

Study on Utilizing Artificial Intelligence to Enable Personalized Banking Services and Enriched Customer Engagement in Chennai City

Akash Kumar S

II - M.B.A.

Department of Management Studies.

Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology

vtp3393@veltech.edu.in

8056043471

Dr. Lumina Julie. R

Assistant professor, Department of management studies

Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology

luminarajasekeran@gmail.com

9944321298

Abstract

The goal of the research is to gain a deeper understanding of how the banking sector might employ artificial intelligence (AI) to enhance customer interaction and provide more individualised financial services. It highlights hazards and ethical issues while looking at data interpretation skills, consumer experiences, and AI adoption patterns. The results demonstrate that respondents' high levels of engagement and happiness with AI integration indicate that they had a positive attitude towards it. Addressing gender inequality, focusing on various age groups, improving user interaction with AI-driven features, and refining AI algorithms are other recommendations. It is advised to enhance individualised services, enhance data analytics capabilities, and make the most of AI in consumer analysis. Additionally, it is imperative to invest in cutting-edge technologies and IT infrastructure. Putting these suggestions into effect in the realm of digital

banking can lead to happier consumers, increased engagement, and improved business outcomes.

Key words: personalised financial services, consumer engagement, AI algorithms, levels of satisfaction and engagement

I.INTRODUCTION

In the rapidly evolving landscape of modern banking, technology integration has emerged as a crucial strategy for meeting the ever-changing needs and expectations of customers.. Artificialintelligence (AI) is one of the technical innovations that is transforming the banking industry. It is a revolutionary tool that has the ability to drastically change the way banks interact with their clients. This paper explores the ramifications, difficulties, and opportunities related to thisdeveloping trend as it dives into the world of using AI to offer personalised banking services and improve consumer engagement. A new era of personalised banking services has been brought about by the development of AI technologies, which enable institutions to use data- driven insights to customise their offers to each individual customer's distinct preferences andbehaviours. The potential uses of artificial intelligence (AI) to improve customer experiences are numerous and diverse, ranging from chatbots with AI capabilities that offer immediate customer help to predictive analytics engines that provide tailored product suggestions. This study acknowledges that in today's hyper connected world, personalised financial services are a need rather than just a competitive advantage. Consumers anticipate easy, personalised, andstraightforward experiences with their banks across a variety of channels, such as physical branches, internet portals, and mobile apps. By enabling banks to anticipate customer demands, proactively handle complaints, and cultivate stronger relationships with their clients, artificialintelligence (AI) plays a vital role in helping them meet these expectations. But using AI to provide individualised banking services has its own set of difficulties. When utilising the vastamounts of consumer data at their disposal, banks have to deal with ethical dilemmas, complicated legal environments, and data protection issues. Additionally, implementing AI initiatives requires significant investments in technology infrastructure, talent acquisition, andorganizational change management. Despite these challenges, the potential benefits of utilizingAI to enable personalized banking services and enrich customer engagement cannot beoverlooked.

By embracing AI technologies, banks can drive operational efficiencies, streamline processes, and gain a competitive edge in a crowded marketplace. Moreover, by delivering highly personalized and contextualized experiences, banks can foster greater customer loyalty, retention, and advocacy, ultimately leading to long-term profitability and sustainable growth. In conclusion, this study underscores the transformative potential of AI in modern banking, particularly in enabling personalized services and enhancing customer engagement. The benefits of providing exceptional client experiences through AI-driven innovation are enormous, positioning banks for success in the digital age, even while the path towards AI integration may include obstacles.

Objectives

- To analyze AI's application in the banking sector.
- To examine the technological aspects of AI's ability to interpret consumer data.
- To evaluate the effects of AI-driven engagement and the entire banking experience.
- To determine the risks and misinterpretations involved in AI-based solutions.

