

Original Article

Integrating the Technology Acceptance Model and Theory of Planned Behavior to Explain Continuance Use of E-Commerce Chatbots: A Theoretical Perspective

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Abstract: *This paper aims to develop a theoretical perspective integrating the Technology Acceptance Model and the Theory of Planned Behavior to explain continuance use intention toward e-commerce chatbots. Although existing research has examined technology acceptance and chatbot adoption, the theoretical understanding of consumers' continued chatbot usage remains an important area for further development. This paper conceptually examines the complementary roles of perceived ease of use, perceived usefulness, attitude, and subjective norm in explaining continuance use intention. Chatbot quality and user satisfaction are also incorporated to extend the discussion beyond initial technology acceptance toward users' post-adoption experiences. The proposed theoretical framework illustrates how technology-related perceptions and social influences may jointly shape users' attitudes and continued engagement with e-commerce chatbots. By integrating TAM and TPB, this paper contributes to the theoretical discussion of chatbot continuance by connecting technology acceptance, social influence, and post-use evaluations within a unified perspective. The framework provides a foundation for future empirical research and offers implications for understanding consumer-chatbot interactions in e-commerce, particularly in emerging digital markets.*

Keywords: *Technology Acceptance Model, Theory Of Planned Behavior, E-Commerce Chatbots, Continuance Use Intention, Chatbot Quality.*

I. INTRODUCTION

Chatbots have become an increasingly important digital technology for facilitating interactions between businesses and consumers. Chatbots are computers that use artificial intelligence, natural language processing, and machine learning to interact with people using either voice or written words to answer their questions. Chatbots can help customers find products they want to buy, resolve customer support issues, and navigate through the process of buying something online. Chatbots are being implemented in many different business areas, such as customer support, marketing, and electronic commerce. By implementing chatbots, companies can increase access to customer service and improve how efficiently they operate.

In the field of e-commerce, the worth of a chatbot depends upon how often it is available as well as how well it delivers useful, reliable, responsive, and relevant exchanges. Chatbots can assist with exchanging information and help customers complete various tasks related to purchasing goods or services. On the other hand, chatbots have several constraints when they attempt to answer complicated queries, comprehend context and respond appropriately to customers' expectations. These limitations will impact the way customers view the quality of service provided by chatbots and whether they will choose to interact with chatbots again. Therefore, the success of a chatbot should be viewed as more than just a function of its technology; it should be seen as a direct reflection of customer perceptions and experiences.

The importance of continued chatbot usage is particularly relevant in e-commerce because the benefits of automated customer service depend on consumers' willingness to use the technology repeatedly. Previous empirical research has examined continuance intention through factors such as chatbot quality, perceived usefulness, satisfaction, and interaction characteristics. For example, some studies have investigated technological and social factors associated with chatbot continuance, while Sundjaja [11] examined chatbot quality, technology anxiety, disclosure, and satisfaction in Indonesian e-commerce. These studies suggest that long-term use is a multi-dimensional construct with aspects related to technology, psychology, and experience.

However, to explain why people continue to use something, there must be a theoretical framework developed that combines the factors that influence continued use. For example, the Technology Acceptance Model has been used to describe how a person's perception of ease of use and perceived value of a product/service will affect their evaluation of the product/service. In addition, the Theory of Planned Behavior describes the impact of an individual's attitudes and social norms on his/her intention to engage in a behavior [2], [3]. Integrating these perspectives offers an opportunity to explain how consumers' evaluations of chatbot technology and perceived social expectations may jointly contribute to their intention to



continue using e-commerce chatbots. Accordingly, developing an integrated theoretical framework can advance understanding of consumer–chatbot interactions and provide a foundation for future research on continuance use intention.

The rapid development of artificial intelligence has transformed the way businesses interact with consumers in digital commerce. As a result of becoming a major part of customer service in e-commerce, chatbots enable companies to offer automated help, answer questions and assist customers with all aspects of the purchase process online. However, it cannot be assumed that the continued usage of chatbots will only occur because they were initially adopted by users. Whether or not users decide to continue using chatbots will be based upon how useful they perceive the technology to be, how easy they find the interaction with chatbots to be, what types of past experiences they had with chatbots and how other people influence them. Consequently, understanding continuance use intention has become an important issue in information systems and consumer behavior research [8],[9].

The Technology Acceptance Model, introduced by Davis [2], provides a theoretical foundation for explaining technology acceptance through perceived ease of use and perceived usefulness. These perceptions influence users' evaluations of a technology and help explain their behavioral intentions. However, continuance use involves more than the initial acceptance of a technological innovation. Users of a chatbot who have used it previously will view the value of the chatbot and how easy it is to use as a different experience than someone who has not used one before. Therefore, studies on the long-term use of digital technology focus on what causes users to stay engaged with the technology after they adopt it and how users evaluate the technology after they start using it [5], [8].

