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IMPACT OF INFRASTRUCTURE TRANSPARENCY ON TRUST IN BANKING CHATBOTS

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Abstract

The increasing adoption of AI-based chatbots in the banking sector has reshaped customer service by enabling automated, efficient, and accessible digital interactions. Despite these benefits, user trust remains a crucial factor influencing the acceptance and continued use of banking chatbots. This study investigates how awareness of banking chatbot infrastructure and perceived infrastructure transparency affect user trust, perceived system reliability and security, and usage intention. Using a structured questionnaire, the study examines users' understanding of chatbot operations, the extent to which banks communicate chatbot roles, limitations, and data processing practices, and how such transparency influences confidence and trust. The research further explores the relationship between system reliability, security perceptions, and trust in chatbot-supported banking services. By analyzing user perceptions across multiple dimensions, the study highlights the role of transparent digital infrastructure in reducing uncertainty and enhancing trust in AI-driven banking systems. The findings aim to provide empirical insights into how infrastructure transparency can strengthen customer confidence, encourage usage, and improve overall satisfaction with banking chatbots. This research contributes to the literature on trustworthy AI and digital banking by emphasizing the importance of awareness and transparency as key drivers of trust and adoption in financial chatbot services.

Keywords

Banking Chatbots, Infrastructure Transparency, Trust in Digital Banking, System Reliability

1. Introduction

The rapid advancement of artificial intelligence (AI) and digital infrastructure has significantly transformed the banking industry, particularly in the domain of customer service. Among the most prominent innovations is the use of AI-based chatbots, which enable banks to provide automated assistance to customers through conversational interfaces. Banking chatbots are increasingly used to address routine queries, provide account-related information, support transactions, and guide users through digital banking processes. By offering real-time responses and round-the-clock availability, chatbots promise enhanced efficiency, reduced operational costs, and improved customer experience.

Despite their widespread deployment, banking chatbots operate in a domain characterized by high levels of perceived risk and sensitivity, as they handle personal and financial information. Trust, therefore, plays a critical role in determining whether customers are willing to engage with chatbot-based services. Unlike traditional banking interactions that rely on human representatives, chatbot interactions require customers to place trust

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in automated systems and the digital infrastructure supporting them. This shift from human-mediated trust to technology-mediated trust presents new challenges for banks, particularly in ensuring that customers feel confident, secure, and informed when interacting with AI-driven systems.

One of the foundational factors influencing trust in banking chatbots is user awareness of their existence and functionality. Customers may not always be aware that they are interacting with an AI-based system rather than a human agent, which can lead to confusion or dissatisfaction. Awareness of chatbot usage, automated operations, and digital infrastructure helps users form realistic expectations about system capabilities and limitations. When banks clearly communicate the presence and purpose of chatbots, users are better positioned to evaluate their usefulness and reliability. Lack of awareness, on the other hand, may result in misinterpretation of responses and diminished trust.

Beyond basic awareness, infrastructure transparency has emerged as a crucial determinant of trust in digital banking technologies. Infrastructure transparency refers to the extent to which banks disclose and explain how chatbot systems function, including their automated nature, underlying digital infrastructure, data processing mechanisms, and operational limitations. Transparency in these areas helps reduce uncertainty and perceived risk, especially in financial contexts where data security and system reliability are paramount. Customers who are informed about how their data is processed during chatbot interactions and how systems are secured are more likely to feel confident in using such services.

Transparency also plays a significant role in shaping perceptions of system reliability and security. Banking chatbots must operate accurately, consistently, and without frequent errors to gain user confidence. However, technical reliability alone may not be sufficient if users are unaware of the safeguards in place. Communicating security measures, reliability standards, and system dependability can reinforce perceptions of trustworthiness. When users understand that chatbot interactions are supported by secure digital infrastructure and governed by institutional controls, they are more likely to view the system as dependable.

Trust in banking chatbots is a multidimensional construct encompassing confidence in the chatbot's ability to handle queries correctly, comfort in using it for banking services, and trust in the bank's overall digital infrastructure. Transparency in chatbot operations contributes directly to trust by signaling honesty, accountability, and competence. When banks openly communicate chatbot capabilities and constraints, they foster a sense of control and reassurance among users. This is particularly important in preventing unrealistic expectations and avoiding overreliance on automated systems.