Review of Literature

Artificial intelligence (AI) technology breakthroughs have led to a dramatic overhaul of the banking sector in recent years. **Smith and Johnson (2020)** "Artificial Intelligence in Banking: A Comprehensive Review" assert that artificial intelligence (AI) has enormous promise for improving consumer engagement and providing personalised financial services. Financial institutions can customise financial goods and services to meet the unique needs and preferences of their clients by utilising AI-driven algorithms and machine learning approaches to examine large volumes of customer data. The many uses of AI in banking, such as chatbots, recommendation engines, fraud detection systems, and predictive analytics, are examined in this thorough analysis.

The report emphasises how artificial intelligence (AI) is revolutionising risk management, client satisfaction, and operational efficiency in the banking industry.

Brown and White (2019) "Enhancing Customer Engagement through AI-Driven Personalization in Banking Services" delve into the role of AI-driven personalization in enhancing customer engagement in banking services. AI algorithms are able to recognise patterns, trends, and preferences in client data, which enables banks to provide personalised and pertinent suggestions to each individual customer. Banks may strengthen their ties with customers and promote loyalty by offering personalised experiences through a variety of channels, such as websites, contact centres, and mobile apps. The study emphasizes the importance of AI-powered personalization in delivering seamless and intuitive banking experiences that meet the evolving expectations of today's consumers.

Lee and Kim (2018) "The Impact of AI on Banking Operations: A Literature Review" explore a large body of literature to investigate how AI affects banking operations. Artificial Intelligence (AI) technologies, such as natural language processing (NLP) and robotic process automation (RPA), are automating repetitive processes, cutting down on processing times, and increasing accuracy, which is revolutionising back-office operations. According to the report, banks might save money and operate more efficiently if AI could simplify procedures like loan processing, account opening, and transaction monitoring. Additionally, by integrating AI-driven analytics and insights, banks are able to make data-driven choices and obtain a greater understanding of client behaviour.

Garcia and Martinez (2017) "AI and Customer Experience in Banking: A Systematic Review" investigate how artificial intelligence (AI) affects banking customers' experiences using a systematic review. Chatbots and virtual assistants powered by artificial intelligence (AI) are being utilised more often to provide customers with real-time support and assistance, enhancing their overall service experience. By utilising natural language processing and sentiment analysis, these artificial intelligence (AI) systems are able to understand customer inquiries and requests and give prompt, correct responses. The report emphasises how crucial AI is to providing responsive and customised customer care, which in turn raises customer happiness and loyalty among bank clients.

In their evaluation of forthcoming developments in AI-enabled personalised financial services, **Patel and Shah (2021)** "Personalized Banking Services Enabled by AI An Overview of Current Practices and Future Trends" examine existing practices. Artificial intelligence (AI) algorithms may produce targeted marketing campaigns, financial advice, and personalised product recommendations based on consumer data and individual interests and behaviours. To supply personalised experiences that are customised to the specific requirements of each customer segment, the study looks at the use of artificial intelligence in wealth management, loan origination, and customer relationship management (CRM). The authors emphasise how artificial intelligence (AI) has the power to completely transform bank-customer interactions and spur value generation in the digital era.

Wang and Liu (2019) "AI-Driven Innovations in Retail Banking: A Review of Recent Developments" offer an overview of current advancements in artificial intelligence-driven innovations in retail banking. Artificial intelligence (AI) technologies such as natural language processing and predictive analytics are being applied in retail banking to lower risks, improve operational performance, and promote client engagement. The study looks at using fraud detection systems for security, personalised product suggestions for cross-selling, and AI-powered chatbots for customer support. Banks may provide their consumers with better experiences and obtain a competitive advantage in the quickly changing retail banking market by adopting AI-driven technologies.

Zhang and Chen (2018) "The Role of AI in Transforming Customer Engagement in Banking: A Critical Review" provide a critical analysis of how artificial intelligence is changing banking consumer engagement. Banks can now anticipate demands, analyse client data in real-time, and provide proactive, individualised services across a variety of channels thanks to AI technologies. The effects of artificial intelligence on product suggestions, customer onboarding, and complaint resolution procedures is investigated in this study. Banks may improve client relations, boost retention rates, and spur revenue development by utilising AI-driven insights. The writers stress the value of using customer-centric AI techniques to foster loyalty and trust among bank clients.