The theory of planned behavior was created by Ajzen [3], and it adds to the concept of how attitudes, social norms, and the individual's ability to control their behavior affect the intention to perform a behavior. In the context of e-commerce chatbots, subjective norm represents perceived social expectations that may influence consumers' evaluations and intentions regarding chatbot use. Kim [9], for example, applied an extended TPB framework to examine continuance intention toward chatbot services and highlighted the relevance of interaction and information quality. This provides a frame of reference for how social influences can be used in conjunction with perception of technology as factors in explaining sustained use of chatbots.

The two theories (TAM and TPB) can provide additional insight into why people engage with or do not engage with technology; however, there needs to be a clear theoretical rationale for integrating them, especially as the research focuses on continued use rather than initial adoption. Research in this area is expanding to include determinants of chatbot continued use such as technological quality, user experience, and user satisfaction. Yan [8] used several different analytical methods to study continued use of chatbots, while other researchers have used broader reviews of continued use to identify relevant areas of explanation (i.e., technological, psychological, social, and behavioral) [8]. These developments suggest the value of a theoretical framework that connects technology acceptance, social influence, and post-use evaluations without treating them as independent explanations.

Accordingly, this paper aims to develop a theoretical perspective integrating TAM and TPB to explain continuance use intention toward e-commerce chatbots. The proposed framework considers perceived ease of use, perceived usefulness, attitude, and subjective norm as central constructs, while incorporating chatbot quality and user satisfaction as complementary factors. The paper seeks to clarify how these constructs may interact in explaining consumers' willingness to continue using chatbot services. Its intended contribution is to provide a theoretically grounded framework for future empirical research and to advance understanding of consumer–chatbot interactions, particularly in emerging digital markets.

II. LITERATURE REVIEW

A) *Technology Acceptance Model*

The Technology Acceptance Model, introduced by Davis [2], is one of the most influential theoretical frameworks for explaining individuals' acceptance and use of information technology. Based on the broader tradition of reasoned action, TAM proposes that technology-related beliefs shape users' attitudes and behavioral intentions toward adopting a particular system. The model primarily emphasizes two determinants: perceived ease of use and perceived usefulness. These constructs explain how individuals evaluate the effort required to use a technology and the benefits they expect to obtain from it.

Perceived ease of use refers to the extent to which an individual believes that using a particular system requires minimal effort, whereas perceived usefulness refers to the extent to which an individual believes that using the system enhances task performance [2]. Within the original TAM, perceived ease of use can influence perceived usefulness because a system that requires less effort may allow users to obtain its benefits more effectively. Both constructs can influence users' attitudes toward technology, which subsequently contribute to behavioral intention. Later developments, including TAM2, expanded the model by incorporating additional social and cognitive factors to explain perceived usefulness and technology acceptance [4],[2].

In the area of e-commerce chatbots, TAM is a good framework for understanding how consumers evaluate conversational technology. Perceived ease-of-use (PEOU) can be thought of as the degree to which a consumer can interact with a chatbot, create questions and interpret the chatbot's responses with minimal effort. Perceived usefulness (PU) can be viewed as whether or not the chatbot provides accurate product data, responds to consumer questions and aids in completing shopping-related activities. If a consumer views a chatbot as simple to communicate with and beneficial in achieving his/her goals, then he/she will most likely view the technology in a positive light.

However, TAM was initially developed to explain technology acceptance rather than the complete process of continued technology use after adoption. Continued usage may depend not only on initial beliefs about usefulness and ease of use but also on users' experiences, satisfaction, and changing expectations. Bhattacharjee [5], through the expectation-confirmation model of information systems continuance, emphasized the importance of post-adoption evaluations in explaining users' intentions to continue using information systems. Accordingly, TAM offers an important starting point for understanding chatbot continuance, but its explanatory scope may be strengthened by integrating complementary theoretical perspectives.

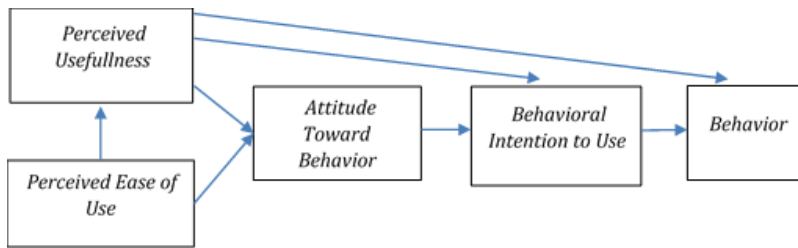


Figure 1. Technology Acceptance Model

B) Theory of Planned Behavior

The Theory of Planned Behavior, developed by Ajzen [3], explains behavioral intention through three principal determinants: attitude toward the behavior, subjective norm, and perceived behavioral control. The theory proposes that an individual's intention to perform a behavior is influenced by personal evaluation, perceived social expectations, and perceived control over performing that behavior. Actual behavior may subsequently be influenced by intention and perceived behavioral control, particularly when individuals have sufficient opportunities and resources to act.

