivity. The study contributes to the growing literature because it provides objective data on the potential impact of AI on the banking sector in the Indian market. Further research may be premised on the expansion of the sample size, longitudinal research and comparison across regions to gain more understanding regarding the evolving customer expectations.

KEYWORDS:
Digital Transformation, Banking Operations, Customer Satisfaction, Artificial Intelligence.

INTRODUCTION:

Due to the innovation in technology, the banking industry has undergone a remarkable transformation in the last few years. Artificial Intelligence (AI) is one of the most disruptive powers at work that affected the types of activities that banks perform and provide to their clients. The banking processes are also being integrated with machine learning and other AI applications, such as chatbots, predictive analytics, natural language processing, and robot process automation. The same improvements are not only making the operations efficient but also changing the customer experience as it assists the banks to provide personalized, efficient and safe financial services. With this digitalization of the world, AI is now seen as a competitiveness and survival requirement in the desktop banking industry. Banking operations that have long been thought to have primarily been humanitarian, paper-based and outdated are now transformation into slick technology-driven operations. Use of AI has enabled automation in areas such as detection of fraud, compliance check, credit rating and risk management thereby reducing cost incurred and errors committed. Besides serving as an efficient operating system, AI has transformed the customer service, which is the fabric of banking. The clients are now demanding rapid, smooth and customized service to their banks. Virtual assistants and chatbots are 24/7-support services that respond to questions and guide users during common transactions made with the help of AI. Only through natural language processing can such systems decode the intent of the customer and behave in a human mannerism without involving physical branches and call centres. The second factor that contributes to the need to augment AI security in the banking industry is its enhanced use. Cybersecurity threats are extremely sensitive to financial institutions, and even past strategies cannot be trusted any longer. In order to safeguard confidential information, AI technologies may detect abnormalities, predict potential violations, and provide proactive remedies. The fact that AI can continue learning and remain aware of new threats is what fosters customer confidence in online banking systems. At the same time, AI also allows a bank to meet the particular requirements of the regulators since the devices have the ability to

generate reports and verify that all the policies are adhered to, reducing the likelihood of fines.

REVIEW OF LITERATURE:

Sharma and Gupta (2021) analysed how AI was used to improve customer service among the banks in the public sector. In their work, they noted the influence that chatbots and virtual assistants have changed the way customers interact with companies by providing non-stop service and quick answers to their questions. The results showed that the customers satisfaction rates went up due to the AI-empowered services, even though issues such as individuality and system failures continued to be problematic.

Martinez and Lopez (2022) examined the role of AI in managing risks of Latin American banks. The authors discovered that AI-based models performed better than traditional systems in analyzing credit risks and forecasting fraud. The authors emphasised that the implementation of AI resulted in a better decision-making process as well as increased customer trust.

Kumar and Priya (2022) on artificial intelligence credit scoring models in Indian banking facilities, the authors examined the application of AI in credit scoring. The study discovered that AI algorithms made more successful predictions about a person being creditworthy than the traditional tools so the banking industry could offer more credit facilities to the inappropriately served clients. This, on the other hand, increased financial inclusion levels whilst upholding efficiency in risk management.

Mehta and Sundaram (2023) analysed the element of AI in the cybersecurity of Indian commercial banks. They emphasised that AI-based anomaly detection systems played the core role in securing sensitive financial information against cyber threats that were on the rise. The study further noted that despite the fact that AI improved security infrastructure, the problem of data privacy and ethical concerns are one of the greatest concerns that should be sought.

Johnson and Williams (2023) discusses the changing character of AI in banking customer experience in America. In their work, they had discovered that AI-based personalization systems like real-time finance offers elevated customer loyalty and engagement. At the same time, the study also showed that the issue of algorithmic discrimination and the need to disclose AI control in finance exists.

OBJECTIVES OF THE STUDY:

1. To examine the role of Artificial Intelligence in enhancing operational efficiency of banking institutions.
2. To analyse the impact of AI on customer satisfaction.
3. To evaluate the contribution of AI technologies in improving security and decision-making within banks.

