

Understanding Customer Acceptance of AI Chatbots Using the Technology Acceptance Model (TAM)

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Abstract

Artificial Intelligence (AI) chatbots are increasingly used by organizations to enhance customer service, automate interactions, and improve operational efficiency. However, the successful implementation of chatbot technology largely depends on customer acceptance and willingness to use these systems. This study aims to examine the factors influencing customer acceptance of AI chatbots using the Technology Acceptance Model (TAM). The research extends the traditional TAM framework by incorporating additional constructs such as trust, artificial intelligence capability, perceived security and privacy, attitude, and digital literacy. A quantitative research design was adopted, and primary data were collected through a structured questionnaire from users who have prior experience with AI chatbot services. The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings indicate that perceived ease of use significantly influences perceived usefulness, which in turn affects users' attitudes toward AI chatbot adoption. Perceived security and privacy were found to be strong predictors of trust, highlighting the importance of secure interactions in AI-enabled systems. Furthermore, behavioral intention significantly influences both user attitude and digital literacy related to chatbot usage. The study concludes that usability, perceived usefulness, and security considerations play crucial roles in determining customer acceptance of AI chatbot technologies. These findings provide important insights for organizations seeking to design more user-friendly and secure chatbot systems to enhance customer engagement and technology adoption.

Keywords: Artificial Intelligence, Chatbots, Technology Acceptance Model, Perceived Usefulness, Perceived Ease of Use, Trust, Customer Acceptance.

INTRODUCTION

Artificial Intelligence (AI)-powered chatbots have rapidly transformed the way organizations interact with customers. From handling basic queries to providing personalized recommendations and 24/7 support, AI chatbots are increasingly being adopted across industries such as banking, healthcare, retail, and e-commerce (Dwivedi et al., 2021; Huang & Rust, 2021). Companies like Amazon, HDFC Bank, and Flipkart have integrated AI-driven virtual assistants to enhance customer engagement and operational efficiency. Despite their growing presence, the success of AI chatbots largely depends on customer acceptance and willingness to use them (Luo et al., 2019; Adam et al., 2021). Understanding the factors that influence customer acceptance of AI chatbots is therefore critical for businesses seeking to maximize return on technological investments (Gnewuch et al., 2017).

One of the most widely used theoretical frameworks for studying technology adoption is the Technology Acceptance Model (TAM), proposed by Davis (1989). TAM suggests that two primary factors Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)—determine an individual's intention to use a technology, which in turn influences actual usage behavior (Davis, 1989; Venkatesh & Davis, 2000; Venkatesh et al., 2003). In the context of AI chatbots, Perceived Usefulness refers to the degree to which customers believe that interacting with a chatbot enhances their service experience, saves time, or improves problem resolution (Gefen et al., 2003). Perceived Ease of Use relates to how effortless and user-friendly

customers perceive the chatbot interaction to be. If customers find the chatbot helpful, easy to navigate, responsive, and accurate, they are more likely to develop a positive attitude toward its use (Davis, 1989; Venkatesh et al., 2003).

However, AI chatbots present unique characteristics compared to traditional information systems. Factors such as trust, perceived intelligence, personalization, privacy concerns, and anthropomorphism may also play a significant role in shaping user acceptance (Gnewuch et al., 2017; Adam et al., 2021; McLean & Osei-Frimpong, 2019). Trust is particularly important in AI-enabled services because users must rely on automated systems to handle information and provide accurate responses (Gefen et al., 2003). Similarly, concerns related to privacy and perceived risk may discourage customers from interacting with chatbot systems (Featherman & Pavlou, 2003).

Therefore, extending TAM to include additional constructs can provide a deeper understanding of behavioral intention toward AI chatbot usage. This project aims to examine the determinants of customer acceptance of AI chatbots using the Technology Acceptance Model as the foundational framework. The study will analyze how perceived usefulness and perceived ease of use influence customers' attitudes and behavioral intentions, and whether additional variables such as trust and perceived risk moderate this relationship.

By identifying key acceptance drivers, this research will provide valuable insights for organizations to design more user-centric AI chatbot systems. The findings of this study are expected to contribute to both academic literature and managerial practice. Academically, it will expand the application of TAM in the context of AI-enabled conversational systems (Dwivedi et al., 2021). Practically, it will help organizations enhance chatbot design, improve customer experience, and increase adoption rates in a competitive digital environment (Huang & Rust, 2021).