Attitude is defined as how an individual views a specific action (or behavior) as either positive or negative. For e-commerce chatbots, attitude is how consumers view their experience using the chatbot services. If consumers find that using the chatbot service provides them with benefits, convenience and value, they are likely to have a positive attitude about continuing to use the service. On the other hand, if consumers experience frustration when interacting with the chatbot service, receive incorrect information from the chatbot service, or find it difficult to understand the output provided by the chatbot service, they are likely to have a negative view of using the service.

Subjective norm refers to perceived social pressure from significant others to perform or refrain from performing a behavior [3]. In digital commerce, consumers may be influenced by recommendations, experiences, and expectations communicated by friends, family members, colleagues, or other relevant social groups. Although chatbot use can occur individually, social information may shape consumers' perceptions of whether using conversational technology is appropriate, beneficial, or worth continuing. Subjective norm therefore provides a theoretical dimension that is not explicitly represented as a core construct in the original TAM.

Perceived behavioral control refers to an individual's perception of the ease or difficulty of performing a behavior, considering available resources, abilities, and potential constraints. For chatbot usage, this construct may encompass consumers' confidence in interacting with the system and their perceived access to the necessary technological resources. Nevertheless, perceived behavioral control should be distinguished from perceived ease of use in TAM. Perceived ease of use concerns the effort required to operate a technology, whereas perceived behavioral control concerns the perceived capacity and control necessary to perform the behavior.

TPB is relevant to chatbot continuance because continued usage may involve both personal evaluations and social influences. The perception of consumers towards the benefits of chatbots and what they believe others will think of them using these services are likely to be positive. However, it is important to remember that just because consumers intend to do something doesn't mean they will. There are many reasons why consumers would stop using chatbot services, including lack of accessibility, technological problems, and the presence of other types of customer service.

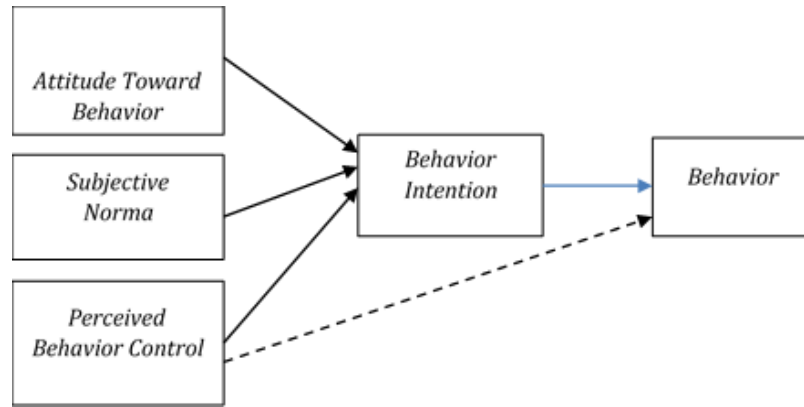


Figure 2. Theory of Planned Behavior

C) Integrating TAM and TPB to Explain Chatbot Continuance Use

Although TAM and TPB share conceptual foundations in the study of behavioral intention, they emphasize different explanatory mechanisms. The Technology Acceptance Model (TAM) emphasizes beliefs about whether a technology is useful and easy to use. On the other hand, the Theory of Planned Behavior (TPB) offers a wider view of behavior that includes attitudes toward the behavior, social pressures to perform the behavior (subjective norm), and the perceived ability to control performing the behavior [2],[3]. Therefore, combining both models would likely provide a more complete explanation of why consumers choose to interact with e-commerce chatbots than if each were used alone.

First, TAM explains how perceived ease of use and perceived usefulness shape consumers' evaluations of chatbot technology. These beliefs are relevant because consumers are more likely to evaluate a chatbot favorably when interacting with it requires little effort and helps them accomplish shopping-related tasks. Second, TPB contributes an explicit explanation of social influence through subjective norm. Consumers' decisions to continue using chatbots may be associated not only with their individual experiences but also with the opinions and expectations of people who influence their decisions.

Attitude represents a conceptual connection between the two frameworks. Within TAM, attitude reflects users' evaluations of technology, while within TPB, attitude represents an evaluation of performing a particular behavior. In chatbot research, these perspectives can be brought together by defining attitude specifically as consumers' overall evaluation of using an e-commerce chatbot. Perceived usefulness and perceived ease of use can inform this evaluation, while subjective norm may provide an additional social influence on attitude or behavioral intention. The direction and strength of these relationships should be justified through prior empirical evidence and the theoretical assumptions adopted in the proposed framework.