HYPOTHESES:

1. **H1:** Artificial Intelligence has a significant positive impact on the operational efficiency of banking institutions.
2. **H2:** Artificial Intelligence significantly impacts customer satisfaction in terms of personalization, responsiveness, and overall satisfaction.
3. **H3:** The adoption of AI technologies significantly impacts security and decision-making in banks.

RESEARCH GAP:

The recent development of the Artificial Intelligence (AI) has raised significant attention to its implementation in the banking industry. A number of studies, both domestic and international, have identified the application of AI in enhancing operational efficiency, improving customer service, and enhancing risk management structures. Though these studies can help to understand the subject better, much of the available literature is inclined to either the technological angle or the operational results, with little to be done to determine how AI can affect both back-end banking processes and front-end customer experiences the same way other factors are integrated. This generates an intellectual gap on the overall effect of AI adoption in banking ecosystem. The applications of AI in the Indian context have been mainly focused on research to understand how AI can assist in the functioning of the Indian public sector banks, and how it can be applied to detect fraud, comply, or grant loans. Nonetheless, there is a dearth of research in a structured evaluation of the direct correlation

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between AI-based tools and customer satisfaction. Regarding the international stage, available literature has shown that AI can be embraced in the fields of predictive analytics, robo-advisory, and real-time decision-making. However, the issues connected with ethical dilemmas, algorithmic discrimination, data security, and customer confidence are not discussed in detail. This demonstrates a gap in research on the challenges and barriers to the adoption of AI and its advantages. It is important to bridge this gap to have balanced information that may help inform policy makers as well as banking institutions on the responsible and effective adoption of AI.

RESEARCH METHODOLOGY:

To address the study question regarding the role of Artificial Intelligence (AI) in banking processes and customer service, the current study will follow the analytical research design. The study will examine operational effectiveness, as well as customer-centric performance, of the AI usage in the banking industry. The research is quantitative in the form where it will be based on primary data gathered through the respondents and secondary data sources like journals, reports, and banking publications. The study population includes banking customers who access AI-powered services like chatbots, mobile banking, robo-advisor, and fraud detection notifications which is likely to be unknown and banking workers. Purposive sampling was used to select a sample of 385 respondents who were administered a structured questionnaire.

ANALYSIS AND INTERPRETATION:

Objective 1: To examine the role of Artificial Intelligence in enhancing operational efficiency of banking institutions.

R	R Square	Std. Error of the Estimate	Change Statistics				
			R Square Change	F Change	df1	df2	Sig. F Change
.309[a]	.096	.52424	.096	40.463	1	383	.000

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.		
		B	Std. Error	Beta				
1	(Constant)	1.719	.178		9.632	.000	40.463	.000[b]
	AI	.336	.053	.309	6.361	.000		
Dependent Variable: OE, Predictors: (Constant), AI								

A simple linear regression was conducted to examine the relationship between AI and Operational efficiency (OE). The results revealed that the overall regression model was statistically significant, $F(1, 383) = 40.463$, $p < .001$, indicating that the predictor variable (AI) significantly explains variance in the outcome variable (OE). The model produced an R^2 value of .096, approximately 9.6% of the variance in operational efficiency is explained by AI. While this represents a small effect size, the relationship is statistically reliable.

The unstandardized regression coefficient (B) for AI was 0.336 ($p < .001$), suggesting that for every one-unit increase in AI, OE is expected to increase by 0.336 units, holding other factors constant. The standardized beta coefficient was $\beta = .309$, indicating a moderate positive relationship between AI and OE. This suggests that AI is a significant positive predictor of operational efficiency.

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Objective 2: To analyse the impact of AI on customer satisfaction.

Correlations			
		AI	CSD
AI	Pearson Correlation	1	.042
	Sig. (2-tailed)		.415
	N	385	385

R	R Square	Std. Error of the Estimate	Change Statistics				
			R Square Change	F Change	df1	df2	Sig. F Change
.042[a]	.002	.44964	.002	.666	1	383	.415

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	F	Sig.
		B	Std. Error	Beta				
1	(Constant)	1.796	.153		11.738	.000	.666	.415[b]
	AI	.037	.045	.042	.816	.415		
Dependent Variable: CSD, Predictors: (Constant), AI								

A Pearson correlation was conducted to assess the relationship between AI and CSD. The results showed that the correlation between AI and CSD was not statistically significant, $r = .042$, $p = .415$, indicating a very weak positive association.

