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# CONSUMER TRUST TOWARD AI CHATBOTS IN E-COMMERCE: A COMPREHENSIVE REVIEW OF DETERMINANTS, CHALLENGES, AND FUTURE DIRECTIONS

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## ABSTRACT

*The emergence of artificial intelligence (AI) chatbots has proven to be a game-changer within the e-commerce industry, as they improve customer interaction by providing real-time support, making product recommendations, and automating service. It has been established that with businesses more inclined towards adopting AI-driven conversational agents in their digital channels, customer trust in AI chatbots will have a huge bearing on their adoption and success in the long run. This review looks into a detailed analysis of consumer trust towards AI chatbots in the e-commerce environment by drawing from existing literature on factors, outcomes, issues, and areas of research on the subject. This review identifies important trust factors, such as perceived intelligence, usefulness, ease of use, transparency, personalization, reliability, human-likeness, and data security, and delves into the psychological aspects that influence trust formation, such as perceived risk, trust propensity, technology readiness, consumer innovativeness, perceived control, and emotional response. It is clear from the analysis that trust influences consumer satisfaction, engagement,*

*purchase intentions, customer loyalty, and positive electronic word-of-mouth. AI chatbots face certain barriers, such as incorrect responses, a lack of empathy, privacy concerns, algorithmic bias, over-automation, and erosion of trust after service failure. Additionally, new trends like generative AI chatbots, LLMs, voice commerce, agentic AI shopping assistants, multimodal AI systems, and hyper-personalized shopping experiences are set to redefine the way digital commerce is practiced, while some research gaps need to be addressed, such as longitudinal studies, cross-cultural studies, ethical trust frameworks, human-AI collaboration models, trust repair, and explainable AI. The study emphasizes the development of transparent, secure, ethical, and customer-centric AI chatbot systems. It is a valuable contribution to the ongoing research in AI-enabled commerce.*

**Keywords:** Artificial Intelligence, AI Chatbots, Consumer Trust, E-Commerce, Technology Acceptance

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## 1. Introduction

In e-commerce, AI chatbots are a conversational system empowered by artificial intelligence techniques like natural language processing (NLP) and machine learning (ML), so they can effectively converse with customers naturally. These chatbots aid shoppers during their online purchase journey by addressing their inquiries, offering relevant product suggestions, guiding their purchasing experience, helping in tracking their orders, and providing them with after-sales services. Thus, AI chatbots improve customer experience, operational efficiency, and customer engagement in e-commerce<sup>1</sup>.

### 1.1. Evolution of E-Commerce

The speed at which information and communication technology has evolved has dramatically changed the way companies communicate with customers. Since the early 1990s, e-commerce, or electronic commerce, has undergone tremendous development. E-commerce started with basic online transactions and simple websites and has evolved into a comprehensive digital system that includes mobile commerce, cloud computing, big data analytics, and AI. With the advent of smartphones, fast internet connections, and secure online payment methods,

online retailing has been growing at a rapid pace. In today's modern day and age, e-commerce platforms don't just facilitate purchases; they also offer individualised shopping experiences, instantaneous customer support, and data-driven recommendations. With the growing competition in the digital world, companies are turning to cutting-edge technologies to create better customer engagement opportunities, boost operational efficiency, and build stronger customer relationships<sup>2</sup>.

## **1.2. Emergence of AI Chatbots**

AI-powered chatbots are one of the technologies transforming the e-commerce industry, particularly in the way they engage with customers and provide service. Chatbots are computer programs that are designed to interact with people via text or speech, which allows them to give information, solve problems, and carry out transactions efficiently. The initial chatbots were very basic, rule-based bots that could only answer a set of preprogrammed questions. Thanks to recent developments in natural language processing (NLP), machine learning (ML), and generative AI, chatbots are becoming more capable of grasping context, comprehending user intent, and delivering more personalized and human-like interactions<sup>3</sup>. AI chatbots help customers with product inquiries and recommendations, order tracking, returns processing, and post-purchase support, which is especially beneficial in e-commerce environments. They are always on hand to provide immediate and 24-hour support, making them a vital part of today's digital commerce approach.

## **1.3. Importance of Consumer Trust**

AI chatbots are becoming an increasingly popular feature in e-commerce, but their success is highly dependent on consumers' trust in these systems. It's well established that trust is a key factor in technology adoption, shaping users' decisions to engage with digital platforms and trust automated recommendations. From a consumer perspective, trust in AI chatbots involves confidence in their reliability, competence, transparency, security, and ethical practices. If the consumer is convinced that the chatbot system is trustworthy, they are likely to interact with it in a meaningful way, share personal information, accept recommendations, and make purchases. On the other hand, privacy, data security, algorithmic bias, inaccurate answers, and the lack of transparency can also pose issues for user trust and, therefore, adoption. Consumer trust is an important research topic for researchers and professionals today, as AI technologies are becoming more autonomous and important in purchasing decisions.

The Review aims to examine by considering how AI chatbots are becoming increasingly integral to e-commerce, as well as how trust plays such a pivotal role in consumer purchasing

habits, a thorough analysis of the available research is essential. This review aims to consolidate the current literature for consumer trust towards AI chatbots in the e-commerce sector by uncovering the main factors that influence trust formation, identifying the challenges that hinder the development of trust, and analysing the implications of trust for consumer behaviour and business performance<sup>4</sup>. Furthermore, the review highlights the new technology trends, ethics, and future research directions of the field. Incorporating insights from consumer behavior, information systems, and marketing and AI research, this article aims to offer a comprehensive understanding of trust in AI-driven commerce and provide valuable insights to researchers, technologists, and e-commerce practitioners seeking to develop trustworthy and successful systems of chatbots.