Nevertheless, explaining continuance use requires a further distinction between initial acceptance and post-adoption behavior. Continuance use intention concerns a user's intention to maintain usage after obtaining experience with the technology. Bhattacharjee [5] demonstrated the importance of post-adoption beliefs, expectation confirmation, and satisfaction in explaining information systems continuance. This perspective suggests that chatbot quality and user satisfaction may complement the TAM–TPB integration by capturing aspects of users' experiences that are not fully represented by the original models.

Chatbot quality may influence consumers' evaluations of the technology through the relevance, reliability, responsiveness, and consistency of its interactions. User satisfaction may capture consumers' overall evaluations of their experiences after using the chatbot. These constructs should not be treated as automatic extensions of TAM or TPB; instead, their inclusion requires explicit theoretical justification regarding how chatbot experiences influence users' beliefs, attitudes, and continuance intentions.

Accordingly, integrating TAM and TPB with selected post-adoption constructs provides a potential theoretical framework for examining e-commerce chatbot continuance. The framework connects technology-related beliefs, social influence, attitudinal evaluations, and user experiences to explain why consumers may continue using chatbot services. Its contribution depends on clearly distinguishing initial technology acceptance from continuance use and demonstrating how the proposed integration addresses explanatory limitations in prior research. The framework should subsequently be refined through a critical review of existing chatbot studies and evaluated empirically in future research.

D) The Technology Acceptance Model: Strengths and Limitations

The Technology Acceptance Model, developed by Davis [2], explains technology acceptance through users' beliefs about perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which individuals believe that using

a technology improves their task performance, whereas perceived ease of use concerns the effort required to operate the technology. These beliefs provide a parsimonious explanation of how individuals evaluate technological systems and form intentions to use them. Subsequent research was able to extend TAM through the addition of other factors that would determine whether a user will accept a form of technology. These include the impact of social influences as well as cognitive instrumental processes [2].

TAM has one of the strongest strengths in explaining how people evaluate technology based on their perceptions of usefulness. For instance, in an online store with a chatbot, the user's perception of usefulness will indicate whether the chatbot is able to answer users' questions about products, resolve their problems related to shopping, and help them with their overall shopping experience. Perceived ease of use captures the effort required to communicate with the chatbot and obtain appropriate responses. These beliefs are particularly relevant when chatbot performance influences consumers' evaluations of automated customer service.

Nevertheless, TAM has theoretical limitations when applied independently to continuance use intention. First, the original model primarily explains technology acceptance and does not fully account for how users revise their evaluations after repeated interactions. Second, its emphasis on individual cognitive beliefs provides limited explicit explanation of social expectations. Third, favorable perceptions of usefulness and ease of use do not necessarily explain why consumers maintain their use of a chatbot after an unsatisfactory experience. Continued usage may also depend on satisfaction, confirmation of expectations, and the quality of previous interactions [3].

These limitations do not imply that TAM is inadequate. Rather, they indicate that TAM may need to be complemented by theories addressing social influences and post-adoption experiences. This distinction is important because the decision to try a chatbot for the first time differs conceptually from the decision to continue using it after experiencing its performance.

E) The Theory of Planned Behavior: Strengths and Limitations

The Theory of Planned Behavior, developed by Ajzen [3], explains behavioral intention through attitude toward the behavior, subjective norm, and perceived behavioral control. Attitude represents an individual's favorable or unfavorable evaluation of performing a behavior. Subjective norm reflects perceived social pressure to perform or refrain from that behavior. Perceived behavioral control concerns an individual's perceived capacity to perform the behavior, considering relevant resources, abilities, and constraints.

TPB offers an important complement to TAM because it explicitly incorporates social and behavioral considerations. In e-commerce chatbot usage, subjective norm may reflect consumers' perceptions of whether people important to them approve of using chatbot services. Attitude captures consumers' overall evaluation of interacting with chatbots, while perceived behavioral control may reflect their confidence and perceived ability to use chatbot services successfully.

The principal strength of TPB is that it situates behavioral intention within a broader social and behavioral context. Consumers' decisions may be influenced not only by their assessment of a chatbot's functionality but also by social expectations and their perceived ability to use the technology. This perspective is relevant when examining consumers who differ in their digital experience, confidence, and exposure to social recommendations.

However, TPB also has limitations when applied independently to chatbot continuance. Its general behavioral framework does not, by itself, explain how specific technological characteristics generate perceptions of usefulness and ease of use. Furthermore, attitude, subjective norm, and perceived behavioral control may not fully capture consumers' evaluations of chatbot performance after actual usage. Satisfaction and perceived confirmation of expectations may provide additional explanations for why consumers continue or discontinue using a chatbot [3].

