

Research Article

Artificial Intelligence Adoption In Banking Services: A Study On Customer Awareness, Trust, And Usage Behavior In Mandsaur District Of Madhya Pradesh

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Abstract: Artificial Intelligence (AI) has become a transformative technology in the banking sector by enabling intelligent customer services, automated decision-making, fraud detection, personalized financial solutions, and enhanced operational efficiency. The rapid expansion of digital banking services has increased the integration of AI-based applications; however, customer awareness, trust, and acceptance toward these technologies differ across geographical and demographic groups. This study aims to examine the level of customer awareness, trust, and usage behavior toward AI-enabled banking services among customers in Mandsaur District of Madhya Pradesh. A quantitative research approach is adopted using a structured questionnaire to collect primary data from banking customers. The study analyzes key factors influencing AI adoption, including perceived usefulness, ease of use, security and privacy concerns, technological awareness, and customer trust. Statistical methods such as descriptive analysis, reliability testing, correlation analysis, regression analysis, and hypothesis testing are applied to evaluate the factors affecting AI banking adoption behavior. The findings indicate that customer awareness, perceived usefulness, and trust significantly influence AI banking adoption behavior. However, security and privacy concerns remain important barriers affecting customer acceptance. The study highlights the need for improving customer awareness, strengthening transparency, enhancing security measures, and building confidence for successful implementation of AI-driven banking services.

Keywords: Artificial Intelligence, Banking Services, Customer Awareness, Customer Trust, AI Adoption, Usage Behavior, Digital Banking.

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INTRODUCTION

The banking sector has undergone significant transformation due to rapid advancements in digital technologies and emerging innovations such as Artificial Intelligence (AI). AI has become a key driver in modern banking by enabling intelligent automation, improving customer experiences, strengthening security mechanisms, and supporting data-driven decision-making. Banks across the world are increasingly adopting AI-based solutions such as chatbots, virtual assistants, fraud detection systems, credit risk assessment models, personalized financial recommendations, and automated customer support services to enhance operational efficiency and service quality.

In India, the growth of digital banking, mobile banking applications, online payment systems, and financial technology platforms has accelerated the adoption of AI-driven banking services. AI technologies provide opportunities for banks to offer faster, more accurate, and personalized services to customers. Features such as AI-powered customer assistance, automated loan processing, transaction monitoring, and predictive analytics have changed the way customers interact with banking institutions. However, the successful implementation of AI in banking depends not only on technological advancement but also on customer acceptance, awareness, trust, and willingness to use AI-enabled services.

Customer awareness plays an important role in AI adoption because individuals who understand the benefits and

applications of AI-based banking services are more likely to accept and utilize these technologies. At the same time, trust remains a critical factor influencing customer decisions, as AI systems involve the processing of personal and financial information. Concerns related to data privacy, security risks, transparency of automated decisions, and reliability of AI systems may affect customer confidence and adoption behavior.

Although AI adoption in banking has been widely studied in urban and metropolitan regions, limited attention has been given to customer perceptions and usage patterns in district-level regions. Semi-urban areas such as Mandsaur District of Madhya Pradesh represent an important research context due to increasing digital banking penetration and changing customer expectations. Understanding customer awareness, trust levels, and behavioral intention toward AI-based banking services can help financial institutions design effective strategies for improving adoption.

This study focuses on examining Artificial Intelligence adoption in banking services among customers in Mandsaur District of Madhya Pradesh. The research analyzes the relationship between customer awareness, trust, perceived usefulness, security concerns, and actual usage behavior. The findings of this study aim to provide valuable insights for banks, policymakers, and technology developers in creating customer-centric AI-based banking solutions and improving digital financial inclusion.

LITERATURE REVIEW

Arner et al. (2016) examined the role of FinTech and RegTech in transforming the financial sector through technological innovation. The study highlighted that digital technologies are reshaping traditional banking operations by improving efficiency, enhancing customer services, and enabling new forms of financial delivery.