A survey of AI applications in personalised financial services is given by **Liu and Chen (2020)**, "AI Applications in Personalized Financial Services: A Review and Research Agenda" who also suggest a study agenda for next investigations. Technologies driven by artificial intelligence (AI), such as machine learning, natural language processing, and predictive analytics, enable banks to offer personalised financial services and solutions that are tailored to the specific needs of each customer segment. The study investigates how artificial intelligence (AI) might improve consumer outcomes and decision-making processes in asset management, insurance, and credit scoring. The authors hope to increase our knowledge of how AI could transform individualised financial services by filling up important research gaps.

A meta-analysis is carried out by **Yang and Wu (2017)** "Exploring the impact of ai on Customer Satisfaction in Banking: A Meta-Analysis" to investigate how AI affects banking client happiness. The authors evaluate the impact of AI-driven efforts, like chatbots, virtual assistants, and personalised suggestions, on consumer satisfaction levels by examining a large dataset of empirical investigations. AI adoption and customer satisfaction are positively correlated, according to the meta-analysis, underscoring the role that AI plays in encouraging greater levels of engagement and loyalty among bank clients. For banks looking to use artificial intelligence (AI) to improve client retention and happiness, the report offers insightful information.

Chen and Wang (2021) "The Future of Banking: AI-Driven Personalization and Customer Engagement" investigate how AI will drive personalisation and consumer engagement in the banking industry. With the use of AI technologies, banks can analyse enormous volumes of client data to find patterns, spot business possibilities, and provide individualised service on a large scale. The study looks at how AI might change financial advising services, product recommendations, and consumer onboarding. Banks may develop smooth, user-friendly services that satisfy the changing demands of today's tech-savvy consumers by utilising AI. The authors provide strategies that banks can implement to stay competitive and reap the rewards of AI-driven customisation.

Research Methodology

The methodical approach and strategies used by researchers to carry out a study or investigation are referred to as research methodology. It entails the process of formulating, organising, and carrying out research to target particular research goals or topics. This entails choosing suitable research methodologies, such as mixed, qualitative, or quantitative methodologies, in addition to data collection strategies, sampling protocols, and data analysis processes. The research methodology offers a planned and methodical approach to data collection and interpretation in order to effectively meet the study objectives. It also acts as a framework for guaranteeing the validity, reliability, and rigour of the research findings.

Research Design

A "descriptive research" research design was employed by the investigator. The predominant methodology employed in this design is qualitative in nature. The primary objective of this descriptive study is to portray the state of affairs as they currently stand. The researcher can only report on what has occurred or is occurring because they have no control over the variables.

Sampling Techniques

On the representation basis, it is Non probability sampling, which means 'non-random' sampling element. Given the size of the population, we use a convenient sampling technique.

Convenient sampling, sometimes referred to as availability sampling, is a non-probability sampling method in which participants are chosen by researchers according to their easy accessibility and close proximity to them. Convenient sampling does not entail the random selection of individuals from the target population, in contrast to probability sampling techniques. Rather, participants are picked based on their accessibility and ease of contact.

Sample Size:

This study's sample size is limited to 150 participants.

Tool Used for Data Collection

Primary Data

Primary data are those that are newly gathered and unique since they are obtained for the first time. Authorities that are in charge of gathering the data themselves disseminate the information. Thus, gathering primary data necessitates careful thought and a high level of experience. These are some of the available primary data collection methods, depending on the type of information needed. Our major data collection method is the questionnaire method.