A further conceptual distinction concerns perceived ease of use and perceived behavioral control. Although these constructs may be related, they are not interchangeable. Perceived ease of use concerns the effort required to operate a system, whereas perceived behavioral control concerns perceived capability and constraints associated with performing a behavior. A theoretically integrated model should preserve these distinctions rather than treating the constructs as equivalent measures.

F) Why TAM and TPB Should Be Integrated to Explain Continuance Use Intention

Integrating TAM and TPB offers a potential theoretical advantage because the two models explain different but complementary aspects of technology-related behavior. TAM emphasizes technology-specific beliefs, whereas TPB explains how attitude, social expectations, and perceived control contribute to behavioral intention [2], [3]. Their integration can therefore connect consumers' evaluations of chatbot functionality with the broader behavioral context in which continued usage decisions occur.

The first point of complementarity concerns the relationship between technological beliefs and attitude. Perceived ease of use and perceived usefulness provide technology-specific information that can inform consumers' evaluations of chatbot interactions. For example, a chatbot that is easy to navigate and provides useful responses may receive a more favorable evaluation than one that requires substantial effort and provides irrelevant information. However, the relationship should not be interpreted as automatic: chatbot users may appreciate a system's usefulness while remaining dissatisfied with its conversational quality or reliability.

The second point concerns social influence. TAM's original formulation does not explicitly include subjective norm as a core determinant, whereas TPB identifies perceived social expectations as an important influence on behavioral intention. In the chatbot context, social influence may help explain why consumers with similar perceptions of usefulness and ease of use nevertheless differ in their willingness to continue using chatbot services. Nevertheless, the influence of subjective norm may depend on the service context and the extent to which consumers rely on the opinions of others when making technology-related decisions.

The third point concerns the distinction between adoption and continuance. TAM and TPB can help explain beliefs, attitudes, and intentions, but continuance use requires explicit attention to users' post-adoption evaluations. Bhattacharjee's expectation-confirmation model [3] establishes a theoretical basis for considering satisfaction and post-use perceptions in explaining continued information systems usage. Accordingly, chatbot quality and satisfaction may complement the integrated TAM-TPB framework by connecting the characteristics of chatbot interactions with consumers' subsequent evaluations and intentions.

The theoretical rationale for integration is therefore not simply that combining more variables produces a more comprehensive model. Instead, the integration should clarify how distinct mechanisms operate together: TAM explains technology-related beliefs, TPB explains attitudinal and social-behavioral influences, and post-adoption constructs help account for users' evaluations after experiencing the service. This framework can provide a more differentiated explanation of continuance use intention than treating technology acceptance, social influence, and post-use evaluations as unrelated factors.

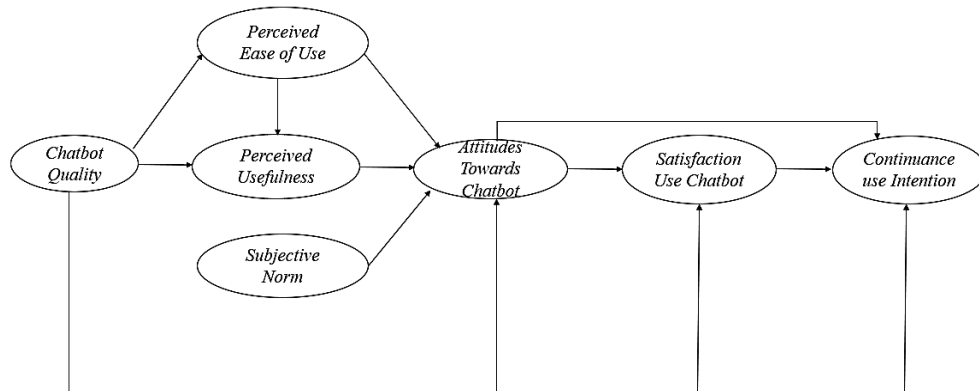


Figure 3. Chatbot with TAM and TPB

G) Recent Empirical Research on E-Commerce Chatbot Continuance

Recent empirical studies provide evidence that chatbot continuance is influenced by multiple technological and experiential factors. However, they also demonstrate that researchers have approached the phenomenon using different theoretical perspectives. Foroughi [10] investigated chatbot continuance using data from 476 users and combined partial least squares analysis with fuzzy-set qualitative comparative analysis and necessary condition analysis. Their results indicated that information, service, and system quality influenced users' perceptions. Their analysis also identified perceived ease of use and system quality as necessary conditions for high continuance intention. The results of this study are consistent with the importance of technology-related beliefs and the quality of chatbots. Also, the configuration analysis indicated that there were several possible ways for individuals to develop a continuing intention to use technology, not just one common path.

