International Research Journal of Multidisciplinary Scope (IRJMS), 2025; 6(3):876-888 IRJMS

Original Article | ISSN (O): 2582-631X DOI: 10.47857/irjms.2025.v06i03.04268

Artificial Intelligence Driven E-Services of New Generation Banks: Customer Perception, Attitude and Response Analysis

Fathimath Thasleena K*, P Santhi

School of Commerce and Management, Avinashilingam Institute for Home Science and Higher Education for Women Coimbatore, Barathi Park Road, Saibaba Colony, Coimbatore, Tamil Nadu, India. *Corresponding Author's Email: 19phcop004@avinuty.ac.in

Abstract

The rapid integration of Artificial Intelligence (AI) in the banking sector has ushered in a new era of digital financial services, offering unprecedented efficiency, personalization, and customer engagement. This study aims to assess the customer perceptions, attitude, and response towards AI-driven e-services of New Generation banks and to examine the customers' acceptance of AI-driven e-services of select New Generation banks. A sample size of 351 customers is determined and data collection is executed through structured interview schedules, ensuring respondent anonymity to encourage honest feedback. The results were analysed by using Structural Equation Modelling. The study reveals that respondents generally hold positive perceptions of AI-driven e-services in banking, emphasizing the importance of efficiency, trust, user experience, personalization, and satisfaction. Efficiency and personalization, in particular, are highlighted for their roles in expediting transactions and delivering tailored advice, respectively. However, the lower R-square value indicates the customer's inherent reluctance of using technology due to their concern regarding data privacy. Hence, the bank should focus on safety and security which is critical to maintain customer trust and thereby increasing customer acceptance level of AI technology-based banking services. The implications of this study providing insights into customer preferences and guiding banks in tailoring AI-driven services.

Keywords: AI-Driven E-Services, Customer Attitude, Customer Perception, Customer Response, Digital Banking, Technology Acceptance Model.

Introduction

Innovation in digitalization has produced both incremental technologies like digital channel dispersion accessibility, which has grown in recent years, and breakthrough technologies like Artificial Intelligence (AI) (1). Customer perception, attitude, and response to AI-driven e-services in banks is a critical area in this digital era. Technology acceptability has grown with new and latest innovations as clients adopt new technologies (2). To enhance customer experiences and operational efficiencies of banks integration encompasses a range of technologies, from chatbots in customer service to AI algorithms for personalized financial advice and machine learning for fraud detection. With the rapid advancement of AI and self-service technologies (SSTs), governments around the world now have a plethora of opportunities to enhance citizen interactions and public services (3). Self Service Technologies are technological interfaces that allow customers to benefit from services without direct service personnel interaction. Its major goal is to make customers independent. An emerging trend is the integration of AI technology with SSTs, which are employed in service sectors. If digital services are expensive and difficult (4), customers may avoid them, and multichannel services given by online banking may dissatisfy customers (5). Customer impression of safety is important for digitalizing customer experience claims (6). IT investments in the banking industry are rising, which has expanded digital capabilities for bank customers and might affect bank earnings. However, concentrating on technology to enhance customer experience claims may affect bank end-users (7). Moreover, understanding customers' adaptability and openness to change is vital, as these aspects determine how quickly they embrace new technologies. Cultural and educational factors also play a significant role in shaping customer responses to AI in banking. The factors of e-service quality will differ based on the geographical regions (8). Customer's cultural attitude on automation privacy and financial technology is

(Received 02nd March 2025; Accepted 25th June 2025; Published 25th July 2025)

significantly differed depends on their geographical region (9). In India and other urban areas, automation is regarded as a sign of contemporary banking. Although privacy concerns are becoming more prevalent, speed and usability still come first. Cultural trust in new generation banks play a mediating role in acceptance of AI tools (10). The banks must consider these nuances to effectively implement AI-driven services that meet the expectations and needs of their diverse customer base (11). The ultimate goal is to strike a balance between technological advancement and customer satisfaction, ensuring that AI-driven e-services not only advance operational efficiency but also resonate well with the customers' expectations and preferences. The success of AI-driven financial services depends on client perception attitude and response. That perspective emphasises trust and reliability (12). Customers must trust AI-driven services to securely and accurately manage their financial transactions and personal data. The usability, accessibility, and problem-solving effectiveness of AI-driven e-services can greatly impact user happiness and adoption (13).

Localised dynamics like customer orientation capability and customer response capability affect customer choices for digital tools (14). Using current technology to become customer-centric is expensive, but the reward is questionable for claim management (15). Digitally changed banks prioritise customer experience (16). The majority of commonplace digital technologies, including automation and machine learning, have been used to enhance customised customer care and increase human presence through routine automation (17). Multiple studies showed the expanding importance of AI in banking (18) notably in Asia. A high positive association exists between AI awareness, utility, attitude, and banking sector adoption intention in five Asian nations (19). The connection was negative with perceived risk. These findings emphasise `the need to build client trust in digital transactions and inform banking strategy.

Customers are increasingly accepting AI-powered digital services, which can boost customer happiness and loyalty (20). Banks should incorporate AI into their operations for automation and better customer experience. Bank's self-service technology and AI are changing the value generation and service delivery of banks. Customers like having the choice between digital self-service and human interaction. Implementing these technologies requires trust, security, and client education (21). AI has helped India's commercial banks migrate from manual to technology-driven operations. Customer experience, efficiency, and effectiveness improve with Artificial Intelligence, increasing profitability (22). AI's role in banking fraud detection and risk reduction is recognised but regulation, data protection, and infrastructural issues remain (23). Chatbot performance and trust improve customer experience and happiness (24). Chatbots must be educated for a personalised, and efficient customer experience. In spite of the benefits, untrained models may make mistakes and reduce productivity (25). Together, these studies highlight the importance of AI which is deployed in the banking sector for operational efficiency and improved customer service on the other hand, the significance of customer trust, security, and education are the requirements for adoption of AI-driven solutions.