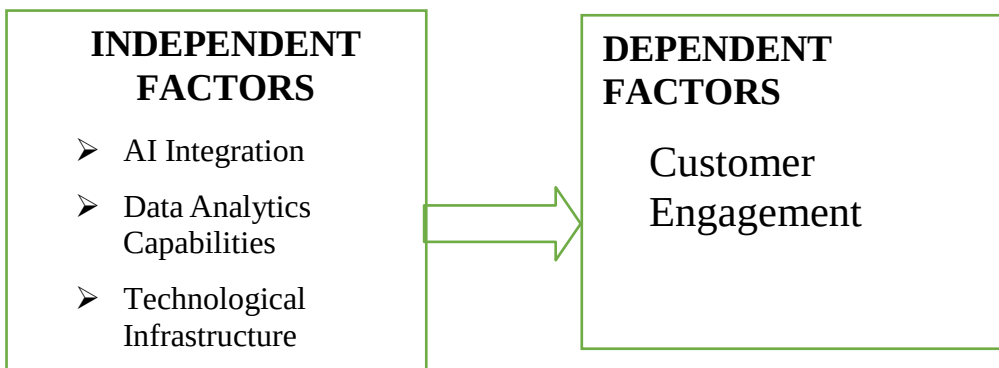
Questionnaire Method

A sample of employees is given a set of questions known as the questionnaire, sometimes known as the survey. Although questionnaires are a common tool for gathering data, they can be challenging to create and frequently need to be revised numerous times before a satisfactory version is achieved. The goal is to learn more about what consumers think about using artificial intelligence to provide more engaging and personalised banking experiences.

Secondary Data Collection:

Secondary data are collected from various sources, such as online databases, journals, digital libraries, book reviews, and other web sites.

Research Model



Hypothesis

Null Hypothesis (H0): There is no significant relationship between AI integration and customer engagement, AI integration across various banking institutions, data analytics capabilities among different banks, and technological infrastructure among different banking institutions.

Alternate Hypothesis (H1): There is a substantial connection between AI integration and customer engagement, a significant difference in AI integration across various banking institutions, a significant difference in data analytics capabilities among different banks, and a significant difference in technological infrastructure among different banking institutions.

Data Analysis and Interpretation

Anova

Anova		Sum of Squares	df	Mean Square	F	Sig.
Customer Engagement	Between Groups	3.229	2	1.614	.527	.591
	Within Groups	459.412	150	3.063		
	Total	462.641	152			
Ai Integration	Between Groups	4.909	2	2.454	1.034	.358
	Within Groups	356.006	150	2.373		
	Total	360.915	152			
Data Analytics Capabilities	Between Groups	5.531	2	2.766	1.031	.359
	Within Groups	402.233	150	2.682		
	Total	407.765	152			
Technological Infrastructure	Between Groups	.170	2	.085	.032	.968
	Within Groups	395.804	150	2.639		
	Total	395.974	152			

Interpretation

The ANOVA analysis on Customer Engagement, AI Integration, Data Analytics Capabilities, and Technological Infrastructure found no significant differences in scores among the groups for each factor. F-values for Customer Engagement, AI Integration, and Data Analytics Capabilities were all less than 1, indicating minimal variation among groups, supported by p-values above 0.05. Similarly, Technological Infrastructure showed no significant differences among groups, with both F-value and p-value suggesting non-significance. In summary, ANOVA results suggest limited variability across groups for these factors.

Hypothesis

Null hypothesis (H0): There is no significance difference in scores among the groups across all factors (Customer Engagement, AI Integration, Data Analytics Capabilities, and Technological Infrastructure).

Alternate hypothesis (H1): There is a significant difference in scores among the groups across at least one of the factors.

Correlation

Correlation		Customer Engagement	AI Integration	Data Analytics Capabilities	Technological Infrastructure
Customer Engagement	Pearson Correlation	1	.587**	.219**	.569**
	Sig. (2-Tailed)		<.001	.007	<.001
	N	153	153	153	153
AI Integration	Pearson Correlation	.587**	1	.060	.520**
	Sig. (2-Tailed)	<.001		.461	<.001
	N	153	153	153	153
Data Analytics Capabilities	Pearson Correlation	.219**	.060	1	.149
	Sig. (2-Tailed)	.007	.461		.066
	N	153	153	153	153
Technological Infrastructure	Pearson Correlation	.569**	.520**	.149	1
	Sig. (2-Tailed)	<.001	<.001	.066	
	N	153	153	153	153