Sundjaja [11] investigated how customers continue to use customer service chatbots within the Indonesian e-commerce industry through an expanded version of the expectation confirmation model. The researchers collected data from 310 respondents. Their results showed that perceived usefulness, confirmation, and satisfaction had positive effects on continuance intentions. Furthermore, they found that when the customer knew the chatbot was a computer-based program (i.e., chatbot disclosure), customers viewed the chatbot as being of higher quality; however, when customers experienced technology-related anxiety, they rated the chatbot lower in terms of quality. This study is important because it focuses on using customer service

chatbots in the Indonesian e-commerce market and emphasizes the importance of transparency, customer views of technology, and how customers evaluate programs after using them.

Gao [12] examined the influence of AI chatbot problem-solving capabilities on customers' continued usage intention in e-commerce platforms through an expectation-confirmation approach. Their study adds to the discussion of continuance by focusing on the ability of AI chatbots to solve customer problems. This perspective suggests that the value of chatbot services depends not only on whether users can operate the technology but also on whether the technology can address their practical needs.

More recently, Ngo [13] investigated customer continuance usage intention toward AI-powered services in e-retailing using an extended expectation-confirmation model. The relevance of post-adoption evaluation is illustrated by their work in explaining why customers continue using AI-powered services within a digital retail environment. Although both AI-powered services and e-commerce chatbots share conceptual similarities, they are not necessarily the same research context and therefore, any application of these results to conversational chatbot services will need to be carefully interpreted.

Taken together, these studies demonstrate that chatbot continuance has been examined through technology continuance and expectation-confirmation perspectives, with particular attention to quality, problem-solving capabilities, satisfaction, and post-use beliefs. They provide a substantive empirical foundation for developing a complementary theoretical explanation. However, these studies should not be interpreted as evidence that TAM–TPB integration is necessarily novel. The contribution of the proposed framework must instead be established by critically comparing the explanatory mechanisms and constructs in prior models and demonstrating what the integration explains that existing approaches leave insufficiently articulated.

H) Theoretical Gap and Proposed Contribution

The reviewed literature suggests three related theoretical issues. First, technology acceptance models explain users' beliefs about the usefulness and ease of operating a system, but these beliefs do not fully represent the social context in which consumers make continuance decisions. Second, TPB explains attitude, subjective norm, and perceived behavioral control, but it does not specifically account for chatbot functionality or the technological beliefs that shape users' evaluations. Third, post-adoption models emphasize satisfaction and confirmation of expectations, yet their principal focus differs from the combined cognitive and social mechanisms addressed by TAM and TPB.

This paper therefore proposes an integrated theoretical perspective that connects technology-related beliefs, social influence, and post-adoption evaluations in explaining continuance use intention toward e-commerce chatbots. Chatbot quality is positioned as a contextual antecedent that may shape users' perceptions of ease of use and usefulness, while attitude and subjective norm provide links between individual evaluations and social influence. Satisfaction is incorporated to represent users' post-use evaluations.

The proposed contribution lies in articulating how these mechanisms may complement one another in the specific context of e-commerce chatbot continuance. Rather than assuming that a combination of established constructs automatically constitutes theoretical novelty, the framework requires a clear explanation of the relationships among them, their underlying mechanisms, and the boundary conditions under which they may operate. This approach provides a basis for developing theoretically grounded propositions and for guiding future empirical studies across e-commerce platforms and consumer settings.

I) Tam Extension

Since its introduction by Davis [2], the Technology Acceptance Model has been extended to address the limitations of its original formulation and explain technology acceptance across different contexts. The original Technology Acceptance Model (TAM) focused on two main factors that determined whether a person would accept a new type of technology, namely how useful the person perceived the technology to be and how easy the person believed it was to use. In addition to these two factors, many other variables have been added to TAM in order to develop more comprehensive models of people's behaviors regarding technology. Variables such as social influence, cognitive processes, facilitating conditions, and post-adoption evaluation have all been used to explain technology-related behaviors.

The second major enhancement is the TAM2 model, created by [4], [2], that includes social influence factors (subjective norm, voluntariness, image) along with cognitive-instrumental factors (job relevance, output quality, result demonstrability). TAM2 shows that technology adoption decisions are made on two levels: individual evaluation of technology's usefulness, and the social environment where technology will be used. This extension is relevant to e-commerce chatbots because consumers' perceptions of chatbot usefulness may be shaped by the quality of its responses and, potentially, by social expectations.

The Unified Theory of Acceptance and Use of Technology, developed by Venkatesh [4], further integrates constructs from several technology acceptance theories. The UTAUT framework defines the key factors influencing an individual's decision

to accept and utilize technology as: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. While UTAUT is not just another variation of TAM, it demonstrates that technology acceptance research is now moving past an individual's perception of the usefulness of technology and its ease-of-use, and is incorporating both social and environmental influences.

