The Role Of Artificial Intelligence In Shaping Customer Experiences In The Banking Sector

Kartikey Koti

Faculty, School of Management Studies
Sapthagiri NPS University, Bangalore.

Abstract

AI in banking is the use of artificial intelligence technology in the financial sector to improve operations, client experiences, and drive innovation. In our study uses a varied sample of 152 respondents to investigate customer preferences and opinions of AI in banking. Aged 26 to 35, the majority of respondents were male (66.4%), with women making up 33.6% of the sample. 60.5% of the workforce had a master's degree, and 59.9% were employed in the private sector. Of those with incomes, 48% made between INR 51,000 and INR 1,00,000. The fact that 78.9% of them had private bank accounts was an important discovery. 48.7% of respondents utilised AI-powered banking services on rare occasions, while 33.6% used them on a regular basis for basic activities such as balance enquiries. The study's Cronbach's Alpha scores demonstrated great consistency in assessing AI's function in customer service and fraud detection. Respondents praised AI for speedier customer service and personalised banking, although many preferred human interventions in areas such as fraud detection (88%) and loan services (85%). AI's involvement in risk management and fraud detection was well supported, with significant t-test findings and large confidence intervals. However, respondents were less confident of AI's effectiveness in loan and credit risk assessment, with an average score of 3.14. Despite the benefits, 43% of respondents felt uneasy about sharing personal financial information with AI systems. The main reasons for using AI were transaction speed (98%) and 24/7 availability (85.7%).

Keywords: Artificial Intelligence (AI) in Banking, Risk Management and Fraud Detection, Customer Service and Personalization, AI Adoption and Regulatory Challenges, Operational Efficiency in Banking

Introduction

The banking industry's adoption of artificial intelligence (AI) has drastically changed how financial services are delivered and perceived by consumers. Recent literature highlights the growing importance of AI in enhancing customer interactions, optimizing operational efficiencies, and improving service quality. As banks strive to remain competitive in a rapidly evolving digital landscape, understanding customer usage, preferences, and perceptions towards AI becomes paramount.

A thorough investigation on the use of artificial intelligence (AI) in banking. The paper focusses on important domains including loan evaluation, fraud detection, risk management, and customer service where AI is revolutionising banking. With a combination of case studies and a survey of previous studies, the article offers a thorough examination of the ways in which AI technologies are improving banking procedures. Nipun Mehndiratta, Ginni Arora, and R. Bathla (2023).

Artificial intelligence (AI) and its revolutionary effects on the Indian banking sector. The study explores how artificial intelligence (AI) technologies, such as machine learning (ML), natural language processing (NLP), and data analytics, are spurring innovation across a range of Indian banking services, such as fraud detection, risk

management, customer support, and tailored financial advising. We were able to pinpoint the study gaps in long-term ethical implications, adoption barriers in rural banking, and quantitative impact assessment during the investigation. The study raised an intriguing topic of how the integration of artificial intelligence (AI) is changing the Indian banking industry with regard to risk management, customer experience, operational efficiency, and financial inclusiveness. Mragank Shakyawar and Kanchan Shakya (2024).

The banking industry is changing rapidly, and artificial intelligence (AI) is having a significant influence on several sectors like customer service, risk management, fraud detection, credit evaluation, and regulatory compliance. The literature review indicates that there is an increasing emphasis on the role of artificial intelligence (AI) in improving banking operations. Notable studies underscore AI's capacity to transform customer engagement via chatbots and virtual assistants, enhance security via fraud detection algorithms, and optimise operations via automation. Specifically, the use of AI in risk management has made it possible for banks to anticipate and reduce risks more successfully, particularly when it comes to credit assessments and loan approvals. Artificial intelligence (AI)-powered predictive analytics solutions provide more data-driven operational and decision-making techniques, while AI monitoring and standards adherence help with regulatory compliance. Additionally, research highlights the continued necessity of implementing ethical AI, concentrating on issues like data privacy, algorithmic fairness, and responsible AI practices. The gaps in regulatory oversight, customer trust and privacy concerns, algorithmic fairness and bias, and artificial intelligence's impact on workforce dynamics are highlighted in the report. The impact of artificial intelligence (AI) on the banking industry's customer experience, particularly with regard to the use of chatbots and virtual assistants, is also a topic of discussion in this paper. Other issues raised include fraud detection in the banking sector, the use of AI systems for credit assessments and loan approvals, and the ways in which AI-enabled investment management—including algorithmic trading and robo-advisors—affects consumer decision-making, financial planning, and the banking environment. Munivel Devan, Sanjeev Prakash, Suhas Jangoan 2023

The paper reveals artificial intelligence's position in the banking industry and emphasises its revolutionary influence by examining the ways in which AI is applied to improve banking efficiency, customer service, risk management, and decision-making. According to the study, there will be a substantial increase in the use of AI in banking. Fraud detection and prevention, customer personalisation, operational efficiency, and data-driven decision making were a few of the important criteria. The impact of using AI on profitability, ethical AI adoption frameworks, integrating AI with legacy systems, and organisational and cultural readiness for AI adoption were all highlighted in the research. The focus of the entire article was whether artificial intelligence (AI) technologies enhance the banking industry's operational effectiveness, risk management, client personalisation, and decision-making. Balaji Dhashanamoorth 2023.

Artificial intelligence (AI) is being incorporated into the banking and financial industries, with a focus on areas such as fraud detection, credit scoring, customer service, and AI applications. The study emphasised the lack of regulatory frameworks and sector-specific applications. Consequently, the topic of what advantages and difficulties may arise from integrating artificial intelligence (AI) in the banking and financial industries emerged. Rita Jain 2024.