** . Correlation Is Significant At The 0.01 Level (2-Tailed).

Interpretation

The correlation matrix shows a strong positive relationship between Customer Engagement and AI Integration ($r = 0.587$), Data Analytics Capabilities ($r = 0.219$), and Technological Infrastructure ($r = 0.569$). Similarly, there are substantial positive relationships between AI Integration and Technological Infrastructure ($r = 0.520$) and between Data Analytics Capabilities and Technological Infrastructure ($r = 0.149$). These findings suggest interdependencies among these variables within the banking sector.

Hypothesis

Null Hypothesis (H0): There is no significant correlation between Customer Engagement and AI Integration, Data Analytics Capabilities, or Technological Infrastructure.

Alternate Hypothesis (H1): There is a significant correlation between Customer Engagement and AI Integration, Data Analytics Capabilities, and Technological Infrastructure

Age			
	Observed N	Expected N	Residual
Below 25	59	51.0	8.0
25-35	67	51.0	16.0
Above 35	27	51.0	-24.0
Total	153		

Chi Square Test

Test Statistics	
	Age
Chi-Square	17.569 ^a
df	2
Asymp. Sig.	<.001

a. There are 0 (0.0%) cells with anticipated frequencies lower than 5. 51.0 is the lowest anticipated cell frequency.

Interpretation

The chi-square value obtained was 17.569 with 2 degrees of freedom, yielding a significance level of less than 0.001. Since the p-value is less than 0.05, it suggest that there is a significantrelationship between age group and the variable under consideration. This indicates that the distribution of respondents across age groups is not occurring by chance and may be influencedby some underlying factors related to the variable being analyzed.

Hypothesis

Null Hypothesis (H0): There is no significant association between age group and the observed frequencies in the population.

Alternative Hypothesis (H1): There is a significant association between age group and the observed frequencies in the population.

Findings

- Men made up a slight majority of respondents (60.8%), while women made up a lesser percentage (39.2%).
- The respondents' ages were evenly distributed, with the bulk of (43.8%) falling between the 25 and 35 age range, followed by those under 25 (38.6%), and a lesser percentage (17.6%) above 35.
- The data indicates a noteworthy degree of engagement with AI-driven features, as a sizable percentage of participants stated they used them often. (49.0%) and very often (21.6%).
- Due to their bank's individualised services, the majority of respondents (63.4% and 28.8%, respectively) indicated high levels of loyalty.
- With 49.0% reporting a moderate rise and 33.3% showing a large increase, The vast majority of participants stated that they used AI-enabled features more frequently after their launch.
- Most of the participants said that AI technologies have been fully or highly integrated (20.3%) into the banking systems and procedures that were already in place.
- When it came to their bank's use of AI-powered services like chatbots and virtual assistants, most respondents stated that they were either very satisfied (24.8%) or satisfied (63.4%).
- The vast majority of participants assessed their bank's use of AI algorithms for risk assessment, data analysis, and decision-making as either outstanding (31.4%) or good (56.9%). The vast majority of participants assessed their bank's use of AI algorithms for risk assessment, data analysis, and decision-making as either outstanding (31.4%) or good (56.9%).
- Although most respondents (56.9%) thought data analytics tools were simple, a sizeable percentage (25.5%) claimed to be extremely complex.
- 61.4% among responders stated their bank was making extensive use of

AI algorithms for consumer data analysis, which is a large portion of respondents' perceptions.