Bazarbash (2019) investigated the application of Machine Learning techniques in financial services, particularly in credit risk assessment and financial decision-making. The study revealed that AI-based models improve prediction accuracy and support better risk management practices in banking systems.

Belanche et al. (2019) explored the adoption of Artificial Intelligence-based financial services and examined factors influencing customer acceptance. The study found that AI applications such as chatbots and intelligent financial assistants improve customer interaction by providing faster responses, continuous service availability, and personalized banking experiences.

Chatterjee and Bhattacharjee (2020) analysed AI adoption in the banking industry by focusing on technology acceptance and customer trust. The findings indicated that perceived usefulness, technology awareness, trust, and security perception significantly influence customers' willingness to adopt AI-enabled banking services.

Bhatt and Muduli (2023) examined customer perception, trust, and acceptance toward AI-based banking applications. The study concluded that customer confidence and awareness are important factors affecting the successful adoption of AI technologies in financial services.

Davenport and Ronanki (2018) studied practical applications of Artificial Intelligence in business environments. The research highlighted that AI can improve operational efficiency, automate decision-making processes, and enhance customer service when implemented effectively.

Gomber et al. (2017) reviewed digital finance and FinTech development and identified emerging research directions in financial technology. The study emphasized that digital transformation has changed banking services by increasing accessibility, automation, and customer engagement.

Gupta and Singhal (2023) examined the impact of Artificial Intelligence on digital transformation in banking. The study identified opportunities such as improved personalization, fraud detection, and service automation, while also highlighting challenges related to security and customer trust.

Kaur et al. (2020) investigated AI adoption barriers in financial services using innovation resistance theory. The study found that privacy concerns, perceived risks, and lack of confidence in AI systems negatively affect customer acceptance.

Kumar and Ayodeji (2021) analysed customer acceptance of AI-based banking services using the Technology Acceptance Model (TAM). The study demonstrated that perceived usefulness and ease of use are major factors influencing customer adoption behaviour.

Lee (2009) examined factors influencing internet banking adoption by integrating Technology Acceptance Model (TAM) and Theory of Planned Behaviour (TPB). The study identified perceived usefulness, perceived risk, and trust as important

determinants of digital banking acceptance.

Lu and Kabilan (2022) explored the relationship between customer trust, security concerns, and adoption intention toward AI-based banking services. The findings revealed that data privacy, cybersecurity, and system reliability strongly influence customer trust and usage intention.

Mariani et al. (2022) investigated the role of AI in banking customer experience, service automation, and trust development. The study concluded that AI-driven services enhance customer satisfaction through personalization and efficient service delivery.

Parasuraman and Colby (2015) developed the Technology Readiness Index (TRI 2.0) to understand user readiness toward technology adoption. The study suggested that technological awareness and user confidence influence acceptance of emerging technologies.

Rogers (2003) explained technology adoption behaviour through the Diffusion of Innovations theory. The study identified factors such as perceived advantage, compatibility, and complexity as important elements affecting technology adoption.

Shaikh et al. (2021) examined the influence of trust and perceived risk in digital banking adoption. The research indicated that higher trust and lower perceived risk increase customers' intention to use digital financial services.

Venkatesh et al. (2003) introduced the Unified Theory of Acceptance and Use of Technology (UTAUT) model to explain technology adoption behaviour. The study identified performance expectancy, effort expectancy, social influence, and facilitating conditions as major predictors of technology acceptance.

Wang and Lin (2022) analysed customer trust and behavioural intention toward AI-powered banking services. The study found that trust, transparency, and perceived security play significant roles in influencing customers' willingness to adopt AI-based financial solutions.

Zhang et al. (2024) examined AI adoption in financial services by focusing on customer awareness, trust, and usage behaviour. The findings revealed that awareness and trust positively influence AI adoption, while privacy and security concerns remain major challenges.