STATEMENT OF PROBLEM

Artificial Intelligence (AI) chatbots are increasingly being deployed by organizations to enhance customer service, reduce operational costs, and provide 24/7 assistance (Huang & Rust, 2021; Dwivedi et al., 2021). Companies such as Amazon, HDFC Bank, and Flipkart are actively integrating AI-based conversational agents into their digital platforms. However, despite technological advancement and investment, many customers hesitate to use chatbots due to concerns about trust, privacy, accuracy, and lack of human touch (Luo et al., 2019; McLean & Osei-Frimpong, 2019). The effectiveness of AI chatbots therefore depends not only on technological capability but also on user acceptance and behavioral intention (Adam et al., 2021). The Technology Acceptance Model (TAM), developed by Davis (1989), provides a theoretical foundation to examine user acceptance through constructs such as Perceived Usefulness and Perceived Ease of Use. TAM has been widely applied to study the adoption of various digital technologies, including mobile banking, e-commerce systems, and online services (Venkatesh & Davis, 2000; Venkatesh et al., 2003; Gefen et al., 2003). However, AI chatbots possess unique characteristics that may require extending TAM with additional variables like trust and perceived risk to better explain user behavior in AI-mediated interactions (Gnewuch et al., 2017; McLean & Osei-Frimpong, 2019). Thus, this study seeks to investigate the factors influencing customer acceptance of AI chatbots using TAM as the core framework.

OBJECTIVES

- To examine the impact of Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) on customers' behavioral intention to use AI chatbots.
- To evaluate the role of trust and perceived risk in influencing customer acceptance of AI chatbots.
- To develop and test an extended Technology Acceptance Model (TAM) for explaining customer adoption of AI chatbots.

RESEARCH QUESTIONS

- Does perceived usefulness significantly influence customers' behavioral intention to use AI chatbots?
- Does perceived ease of use positively influence customers' behavioral intention to use AI chatbots?
- How does trust influence customer acceptance of AI chatbots?
- Does perceived risk negatively influence customers' behavioral intention to use AI chatbots?

RESEARCH METHODOLOGY

This study adopts a quantitative research design to examine the factors influencing customer acceptance of AI chatbots using the Technology Acceptance Model (TAM). The research aims to analyze the relationships between perceived usefulness, perceived ease of use, trust, perceived risk, and behavioral intention toward AI chatbot usage. A quantitative approach is considered appropriate because it allows the researcher to measure user perceptions and statistically test the relationships between these variables.

Primary data for the study will be collected through a structured questionnaire administered to customers who have prior experience using AI chatbots on digital platforms, such as banking services, e-commerce websites, or online customer support systems. The questionnaire will consist of multiple statements related to the study variables, enabling respondents to express their perceptions regarding chatbot usage.

The study will employ a convenience sampling technique to gather responses from individuals who are familiar with AI chatbot services. This sampling approach is suitable for exploratory studies where respondents with relevant experience are required. The target sample size for the study will be approximately 150 respondents, which is considered adequate for conducting statistical analysis and ensuring reliable results.

All variables in the study will be measured using a five-point Likert scale, where responses range from 1 (Strongly Disagree) to 5 (Strongly Agree). This scale helps capture respondents' attitudes and perceptions toward AI chatbot usage in a consistent and measurable manner.

The collected data will be analyzed using various statistical techniques. Descriptive statistics will be used to summarize the demographic characteristics of respondents and provide an overview of the data. Reliability analysis, particularly Cronbach's Alpha, will be conducted to test the internal consistency of the measurement items. Correlation analysis will be used to examine the relationships between the study variables. Furthermore, regression analysis or Structural Equation Modeling (SEM) may be employed to test the proposed relationships within the extended Technology Acceptance Model.

In this study, perceived usefulness, perceived ease of use, trust, and perceived risk are considered the independent variables, while behavioral intention to use AI chatbots is treated as the dependent variable. The conceptual model of the research examines how these factors influence customers' willingness to adopt AI chatbot technology.