Understanding localized customer perception and attitudes towards AI-driven services in banking is crucial given its high literacy rate and tech-savvy population. The existing literature is inadequately addressing how customers interact with and respond to AI-driven banking services. This gap hinders the development of specific strategies for AI implementation. Understanding these nuances is essential for banks to tailor their AI-driven services effectively, ensuring their alignment with customer expectations and preferences. Thus, the problem statement addresses the need to explore and analyse the multi-dimensional aspects of customer perception, attitude and response to AI-driven e-services in new generation banks, with an aim to provide insights that could guide the strategic implementation of AI in banking to achieve higher customer satisfaction and engagement. The novelty of the study lies in measuring the level of customer attitude towards AI driven e-banking services and to examine the extent to which this attitude leads to customer acceptance of such services. Additionally, the study is conducted in a region with unique demographic characteristics including highest literacy rate, widespread technology adoption, and diverse cultural values.

Applications of Artificial Intelligence (AI) in Banking

The concept of artificial intelligence (AI) describes a group of technologies that include deep learning, neural networks, machine learning (ML), and others that are vital in tackling challenges and transforming the banking industry (21). In the banking sector AI tools are increasingly applied to identify and prevent fraudulent transactions and detailed KYC checking of customers (26). A chatbot is an AI application that responds automatically and can occasionally be built to mimic a real conversation in natural language with a human and financial robo-advisors are digital platforms that use algorithms to provide automated investment management or financial guidance (27). Banks are exploring the use of AI for analysing data from annual reports or legal documents, the application of chatbots and robo-advisors provides online financial planning to bank's customers which will enhance their digital engagements and self -service usage. Machine learning and AI tools are used to predict the effect of geopolitical risk in financial markets which will enhance customer trust and perceived security (23). FinBots are straightforward chatbots designed to optimise and streamline banking choices by offering users guided solutions to address basic finance-related questions (28). Application of AI in banking is also found in online loan processing, bulk transaction processing, sentiment analysis, customer segmentation, and customer relationship management practices (29). The use of these AI application will assist the customers for faster decision making, ease of banking, transparency, efficiency, personalised services resulted greater loyalty due to these tailored services.

The objectives of the study are to assess the customer perceptions, attitude, and response towards AI-driven e-services of New Generation banks and to examine the customers' acceptance of AI-driven e-services of select New Generation banks.

Conceptual Framework and Hypotheses Development: The research constructs for the study are drawn from the Technology Acceptance Model (TAM) developed by Davis, 1986 and from the review of the literature. The TAM model identifies how well customers adopt new technology, important latent variables such as perceived usefulness which reflects the usefulness of AI driven technology and perceived ease of use reflects the level of easiness in using new technology. Since deployment of advanced technology in banking for customer engagement necessitates quick customer adoption and usage. The customer looks for trust and security, Personalisation of banking services, and the ultimate acceptance of such technology leads to customer satisfaction (30).

Efficiency and Customer Perception of AI-driven E-Services: AI technologies can automate routine manual operations like data entry, document verification, and verification of compliance (31). As a result, processing times are shortened, errors are decreased, and bank staff members are free to concentrate on higher-value tasks like client relationship management and strategic decision-making processes (32). An AI-driven e-services avoid service queues and a number of service requests (23). It makes these functions smooth and easy. Technology- driven bank services and fund transfers are time saving and efficient (33). It also improves efficiency and financial inclusion through the detection and prevention of fraudulent transactions (34). Hence it is hypothesized that,

H1: Efficiency in AI-driven e-services positively influence customer perception and attitude.

Trust, Security and Customer Perception of AI-driven E-Services: In banking industry trust and security are crucial as they handle sensitive financial data and transactions. Customers are likely to trust online banking providers and form enduring connections when they perceive that these companies regard their individual requirements and preferences and treat their data with care and honesty to a great extent (35). Artificial Intelligence has revolutionised digital payments in multiple ways. Certain applications, such as Face-pay, rely on artificial intelligence to power facial recognition technology, while others adopt a more advanced strategy, enabling users to be identified by their smartphone app and make payments without entering a PIN with precision. Some payment gateways use artificial intelligence to stop fraudulent transactions. Through these technologies, AI -driven E-services enhances customer perception and attitude. Based on this following hypothesis is framed.

H2: Trust and Security of AI-driven e-services positively influence customer perception and attitude.

User Experience and Customer Perception of AI-driven E-Services: A user's experience is the perception of each interaction they have with the object in front of them while using it (36). The value derived from the user's interaction with the service is recognised as the user experience (37). This value is created from the benefits of AI-driven e-services such as simplicity in usage, real-time functionality, visual appeal, control sense, social standing, and trust. From these facts, it is evident that user experience is a utilitarian value since it offers useful advantages like speed and time savings (38). The customer's propensity to accept AI-driven banking services is positively impacted by their perceived benefit, which also improves user experience (39). Hence it is hypothesised that,

H3: User Experience of AI driven e-services positively influences customer perception and attitude.

Personalisation and Customer Perception of AI-driven E-Services: AI enabled services like AI service assistants, chatbots and AI navigation provide personalised banking experience (40). AI creates personalised banking gateways using innovative algorithms for each individual bank customer (41). Personalised banking services thereby assist customers in carrying out pertinent banking tasks and work to improve the financial service experience (42). Artificial Intelligence facilitates financial operations using official banking apps. The AI begins to comprehend consumers' financial needs automatically as soon as they utilise the AI-enabled banking services. AI then sets users' service requests and creates banking metrics for them (43). These personalised services help users to track their financial transactions (44). Hence, it is hypothesised that

H4: Personalised AI driven e- services positively influences customer perception and attitude.

Satisfaction and Customer Perception of AI-driven E-Services: Customer satisfaction assumes a special significance in the realm of AI-powered services (40). The trendiness, attractiveness, and problem-solving capabilities of artificial intelligence have enhanced the allure, innovation, and appeal of banking operations (41). Artificial intelligence in digital banking made it possible for service providers to respond to clients' issues around the clock, which increased client happiness (45). Previous research suggests that artificial intelligence e-driven digital banking caters to clients' needs and fashionable lifestyles, thereby increasing customer satisfaction. AI can boost customer satisfaction by increasing service accuracy and efficiency (30). Based on this following hypothesis were made.