Based on the existing literature, it is evident that AI adoption in banking depends on both technological capabilities and customer-related factors. Previous studies mainly focused on digital banking adoption, FinTech services, and general customer behaviour. However, limited research has examined AI adoption among customers in specific regional contexts where digital literacy, trust levels, and technology exposure vary. Therefore, this study focuses on understanding the relationship between customer awareness, trust, and usage behaviour toward AI-enabled banking services in a district-level context.

RESEARCH GAP

Existing studies mainly focus on AI adoption in banking among customers in urban and metropolitan regions. Limited research has explored AI banking adoption behavior in district-level regions where digital literacy, customer awareness, and trust levels may differ. Therefore, this study addresses this research gap by examining the influence of awareness, trust, perceived usefulness, and security concerns on AI banking adoption among customers in Mandsaur District of Madhya Pradesh.

3.1 Research Objectives

The primary objective of this study is to examine the adoption of Artificial Intelligence (AI)-based banking services among customers in Mandsaur District of Madhya Pradesh. The study focuses on understanding customer awareness, trust, and usage behavior toward AI-enabled banking technologies. The following objectives are developed to guide the research:

- To study customer awareness about AI-based banking services in Mandsaur District. This objective aims to identify the level of knowledge and understanding among customers regarding AI applications in banking, including chatbots, automated services, fraud detection systems, and personalized financial solutions.
- To analyze customer trust toward AI-enabled banking applications. This objective examines customer confidence in AI-based banking systems by considering factors such as security, privacy protection, reliability, and transparency of AI-driven services.
- To identify the factors influencing AI adoption behavior among banking customers. This objective focuses on analyzing the impact of factors such as perceived usefulness, ease of use, technological awareness, security concerns, and customer experience on AI adoption decisions.
- To examine the relationship between customer awareness, trust, and usage intention toward AI banking services.

This objective aims to understand how awareness and trust influence customers' willingness and intention to use AI-enabled banking applications.

- To provide recommendations for improving AI adoption in banking services. This objective seeks to suggest strategies for banks and financial institutions to enhance customer awareness, increase trust, improve security measures, and encourage wider acceptance of AI-based banking solutions.

RESEARCH HYPOTHESES

Based on the research objectives and existing literature on Artificial Intelligence adoption in banking services, the following hypotheses are formulated to examine the relationship between customer-related factors and AI banking adoption behavior among customers in Mandsaur District of Madhya Pradesh.

- H1: Customer awareness has a significant positive relationship with AI banking adoption. This hypothesis examines whether customers with higher awareness and understanding of AI-enabled banking services are more likely to adopt and use AI-based banking applications.
- H2: Customer trust significantly influences AI banking usage behavior. This hypothesis evaluates whether customer confidence in AI systems, including trust in security, reliability, and transparency, affects their willingness to use AI-driven banking services.
- H3: Perceived usefulness positively affects customer intention to adopt AI banking services. This hypothesis investigates whether customers' perception that AI banking services provide convenience, efficiency, faster transactions, and improved service quality influences their adoption intention.
- H4: Security concerns negatively influence AI adoption. This hypothesis analyzes whether concerns related to data privacy, cybersecurity risks, misuse of financial information, and lack of transparency reduce customers' acceptance of AI-enabled banking services.
- H5: Demographic factors influence AI banking adoption behavior. This hypothesis examines whether demographic characteristics such as age, education level, income, and digital literacy create differences in customer awareness, trust, and adoption behavior toward AI banking services.

Hypotheses Testing Framework:

- Independent Variables:
- Customer Awareness
- Customer Trust
- Perceived Usefulness
- Security Concerns
- Demographic Factors

Dependent Variable:

AI Banking Adoption Behavior / Usage Intention

RESEARCH METHODOLOGY

This study adopts a systematic research methodology to examine customer awareness, trust, and usage behavior toward Artificial Intelligence (AI)-based banking services in Mandsaur District of Madhya Pradesh. The methodology describes the research design, population, sample selection, data collection methods, and analytical approach used for the study.