To further explore the relationship, a simple linear regression was performed with AI as the predictor and CSD as the dependent variable. The overall regression model was not statistically significant, $F(1, 383) = 0.666$, $p = .415$, indicating that AI does not significantly predict CSD. The model explained only 0.2% of the variance in CSD, $R^2 = .002$, suggesting a negligible effect size. The regression coefficient for AI was not significant, $B = 0.037$, $SE = 0.045$, $\beta = .042$, $t = 0.816$, $p = .415$. The regression coefficient for AI was B = .037 (p = .415), indicating a very small and non-significant effect. The standardized coefficient (β = .042) supports the conclusion that AI does not significantly predict CSD in this sample.

Objective 3: To evaluate the contribution of AI technologies in improving security and decision-making within banks.

R	R Square	Std. Error of the Estimate	Change Statistics				
			R Square Change	F Change	df1	df2	Sig. F Change
.554[a]	.306	.45149	.306	169.235	1	383	.000

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	F	Sig.
		B	Std. Error	Beta				
1	(Constant)	.384	.154		2.499	.013	169.235	.000[b]
	AI	.591	.045	.554	13.009	.000		
Dependent Variable: DMS, Predictors: (Constant), AI								

A simple linear regression was conducted to examine whether AI significantly predicts DMS. The results showed that the overall model was statistically significant, $F(1, 383) = 169.24$, $p < .001$, and explained approximately 30.6% of the variance in DMS ($R^2 = .306$), indicating a large effect size.

The regression coefficient for AI was significant, $B = 0.591$, $SE = 0.045$, $\beta = .554$, $t = 13.01$, $p < .001$. This suggests that higher levels of AI are associated with significantly higher DMS scores. Specifically, for each one-unit increase in AI, DMS is expected to increase by 0.591 units.

FINDINGS:

- The customers form part of this study, do find that the adoption of artificial intelligence does not improve their customer satisfaction levels.
- The human touch in resolving the customer queries played a vital role in improving customer satisfaction, whereas the adoption of AI like chatbots reduced the customer satisfaction levels, as the query solving process was difficult for most customers.
- The operational efficiency of the banks has significantly improved on the post-adoption of artificial intelligence.
- The effectiveness in the decision-making skills was improved on the adoption of artificial intelligence services.

SUGGESTIONS:

- The banks must not only concentrate on cost-cutting through the adoption of AI technologies, but also, they have to focus on customer preferences in terms of query solving and addressing of discrepancies.
- Sentiment analysis can be extensively used by the service providers to have a consistent monitoring of the feedbacks and improve the services accordingly.

CONCLUSION:

The current paper addressed the revolutionary nature of Artificial Intelligence (AI) in banking tasks and consumer service, specifically operational efficiency, customer satisfaction, and decision-making abilities. It was identified that the adoption of AI contributed to a significant increase in the efficiency of operations, minimizing redundancies and automating internal operations, which allowed banks to become cost-effective and realize higher productivity. Likewise, the findings revealed that AI had a significant beneficial impact on the capability to make decisions and security systems. AI has enabled banks to make faster, data-driven, and more reliable decisions and is important in an ever-competitive and technology-driven financial landscape as AI allows them to detect anomalies quickly and provides real-time insights. But in the case of customer satisfaction, there is a gap that was discovered in the study. Although AI-powered applications like chatbots and robo-advisors were helpful in delivering immediate feedback, they failed to make customers feel that their level of satisfaction had increased significantly. The absence of human touch, empathy, and individual response to queries proved to be the main factors decreasing the efficiency of AI in augmenting customer experience. This highlights the need to balance technology with human contact to ensure customer trust, inclusion, and loyalty in the long run. The application of AI in the banking sector has unquestionably presented quantifiable benefits in terms of operational and strategic aspects, yet its results on the customer side remain scarce. The answer therefore lies in the banks taking a hybrid strategy where they use AI to be efficient and make decisions, but still employ human-driven experience in cases of complex and emotion-oriented services. The dual approach in various regions and banking segments should be further investigated in future studies.

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