H5: Satisfaction of AI driven e-services positively influence customer perception and attitude.

Customer Perception, Attitude and Acceptance level: An enhanced level of personalisation results in a more pertinent user experience (42). Personal standards, perceived trust, perceived risk, and perceived usefulness all have a significant influence on customers' intentions to adopt AI-driven services (45). New technology products are more likely to be trusted and used again by users who use them at first (42). AI banking gateways provide a better, more individualised banking experience while fostering a user's independence in making banking decisions (46). A person's openness to new ideas and its level of satisfaction will increase willingness to accept them (47). Acceptance of AI banking is greatly influenced by attitudes. It has been discovered that favourable perceptions of innovative AI-based financial services affect customers' acceptance of online banking services (48). Thus, it is hypothesized that**,**

H6: Customer perception and attitude on AI-driven e-services positively influence customer acceptance.

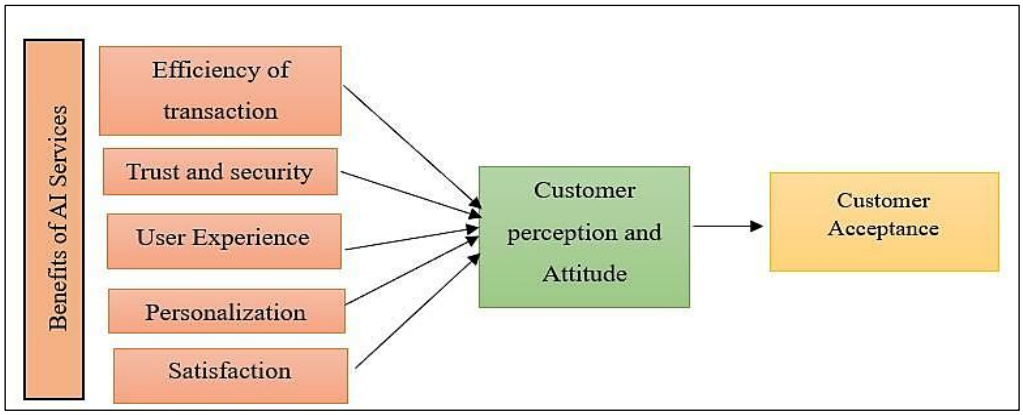

Figure 1: Model of Customer Acceptance for AI-Driven E-Services

The integration of AI in banking has transformed customer service by delivering personalised banking experience and enhances efficiency in banking operations (49). AI is now utilised in banking in a variety of ways, from strengthening customer service through personalised interactions to strengthening transaction security and preventing cyberattacks (50). By focusing the benefits of AI integration in banking like efficiency, trust and security, user experience, personalisation and satisfaction, banks can leverage AI to meet changing customer expectations and thereby creating positive attitude to e-banking services (51). This will lead to high rate of customer acceptance of AI driven e-services. Based on the above discussion the conceptual model (Figure 1) is used to analyse client attitudes and responses towards AI driven e-services.

Methodology

This study is an empirical and qualitative research. locale of the study of Trivandrum city of Kerala, with its unique demographic characteristics, including the highest literacy rates, widespread use of technology, diverse cultural values, and significant NRI account presence provides a distinctive context for this study (52). The focus is on six New Generation banks namely ICICI, HDFC, Axis bank, Kotak Mahindra, IndusInd and Yes Bank situated in the study area. These banks are selected based on their prominence in integrating AI-driven e-services and their substantial customer base in the region. Considering the confidentiality of customer data in the banks, the exact customer count is not publicly available. Based on the population of the city, the sample size of 384 is arrived at using Krejcie and Morgan table. The study employed a convenience sampling method to select sample respondents who were clients of the new generation banks and were using AI-driven e-services. Data collection was executed through structured interview schedules, promising anonymity to stimulate candid responses. After reducing incomplete responses, a sample of 351 responses (ICICI 145, HDFC 110, Axis bank 45, Kotak Mahindra 28, IndusInd bank 15 and Yes bank 8 customers) were taken for analysis.

The survey incorporated several sections encompassing demographic details, parameters for measuring customer perception of Efficiency, Trust, Personalization, User Experience and Satisfaction signifying mounting acceptance and confidence in AI technologies in banking, response and inquiries aimed at evaluating the opinion towards the AI- driven services in New Generation banks evaluated using five-point Likert scale (53). The 20 items and 5 variables in the survey were taken from previous studies (12, 21, 24) and the content validity is ensured. The reliability of data has been proved through Cronbach alpha test and the value of all the constructs is found to be above 0.7. The framework of analysis includes descriptive statistics, correlation and Structural Equation Modelling (SEM). The study acknowledges its limitations, including the possibility of response bias in self-reported surveys.

Results and Discussion

The demographic profile of the customers represents that the majority of respondents (61%) are below 30 years of age, while those aged 30-45 years constitute 27.90 percent and those above 45 years age group make up 11.10 percent. In terms

of gender, males represent a larger portion of the respondents at 61.56 percent, compared to females at 38.55 percent. A significant majority, 73.86 percent, are married, while 26.23 percent are unmarried. Educational qualifications show a diverse range, with 25.44 percent being graduates, 23.92 percent having professional qualifications 19.47 percent being Postgraduates,18.86 percent falling into skill education and 12.54 percent having completed high school.