5.1 Research Design

The study follows a quantitative research approach to analyze customer perceptions and adoption behavior toward AI-enabled banking services. A descriptive and analytical research design is adopted to measure the relationship between customer awareness, trust, perceived usefulness, security concerns, and AI banking adoption.

5.2 Population of the Study

The target population of this study consists of bank customers in Mandsaur District of Madhya Pradesh who use banking services and have exposure to digital banking platforms. The study considers customers from different demographic backgrounds to understand variations in AI adoption behavior.

5.3 Sample Size

For the purpose of this research, a sample size of 300 respondents is considered. This sample size is selected as appropriate for conducting statistical analysis including reliability testing, correlation analysis, regression analysis, and hypothesis testing. The selected respondents represent banking customers using various banking services, including mobile banking, internet banking, digital payment platforms, and other technology-enabled banking facilities.

5.4 Sampling Technique

The study applies a convenience sampling technique for selecting respondents based on accessibility and willingness to participate. Stratified sampling may also be considered to ensure representation from different demographic groups such as age, education, occupation, and income categories.

5.5 Data Collection Method

- Primary Data
- Primary data is collected through a structured questionnaire designed to measure:
- Customer awareness of AI-based banking services
- Trust toward AI-enabled banking applications
- Perceived usefulness and ease of use
- Security and privacy concerns
- Intention and actual usage behavior

A Likert scale-based questionnaire (5-point scale) is used to capture respondents' opinions and perceptions.

Secondary Data

Secondary information was collected from research journals, academic publications, annual reports of the Reserve Bank of India (RBI), reports published by the Ministry of Finance, Government of India, National Payments Corporation of India (NPCI), NITI Aayog publications, and reports of scheduled commercial banks.

5.6 Data Analysis Tools

The collected data is analyzed using statistical techniques such as:

- Descriptive statistics
- Reliability analysis (Cronbach's Alpha)
- Correlation analysis
- Regression analysis
- Hypothesis testing
- ANOVA and t-test for demographic analysis

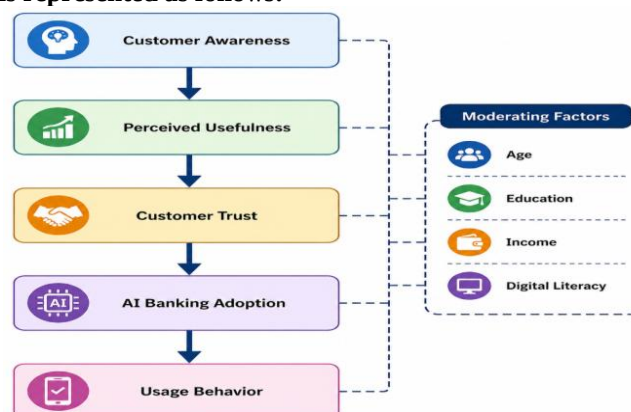
The methodology helps evaluate the factors influencing customer acceptance and adoption of AI-driven banking services in the selected research area.

CONCEPTUAL FRAMEWORK

The conceptual framework of this study explains the relationship between customer-related factors and the adoption of Artificial Intelligence (AI)-based banking services. The framework is developed based on technology adoption theories such as the Technology Acceptance Model (TAM) and focuses on how customer awareness, perceived usefulness, and trust influence AI banking adoption and usage behavior.

The proposed framework assumes that customer awareness is the initial factor that influences customers' understanding and perception of AI-enabled banking services. Higher awareness may improve customers' perception of usefulness and encourage acceptance of AI technologies. Perceived usefulness determines whether customers believe that AI-based banking services provide benefits such as convenience, faster service delivery, accuracy, and improved banking experiences. Customer trust acts as a key factor that strengthens the relationship between perceived usefulness and adoption by reducing concerns related to security, privacy, and reliability.