Results and Discussion

Structural Model Results

The structural model was analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the relationships among perceived ease of use (PEOU), perceived usefulness (PU), artificial intelligence capability (AIC), perceived security and privacy (PSP), trust (TRU), attitude (ATT), behavioral intention (BI), and digital literacy/usage (DL). The results indicate that the model explains a substantial proportion of variance in the endogenous constructs. The coefficient of determination (R^2) for Trust (TRU) is 0.788, which indicates that 78.8 percent of the variance in trust is

explained by artificial intelligence capability and perceived security and privacy. Similarly, Attitude (ATT) has an R^2 value of 0.924, meaning that 92.4 percent of the variation in user attitude toward AI chatbot usage is explained by perceived usefulness, perceived ease of use, trust, and behavioral intention. Furthermore, the R^2 value for Digital Literacy (DL) is 0.635, suggesting that 63.5 percent of the variance in digital literacy is explained by behavioral intention. These findings demonstrate that the structural model has strong explanatory power, as R^2 values above 0.50 are generally considered substantial in behavioral and technology adoption research.

Direct Effects

The path coefficients reveal several significant relationships among the constructs in the structural model. Perceived ease of use (PEOU) has a strong positive effect on perceived usefulness (PU) with a path coefficient of $\beta = 0.843$, indicating that when users perceive AI chatbots as easy to operate, they are more likely to consider them useful. This finding is consistent with the Technology Acceptance Model (TAM), which suggests that systems that are easy to use tend to enhance users' perceptions of usefulness. Furthermore, perceived usefulness has a positive influence on attitude toward AI chatbot usage ($\beta = 0.391$), suggesting that users who believe chatbots are helpful for performing tasks and obtaining information tend to develop a favorable attitude toward using them. In contrast, the direct effect of perceived ease of use on attitude is relatively weak ($\beta = 0.038$), implying that ease of use alone may not significantly influence users' attitudes unless it contributes to increasing perceived usefulness.

Artificial intelligence capability (AIC) shows a positive but weak influence on trust ($\beta = 0.067$), indicating that although advanced AI features may contribute to users' confidence in chatbot systems, they are not the primary factor driving trust. On the other hand, perceived security and privacy (PSP) demonstrate a strong positive impact on trust ($\beta = 0.835$), highlighting that users' trust in AI chatbots largely depends on their perception of system security and data privacy protection. Interestingly, trust shows a negative relationship with attitude ($\beta = -0.247$) in this model. This unexpected result may suggest that users place greater emphasis on the functional usefulness and performance of chatbots rather than relying solely on trust when forming attitudes toward their usage.

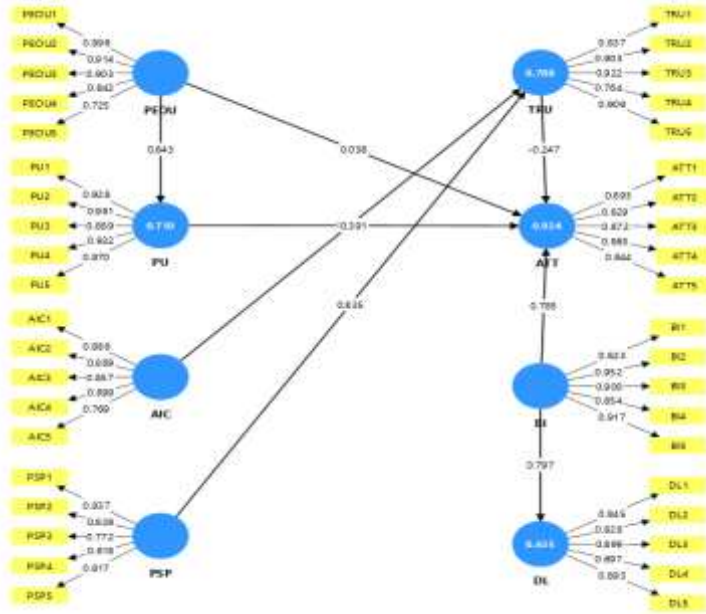
Additionally, behavioral intention (BI) strongly influences attitude ($\beta = 0.785$), indicating that individuals who have a stronger intention to use AI chatbots are more likely to develop a positive attitude toward them. Behavioral intention also has a strong positive effect on digital literacy (DL) with a coefficient of $\beta = 0.797$, suggesting that individuals who are more willing to adopt AI chatbot technologies are also more likely to enhance their digital engagement and technological usage skills. Overall, these results highlight the significant role of perceived usefulness, perceived security, and behavioral intention in shaping users' attitudes and digital literacy in the context of AI chatbot adoption.