The result of ANOVA test reveals that the customer impression on AI driven e-banking services will differ significantly between different customer demographic segmentation. The ANOVA test result shows that there is a statistically significant difference in customer attitude toward AI driven e-service factors across different age groups (Below 30, 30 to 45 and Above 45) in new-generation banks, as indicated by the p-values (<0.001) for all factors (Efficiency, Trust, Personalization, User Experience and Satisfaction). The F-values range from 7.53 (Trust) to 18.50 (Efficiency), suggesting strong variations across age groups (54). There is significant difference in customer attitude toward e-service quality factors across different education level (Graduate, Professionals, Post Graduate and Skill education) in new-generation banks, as indicated by the p-values (>0.05) for all factors (Efficiency, Trust, Personalization, User Experience and Satisfaction). The F-values range from 6.89 (Trust) to 19.39 (Efficiency), suggesting strong variations across their educational level. Additionally, there is a statistically significant difference in gender of customer and customer attitude toward e-service quality factors in new-generation banks, as indicated by the p-values (<0.001) for all factors. The F-values range from 11.284 (Personalisation) to 16.214 (User experience), suggesting strong variations in groups based on gender. The results support the findings of previous studies (55, 56).

The respondents had the experience using AI driven banking chatbots namely EVA of HDFC bank (41.36%), Ask iPal of ICICI (31.33%), Axis AHA of Axis bank (12.8 %), Ask Keya of Kotak Mahindra bank (7.97%), Indus Assist of IndusInd bank (4.27%) and Yes Robot of YES bank (2.27%). Fifty percent of respondents are aware of fraud detection and cyber security, while eighty percent of customers are familiar with AI-driven process automation services. Thirty-five percent of respondents are aware of wealth management, and forty-five percent are familiar with AI-based loan assessment and credit scores.

The data presents respondents' perceptions of AI-driven e-services in various categories, expressed as percentage values. In terms of Efficiency, the majority (52.49%) agree that AI speeds up banking transactions, and 63.58 percent strongly agree that it helps complete tasks more quickly. Regarding Trust and Security, 51.82 percent express confidence in AI-driven service security. Additionally, 35.61 percent trust AI with sensitive banking information. User Experience shows positive outcomes, with 66.29 percent opining that AI makes banking user-friendly. About 37 percent find the AI-driven interface intuitive. In the realm of Personalization, 42.81 percent strongly agree that AI provides personalized advice, and 25.42 percent strongly agree that it understands their preferences. In terms of Satisfaction, 53.54 percent are overall satisfied with AI-driven services, and 45.83 percent believe they meet quality and reliability expectations. In summary, respondents generally hold positive attitudes towards AI-driven e-services, particularly in Efficiency, Trust, User Experience, Personalization, and Satisfaction, signifying mounting acceptance and confidence in AI technologies in banking. The result is consistent with the previous study results (57).

Correlation matrix analysis of AI driven e-services and customer perception of New Generation banks

To determine the relation between respondent's perception of the benefits of AI-driven e-services Karl Pearson correlation was applied and the results obtained were presented in Table 1.

Table 1: Correlation Matrix of Customer Perception on Benefits of AI Driven E-Services

Variable	Efficiency of Transaction	Trust and Security	User Experience	Personalisation	Satisfaction
Efficiency of Transaction	1				
Trust and Security	0.423**	1			

User Experience	0.535**	0.326**	1		
Personalised	0.324**	0.245**	0.325	1	
Satisfaction	0.524**	0.625**	0.548**	0.398**	1

Notes: ** Correlation is significant at the 0.01 level (2-tailed)

The Pearson Correlation analysis indicates significant correlations among Efficiency of transactions, Trust and security, User experience, Personalization, and Satisfaction. Efficiency shows low positive correlation with all the variables. Trust and security show high correlation with satisfaction indicating trust in AI driven services highly influence satisfaction. The user experience of AI-driven banking services exhibits a low positive association across all the variables. This correlation is statistically significant indicating a strong likelihood that the observed relationship is not due to chance. A meaningful relationship between all the factors exists. This result supported by the study findings (58). All factors influence satisfaction as it shows a significant degree of correlation among the variables.

Impact of Perception and Attitude on AI Driven E-Services and its Acceptance among Customers of select New Generation banks

AI services and benefits, encompassing efficiency of transaction, trust and security, user experience, and personalization, have a significant positive impact on customer satisfaction, which in turn positively influences customer perception, ultimately leading to higher levels of acceptance of AI-driven banking services in New Generation banks (22). It has been tested using the Structural Equation Model and the Table 2 shows construct reliability and composite reliability of the variables under study.

Table 2: Construct Reliability and Composite Reliability

	Cronbach's Alpha	**Composite Reliability (Rho_A)**	**Composite Reliability (Rho_C)**	**Average Variance Extracted (AVE)**
Acceptance level	0.795	0.794	0.807	0.502
Customer perception and attitude	0.946	0.956	0.952	0.641
Satisfaction	0.78	0.733	0.714	0.674
Trust and Security	0.896	0.91	0.912	0.826
User Experience	0.818	0.847	0.858	0.837
Personalisation	0.864	0.883	0.885	0.735

Table 2 presents a range of statistical measures that are used to assess the validity and reliability of distinct constructs under study. The measures Cronbach's Alpha, Average Variance Extracted (AVE), and Composite Reliability (rho_a and rho_c) are essential for evaluating the study's constructs' robustness and data quality. As a gauge of internal consistency, Cronbach's Alpha shows how closely similar the questions or objects within each construct are to one another. Greater internal consistency is indicated by higher Cronbach's Alpha values, which range from 0 to 1, with values nearer 1 being preferred.

The composite reliability, denoted by rho_a and rho_c, evaluates the constructs' internal consistency in addition. Higher rho_a and rho_c values, which are closer to 1, are favoured, and are indicative of improved reliability, much like Cronbach's Alpha. The Average Variance Extracted (AVE) is used to evaluate convergent validity. It determines how well a construct's items capture its underlying variance while taking measurement error into account. Stronger convergent validity is indicated by higher AVE values, which range from 0 to 1. Generally, AVE values above 0.5 are considered acceptable. Interpreting the values for each construct in the table, we observe varying levels of internal consistency and convergent validity. Constructs with higher Cronbach's Alpha, rho_a, rho_c, and AVE values are deemed more reliable and valid. These measures collectively offer insights into the quality and trustworthiness

of the data collected in the research, which is essential for drawing meaningful conclusions and making informed decisions based on the study's findings.