The banking sector is demonstrating the revolutionary potential of Artificial Intelligence (AI) and Machine Learning (ML) integration. The uses of artificial intelligence (AI) to improve banking operations, such as fraud detection, customer service, risk management, and regulatory compliance, are the main focus of research studies and case evaluations. The literature frequently discusses how artificial intelligence (AI) may reduce risks while enhancing operational effectiveness, customer happiness, and security protocols. The application of AI-based models in banks across various countries has been thoroughly studied by academics in order to evaluate the enhancements in risk management, cost savings, and customer experience. Technology advancements, legal compliance, security issues, and the development of artificial intelligence (AI) solutions for conventional banking operations are the subjects that are most commonly discussed. The study also revealed gaps in model explain ability and transparency, ethical and regulatory challenges, and early stage AI development in banking. The implementation of AI and ML solutions in banking presents challenges for smaller banks in comparison to larger

ones. The use of AI models in banking achieves greater transparency and explain ability to meet regulatory requirements and build customer trust. The widespread adoption of AI in banking raises ethical and regulatory issues. The long-term impact of AI-based banking solutions on customer behaviour, trust, and engagement with financial services. Zoran Temelkov 2023

The transition from conventional to digital banking via the lens of an Omni-channel strategy, in which the consumer is at the centre of all banking channels. The report demonstrates how artificial intelligence (AI) is transforming the banking industry by providing better risk management, more operational efficiency, and more individualised client care. The paper focused on topics such as AI-Driven Efficiency, Customer-Centric Banking, and Integration Challenges with AI. The study also focused on gaps in areas such as AI in Rural Banking, Empirical Evidence, and Omni-channel Effectiveness. The main issues with integrating AI into financial services are how to improve operational effectiveness and customer experience while navigating the associated transformational hurdles in the context of ethical, security, and regulatory concerns. Dr. Gurumurthy K H 2024

An in-depth examination of the integration and effects of AI technologies on different banking tasks may be found in the U.S. banking industry's position in AI. With an emphasis on the U.S. banking industry, the paper discusses topics including chatbots and virtual assistants, risk management and fraud detection, and operational efficiency. It also showcases the larger patterns in global AI development in finance to help local institutions understand how to leverage these technologies. Analysis is dominated by use cases and data unique to the United States. The main gaps were in the following areas: inadequate attention to smaller banks and credit unions; lack of empirical data on AI failures; little focus on workforce transformation; and cross-country comparative analysis. The difficulty was determining what elements affected the success or failure of using AI in banking, fraud detection, individualised financial counselling, and client support. Atadoga, A., Obi, O. C., Onwusinkwue, S., Dawodu, S. O., Osasona, F., & Daraojimba, A. I. 2024,

A thorough analysis of the effects of AI in important domains as risk management, customer service, banking, investment management, and fraud detection. According to the report, artificial intelligence (AI) technologies, such as robotic process automation (RPA), natural language processing (NLP), and machine learning (ML), have greatly enhanced the accuracy, efficiency, and client experiences of financial institutions. AI helps to transform the banking industry by providing individualised client care, automating repetitive operations, and improving fraud detection. The quantitative impact on business metrics, ethical concerns, algorithmic transparency, and adoption in emerging markets are all lacking in this article. Given this, it begs the questions of whether artificial intelligence is revolutionising important facets of the financial industry and what possible advantages and difficulties come with its broad use. Prof. Rahul Thumar , Prof. Ritesh Vaghasiya, Dr. Subhash 2024

AI in banking and customer service, in particular, indicates growing interest in the potential of AI to improve client experiences. The role of AI in personalised services, consumer preferences in service delivery, task complexity and AI efficacy, perceived problem-solving ability, boundary conditions, and mediators are some of the major issues that have been discovered in recent articles. The investigation of industry-specific impacts, longitudinal research on consumer behaviour, the performance of AI in hybrid models, and the perception of AI's emotional intelligence were among the gaps that were covered by the studies. The main focus of this study was how consumers' choices for AI-based vs human customer care in the banking industry were influenced by the complexity of customer service jobs. Yingzi Xu a, Chih-Hui Shieh b, Patrick van Esch a, I-Ling Ling c 2020

This paper address of AI-driven innovations in banking sectors would be explored, helping situate the study in the broader field of AI in digital transformation and customer personalization. And pointing to AI in Banking, Customer Engagement and Satisfaction, Chatbot Use-Cases, Digital Banking Transformation. The paper also had a gap of Narrow Exploration of Chatbot Effectiveness and Lack of Understanding in AI's Back-End Operations. The challenged portrayed was integration of AI in banking processes (front, middle, and back office) enhance customer engagement and satisfaction in metropolitan Indian banks. Chandrima Bhattacharya and Dr. Manish Sinha 2022.

This study contributes to two major domains: Human-Computer Interaction (HCI) and Computational Creativity. The relationship between AI and human creativity and cognition is examined in both domains. AI has greatly impacted the creative industry, especially with regard to Generative Adversarial Networks (GANs), which have an influence on human jobs like art production. The evaluation of AI in creativity and priming effects in AI studies were lacking in the research. This raises the question of how perception and appraisal are influenced—by AI or by humans. Martin Ragot, Nicolas Martin, Salomé Cojean 2020

Using a quantitative research methodology, the study examines the usage of artificial intelligence (AI) in the banking industry in five Asian countries: Thailand, Saudi Arabia, China, Pakistan, and Iran. It mainly examines how consumers see the adoption of AI, taking into account factors such as perceived usefulness (PU), awareness (AWR), attitude (ATT), subjective norms (SN), knowledge (KNG), and perceived risk (PR). Through an analysis of how these factors affect consumer intentions (INT) to utilise AI technology in banking, the study gathered 799 useful replies from the examined nations and added to the body of knowledge on AI adoption. Every variable's relevance was investigated, and all predictors indicated positive associations, with the exception of PR, which had a substantial negative impact on the intentions of adopters of AI. Geographic limitation and sector-specific focus were challenges they faced. The main challenge was figuring out what characteristics, such as educational attainment and geographic location, affected how consumers in Asian countries used artificial intelligence in the banking sector, Umara Noreen , Attayah Shafique , Zaheer Ahmed and Muhammad Ashfaq 2023

Research Gap of the study

1. Quantitative Impact on Customer Satisfaction: There is a deficiency of empirical evidence demonstrating the direct, quantitative impact of AI on customer satisfaction. While qualitative improvements such as enhanced customer service efficiency are mentioned, there is insufficient analysis of key performance indicators (KPIs) like customer retention, loyalty, and overall satisfaction rates in AI-driven systems.