Indirect Effects

The structural model also reveals important mediation relationships among the constructs. Perceived ease of use (PEOU) indirectly influences attitude (ATT) through perceived usefulness (PU), with an indirect effect of $\beta = 0.330$. This indicates that when users perceive AI chatbots as easy to use, it enhances their perception of usefulness, which in turn positively shapes their attitude toward using the technology. This result further supports the Technology Acceptance Model, where perceived usefulness acts as a key mediating factor between ease of use and user attitude. In addition, perceived security and privacy (PSP) show a negative indirect effect on attitude through trust (TRU), with an indirect coefficient of $\beta = -0.206$. This negative effect occurs because trust demonstrates a negative relationship with attitude in the structural model. Similarly, artificial intelligence capability (AIC) shows a very small negative indirect effect on attitude through trust ($\beta = -0.017$), indicating that the influence of AI capability on users' attitudes operates weakly through the trust construct.

The measurement model assessment indicates that the reliability and validity of the indicators are generally satisfactory. The outer loadings of most indicators exceed the recommended threshold value of 0.70, confirming good indicator

reliability and strong measurement consistency. For instance, the loadings for perceived usefulness (PU) indicators range from 0.870 to 0.961, attitude (ATT) indicators range from 0.829 to 0.944, behavioral intention (BI) indicators range from 0.823 to 0.952, and trust (TRU) indicators range from 0.764 to 0.922. These high loading values demonstrate that the indicators effectively represent their respective latent constructs. A few indicators show slightly lower loading values, such as PSP4 (0.618) and DL4 (0.697). However, since these values are close to the recommended threshold of 0.70 and the overall construct reliability remains acceptable, these indicators can still be retained in the measurement model without significantly affecting the overall validity and reliability of the study.



Hypothesis Testing

Based on the Technology Acceptance Model (TAM) and the proposed conceptual framework, several hypotheses were formulated to examine the relationships between the study variables. The structural model results obtained through PLS-SEM were used to test these hypotheses. The results indicate that Perceived Ease of Use significantly influences Perceived Usefulness ($\beta = 0.843$), supporting the hypothesis that ease of use enhances users' perception of usefulness in AI chatbot systems. This finding is consistent with the TAM framework, which emphasizes the importance of system usability in shaping perceived utility.

Similarly, Perceived Usefulness positively influences Attitude toward AI chatbot usage ($\beta = 0.391$), suggesting that customers who perceive chatbots as helpful and efficient are more likely to develop a favorable attitude toward using them. However, the direct relationship between Perceived Ease of Use and Attitude ($\beta = 0.038$) appears relatively weak, indicating that ease of use influences attitude mainly through perceived usefulness rather than directly. The results also show that Perceived Security and Privacy strongly influence Trust ($\beta = 0.835$), confirming that security and data protection play a critical role in shaping users' trust in AI chatbot systems. In contrast, Artificial Intelligence Capability shows only a weak positive influence on Trust ($\beta = 0.067$), suggesting that technical sophistication alone may not be sufficient to build strong user trust.

Interestingly, Trust has a negative influence on Attitude ($\beta = -0.247$) in this study. This unexpected result may indicate that users focus more on functional benefits such as usefulness and efficiency rather than trust when forming attitudes toward AI chatbots. Furthermore, Behavioral Intention significantly influences Attitude ($\beta = 0.785$) and also shows a strong positive impact on Digital Literacy ($\beta = 0.797$). This suggests that individuals who intend to use AI chatbots are more likely to

develop positive attitudes and improve their digital engagement skills. Overall, the hypothesis testing results provide empirical support for the extended TAM framework in explaining customer acceptance of AI chatbot technology.

Findings of the Study

The analysis of the structural model reveals several important findings regarding customer acceptance of AI chatbots. First, perceived ease of use significantly enhances perceived usefulness, confirming that systems that are easy to operate are more likely to be perceived as beneficial by users. This result supports the core assumption of the Technology Acceptance Model, which states that ease of use improves the perceived effectiveness of a technological system. Second, perceived usefulness plays a critical role in shaping user attitudes toward AI chatbots. Customers who perceive chatbots as efficient tools for obtaining information, solving problems, and saving time tend to develop more positive attitudes toward their use. Third, perceived security and privacy emerge as the strongest predictors of trust, highlighting the importance of protecting customer data and ensuring secure interactions in AI-enabled systems. When users believe that their personal information is safe, they are more likely to trust chatbot services. Fourth, behavioral intention strongly influences both attitude and digital literacy, indicating that individuals who intend to use AI chatbots are more likely to develop positive attitudes and improve their digital engagement and technological skills. Finally, the results indicate that artificial intelligence capability alone has a limited impact on trust, suggesting that advanced technological features must be supported by transparency, reliability, and strong security measures in order to gain user confidence and encourage wider adoption of AI chatbot systems.