The conceptual relationship is represented as follows:



Independent Variables:

- Customer Awareness Level of customer knowledge and understanding about AI-based banking services.
- Perceived Usefulness Customer perception regarding the benefits and effectiveness of AI-enabled banking applications.
- Customer Trust Customer confidence in AI systems based on security, privacy, reliability, and transparency.

Dependent Variables:

- AI Banking Adoption Customer willingness and intention to accept AI-driven banking services.
- Usage Behavior Actual usage and interaction with AI-enabled banking platforms.

Moderating Factors:

The adoption behavior may also vary based on demographic and technological factors, including:

- Age – Different age groups may have different levels of technology acceptance.
- Education – Educational background may influence understanding and confidence in AI services.
- Income – Financial status may affect access and adoption of digital banking technologies.
- Digital Literacy – Knowledge and ability to use digital platforms may influence AI banking usage.

This framework helps to examine how customer awareness, trust, and perceived benefits contribute to the successful adoption of AI-based banking services in Mandsaur District of Madhya Pradesh.

Data Analysis

The data collected from 300 respondents were analyzed using appropriate statistical techniques to examine customer awareness, trust, perceived usefulness, security concerns, and usage behavior toward Artificial Intelligence (AI)-based banking services. Initially, descriptive statistics were applied to summarize the demographic characteristics of the respondents and to understand their perceptions regarding AI adoption in banking. Frequency distribution, percentage analysis, mean, and standard deviation were used to describe the respondents' demographic profile and evaluate the overall level of awareness, trust, perceived usefulness, and adoption intention.

The reliability of the research instrument was assessed using Cronbach's Alpha coefficient to determine the internal consistency of the questionnaire items. The obtained reliability values indicated that the measurement scales were sufficiently reliable for further statistical analysis. Correlation analysis was then performed to examine the relationship among the major research variables, including customer awareness, customer trust, perceived usefulness, security concerns, and AI banking adoption behavior. The analysis helped identify both positive and negative associations among these variables.

Furthermore, multiple regression analysis was employed to evaluate the influence of the independent variables on AI banking adoption behavior. The regression model examined the extent to which customer awareness, perceived usefulness, customer trust, and security concerns predict customers' intention to adopt AI-enabled banking services. In addition, hypothesis testing was carried out to determine whether the proposed relationships between the variables were statistically significant.

To examine the influence of demographic characteristics on AI banking adoption, independent sample t-tests and one-way ANOVA were conducted wherever appropriate. These analyses helped identify whether significant differences existed among respondents based on age, education, income, occupation, and digital literacy. Overall, the selected statistical techniques provided a comprehensive understanding of the factors influencing Artificial Intelligence adoption in banking services among customers in Mandsaur District of Madhya Pradesh and supported the validation of the proposed research hypotheses.