2. **Perception of AI in Customer Service:** Many studies touch on the perception bias against AI in customer service interactions, particularly in the banking sector, but fail to deeply explore the **long-term impacts** of these biases on customer satisfaction. The negative bias towards AI, especially compared to human-driven services, remains under-explored in terms of its effect on customer loyalty and trust.

3. **Hybrid Service Models (AI + Human Interaction):** There is limited research exploring how hybrid models—where AI and human agents work together—impact customer satisfaction. While AI improves service efficiency, certain complex, high-stakes interactions (such as financial planning or loan decisions) may require human intervention to satisfy customers fully.

4. **AI's Emotional Intelligence in Customer Service:** There is little research focusing on how AI systems handle emotionally charged customer interactions in banking, such as complaints, disputes, or high-stress situations. Emotional intelligence, empathy, and rapport are key aspects of customer satisfaction that AI has yet to fully replicate.

5. **Long-term Effects of AI Adoption on Customer Trust:** While short-term impacts of AI adoption, such as speed and convenience, are frequently highlighted, studies often fail to explore the **long-term effects** of AI on customer trust and satisfaction. Customers may initially appreciate AI-driven services for their efficiency but become wary over time due to concerns about privacy, algorithmic transparency, or job displacement in the banking sector.

Research question of the study

1. How does the integration of AI in banking services influence customer satisfaction, particularly in terms of speed, convenience, and personalization?
2. What are the primary factors that affect customer preferences for AI-driven banking services over traditional human interactions, and how do these preferences vary by demographic groups?
3. How does customer trust in AI-based banking systems impact their willingness to use AI-driven solutions for tasks such as account management, investment advice, and loan applications?

4. What are the perceived benefits and concerns customers have about using AI-powered tools like virtual assistants, chatbots, and robo-advisors in managing their financial needs?
5. How does the accuracy and problem-solving efficiency of AI in customer service influence customer loyalty and long-term engagement with AI-enabled banking services?

Objectives of the study

1. To examine the customer usage of AI based banking services, focusing on usage frequency, satisfaction, behaviour.
2. To analysis customer preference towards AI versus Human system in banking task and identify the reasons of opting AI Powered Banking.
3. To evaluate customer perceptions of AI's role in banking.

Methodology

Bibliometric analysis is used to uncover emerging trends in article of AI in Banking Sector. In this paper we have taken into consideration of article showcasing the paradigm shift from traditional baking to AI Powered Banking. The Bibliometric analysis through light on how people have adopted the current banking system. In majority of the literature we can see, that they are happier with banking system without human interaction. Further in the Bibliometric analysis we can carefully see the satisfaction of customer in the current banking scenario.

Bibliometric analysis is used to identify developing patterns in articles on AI in the banking sector. In this research, we have considered all article that discussed the paradigm change from traditional baking to AI-powered banking. The bibliometric research sheds information on how individuals embraced the existing banking system. The majority of the literature indicates that people are more satisfied with a banking system that does not require human involvement.

Bibliometric analysis is a new technique in business research that offers a systematic approach to exploring large volumes of scientific data. Naveen Donthu , Satish Kumar, Debmalya Mukherjee, Nitesh Pandey , Weng Marc Lim, 2023

The methodology in this paper is hybrid mode or mixed approach, we have incorporate both qualitative and quantitative methodology. For qualitative data we have chosen the most recent paper on AI in banking. And for quantitative data a structured questionnaire was used to collect data from the respondents

Based on stratified sampling the data is collected across Bangalore city. Emphasis was given to gender, age, Martial status, education, occupation, and income of the respondents. The total sample were 152 belong from north, south, east Bangalore.

During the study for the computation of Socio Demography characteristics simple frequency and percentage was used to validate the data. Further for Frequency of Using Banking services powered by AI only descriptive statistics was used with percentage of usage. In this study we have used Cronbach's Alpha for variable consistency. For majority of the data we have computed Mean score and SD for the relevance of the particular question used for the respondent. In the study to calculate AI in fraud detection & risk management, we have used T-test and statistical significance.

To access the role of AI in loan and credit risk we have run the data through reliability statistics, Mean score and SD. For preference of AI and Human a simple bar chart is used to strengthen the data. And Pie chart for reasons of opting AI in banking.

For Perception of AI in banking experience, secured, Customer Service, Financial Transaction, and Replace Human we have used Kaiser-Meyer-Olkin (KMO) to Measure of Sampling Adequacy, Bartlett's Test of

Sphericity, communalities and total variance explained.

Limitation

Studies on AI in banking focus on immediate benefits such as fraud detection and client service, but they frequently disregard long-term ethical considerations such as algorithmic bias and legal frameworks. Furthermore, there is a dearth of attention on AI deployment in rural and smaller banks, which confront unique hurdles when compared to bigger institutions. Many studies do not give adequate quantitative data to determine AI's true influence on profitability and operational efficiency. Furthermore, concerns of consumer trust, AI transparency, and justice remain unexplored, while the implications on labour dynamics, such as job displacement and the need for reskilling, are inadequately addressed.

Analysis and Discussion

1.1 Socio-Demography of the respondents

	Options	Frequency	Percentage
	Male	101	66.4
Gender	**Female**	51	33.6
	Total	152	100.0
Age	**18-25**	52	34.2
	26-35	53	34.9
	36-45	26	17.1
	46-55	21	13.8
	Total	152	100.0
Marital Status	**Single**	51	33.6
	Married	101	66.4
	Total	152	100.0
Education	**Graduation**	36	23.7
	Master	92	60.5
	Professional	24	15.8
	Total	152	100.0
Occupation	**Private**	91	59.9
	Government	51	33.6
	Business	10	6.6
	Total	152	100.0
	26000-50000	70	46.1
Monthly Income	**51000-100000**	73	48.0
	Above 101000	9	5.9
	Total	152	100.0
Account Holding	**Private Bank**	120	78.9
	Public Sector	32	21.1

	Bank		
	Total	152	100.0

For the study which was conducted to know the role of AI in determining customer experiences in Bangalore city. The study covers the respondents across Bangalore city. Table depicting the Socio-Demography of the respondents.