Managerial Implications

The findings of this study provide several practical implications for organizations implementing AI chatbot technologies. Organizations should focus on improving the usability and functionality of chatbot systems, as perceived ease of use and perceived usefulness significantly influence customer acceptance. Designing intuitive interfaces, providing quick and accurate responses, and ensuring efficient problem-solving capabilities can enhance user satisfaction and encourage continued interaction with chatbot services. In addition, companies must prioritize data security and privacy protection because perceived security strongly influences user trust in AI-based systems. Establishing transparent privacy policies and implementing secure data management practices can help strengthen customer confidence in chatbot technologies. Furthermore, organizations should invest in customer education and digital literacy initiatives, as increased exposure and familiarity with chatbot systems can promote greater adoption and more positive user attitudes. By focusing on usability, security, and user awareness, businesses can enhance the effectiveness of AI chatbots and improve the overall customer experience in digital service environments.

Limitations of the Study

Despite its contributions, this study has certain limitations. First, the research is based on a convenience sampling method, which may limit the generalizability of the findings to a broader population. Second, the study focuses primarily on perceptual variables within the TAM framework, while other psychological and contextual factors such as user experience, anthropomorphism, or emotional engagement were not examined. Third, the data were collected through self-reported questionnaires, which may be subject to response bias.

Suggestions for Future Research

Future studies may expand this research by including larger and more diverse samples to improve generalizability. Researchers may also explore additional variables such as perceived intelligence, anthropomorphism, emotional attachment, or service quality in AI chatbot interactions. Furthermore, comparative studies across different industries such as banking, healthcare, and e-commerce could provide deeper insights into the factors influencing chatbot adoption.

Conclusion

This study examined customer acceptance of AI chatbots using the Technology Acceptance Model (TAM) and an extended framework incorporating trust and perceived security. The findings demonstrate that perceived usefulness, perceived ease of use, perceived security, and behavioral intention play significant roles in shaping users' attitudes toward AI chatbot adoption. The results confirm that usability and usefulness remain fundamental drivers of technology acceptance, while security and privacy concerns strongly influence trust in AI systems. By enhancing system usability, ensuring data security, and promoting digital literacy, organizations can increase customer acceptance and maximize the benefits of AI chatbot technology. Overall, the study contributes to the growing body of literature on AI-driven customer service technologies and provides valuable insights for both researchers and practitioners seeking to understand and improve the adoption of AI chatbots in digital environments.

Reference

- Adam, M., Wessel, M., & Benlian, A. (2021). AI-based chatbots in customer service and their effects on user compliance. *Electronic Markets*, 31(2), 427–445. <https://doi.org/10.1007/s12525-020-00414-7>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Dwivedi, Y. K., Hughes, D. L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., ... & Williams, M. D. (2021). Artificial intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 57, 101994. <https://doi.org/10.1016/j.ijinfomgt.2019.08.002>
- Featherman, M. S., & Pavlou, P. A. (2003). Predicting e-services adoption: A perceived risk facets perspective. *International Journal of Human-Computer Studies*, 59(4), 451–474. [https://doi.org/10.1016/S1071-5819\(03\)00111-3](https://doi.org/10.1016/S1071-5819(03)00111-3)
- Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, 27(1), 51–90. <https://doi.org/10.2307/30036519>
- Gnewuch, U., Morana, S., & Maedche, A. (2017). Towards designing cooperative and social conversational agents for customer service. In *Proceedings of the International Conference on Information Systems (ICIS)*.
- Huang, M. H., & Rust, R. T. (2021). Artificial intelligence in service. *Journal of Service Research*, 24(1), 3–22. <https://doi.org/10.1177/1094670520902266>
- Luo, X., Tong, S., Fang, Z., & Qu, Z. (2019). Frontiers: Machines vs. humans: The impact of artificial intelligence chatbot disclosure on customer purchases. *Marketing Science*, 38(6), 937–947. <https://doi.org/10.1287/mksc.2019.1192>
- McLean, G., & Osei-Frimpong, K. (2019). Chat now... examining the variables influencing the use of online live chat. *Technological Forecasting and Social Change*, 146, 55–67. <https://doi.org/10.1016/j.techfore.2019.05.017>
- Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186–204. <https://doi.org/10.1287/mnsc.46.2.186.11926>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>