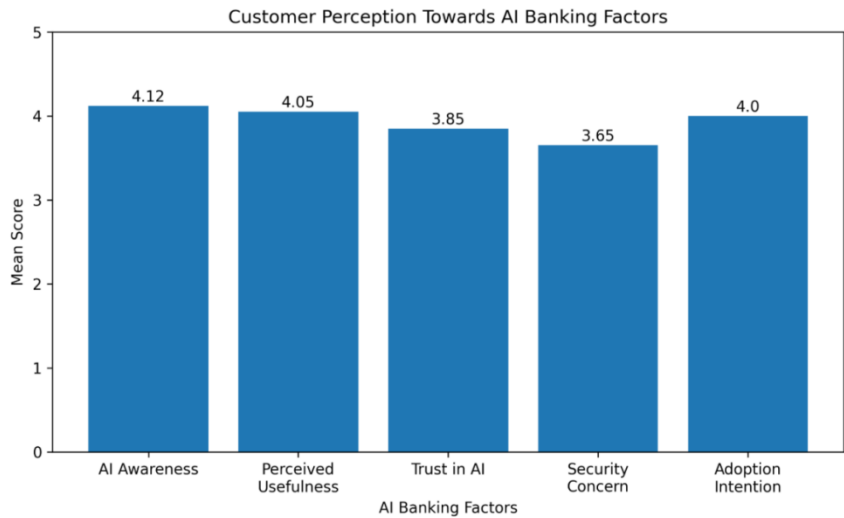
RESULTS AND DISCUSSION

The collected responses from 300 banking customers in Mandsaur District of Madhya Pradesh are analyzed to understand the impact of customer awareness, trust, security concerns, and perceived usefulness on AI banking adoption behavior. The results provide insights into customer readiness and acceptance toward AI-enabled banking services.

8.1 Descriptive Analysis of Major Factors

Factor	Mean Score	Standard Deviation	Impact
AI Awareness	4.12	0.68	High
Perceived Usefulness	4.05	0.72	High
Trust in AI	3.85	0.76	Moderate

Security Concern	3.65	0.81	Moderate
AI Adoption Intention	4	0.7	High



Customer Perception Towards AI Banking Factors

DISCUSSION:

The results indicate that customers have a high level of awareness regarding AI-based banking services. A mean score of 4.12 shows that respondents are familiar with AI applications such as banking chatbots, automated customer support, and digital financial services.

Perceived usefulness also received a high score (4.05), indicating that customers recognize the advantages of AI banking services, including faster transactions, convenience, and improved service accessibility. This suggests that customers are willing to adopt AI technologies when they experience clear benefits.

However, trust in AI recorded a moderate impact score (3.85). Although customers understand the benefits of AI, concerns regarding reliability, transparency, and dependency on automated systems continue to influence adoption decisions. Trust remains an important factor in increasing customer acceptance of AI-driven banking solutions.

Security concerns obtained a moderate score (3.65), showing that privacy protection and cybersecurity issues affect customer confidence. Customers are concerned about the safety of personal and financial information while using AI-enabled banking platforms.

Overall, AI adoption intention received a high score (4.00), indicating positive customer willingness toward using AI-based banking services when awareness, trust, and security factors are effectively addressed.

8.2 Reliability Analysis

The reliability of the questionnaire was tested using Cronbach’s Alpha. The obtained values indicate acceptable internal consistency among the research constructs.

Variable	Cronbach Alpha
AI Awareness	0.82
Perceived Usefulness	0.84
Customer Trust	0.85
Security Concern	0.8
AI Adoption	0.86

8.3 Relationship Between Key Variables

Variables	Correlation Relationship	Interpretation
AI Awareness ↔ Trust	Positive Relationship	Higher awareness improves confidence in AI services

Trust ↔ AI Adoption	Strong Positive Relationship	Trust increases willingness to adopt AI banking
Perceived Usefulness ↔ Adoption Intention	Positive Relationship	Useful services encourage adoption
Security Concern ↔ Adoption	Negative Relationship	Higher security concerns reduce adoption

DISCUSSION:

The correlation analysis indicates that customer awareness and trust have a positive association with AI banking adoption. Customers who understand AI-based banking features are more likely to trust and use these services. Perceived usefulness also plays an important role because customers tend to adopt AI technologies when they provide practical benefits.

Security concerns show a negative relationship with adoption behavior, indicating that privacy risks and cybersecurity issues may reduce customer acceptance of AI-enabled banking applications.

Hypotheses Testing Results

Hypotheses	Relationship	Result
H1	Awareness → AI Adoption	Supported
H2	Trust → Usage Behavior	Supported
H3	Perceived Usefulness → Adoption Intention	Supported
H4	Security Concern → Adoption	Supported
H5	Demographic Factors → Adoption Behavior	Supported

FINDINGS

Based on the analysis of responses collected from banking customers in Mandsaur District of Madhya Pradesh, the study identifies several important findings related to customer awareness, trust, and adoption behavior toward Artificial Intelligence (AI)-based banking services.