Source: Sample Survey

Respondents were assessed on a variety of sociodemographic variables, such as gender, age, education, marital status, employment, and monthly income, in a research on the application of AI in banking. The majority of respondents, who included both professionals and company owners, had accounts in both private and public sector banks. They came from a variety of socioeconomic backgrounds and had undergraduate and graduate degrees. Understanding how AI affects banking choices and service uptake across a range of user categories depends on this demographic information.

It is observed during the study that 66.4% of the respondent were male and 33.6% of the respondent were female from the total respondents of 152. Further majority of the respondents age were between 26-35 which was 34.9% and the second largest respondents were belonging to the age group between 18-25. The respondents around 17.1% were between 36-45 and the remaining 13.8% of the respondents between 46-55.

Additionally, it was seen Education of the respondents, were 60.5% had completed Masters, 23.7% were graduation degree, 15.8% of the respondents had completed professional degree.

During the study we also observed that, majority of the respondent's occupation were in private sector of 59.9%, working in government were 33.6% and the remaining 6.6% of the respondent were running their own business.

The other major element was the income of the respondents it was seen that 48% of the respondent's income was between 51,000 to 1,00,000 INR, 46.1% of the respondent's income was between 26,000 to 50,000 INR and the remaining were 5.9% of the respondent's income above 1,01,000 INR per month.

The interesting component of the study was majority of the respondents were holding private bank account which was 78.9%. And around 21.1% of the respondents had Public Sector banks.

Part A

AI Usage in Banking

Using AI in banking may be divided into groups based on how frequently it is used: every day for jobs like using chatbots for customer service and fraud prevention; once a week for credit risk assessments and data-driven decision-making; for loan approvals and performance reports every month; Seldom for highly complicated forecasting or strategic planning; and never for tasks involving delicate client contacts or a great deal of human judgement.

1.2 Frequency of Using Banking services powered by AI

Options	Frequency	Percent
Daily	51	33.6
Weekly	27	17.8
Rarely	74	48.7
Total	152	100.0

Source: Sample Survey

From the table we can see that 48.7% of the respondent were using the AI powered banking services rarely. The services were used be avoiding loan defaulter zone. They were also used for personalized financial products availed as per there choice in different customer segment.

The next best frequency of usage was on daily basis which was 33.6% largely the services were used by customer for routine enquiries such as balance checking, transaction history, location of the branch. Such kind of services were used to reduce the waiting time, bill payments (No waiting for long queues)

The Weekly services of 17.8% were used for their personal tailored services. They essentially used it for services like market based investment and loan approvals.

1.3 AI in Customer Service

AI improves banking customer service by enabling chatbots and virtual assistants to respond more quickly, which increases customer happiness. By tailoring services to each user's unique Behaviour and minimizing the need for human involvement, it ensures effective and smooth assistance.

Reliability Statistics

Cronbach's Alpha	No of Items
.904	5

Source: Computed based on survey values

The standards set for Cronbach's Alpha are 0.90 to 1 as excellent, 0.81 to 0.90 as good , 0.71 to 0.80 good and acceptable , 0.6 to 0.7 as acceptable and 0.01 to 0.60 not acceptable.

During our study our Cronbach's Alpha value is 0.904 which refers to the best consistency shared among the variables. The variables considered for our study are AI enhances customer service in banks by providing faster response times, Chabot's and virtual assistants in banking improve customer satisfaction, AI helps in personalizing banking services based on individual customer behaviour, AI-enabled customer support reduces the need for human interaction.

Computed Mean Scores and SD for AI in Customer Service Availed

Options	Mean	Std. Deviation	N
AI enhances customer service in banks by providing faster response times.	3.47	1.496	152
Chatbots and virtual assistants in banking improve customer satisfaction.	3.47	1.496	152
AI helps in personalizing banking services based on individual customer behaviour.	3.56	1.178	152
AI-enabled customer support reduces the need for human interaction.	3.33	.947	152

Source: Sample Survey

The above table is based on 5 point Likert Scale ranging from Strongly Disagree to Strongly Agree. Mean score indicating high refers to stronger agreement to the statement. The standard set for mean values are 1.00 – 1.80 Very Low, 1.81 – 2.60 Low, 2.61 – 3.40 Average, 3.41 – 4.20 High and 4.21 to 5.00 very High (Mohammad Issam Khalil Abu-Baker et al., 2019)

We could observe from our study that AI helps in personalizing banking services based on individual customer behaviour has high mean score of 3.56 which means customers are in use of the service and the standard deviation of 1.78 which is less variations in the response

During our study we could see both AI enhances customer service in banks by providing faster response time and Chatbots and virtual assistants in banking improve customer satisfaction mean score valued at 3.47 which is High as per the standard, which mean highly accepted statement by the customers, with relatively high standard deviation of 1.469 has variation in the response.

The other service of AI-enabled customer support reduces the need for human interaction with mean score of 3.33 which is average, that mean the statements are not widely accepted and we can find the Standard Deviation is less of 0.947 that mean the respondents are not widely spread. This also means customers also want to operated banking things with the human interferences.

1.4 AI in Fraud Detection & Risk Management

Reliability Statistics

Cronbach's Alpha	No of Items
.959	4

Source: Computed based on survey values

The standards set for Cronbach's Alpha are 0.90 to 1 as excellent, 0.81 to 0.90 as good, 0.71 to 0.80 good and acceptable, 0.6 to 0.7 as acceptable and 0.01 to 0.60 not acceptable.

Cronbach's Alpha is used for checking the internal consistency which is 0.959 in our study which means the relation between the variables is excellent. The variable considered here are AI enhances the detection of fraudulent transactions in real-time, AI helps banks better manage risk by analysing large datasets more effectively, AI reduces human errors in identifying high-risk transactions, AI improves the security of online banking transactions.

T TEST TO SEE AI IN FRAUD DETECTION & RISK MANAGEMENT

	T	df	Sig. (2-tailed)	Mean Difference	Lower 95% Confidence	Upper 95% Confidence
AI Enables Detecting Frauds	31.550	151	.000	2.974	2.79	3.16
AI helps for Manage Risk	29.416	151	.000	3.309	3.09	3.53
AI Helps in reducing Human Error	45.126	151	.000	2.993	2.86	3.12
AI improves the security of online Banking Transaction	31.701	151	.000	2.493	2.34	2.65

Source: Sample Survey

The data that is presented shows the findings of a statistical analysis that looked at how AI is affecting several banking tasks, with a particular emphasis on fraud detection, risk management, minimising human error, and online banking security.