Table 3 presents key statistics for assessing regression model fit: R-squared (R^2) and adjusted R-squared values. R-squared measures how well predictors explain variance in the dependent variable and adjusted R-squared considers model complexity, penalizing unnecessary predictors.

Table 3: Customer Perception and Acceptance of AI-Driven E-Services

	R-square	**R-square Adjusted**
Customer perception and attitude	0.676	0.658
Acceptance level	0.079	0.069

The "Customer perception and attitude " has an adjusted R-squared of 0.658 and the acceptance level has an R-square of 0.079 showing a good fit considering model complexity. The "Acceptance level" has an R-square of 0.079, indicating 7.9 percent explained variance. Higher values suggest better fit, while adjusted R-squared balances fit and complexity in model comparisons. It also indicates a significant positive attitude and perception towards AI-driven banking services. However, low R-square value of the Acceptance level indicates the respondent's inherent reluctance to use AI services even though they have a positive perception and attitude toward those services. The inherent complexity of AI based services, customer's worry about mishandling their personal and financial data and customers may feel that they are losing control over their financial matters while depending on machines are the reasons to prevent customers from adopting such technologies implemented in banks at a fast pace. Measures of discriminant validity were conducted using the Heterotrait-Monotrait ratio (HTMT). Utilising the HTMT ratio, this method computes discriminant validity based on the construct indicators' correlation values. Table 4 presented the findings for discriminant validity using the HTMT ratio.

Table 4: Discriminant Validity: Heterotrait-Monotrait Ratio (HTMT)

	Heterotrait-Monotrait Ratio (HTMT)
Customer perception and attitude <->Acceptance level	0.423
Efficiency of transaction <->Acceptance level	0.377
Efficiency of transaction <-> Customer perception and attitude	0.326
Satisfaction <->Acceptance level	0.507
Satisfaction <->Customer perception and attitude	0.734
Satisfaction <-> Efficiency of transaction	0.278
Trust and security<->Acceptance level	0.42
Trust and security <-> Customer perception and attitude	0.692
Trust and security <-> Efficiency of transaction	0.241
Trust and security <->Satisfaction	0.711
User experience<->Acceptance level	0.924
User experience<->Customer perception and attitude	0.63
User experience<-> Efficiency of transaction	0.374
User experience<-> Satisfaction	0.418
User experience<-> Trust and security	0.729
Personalization<->Acceptance level	0.624
Personalization<->Customer perception and attitude	0.693

Personalization<-> Efficiency of transaction	0.199
Personalization<-> Satisfaction	0.558

The HTMT statistic thresholds are less than 0.90 and the results demonstrate that all of the values in Table 4 are below the limit. Thus, the discriminant validity of constructs is proven. The path coefficient of the constructs is presented in Table 5.

Table 5: Path Coefficients for the Model

	Original Sample (O)	**Sample Mean (M)**	**SD**	**T Statistics**	**P Values**	**Result**
Customer perception and attitude ->Acceptance level	0.28	0.335	0.138	2.029	0.043	Accepted
Efficiency of transaction -> Customer perception and attitude	0.129	0.129	0.049	2.645	0.008	Accepted
Customer perception and attitude-> Satisfaction	0.221	0.218	0.086	2.576	0.01	Accepted
Trust and security -> Customer perception and attitude	0.24	0.24	0.082	2.914	0.004	Accepted
User experience -> Customer perception and attitude	0.2	0.205	0.071	2.813	0.005	Accepted
Personalization -> Customer perception and attitude	0.369	0.371	0.072	5.139	0.000	Accepted

Table 5 shows the findings of the path coefficient and indicates that the efficiency of the transaction on the customer perception and attitude resulted significantly at the 0.05 level and the H_1 is accepted. The trust and security on the customer perception and attitude resulted significant at the 0.05 level, and H_2 is accepted. The influence of user experience on the customer perception and attitude resulted significantly at the 0.05 level and the H_3 hypothesis is accepted. The personalisation or customised services have positively influenced and resulted in the 0.05 level. Hence H_4 is accepted. The impact of customer perception and attitude on customer satisfaction resulted significantly at the 0.05 level and the H_5 hypothesis is accepted. The effect of customer perception and attitude on customer acceptance resulted significant at the 0.5 level and the H_6 hypothesis is accepted. The results are corroborated by previous study findings (59-61).

Table 6: Goodness of Fit (GoF)

	Saturated Model	**Estimated Model**
SRMR	0.083	0.081
d_ULS	16.453	15.819
d_G	11.440	11.374
Chi-square	348.657	326.723
NFI	0.961	0.961

The fit indices for the structural equation modelling (Table 6) suggest that both the saturated and estimated models have a good fit, with the estimated model showing slight improvements. Specifically, the Standardized Root Mean Square Residual (SRMR) values for both models are marginally above the desired threshold of 0.08, indicating a generally good fit to the data. The lower d_ULS and d_G values for the estimated model compared to the saturated model reflect a better fit, and the decrease in the Chi-square value also supports this conclusion. Moreover, the

Normed Fit Index (NFI) stands at 0.961 for both models, which is close to the ideal value of 1, indicating that both models fit the data well. The consistency in NFI suggests that the estimated model retains the goodness of fit of the saturated model while likely benefiting from greater parsimony. Overall, these indices collectively imply that the hypothesized model is capturing the underlying data structure with an appropriate level of complexity.

The study underscores the need for banks to focus on AI-driven services tailored to all the products especially while offering to younger, tech-savvy demographic while considering the diverse needs of all customers (62). Banks should prioritize customer-centric AI development, emphasizing personalization, efficiency, and user-friendly interfaces. Since user experience is highly valued, AI interfaces should be intuitive and user-friendly. To safeguard consumer data and foster trust, banks should make sure that their AI systems have strong security features (27). Although improved efficiency is recognized less in customer expectations, it is still positively correlated with customer preference. Thus, improving the efficiency of AI-driven services by reducing waiting time, making services available 24/7, and invest in chatbots could enhance customer satisfaction and preference indirectly. Simplifying the user journey and ensuring AI-driven platforms are easily navigable can increase customer satisfaction. Personalization is key in customer service satisfaction. Banks should leverage AI to provide personalized financial advice, product recommendations, and support based on individual customer data and behaviour.