Another important development concerns the distinction between initial acceptance and continuance use. Bhattacharjee's expectation-confirmation model [5] explains information systems continuance through confirmation of expectations, perceived usefulness, satisfaction, and continuance intention. This perspective suggests that continued chatbot usage requires attention to consumers' actual experiences and post-use evaluations rather than relying exclusively on their initial perceptions of the technology.

These extensions indicate that technology acceptance is a multidimensional phenomenon involving cognitive beliefs, social influences, and post-adoption evaluations. For e-commerce chatbots, TAM provides a foundation for explaining perceived ease of use and perceived usefulness, while TAM2 and UTAUT illustrate the relevance of social influences. The expectation-confirmation model adds an explanation of satisfaction and continued usage. Integrating selected insights from these perspectives with the Theory of Planned Behavior may therefore provide a theoretically grounded approach to understanding consumers' continuance use intention toward e-commerce chatbots. However, such integration should be justified by the distinct explanatory role of each construct to avoid unnecessary overlap and conceptual redundancy.

Table 1: Summary of TAM Extension

Model	Key Extensions	Relevance to Chatbots
TAM — Davis (1989)	Perceived usefulness and perceived ease of use	Explains users' perceptions of chatbot usefulness and ease of use.
TAM2 — Venkatesh & Davis (2000)	Social influence and cognitive instrumental processes	Helps explain the formation of perceived usefulness and the role of social influence.
UTAUT — Venkatesh et al. (2003)	Performance expectancy, effort expectancy, social influence, and facilitating conditions	Extends the explanation of technology acceptance by incorporating social and contextual factors.
ECM — Bhattacharjee (2001)	Confirmation, satisfaction, perceived usefulness, and continuance intention	Explains why users continue using a technology after their initial experience.

J) Summary of TPB Extensions

The Theory of Planned Behavior (TPB) was developed by Ajzen [3] as a framework for understanding how individuals make decisions based on their attitudes toward the behavior, subjective norms, and perceived behavioral control. While initially used to predict behavioral intentions, TPB has since been expanded and combined with various other theories to provide an enhanced explanation of the factors that influence individuals' choices to adopt or continue using Information Technology.

Technology-related studies often integrate the Theory of Planned Behavior (TPB) and Technology Acceptance Model (TAM) to include technology-specific beliefs and social-behavioral influences. While TAM describes how users perceive technology as being useful and easy to use when making their decisions regarding adopting technology, TPB emphasizes the impact of user perceptions of societal expectations and the level of control users have in making those decisions. Integrating these two theories creates a more comprehensive conceptual framework for understanding why users choose to adopt and continue using digital services.

The theory of planned behavior (TPB) is useful for understanding how users' perceptions of their attitudes towards using a chatbot in an e-commerce environment, their perceptions of what is expected from them by society regarding the use of such technology, and their perceptions of whether they are capable of utilizing this technology affect their behavioral intentions. Additionally, user satisfaction with the performance of the chatbot and the user's perception of the quality of services provided through the chatbot after initial adoption will determine if the user continues to utilize the technology. As such, combining the TPB with the technology acceptance model (TAM), and adding in relevant post-adoption constructs provides a better conceptual framework for explaining the continued use intention of users toward e-commerce chatbots.

Table 2: Summary of TPB Extensions

Theory or Extension	Key Constructs or Extensions	Relevance to E-Commerce Chatbots
TPB — Ajzen (1991)	Attitude, subjective norm, and perceived behavioral control	Explains how personal evaluations, social expectations, and perceived control influence chatbot continuance intentions.
Decomposed TPB — Taylor and Todd (1995)	Decomposes attitude, subjective norm, and perceived behavioral control into more specific belief dimensions	Provides a more detailed explanation of the beliefs underlying technology-related behavioral intentions.

Integrated TAM–TPB	Combines perceived usefulness and perceived ease of use with attitude, subjective norm, and perceived behavioral control	Explains chatbot continuance intentions through technology acceptance beliefs and social-behavioral factors.
Extended TPB	Incorporates additional context-specific variables, such as trust, perceived risk, or satisfaction, where theoretically justified	Captures additional factors that may shape users' decisions to continue using e-commerce chatbots.

III. RECOMMENDATIONS FOR FUTURE RESEARCH DIRECTIONS

Future studies will continue to refine and empirically test the combined use of the Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB) to explain why people continue using e-commerce chatbots. While TAM can provide insight into what users perceive as being useful and how easy they feel it is to use, and TPB can provide insight into how a person's attitudes, social norms, and perceptions of control affect whether or not they engage in a particular behavior, the combination of both models may not accurately represent the user experience of AI-powered customer service after adoption. Future research will need to expand upon the integrated model to include other factors such as the performance of the chatbot, the user experience of interacting with the chatbot, and the user's intention to continue using the technology.