1. **AI Enables Detecting Frauds**:

   a. **t** (31.550), df (151), Sig. (2-tailed) (.000): The remarkably low p-value denotes a outcome, suggesting that artificial intelligence is essential for uncovering fraudulent activities.
   b. Mean Difference (2.974): According to this number, respondents generally strongly believe that AI improves fraud detection.
   c. Confidence Interval (Upper 95%: 3.16, Lower 95%: 2.79): This range demonstrates that respondents generally had strong opinions of AI's ability to identify fraud.

2. **AI Helps for Manage Risk**:

   a. The results show that AI is successful in risk management. t (29.416), df (151), Sig. (2-tailed) (.000): This is another example of a low p-value indicating a significant conclusion.
   b. Mean Difference (3.309): This is a very favourable answer, suggesting that participants believe AI helps a great deal with risk management.
   c. Confidence Interval (Upper 95%: 3.53, Lower 95%: 3.09): This interval highlights even more the high degree of consensus on the contribution of AI to risk management.

3. **AI Helps in Reducing Human Error**:

   a. t (45.126), df (151), Sig. (2-tailed) (.000): The high t-value and low p-value highlight a robust and significant finding.
   b. Mean Difference (2.993): Respondents nearly agree that AI effectively reduces human errors in banking processes.
   c. Confidence Interval (Lower 95%: 2.86, Upper 95%: 3.12): This range confirms the strong consensus on AI's role in minimizing human error.

4. **AI Improves the Security of Online Banking Transactions**:

   a. t (31.701), df (151), Sig. (2-tailed) (.000): The significant p-value indicates that AI positively impacts the security of online transactions.
   b. Mean Difference (2.493): This reflects a positive perception regarding AI's contribution to enhancing online banking security.

c. Confidence Interval (Lower 95%: 2.34, Upper 95%: 2.65): The confidence interval suggests that respondents are consistently confident in the effectiveness of AI in improving security.

1.5 AI in Loan and Credit Risk Assessment

Reliability Statistics

Cronbach's Alpha	No of Items
.920	3

Source: Computed based on survey values

The standards set for Cronbach's Alpha are 0.90 to 1 as excellent, 0.81 to 0.90 as good , 0.71 to 0.80 good and acceptable , 0.6 to 0.7 as acceptable and 0.01 to 0.60 not acceptable.

During our study our Cronbach's Alpha value is 0.920 which refers to the best consistency shared among the variables. The variables considered for our study are AI helps in faster and more accurate credit scoring and loan approval processes, AI-based models are more efficient in assessing loan repayment capabilities, AI can predict loan defaults more effectively than traditional methods.

COMPUTED MEAN SCORES AND SD FOR AI IN LOAN AND CREDIT RISK ASSESSMENT

Options	Mean	Std. Deviation	N
AI helps in faster and more accurate credit scoring and loan approval processes.	3.14	1.352	152
AI-based models are more efficient in assessing loan repayment capabilities.	3.00	1.003	152
AI can predict loan defaults more effectively than traditional methods.	3.33	.947	152

Source: Sample Survey

Standards as per Mohammad Issam Khalil Abu-Baker et al., 2019

Mean values are 1.00 – 1.80 Very Low, 1.81 – 2.60 Low, 2.61 – 3.40 Average, 3.41 – 4.20 High and 4.21 to 5.00 very High

We could observe from our study that AI helps in faster and more accurate credit scoring and loan approval processes. has average mean score of 3.14 and the SD of 1.352. Which means customers are not completely happy on this services.

AI-based models are more efficient in assessing loan repayment capabilities mean score of 3.00 and the SD of 1.003. Which means customers feel AI model cannot highly efficient.

 AI can predict loan defaults more effectively than traditional methods. with mean score of 3.33 which is average, and SD of 0.947 which means all customers do not accept the statement.

1.6 AI in Personalization & Customer Experience

Reliability Statistics

Cronbach's Alpha	No of Items
.984	3

Source: Computed based on survey values

The standards set for Cronbach's Alpha are 0.90 to 1 as excellent, 0.81 to 0.90 as good, 0.71 to 0.80 good and acceptable, 0.6 to 0.7 as acceptable and 0.01 to 0.60 not acceptable.

The Cronbach's Alpha value is 0.984 which is excellent and the internal variable consistency is great The variables considered for our study are AI helps banks provide more personalized financial advice, AI-powered insights lead to a more tailored banking experience for customers., AI helps banks design products and services based on customer preferences and needs.

COMPUTED MEAN SCORES AND SD FOR AI IN LOAN AND CREDIT RISK ASSESSMENT

| Options	Mean	Std. Deviation	N
AI helps banks provide more personalized financial advice.	3.32	1.116	152
AI-powered insights lead to a more tailored banking experience for customers.	3.49	1.125	152
AI helps banks design products and services based on customer preferences and needs	3.32	1.098	152

Source: Computed based on survey values

Mean score as per standard (Mohammad Issam Khalil Abu-Baker et al., 2019). AI-powered insights lead to a more tailored banking experience for customers is high with mean as 3.49 and SD as 1.125 which means customers do like the services. And the other two options AI helps banks provide more personalized financial advice and AI helps banks design products and services based on customer preferences and needs having the Mean score of 3.32 both are average with SD of 1.116 and 1.098 , which means the customers haven't accepted completely.