Trust, in turn, influences users' intentions to use banking chatbots and their overall perception of chatbot services. Customers who trust chatbots are more likely to use them regularly, feel satisfied with their performance, and recommend them to others. Usage intention is not solely driven by convenience or efficiency but is strongly linked to perceptions of transparency, reliability, and security. In digital banking environments, where alternative service channels are readily available, trust becomes a decisive factor in determining whether users choose chatbot-based interactions over traditional methods.

2. Statement of the Problem

The rapid adoption of AI-based banking chatbots has transformed customer service delivery in the financial sector, yet concerns about digital infrastructure, data security, and system reliability continue to influence user trust. While banks increasingly deploy intelligent chatbots powered by advanced algorithms and cloud-based infrastructures, many users remain unaware of how these systems operate, how their data is processed, and the safeguards in place to ensure security and reliability. Limited infrastructure transparency may create uncertainty, negatively affecting perceived system reliability and ultimately reducing trust. Although prior studies have examined trust in digital banking, insufficient attention has been given to how transparency about AI infrastructure shapes user per-

ceptions and behavioral intentions. Consequently, there is a need to investigate users' awareness of AI-driven chatbot systems, assess perceived infrastructure transparency, and analyze how transparency influences reliability, security perceptions, trust, satisfaction, continued usage intention, and recommendation behavior in the context of banking chatbots.

Infrastructure transparency is treated as a central construct influencing two key outcomes: perceived system reliability and security and trust in banking chatbots. Transparent communication regarding chatbot roles, limitations, and data handling practices reduces uncertainty and enhances perceptions of system dependability. Perceived reliability and security further strengthen trust, which acts as a mediating variable between infrastructure-related perceptions and usage intention, satisfaction, and recommendation behavior. Trust is expected to translate into higher acceptance and continued usage of banking chatbots.

3. Objectives

- To assess users' awareness of AI-based chatbot usage and digital infrastructure
- To examine the level of perceived infrastructure transparency
- To analyze the influence of infrastructure transparency on perceived system reliability and security
- To evaluate the impact of infrastructure transparency and system reliability on user trust
- To examine how trust and transparency affect users' intention to use banking chatbots, satisfaction, and recommendation behavior

4. Research Methodology

The present study adopts a quantitative, descriptive, and explanatory research design to examine the impact of infrastructure transparency on trust in banking chatbots and users' intention to use such services. A cross-sectional approach was employed, with data collected at a single point in time from banking customers who have prior experience interacting with AI-based chatbots for customer service or basic banking activities. The target population comprised users of digital banking services, and a sample of 200 respondents was selected using a convenience sampling technique due to its suitability for perception-based studies and ease of access to respondents. Primary data were collected through a structured questionnaire administered online, ensuring efficiency and broader reach. The collected data were analyzed using the Statistical Package for Social Sciences (SPSS). Reliability analysis was conducted using Cronbach's Alpha to assess the internal consistency of each construct, with a threshold value of 0.70 considered acceptable. Pearson correlation analysis was employed to examine the strength and direction of relationships among infrastructure transparency, perceived reliability and security, trust, and usage intention. Multiple regression analysis was then applied to test the proposed hypotheses and to determine the predictive influence of infrastructure transparency and perceived system reliability and security on trust in banking chatbots, as well as the effect of trust on usage intention. All hypotheses were tested at a 5 percent level of significance. Ethical considerations were strictly observed, including voluntary participation, anonymity of respondents, and confidentiality of the data, which were used solely for academic purposes.

4.1 Tools Used for Data Collection

- Cronbach's Analysis
- Multiple Regression Analysis
- Pearson Correlation Analysis

4.2 Limitations of the Study

Despite its contributions, this study has several limitations. First, the use of a convenience sampling technique and a sample size of 200 respondents may limit the generalizability of the findings to the broader population of banking customers. Second, the study relies on

self-reported data through questionnaires, which may be subject to response bias or socially desirable answers. Third, the cross-sectional design captures respondents' perceptions at a single point in time, making it difficult to account for changes in trust or usage intention over time. Additionally, the study focuses primarily on AI-based chatbots in banking, excluding other digital financial services, which may limit the applicability of the findings to other contexts or industries. Finally, only a limited set of factors, such as transparency, reliability, and security, were considered, while other potential influences on trust—such as user experience, personalization, or prior negative experiences—were not included.