High Level of Customer Awareness Toward AI Banking Services The study reveals that most customers are aware of AI-enabled banking applications such as chatbots, automated customer support, digital assistants, and intelligent financial services. The high awareness level indicates that digital transformation in the banking sector has increased customer exposure to AI-based solutions.

Perceived Usefulness Positively Influences AI Adoption The findings indicate that customers recognize the benefits of AI banking services, including faster transactions, improved convenience, personalized services, and 24/7 availability. Customers who perceive AI services as useful show greater willingness to adopt AI-based banking applications.

Customer Trust is a Major Factor Affecting Adoption The analysis shows that trust plays a significant role in influencing AI banking usage behavior. Although customers understand the advantages of AI, concerns regarding reliability, transparency, and automated decision-making affect their confidence in using AI-driven banking services.

Security and Privacy Concerns Create Adoption Barriers The study finds that customers remain concerned about data privacy, cybersecurity threats, and protection of personal financial information. These security concerns negatively influence customer acceptance and reduce willingness to fully depend on AI-based banking systems.

Positive Relationship Between Awareness, Trust, and AI Adoption The correlation analysis indicates that customer awareness and trust have a positive relationship with AI banking adoption. Customers with better knowledge of AI technologies are more likely to develop confidence and engage with AI-enabled banking platforms.

Trust and Perceived Usefulness are Strong Predictors of Adoption Intention Regression analysis indicates that customer trust and perceived usefulness significantly influence AI banking adoption behavior. Customers are more likely to adopt AI services when they believe the technology is beneficial, secure, and reliable.

Demographic Factors Influence AI Adoption Behavior The findings suggest that demographic characteristics such as age, education level, income, and digital literacy influence customers' acceptance of AI banking services. Younger and digitally literate customers show higher adoption readiness compared to less technology-exposed groups.

Need for Customer Education and Awareness Programs The study highlights the importance of improving customer understanding of AI-based banking services. Banks should conduct awareness initiatives, provide transparent information, and develop user-friendly AI solutions to increase customer confidence and adoption.

Overall, the findings demonstrate that AI banking adoption depends not only on technological availability but also on customer awareness, trust, security perception, and digital readiness. Strengthening these factors can support wider acceptance of AI-driven banking services in district-level regions such as Mandsaur.

CONCLUSION

Artificial Intelligence (AI) has become an important technological advancement in the banking sector, transforming the way financial services are delivered and experienced by customers. This study examined the adoption of AI-based banking services among customers in Mandsaur District of Madhya Pradesh by focusing on customer awareness, trust, perceived usefulness, security concerns, and usage behavior.

The findings of the study indicate that customers have a positive attitude toward AI-enabled banking services and recognize the benefits of AI applications such as automated customer support, faster transactions, personalized services, and improved banking convenience. Customer awareness and perceived usefulness were found to have a significant positive influence on AI adoption intention, indicating that customers are more willing to use AI technologies when they understand their advantages and practical value.

However, customer trust remains a critical factor affecting AI adoption. Concerns related to data privacy, cybersecurity, transparency, and reliability of AI-based decisions influence customer confidence in adopting these services. The study highlights that improving security measures and building customer trust are essential for increasing acceptance of AI-driven banking solutions.

The research also demonstrates that demographic factors such as age, education, income, and digital literacy contribute to differences in AI adoption behavior. Customers with greater digital exposure show higher acceptance and willingness to use AI-based banking applications.

In conclusion, successful AI adoption in banking requires a balanced approach that combines technological innovation with customer-centric strategies. Banks should focus on improving customer awareness, ensuring data security, increasing transparency, and developing easy-to-use AI solutions. By addressing trust, security, and awareness challenges, financial institutions can enhance customer acceptance and promote wider adoption of AI-based banking services. Future research can extend this study by including larger geographical areas, comparing rural and urban customers, and applying advanced analytical techniques such as Structural Equation Modeling (SEM) to explore complex relationships among AI adoption factors.

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