Part B
**PREFERENCES TOWARD AI IN BANKING**
1.7   PREFERRED INTERACTION METHOD FOR VARIOUS BANKING TASKS: AI VS. HUMAN
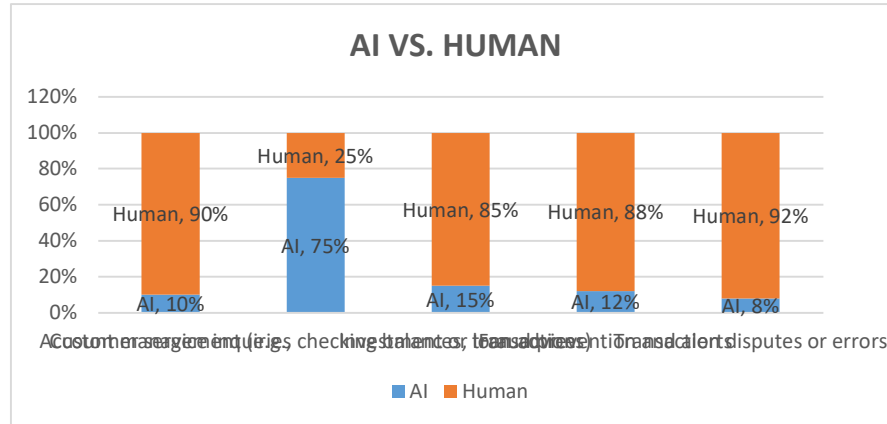
Source: Sample survey

- From the above chart we can see that in case of Customer Service inquires respondents prefer Human with 90% over the AIs of 10%.
- When it come with Account Management respondents prefer AI of 75% over human of 25%.
- Respondents are extra careful when it come for investment and availing loan 85% of the respondent feel human intervention is better than AI which is 15%.
- When it comes to Fraud prevention they prefer human which is 88%, with that of AI which us only 12%.
- 92% of the respondents prefer human in case of transaction dispute as compared with AI which is 8%.

1.8 USER COMFORT LEVEL WITH SHARING PERSONAL BANKING INFORMATION WITH AI-POWERED SYSTEMS
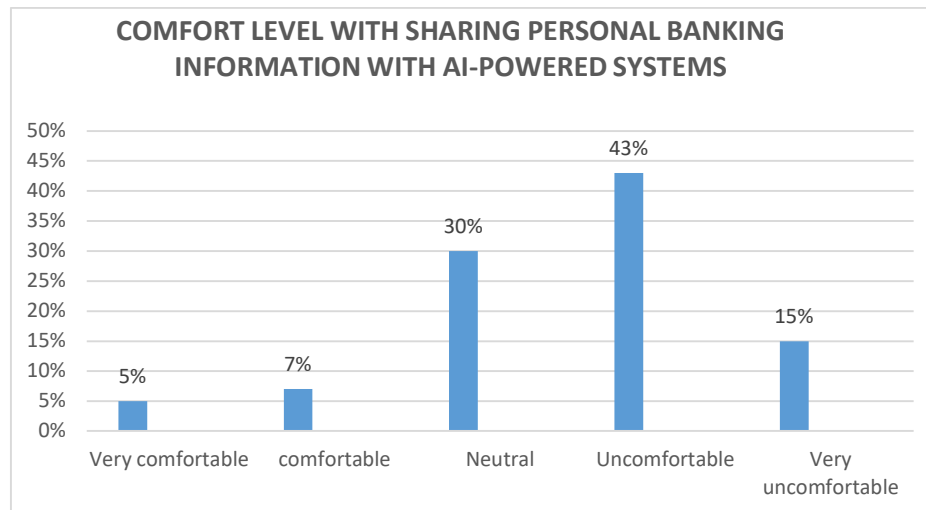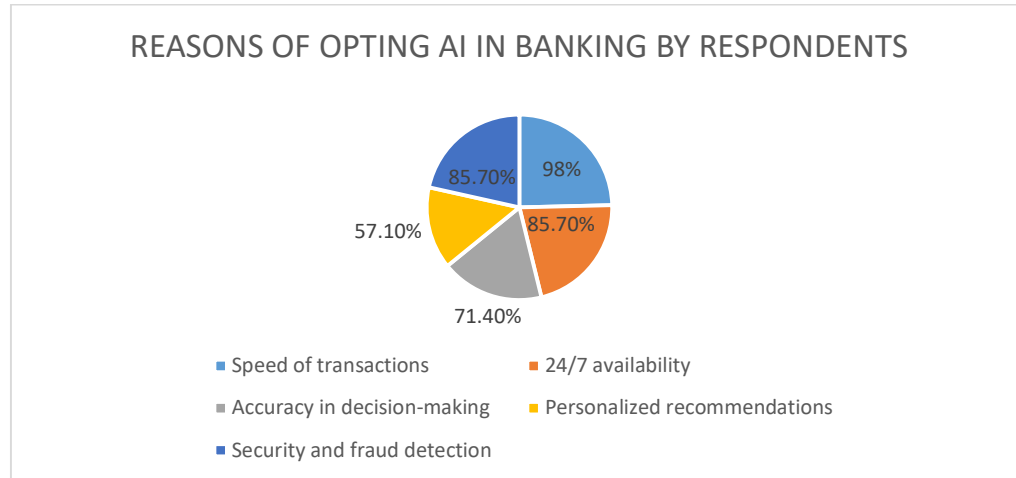

Source: Sample survey

From the above chart we can observe that 43% of the respondent are uncomfortable sharing their personal banking information with AI powered banking.

30% of the respondent are Natural, 15% are very uncomfortable.

Only a small margin of 7% are comfortable and 5% are very comfortable with AI service provided.

1.9 REASONS OF OPTING AI IN BANKING BY RESPONDENTS

Source: Sample survey (As the respondents was given to choose the options each reason is considered for 100%)

From the above chart we can see that 98% of the respondents opted AI in banking for speed in the transaction, 85.7% of the respondents for 27/7 available service, 71.40% of the respondents for Accurate in decision making and 57.10% of the respondents for Personalized recommendation

Part C

Perception of AI in Banking

KMO and Bartlett's Test

Kaiser-Meyer-Olkin	Measure of Sampling Adequacy.	.800
Bartlett's Test of Sphericity	Approx. Chi-Square	1112.556
	df	15
	Sig.	.000

Source: Computed based on survey values

The **KMO and Bartlett's Test** results assess the suitability of your data for factor analysis:

1. **Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy**:

   A KMO value between 0.7 and 0.8 is regarded as "good," implying the data is appropriate for structure discovery by factor analysis. The sample is deemed sufficient for factor analysis based on its KMO value of 0.800.

2. **Bartlett's Test of Sphericity**:

The Chi-Square value is about 1112.556, with a p-value (Sig.) of 0.000. Bartlett's test indicates that the correlations between the variables are strong enough to support component analysis because the p-value is less than 0.05.