The first direction for future research would be to use the quality of a chatbot as a prior to technology acceptance beliefs and user evaluation. Aspects of quality such as reliability, responsiveness, understanding, assurance, and interactivity can affect the user's perception of utility, ease of use, attitude, and satisfaction. Studying these relationships will help clarify how the characteristics of a chatbot affect users' willingness to interact with automated customer service.

The second area for research involves looking at the post-adoption aspects of the user's experience with the technology, especially regarding the user's satisfaction with the technology and whether their expectations for the technology were met. As noted above, because the reasons why people continue using a technology differ significantly from those that lead them to adopt it, there may be benefit in integrating TAM and TPB with the Expectation-Confirmation Model (ECM) in future research. By doing so, researchers will have a better understanding of how a user's initial expectations about the technology, combined with their actual experience using the technology, affect the user's continued intention to use the technology.

The third area for additional study is how trust, perceived risks, privacy issues and human-like characteristics (anthropomorphism) could play a part in using AI-powered chatbots. These aspects might be especially important for AI-powered chatbots as users may have concerns about whether the answers provided by the chatbot will be correct; what will happen with their private information; and if the chatbot will be able to understand their context-specific requirements. When incorporating these variables into the model, researchers must base this decision on sound theoretical principles rather than simply adding more variables to the model.

Fourth, researchers could utilize longitudinal study designs to determine if users' perceptions and intentions vary over time. While cross-sectional studies assess users' perceptions at one specific point in time, longitudinal studies can provide insights into the difference between users accepting the technology initially versus using the technology repeatedly, and whether satisfaction, trust, and perceived usefulness continue to influence user behavior throughout multiple interactions with the chatbot.

Lastly, researchers in future studies may want to compare their results across multiple platforms and cultures. Comparing the results of those who interact with chatbots on various e-commerce websites and within different countries will allow us to see if the proposed theories apply generally or only under certain conditions. Furthermore, comparative research will enable us to determine how platform characteristics and social norms affect a user's decision to continue using a product/service.

Lastly, future research may also apply alternative analytical techniques that include, but are not limited to, Covariance-Based Structural Equation Modeling (CBSEM), Multi-Group Analysis (MGA), and Qualitative Comparative Analysis (QCA) using Fuzzy Set Theory (fsQCA). All three of these analytical techniques will allow researchers to evaluate the interrelationships among each construct and the combinations of conditions that result in higher levels of continuing use intentions.

In summary, subsequent research should go beyond explaining technology acceptance in isolation and create more complete conceptual frameworks which include technology-related perceptions, socio-behavioral influences on behavior, and post-adoption experiences. Creating these types of frameworks can enhance the explanatory power of TAM and TPB while offering actionable advice to e-commerce businesses interested in improving chatbot quality, increasing consumer satisfaction, and sustaining consumer participation.

IV. CONCLUSION

This theoretical study will look at integrating the Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB) to better understand why people would want to keep using an e-commerce chatbot. The TAM will provide the basis for understanding how users evaluate technology based on their perception of the usefulness of the technology and how easy it is to

use the technology. On the other hand, the TPB focuses on the role of attitudes, social norms, and perceived behavioral controls in determining whether individuals intend to engage in a specific behavior. Combining the two theories will allow researchers to gain a much wider perspective on what factors may contribute to whether or not users choose to continue using an e-commerce chatbot.

The proposed theoretical framework will also emphasize the need to expand current technology acceptance and behavioral intention frameworks to incorporate post-adoption experiences. For example, in the case of e-commerce chatbots, chatbot quality and user satisfaction can offer further insight into how the performance of the technology and the user's experience with the technology impact the user's continued usage intentions. In addition to expanding the scope of technology acceptance and behavioral intention frameworks, incorporating relevant post-adoption concepts (e.g., expectation confirmation) can assist in distinguishing between continued usage of a product or service and the initial adoption of a product or service.

The major conceptual contribution of this article is that it provides a complementary approach that integrates technology-related beliefs, social-behavioral factors, and post-adoption assessments. Instead of viewing TAM and TPB as rival explanations, the integrated view positions these two theories as complementary approaches to studying continued use intentions in AI-enabled customer service. However, the proposed model remains conceptual and needs to be tested empirically to determine whether the relationships identified within the model are statistically significant.

Future research will be conducted to evaluate the proposed relationship in a variety of e-commerce platforms, sample groups (users), and cultural contexts. In addition, longitudinal studies and comparative analysis could offer more insight into user perceptions and behavior intention with continued interaction with chatbots. A more complete understanding of continuous usage intention will ultimately lead to advances in theory development and aid e-commerce organizations in developing chatbots that are functional, accessible, reliable, and responsive to the needs of their customers.

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