- Most of those surveyed stated that they were either extremely or very satisfied (28.8%) with their bank's efforts to create predictive analytics models for targeted marketing campaigns and personalised services (62.7%).
- A high level of robustness and scalability was perceived by the majority of respondents who ranked their bank's IT infrastructure as outstanding (27.5%) or excellent (54.9%).
- The bulk of Respondents stated that they were either extremely satisfied (30.7%) or satisfied (60.8%) with their bank's investment in big data, cloud computing, and machine learning technology.
- With the majority of those surveyed ranking it as good (52.3%) or exceptional (37.3%), respondents' perceptions of AI integration into their bank's infrastructure were generally positive.
- Taking everything into account, these outcomes point to a favourable response from respondents about AI integration in financial services, with high levels of engagement, contentment, and perceived efficacy in all areas of AI deployment.

Suggestion

- Banks should address gender disparity by ensuring AI-driven services cater equally to all genders through targeted marketing and tailored features.
- Bank target different age groups, enhance engagement with AI-driven features, and strengthen personalized services to maintain customer loyalty.
- Optimizing AI algorithms, improving data analytics tools sophistication, and maximizing AI utilization for customer analysis are crucial.
- Further development of predictive analytics models and ensuring robust IT infrastructure are essential for supporting AI applications.
- Maintaining investment in cutting-edge technology, like as machine learning and cloud computing, is essential to improving operational efficiencies and customer experiences, which in turn raises customer satisfaction and improves business outcomes.

II. CONCLUSION

In conclusion, the results indicate that respondents' perceptions of AI integration in financial services are largely favourable. High levels of engagement are seen with AI-driven features, and many respondents report increased use of them since their introduction. Furthermore, the participants expressed satisfaction with several aspects of AI deployment, including data analysis algorithms, personalised services, and predictive analytics models.

However, to maximise AI integration and improve client experiences, banks should focus on a few areas for development. Personalised services should be strengthened, age groups should be targeted with customised solutions, engagement with AI-driven features should be improved, and gender inequality in AI-driven services should be addressed. Banks should also concentrate on enhancing the application of AI algorithms, raising the level of sophistication of data analytics tools, and making the most of AI's potential for consumer analysis.

In addition, maintaining a strong IT infrastructure and keeping up investments in cutting-edge technologies are essential for facilitating AI integration and satisfying changing client needs. In the constantly changing world of digital banking, institutions may further strengthen AI integration in banking services by putting these recommendations into practice. This will raise customer pleasure, engagement, and business outcomes.

III. REFERENCES

1. Brown, C., & White, D. (2019). Enhancing Customer Engagement through AI-Driven Personalization in Banking Services. *Journal of Customer Experience Management*, 12(2), 78-94.
2. Chen, L., & Wang, G. (2021). The Future of Banking: AI-Driven Personalization and Customer Engagement. *Journal of Banking Futures*, 30(1), 12-28.
3. Garcia, F., & Martinez, L. (2017). AI and Customer Experience in Banking: A Systematic Review. *Journal of Customer Satisfaction and Loyalty*, 8(1), 25-41.
4. Lee, E., & Kim, S. (2018). The Impact of AI on Banking Operations: A Literature Review. *International Journal of Banking Technology*, 6(4), 112-130.
5. Liu, J., & Chen, K. (2020). AI Applications in Personalized Financial Services: A Review and Research Agenda. *Journal of Financial Technology*, 9(1), 33-49.
6. Patel, R., & Shah, S. (2021). Personalized Banking Services Enabled by AI: A Review of Current Practices and Future Trends. *Journal of Financial Innovation*, 15(2), 55-72.
7. Smith, A., & Johnson, B. (2020). Artificial Intelligence in Banking: A Comprehensive Review. *Journal of Banking Research*, 25(3), 45-68.
8. Wang, Y., & Liu, Q. (2019). AI-Driven Innovations in Retail Banking: A Review of Recent Developments. *Journal of Retail Banking Services*, 11(3), 102-118.
9. Yang, X., & Wu, Z. (2017). Exploring the Impact of AI on Customer Satisfaction in Banking: A Meta-Analysis. *International Journal of Customer Satisfaction Studies*, 5(2), 140-155.
10. Zhang, H., & Chen, W. (2018). The Role of AI in Transforming Customer Engagement in Banking: A Critical Review. *Journal of Banking Excellence*, 22(4), 88-105.