In summary, both the KMO measure and Bartlett's test indicate that your data is well-suited for factor analysis.

COMMUNALITIES

	Initial	Extraction
Perceiption of AI in banking experience	1.000	.948
Perceiption of AI Banking secure	1.000	.854
Perceiption of AI Customer Service	1.000	.826
Perceiption of AI Financial Transcation	1.000	.923
Perceiption of AI Replace Human	1.000	.902

Source: Computed based on survey values

The data's communalities reveal how much of the variance in each variable is explained by the variables that Principal Component Analysis (PCA) retrieved. This is how I understand the communalities you gave:

Interpretation of Communalities

1. **Perception of AI in Banking Experience (0.948)**:

   The high communal value indicates that approximately 94.8% of the variance in respondents' perception of AI in banking experience is explained by the factors extracted in the analysis. This suggests that AI plays a significant role in shaping customer experiences in banking.

2. **Perception of AI Banking Security (0.854)**:

   With a communality of 85.4%, this variable also shows strong support from the extracted factors. It implies that a considerable portion of the variance in perceptions of AI-related security in banking can be attributed to the identified factors, highlighting concerns about security in AI applications in banking.

3. **Perception of AI Customer Service (0.826)**:

   The communal value of 82.6% indicates that the extracted factors explain a significant part of the variance in perceptions of AI customer service. This suggests that AI's impact on customer service is recognized and measured by the respondents, indicating trust in AI to enhance customer interactions.

4. **Perception of AI Financial Transaction (0.923)**:

   The 92.3% communal value for financial transactions indicates a strong relationship between the extracted factors and perceptions of AI in this area. It suggests that the factors analyzed greatly contribute to how customers view the effectiveness and reliability of AI in processing financial transactions.

5. **Perception of AI Replacing Humans (0.902)**:

   With a communal value of 90.2%, this indicates a significant understanding among respondents regarding the potential of AI to replace human roles in banking. The factors extracted play an important role in shaping these perceptions, possibly reflecting a mix of apprehension and acceptance of AI's role in the workforce.

TOTAL VARIANCE EXPLAINED

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.453	74.220	74.220	4.453	74.220	74.220	4.452	74.199	74.199
2	1.000	16.671	90.892	1.000	16.671	90.892	1.002	16.693	90.892
3	.249	4.154	95.046						
4	.165	2.743	97.789						
5	.104	1.728	99.518						
6	.029	.482	100.000						

Source: Computed based on survey values

The eigenvalues, variance percentage, and cumulative variance % accounted for by each component in your Principal Component Analysis (PCA) are summarised in the Total Variance Explained table. This is how the supplied data are interpreted:

Interpretation of Total Variance Explained

1. **Component 1**:
   o **Total Eigenvalue**: 4.453
   o **% of Variance**: 74.220%
   o **Cumulative %**: 74.220%
   o **Interpretation**: The first component explains 74.22% of the total variance in the data. This indicates that a significant portion of the variability in perceptions regarding AI in banking is captured by this single factor. It suggests that this component may represent a key underlying construct or dimension of how customers view AI's impact in banking.

2. **Component 2**:
   o **Total Eigenvalue**: 1.000
   o **% of Variance**: 16.671%
   o **Cumulative %**: 90.892%
   o **Interpretation**: The second component accounts for 16.67% of the variance. When combined with the first component, they explain a cumulative 90.89% of the total variance. This indicates that both components together capture a substantial portion of the variability in the data, reinforcing the importance of both components in understanding customer perceptions of AI in banking.

3. **Component 3**:
   o **Total Eigenvalue**: 0.249
   o **% of Variance**: 4.154%
   o **Cumulative %**: 95.046%
   o **Interpretation**: The third component explains only 4.15% of the variance. Although it contributes to the overall cumulative variance, its relatively low percentage suggests it may not represent a significant additional construct beyond the first two components.

4. **Component 4**:
   o **Total Eigenvalue**: 0.165
   o **% of Variance**: 2.743%
   o **Cumulative %**: 97.789%
   o **Interpretation**: This component accounts for 2.74% of the variance, which further adds to the cumulative total but is again relatively low. This suggests diminishing returns in terms of variance explained with additional components.

5. **Component 5**:
   - o **Total Eigenvalue**: 0.104
   - o **% of Variance**: 1.728%
   - o **Cumulative %**: 99.518%
   - o **Interpretation**: This component explains just 1.73% of the variance, reinforcing that the majority of the variance is captured by the first two components.
6. **Component 6**:
   - o **Total Eigenvalue**: 0.029
   - o **% of Variance**: 0.482%
   - o **Cumulative %**: 100.000%
   - o **Interpretation**: The sixth component explains only 0.48% of the variance and adds very little to the total cumulative variance.

The first two PCA components, which together account for 90.89% of the variation, are critical in understanding how AI is perceived in the banking industry. With nearly 74% of the total, the first component alone is evidently dominant in shaping consumer impressions.

1.11 Perceived Opportunities for Enhancing the Banking Experience Through AI"

The Consumers feedback demonstrates how AI-powered banking systems offer specialised services through the provision of individualised financial advice, enhanced fraud detection, and improved customer support. By streamlining processes, these tools improve overall efficiency and personalise the banking experience. Customers also highlight AI's significance in security, pointing out that it can guarantee speedier transactions with improved security measures, making banking safer as well as easier. Customers' expectations for contemporary banking solutions are met by this seamless and reliable experience provided by the combination of customisation and security.

1.12 Customer Preferences for Human-Handled Banking Tasks and Their Reasons

The Consumers voiced worries that people should make high-stakes judgements rather than AI, particularly when they include complicated ethical issues or uncommon conditions. They underlined that human-led solutions guarantee empathy, thoughtful assessment, and responsibility—elements they contend AI is deficient in. Customers also brought up security issues with AI-powered products, emphasising the possibility of hacking. They emphasised the need for more rigorous redressal processes to prevent such breaches, as weaknesses in AI systems may disclose sensitive data. They also emphasised the need for greater safeguards to secure personal information.