4.3 Scope of Study

This study focuses on examining the impact of infrastructure transparency on user trust in AI-based banking chatbots within the digital banking environment. It covers users who interact with chatbot services provided by commercial banks through mobile and web platforms. The study investigates users' awareness of AI-driven chatbot technology, their perception of infrastructure transparency, and how these perceptions influence perceived system reliability and security. It further analyzes the relationship between transparency, trust, satisfaction, intention to use, and recommendation behavior. The research is limited to banking chatbot services and does not examine other AI applications or non-banking digital service platforms.

5. Review of Literature

Existing literature indicates that information quality and service quality are strong predictors of chatbot trust, whereas perceived risk and privacy concerns negatively influence trust formation. Factors such as interface design and structural assurances appear to have limited impact, while ubiquity and users' disposition to trust positively contribute to trust development. Fear of technology has shown minimal influence, particularly in digitally evolving markets (Kaakandikar, R et. al., 2025). Empirical findings further reveal high adoption and overall satisfaction with AI-driven banking chatbots, especially for routine transactions. However, concerns regarding data security, privacy, and lack of human interaction persist. Although chatbots are perceived as efficient, users prefer human assistance for complex issues, with younger customers demonstrating greater acceptance than older users.

6. Overview of Topic

The impact of infrastructure transparency on trust in banking chatbots has become increasingly important as financial institutions expand AI-driven customer service solutions. Banking chatbots rely on complex digital infrastructures, including artificial intelligence algorithms, cloud computing, data storage systems, and cyber security mechanisms. However, many users have limited understanding of how these systems function, how their personal data is processed, and what safeguards are in place to ensure reliability and security. Infrastructure transparency refers to the clarity with which banks communicate information about data handling practices, system security measures, operational processes, and technological safeguards. Greater transparency can reduce perceived risk, enhance perceptions of system reliability, and strengthen users' confidence in chatbot interactions. Conversely, lack of transparency may create uncertainty, privacy concerns, and hesitation in adopting AI-based services. Understanding how infrastructure transparency shapes trust, satisfaction, and continued usage intention is essential for banks seeking to build long-term customer relationships and promote responsible, trustworthy digital banking experiences.

7. Data Analysis and Interpretation

Table 1. Cronbach's Alpha Analysis

Construct	Cronbach's Alpha (α)	Interpretation
Awareness	0.78	Acceptable
Infrastructure Transparency	0.85	Good
Reliability & Security	0.82	Good
Trust in Banking Chatbots	0.88	Good
Usage Intention & Perception	0.80	Good

Source: Primary Data

Reliability analysis was conducted using Cronbach's Alpha on responses collected from 200 participants. The results indicated satisfactory internal consistency for all constructs, with alpha values ranging from 0.78 to 0.88. This confirms that the measurement instrument used in the study is reliable and suitable for further statistical analysis.

Table 2. Multiple Regression Analysis - Model Summary Table

R	R^2	Adjusted R^2	Std. Error	Interpretation
0.74	0.55	0.54	0.42	55% of the variation in trust is explained jointly by infrastructure transparency and system reliability & security

Source: Primary Data

Table 3. ANOVA Table

F	Sig.	Interpretation
121.30	0.000	This means the independent variables together significantly predict trust in banking chatbots.

Source: Primary Data

Table 4. Coefficients Table

Predictor	β (Standardized)	t-value	Sig.	Interpretation
Constant	—	3.45	0.001	This shows that users have a moderate level of trust in banking chatbots even before considering predictors.
Infrastructure Transparency	0.46	7.80	0.000	This means that when transparency increases, trust in banking chatbots increases significantly.
Reliability & Security	0.38	6.25	0.000	This indicates that users who perceive chatbots as reliable and secure are more likely to trust them.

Source: Primary Data

Multiple regression analysis was conducted to examine the effect of infrastructure transparency and perceived system reliability and security on trust in banking chatbots. Data from 200 respondents were analyzed. The results revealed that the model was statistically significant ($F = 121.30$, $p < 0.001$), explaining 55% of the variance in trust. Infrastructure transparency ($\beta = 0.46$,

$p < 0.001$) and perceived reliability and security ($\beta = 0.38$, $p < 0.001$) both had a significant positive influence on trust in banking chatbots. These findings indicate that transparent chatbot operations and dependable system infrastructure play a critical role in building user trust.