The customers perceived that AI services are functionally good and have positive attitude towards all benefits of AI services. From the model tested it is evident that a positive attitude not completely led to acceptance of AI services in toto. This might be due to some psychological factors. Customers feel secure and psychologically comfortable if they have trust in the system (54). AI safety and security are critical to maintaining customer trust, especially for sensitive financial data upholding operational efficiencies through AI should be leveraged to enhance customer satisfaction. Before implementing an AI-based banking system, the bank needs well-organized and validated data, and the recommendations derived from this data must be clear and understandable. Banks must also establish feedback mechanisms for continuous AI service improvement and ensure compliance with regulatory standards, particularly regarding ethics and transparency (63). In the case of efficiency, the mean score has low value. So, the bank should improve the efficiency of AI driven services and educate customer about its utilities. For getting complete trust in the system bank should utilise help centres and online demos. By effectively integrating AI, banks can create positive attitudes and differentiate themselves in a competitive market, attracting customers to adopt advanced digital banking services.

Conclusion

The study indicates a significant acceptance and enthusiasm for AI-driven e-services among banking customers, particularly among the younger, tech-savvy demographic. Customers prioritize convenience and efficiency, expecting AI to streamline and expedite transactions. There is a clear preference for personalized interactions, as evidenced by the high valuation of chatbots for customer support. Trust and security are also important, though secondary to service efficiency and personalization.

The statistical analysis provides a robust confirmation that efficiency in AI-driven services is a significant factor in customer preference. The study's findings suggest a roadmap for banks to enhance customer experience and satisfaction by focusing on personalized, efficient, and user-friendly AI-driven services, while also ensuring robust security measures are in place.

As the banking sector continues to evolve with AI technologies, the institutions that pay heed to these customer preferences and attitudes are likely to gain a competitive edge, fostering loyalty and expanding their customer base in an increasingly digital financial landscape.

Future Scope of the Study

Future research in the field of AI-driven e-services in banking could extend in various directions. It could include longitudinal studies to monitor the evolution of customer attitudes and preferences as technology becomes more integrated into banking operations. Expanding the scope of demographic studies to include a wider range of age groups, socioeconomic backgrounds, and geographic

regions would yield a more thorough understanding of the perspectives of worldwide customers. Investigating customers' positioning within the technology adoption lifecycle could offer insights into how different segments respond to AI advancements. The impact of emerging technologies like blockchain, quantum computing, and augmented reality on AI-driven e-services is another promising area, providing a comparative view across different sectors such as healthcare or retail.

There's a significant scope to explore customer education and its influence on AI service adoption and effectiveness. Ethical and regulatory aspects, especially concerning data privacy and decision-making transparency, present a critical area of study. The role of AI in advancing financial inclusion, particularly for underserved population, is a vital aspect to explore. Further, delving into the personalization of customer experiences through AI could reveal its impact on customer loyalty and trust. Lastly, the interplay between AI and the human workforce in the banking sector, focusing on employment dynamics, skill requirements, and the changing nature of banking work, presents a rich field for investigation. These areas collectively offer a broad spectrum for future research, shedding light on the multifaceted implications of AI in the banking industry.

Abbreviations

KYC: Know Your Customer, NRI: Non- Resident Indians, SD: Standard Deviation, SEM: Structural Equation Modelling.

Acknowledgement

We would like to express our gratitude to the Avinashilingam Institute for Home Science and Higher Education for Women for their support in conducting the research work and special thanks to bank customers who participated in this survey.

Author Contributions

Both the authors contributed equally.

Conflict of Interest

The authors declare no conflict of interest.

Ethics Approval

Not applicable, as no human experiments conducted.

Funding

This research did not receive any grant from funding agencies.

References

1. Van Veldhoven Z, Vanthienen J. Best practices for digital transformation based on a systematic literature review. Digital Transformation Society. 2023;2(2):104–28.
2. Jeon HM, Sung HJ, Kim HY. Customers' acceptance intention of self-service technology of restaurant industry: expanding UTAUT with perceived risk and innovativeness. Serv Bus. 2020;14(4):533–51.
3. Cheng Y, Jiang H. How Do AI-driven Chatbots Impact User Experience? Examining Gratifications, Perceived Privacy Risk, Satisfaction, Loyalty, and Continued Use. J Broadcast Electron Media. 2020;64(4):592–614.
4. Gawer A. Digital platforms and ecosystems: remarks on the dominant organizational forms of the digital age. Innov. 2021;24(1):110–24.
5. Alzaydi Z. Examining the mediating effect of multi-channel integration quality in the relationship with service quality, customer satisfaction and customer loyalty in the Saudi banking sector. Management & Sustainability: An Arab Review. 2023 Mar 29;3(2): 132-49.
6. Rodrigues ARD, Ferreira FA, Teixeira FJ, Zopounidis C. Artificial intelligence, digital transformation and cybersecurity in the banking sector: A multi-stakeholder cognition-driven framework. Res Int Bus Finance. 2022;60:101616.
7. Doumpos M, Zopounidis C, Gounopoulos D, Platanakis E, Zhang W. Operational research and artificial intelligence methods in banking. Eur J Oper Res. 2023;306(1):1–16.
8. Paltayian G, Georgiou A, Gotzamani K. A combined QFD-AHP decision-making tool for the investigation and improvement of e-banking usage. International Journal of Quality & Reliability Management. 2024 Jan 2;41(1):150-72.
9. Waliszewski K, Warchlewska A. Attitudes towards artificial intelligence in the area of personal financial planning: a case study of selected countries. Entrepreneurship and Sustainability Issues. 2020 Dec 1;8(2):399.
10. Pfoertsch W, Sulaj K. Integrating artificial intelligence with customer experience in banking: An empirical study on how chatbots and virtual assistants enhance empathy. In2023 International Conference on Computing, Networking, Telecommunications & Engineering Sciences Applications (CoNTESA). IEEE. 2023 Dec 14:69-74. https://ieeexplore.ieee.org/abstract/document/10384979
11. Mi Alnaser F, Rahi S, Alghizzawi M, Ngah AH. Does artificial intelligence (AI) boost digital banking user satisfaction? Integration of expectation confirmation model and antecedents of artificial intelligence enabled digital banking. Heliyon. 2023;9(8):e18930.
12. Lui A, Lamb GW. Artificial intelligence and augmented intelligence collaboration: regaining trust and confidence in the financial sector. Inf Commun Technol Law. 2018;27(3):267–83.