1.13 Additional Comments or Suggestions on the Use of AI in Banking

Sustaining client happiness and confidence in banking requires the ethical use of AI. Strong data privacy safeguards are required to protect sensitive information, openness in the decision-making process is necessary to guarantee justice and clarity, and ongoing human review is necessary to avoid prejudice. Customers still need to be made acutely aware of the ways in which artificial intelligence is being applied to financial services. Customers' trust in sharing personal information with AI-powered systems will grow as a result of education on the advantages, dangers, and safety measures in place. This will ultimately create a more secure and knowledgeable banking environment.

1.14 Recommendation

In our study AI is improving various aspects of banking, such as personalised services, account management, and fraud detection, there is still a significant preference for human interaction in customer care, loan administration, and dispute settlement. To increase client trust, banks should work on enhancing the openness and dependability of AI systems, particularly in sensitive areas such as loans and fraud detection. Improving AI's capacity to function alongside human help, rather than replacing it, could improve customer satisfaction. Additionally, addressing the discomfort customers feel in sharing personal information with AI is crucial. Strengthening security measures and educating users about AI's privacy safeguards may help alleviate concerns. Finally, while AI's speed and 24/7 availability are appreciated, further work is needed to enhance its decision-making accuracy and personalization to meet customer expectations comprehensively. Instead of replacing it, it might boost consumer happiness. Additionally, addressing the anxiety users have while sharing personal information with AI is critical. Strengthening security measures and educating users about AI's privacy precautions should help to allay worries. Finally, while AI's speed and 24/7 availability are commendable, more effort is needed to improve its decision-making accuracy and personalisation in order to match client expectations completely.

1.15 Conclusion

The use of artificial intelligence (AI) into the banking industry has proven revolutionary, with substantial advances in areas such as fraud detection, loan appraisal, customer service, and risk management. AI-powered technologies, such as machine learning (ML), natural language processing (NLP), and robotic process automation (RPA), have improved operational efficiency, accuracy, and customer experience. The articles analysed show how AI is revolutionising banking by automating tasks, personalising services, and enhancing decision-making processes. However, problems persist, notably in areas such as ethical AI adoption, regulatory compliance, transparency, and AI interaction with legacy systems. Furthermore, gaps in rural banking acceptance, client trust, and long-term ethical concerns must be addressed. While AI improves profitability, risk management, and operational efficiency, its success is also dependent on addressing concerns about algorithmic fairness, worker implications, and customer trust. According to the analysis, AI has enormous promise, but widespread use in banking needs overcoming these obstacles to secure the industry's long-term and equitable growth.

1.16 Scope for further research

Future studies can be taken to investigate the ethical and legal issues surrounding AI use in banking, with an emphasis on data protection, algorithmic fairness, and transparency. Studies might also look into how AI influences employment dynamics, namely job displacement and skill needs. Comparative investigations of bigger and smaller banks' use of AI technology across geographies, particularly in rural banking, would provide significant insights. Further research into AI's long-term influence on customer trust, behaviour, and financial inclusion is required. Empirical investigations on the usefulness of AI models in real-world banking operations and their integration with legacy systems will further enhance the area.

Reference

1. Mehndiratta, N., Arora, G., & Bathla, R. (2023, May 1). *The use of artificial intelligence in the banking industry*. In **2023 International Conference on Recent Advances in Electrical, Electronics & Digital Healthcare Technologies (REEDCON)**. IEEE. https://doi.org/10.1109/REEDCON57544.2023.10150681
2. Shakyawar, M., & Shakya, K. (2024). Using artificial intelligence to improve banking services in India: A review and prospects for the future. *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*, 12(IV), 728. https://www.ijraset.com
3. Devan, M., Prakash, S., & Jangoan, S. (2024). Predictive maintenance in banking: Leveraging AI for real-time data analytics. *Journal of Knowledge Learning and Science Technology*, *2*(2). https://jklst.org/index.php/home

4. Temelkov, Z. (2023). Overview of Artificial Intelligence (AI) application in the banking industry. *International Journal of Economics, Management and Tourism*, *3*(2), 43-51. https://doi.org/UDC: 336.71:004.8

5. Gurumurthy, K. H. (2024). Artificial Intelligence (AI) in banking: Opportunities & challenges. *International Journal for Multidisciplinary Research (IJFMR)*, *6*(3), 1. https://doi.org/IJFMR240321453

6. Gurumurthy, K. H. (2024). Artificial Intelligence (AI) in banking: Opportunities & challenges. *International Journal for Multidisciplinary Research (IJFMR)*, 6(3). https://www.ijfmr.com/IJFMR240321453

7. Atadoga, A., Obi, O. C., Onwusinkwue, S., Dawodu, S. O., Osasona, F., & Daraojimba, A. I. (2024). AI's evolving impact in US banking: An insightful review. *International Journal of Science and Research Archive*, 11(01), 904–922.

8. Xu, Y., Shieh, C.-H., van Esch, P., & Ling, I.-L. (2020). AI customer service: Task complexity, problem-solving ability, and usage intention. *Australasian Marketing Journal*. Advance online publication. https://doi.org/10.1016/j.ausmj. 10.1016/j.ausmj.2020.03.0

9. Bhattacharya, C., & Sinha, M. (2022). The role of artificial intelligence in banking for leveraging customer experience. *Australasian Accounting, Business and Finance Journal*, *16*(5), 89-102.

10. Ragot, M., Martin, N., & Cojean, S. (2020). AI-generated vs. human artworks: A perception bias towards artificial intelligence? *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (pp. 1–10). Association for Computing Machinery. https://doi.org/10.1145/3334480.3382892

11. Noreen, U., Shafique, A., Ahmed, Z., & Ashfaq, M. (2023). Banking 4.0: Artificial Intelligence (AI) in the banking industry and consumer's perspective. *Sustainability, 15*(3682). https://doi.org/10.3390/su15043682

12. Abu-Baker, M. I. K., Abu-Zaid, M. K. S., Alsawalqah, H., Al-Shamayleh, Y., & Al-Shboul, B. (2019). The impact of the implementation of capability maturity model integration on user satisfaction: Case study on software companies in Jordan. *Journal of Software*, 14(7), 293-311. https://doi.org/10.17706/jsw.14.7.293-311