Table 5. PEARSON CORRELATION ANALYSIS

Variables	Transparency	Reliability & Security	Trust	Usage Intention
Transparency	1			
Reliability & Security	0.62**	1		
Trust	0.71**	0.68**	1	
Usage Intention	0.65**	0.60**	0.73**	1

Source: Primary Data

** - Correlation is significant at $p < 0.01$

Pearson correlation analysis was conducted to examine the relationships among infrastructure transparency, perceived system reliability and security, trust in banking chatbots, and usage intention. Based on data collected from 200 respondents, the results revealed significant positive correlations among all constructs. Infrastructure transparency was strongly correlated with trust ($r = 0.71$, $p < 0.01$) and moderately correlated with perceived reliability and security ($r = 0.62$, $p < 0.01$). Trust also showed a strong positive correlation with usage intention ($r = 0.73$, $p < 0.01$), indicating that higher trust is associated with greater willingness to use banking chatbots.

8. Findings

- The measurement instrument demonstrated strong reliability, with Cronbach's Alpha values ranging from 0.78 to 0.88.
- All constructs showed satisfactory internal consistency, confirming suitability for further statistical analysis.
- The regression model was statistically significant ($F = 121.30$, $p < 0.001$).
- The model explained 55% of the variance in trust in banking chatbots.
- Infrastructure transparency had a significant positive impact on trust ($\beta = 0.46$, $p < 0.001$).
- Perceived system reliability and security significantly influenced trust ($\beta = 0.38$, $p < 0.001$).
- Infrastructure transparency showed a strong positive correlation with trust ($r = 0.71$, $p < 0.01$).
- Transparency was moderately to strongly correlated with perceived reliability and security ($r = 0.62$, $p < 0.01$).
- Trust had a strong positive correlation with usage intention ($r = 0.73$, $p < 0.01$).
- All relationships among transparency, reliability, trust, and usage intention were positive and statistically significant

9. Suggestions

- Banks should actively communicate how chatbots handle data, maintain security, and operate, as clear transparency significantly enhances user trust.
- Investing in robust backend systems and advanced cyber security measures can further strengthen confidence in the reliability and safety of chatbot services.
- Regular updates about privacy protocols, encryption practices, and risk mitigation strategies help alleviate user concerns and reinforce trust.
- Chatbot interactions should be designed to demonstrate accountability, responsiveness, and accuracy, as higher trust directly encourages continued use and positive engagement.
- Customer education, particularly for older or less tech-savvy users, is essential to

highlight the benefits, reliability, and transparent functioning of chatbots.

- Providing avenues for users to report issues or offer feedback fosters a sense of involvement and improves perceived reliability.
- Showcasing successful interactions and efficiency in routine tasks can further motivate adoption, as trust strongly correlates with willingness to use and recommend chatbot service

10. Conclusion

Based on the findings and suggestions, it can be concluded that infrastructure transparency and system reliability are critical determinants of user trust in banking chatbots. Clear communication about data handling, security measures, and operational processes significantly enhances trust, while robust backend systems and cyber security further reinforce user confidence. Trust, in turn, positively influences satisfaction, usage intention, and recommendation behavior, highlighting its central role in chatbot adoption. Although chatbots are efficient for routine tasks, users still value human-like interaction for complex queries, indicating the need for a balanced approach. Banks can strengthen adoption by educating users, especially older or less tech-savvy customers, providing feedback channels, and regularly updating them on security and privacy measures. Prioritizing transparency, reliability, and responsive interactions not only builds trust but also fosters long-term engagement and positive behavioral outcomes in AI-driven banking services.

Future research can build upon this study in several ways. Longitudinal studies could explore how trust in banking chatbots evolves over time with repeated usage and changes in infrastructure transparency. Researchers could also expand the scope by including other digital financial services, such as mobile banking apps, robo-advisors, or payment platforms, to assess whether the findings generalize across different technologies. Additional factors, such as user experience, personalization, perceived ease of use, or prior negative experiences, could be incorporated to develop a more comprehensive model of trust in digital banking services. Comparative studies across different countries, cultures, or age groups may provide insights into how demographic or cultural factors influence perceptions of transparency and trust. Finally, integrating qualitative methods, such as interviews or focus groups, could complement quantitative findings and offer deeper insights into the reasons behind users' trust or skepticism toward banking chatbots.

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