13. Kaur N, Sahdev SL, Sharma M, Siddiqui L. Banking 4.0: The Influence of Artificial Intelligence on the Banking Industry and How AI Is Changing the Face of Modern Day Banks. Int J Manag. 2020;11(6):577-585.
14. Al-Araj R, Haddad H, Shehadeh M, Hasan E, Nawaiseh MY. The Effect of Artificial Intelligence on Service Quality and Customer Satisfaction in Jordanian Banking Sector. WSEAS Trans Bus Econ. 2022;19:1929–47.
15. Setia P, Venkatesh V, Joglekar S. Leveraging Digital Technologies: How Information Quality Leads to Localized Capabilities and Customer Service Performance. MIS Q. 2013;37(2):565–90.
16. Howson P. Building trust and equity in marine conservation and fisheries supply chain management with blockchain. Mar Policy. 2020;115:103873.
17. Ghosh A, Sarkar N, Ganguly A, Banerjee S. Modelling Customer Satisfaction and Loyalty Using Structural Equation Modeling Based on Service Quality Measurement in the 10-Minute Online Grocery Delivery Industry. SDMIMD Journal of Management. 2023 Oct 9:61-76. 10.18311/sdmimd/2023/33294
18. Noreen U, Shafique A, Ahmed Z, Ashfaq M. Banking 4.0: Artificial Intelligence (AI) in Banking Industry and Consumer's Perspective. Sustainability. 2023;15(4):3682.
19. Khawan S. The Use of Artificial Intelligence Technology in The Organization's E-Services and The Impact on Customer Satisfaction. SSRN Electron J. 2023. https://doi.org/10.2139/ssrn.4595784
20. Kushwaha AK, Kumar P, Kar AK. What impacts customer experience for B2B enterprises on using AI-enabled chatbots? Insights from Big data analytics. Ind Mark Manag. 2021;98:207–21.
21. Suma SR, Anupama S. Banking 4.0: Artificial Intelligence and its applications in Indian Commercial Banks. MDIM Bus Rev. 2021;2:50–8.
22. Krishnaveni RV, Pandey N, Modh S. Indigenous and disruptive remote patient monitoring devices-a case study on ai in healthcare. SDMIMD Journal of Management. 2023;14(2):27-34.
23. Aziz LA, Andriansyah Y. The role artificial intelligence in modern banking: an exploration of AI-driven approaches for enhanced fraud prevention, risk management, and regulatory compliance. Reviews of Contemporary Business Analytics. 2023 Aug;6(1):110-32.
24. Lai ST, Leu FY, Lin JW. A banking chatbot security control procedure for protecting user data security and privacy. In Advances on Broadband and Wireless Computing, Communication and Applications: Proceedings of the 13th International Conference on Broadband and Wireless Computing, Communication and Applications (BWCCA-2018). Springer International Publishing. 2019:561-571. https://link.springer.com/chapter/10.1007/978-3-030-02613-4_50
25. Ng M, Coopamootoo KP, Toreini E, Aitken M, Elliot K, van Moorsel A. Simulating the effects of social presence on trust, privacy concerns & usage intentions in automated bots for finance. In 2020 IEEE European symposium on security and privacy workshops (EuroS&PW). IEEE. 2020 Sep 7:190-199. https://ieeexplore.ieee.org/abstract/document/9229876
26. Yadav RS, Kaya SK, Pant A, Tiwari A. AI-enabled human capital management (HCM) software adoption using full consistency method (FUCOM): evidence from banking industry. Global Knowledge, Memory and Communication. 2023 Oct 20;74(⅝):1724-1746.
27. Bhattacharya C, Sinha M. The Role of Artificial Intelligence in Banking for Leveraging Customer Experience. Australas Bus Account Finance J. 2022;16(5):89–105.
28. Jiang H, Cheng Y, Yang J, Gao S. AI-powered chatbot communication with customers: Dialogic interactions, satisfaction, engagement, and customer behavior. Comput Human Behav. 2022;134:107329.
29. Buttazzo G. Rise of artificial general intelligence: risks and opportunities. Frontiers in artificial intelligence. 2023 Aug 25;6:1226990.
30. Pendy B. Role of AI in Business Management. Brilliance Res Artif Intell. 2023;3(1):48–55.
31. Ashta A, Herrmann H. Artificial intelligence and fintech: An overview of opportunities and risks for banking, investments, and microfinance. Strateg Change. 2021;30(3):211–22.
32. Sharma M. A study: How AI is incorporated in the Middle East banking. J Res Appl Sci Biotechnol. 2023;2(3):202–8.
33. Artificial Intelligence in the Fight Against COVID-19 in the Banking Sector. Adv Mach Learn Artif Intell. 2020;1(1). https://www.opastpublishers.com/open-access-articles/artificial-intelligence-in-the-fight-against-covid19-in-the-banking-sector-18.html
34. Hinderks A, Schrepp M, Domínguez Mayo FJ, Escalona MJ, Thomaschewski J. Developing a UX KPI based on the user experience questionnaire. Comput Stand Interfaces. 2019;65:38–44.
35. Komulainen H, Saraniemi S. Customer centricity in mobile banking: a customer experience perspective. Int J Bank Mark. 2019;37(5):1082–102.
36. Putri CA, Ginting P, Situmorang SH. E-service quality and relational marketing effect satisfaction with using mobile banking through user experience in Mandiri Syariah Bank KCP Medan Petisah. Int J Res Rev. 2021;8(6):74–95.
37. Sheth JN, Jain V, Roy G, Chakraborty A. AI-driven banking services: the next frontier for a personalised experience in the emerging market. Int J Bank Mark. 2022;40(6):1248–71.
38. Preprint repository arXiv achieves milestone million uploads. Phys Today. 2014. https://doi.org/10.1063/pt.5.028530
39. Ho MT, Le NTB, Mantello P, Ho MT, Ghotbi N. Understanding the acceptance of emotional artificial intelligence in Japanese healthcare system: a cross-sectional survey of clinic visitors' attitude. Technol Soc. 2023;72:102166.
40. Xie C, Wang Y, Cheng Y. Does artificial intelligence satisfy you? A meta-analysis of user gratification and user satisfaction with AI-powered chatbots. Int J Hum Comput Interact. 2022;40(3):613–23.
41. Wang W, Siau K. Artificial intelligence, machine learning, automation, robotics, future of work and future of humanity. J Database Manag. 2019;30(1): 61–79.

42. Panda S, Chakravarty R. Adapting intelligent information services in libraries: a case of smart AI chatbots. Libr Hi Tech News. 2022;39(1):12–5.
43. Middlewood BL, Gallegos J, Gasper K. Embracing the unusual: feeling tired and happy is associated with greater acceptance of atypical ideas. Creat Res J. 2016;28(3):310–7.
44. Schiff A, McCaffrey M. Redesigning digital finance for big data. SSRN Electron J. 2017. https://doi.org/10.2139/ssrn.2967122
45. Mogaji E, Nguyen NP. Managers' understanding of artificial intelligence in relation to marketing financial services: insights from a cross-country study. Int J Bank Mark. 2021;40(6):1272–98.
46. Zolkepli IA, Kamarulzaman Y. Social media adoption: The role of media needs and innovation characteristics. Computers in human behavior. 2015 Feb 1;43:189-209.
47. Lee JC, Chen X. Exploring users' adoption intentions in the evolution of artificial intelligence mobile banking applications: the intelligent and anthropomorphic perspectives. Int J Bank Mark. 2022;40(4):631–58.
48. Miller R, Fang A. Business Intelligence Leveraging Regression Models, Artificial Intelligence, Business Intelligence and Strategy. Artificial Intelligence, Business Intelligence and Strategy. 2023 May 14. https://dx.doi.org/10.2139/ssrn.4453875
49. Rahman M, Ming TH, Baigh TA, Sarker M. Adoption of artificial intelligence in banking services: an empirical analysis. Int J Emerg Mark. 2021;18(10): 4270–300.
50. Kumar R, Singh R, Kumar K, Khan S, Corvello V. How does perceived risk and trust affect mobile banking adoption? Empirical evidence from India. Sustainability. 2023 Feb 23;15(5):4053.
51. Mardanghom R, Sandal H. Artificial intelligence in financial services: an analysis of the AI technology and the potential applications, implications, and risks it may propagate in financial services (Master's thesis).2019. https://openaccess.nhh.no/nhh-xmlui/bitstream/handle/11250/2647381/masterthesis.pdf?sequence=1
52. Oyeniyi LD, Ugochukwu CE, Mhlongo NZ. Implementing AI in banking customer service: A review of current trends and future applications. International Journal of Science and Research Archive. 2024;11(2):1492-509.
53. Qasaimeh GM, Jaradeh HE. The impact of artificial intelligence on the effective applying of cyber governance in Jordanian commercial banks. Int J Technol Innov Manag. 2022;2(1). https://doi.org/10.1108/JFEP-10-2024-0306
54. Mhlanga D. Industry 4.0 in finance: the impact of artificial intelligence (AI) on digital financial inclusion. Int J Financ Stud. 2020;8(3):45.
55. Jain HC, Godara A. Smart banking services resistance across the income levels. Hem Chand Jain, Anubha Godara, Smart Banking Services Resistance across the Income Levels. International Journal of Management. 2021 Feb 13;11(11):2020.
56. Khaldi A. The Effect of Customers' Gender, Education and Age on Their E-banking Experience and Word-of-Mouth Online: A CRM Approach. Journal of Business Studies Quarterly. 2021 Mar 1;10(3):1-0.
57. Zyberi I. The Impact of Personal Factors on Trust and Image of E-Banking Customers. Research and Innovation. 2021:106-14. https://conferencii.com/arc/2021-03.pdf#page=106
58. Park S, Yoon S. Cross-National Findings of Factors Affecting the Acceptance of AI-Based Sustainable Fintech. Sustainability. 2025 Jan;17(1):49.
59. Gautam DK, Sah GK. Online banking service practices and its impact on e-customer satisfaction and e-customer loyalty in developing country of South Asia-Nepal. Sage Open. 2023 Jul;13(3): 21582440231185580.
60. Angusamy A, Yee CJ, Kuppusamy J. E-banking: An empirical study on customer satisfaction. Journal of System and Management Sciences. 2022;12(4):27-38.
61. Mosa RA. The influence of E-customer relationship management on customer experience in E-banking service. International Journal of Academic Research in Business and Social Sciences. 2022;12(2):193-215.
62. Mamakou XJ, Zaharias P, Milesi M. Measuring customer satisfaction in electronic commerce: the impact of e-service quality and user experience. Int J Qual Reliab Manag. 2023;41(3):915–43.
63. Fondahl G, Espiritu AA, Ivanova A. Russia's arctic regions and policies. InThe Palgrave handbook of Arctic policy and politics. Cham: Springer International Publishing. 2019 Nov 15:195-216. https://doi.org/10.1007/978-3-030-20557-7