## **2. AI Chatbots in E-Commerce**

AI chatbots are computer programs that mimic the behavior of a human in a chat or conversation. The systems are designed to provide context-aware responses based on different levels of AI to comprehend the user's query and process the information it contains. Overall, Chatbots are a valuable tool for digital customer service and online retailing because they provide quick responses and unique interactions with customers. Chatbots can be classified under four categories based on the technology and the functions they perform: Rule-Based, AI-powered, Hybrid, and Voice-Enabled Chatbots. While rule-based chatbots are scripted, AI-powered chatbots use machine learning and natural language processing to understand user intent and respond accordingly. Hybrid Chatbots: The hybrid chatbots blend the best of both worlds to ensure efficiency and accuracy. Voice-activated chatbots, combined with virtual assistants and connected smart devices, allow for hands-free communications and accessibility<sup>5</sup>. The emerging sophistication of chatbot technologies has given companies the ability to engage customers while utilizing robotic process automation with high levels of engagement and quality service (Fig.1).

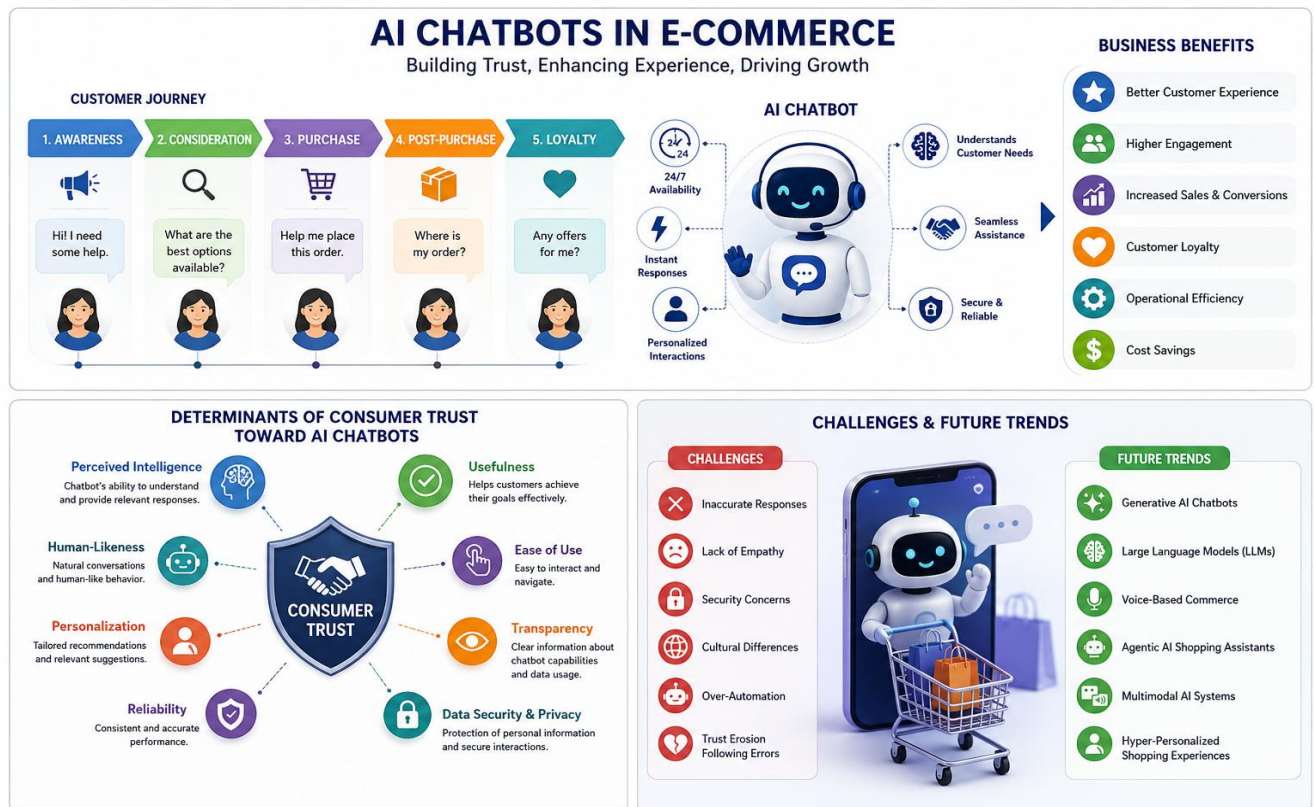


Fig.1. AI chatbots in e-commerce

## 2.1. Rule-Based vs AI-Powered Chatbots

In the early days, chatbots were simple scripts that could answer a limited number of questions. Today, chatbots have come a long way from their limited script-only origins and have become sophisticated conversational agents that can handle complex human language. Rule-based chatbots are bot systems that operate based on certain rules, keywords, and dialogue patterns. They work well for answering repetitive and predictable questions but tend to be less effective when dealing with ambiguous questions, understanding context, and handling unexpected user inputs. The lack of adaptability has a negative impact on the users during out-of-programmed interactions, which can lead to frustration. AI-powered chatbots, on the other hand, leverage technologies like natural language processing, machine learning, deep learning, and large language models to interpret context, identify intent, and learn from data to continually enhance their performance. Such sophisticated systems can carry on more realistic interactions, offer tailored suggestions, and manage intricate customer inquiries. The use of AI-driven chatbots is highly adaptable and provides a better customer experience, but it comes with its own set of problems with transparency, data privacy, and response accuracy<sup>6</sup>. This means that companies need to strike a balance between automation and reliability as well as ethics when adopting a chatbot solution.

## 2.2. Applications in E-Commerce

From chatbots that respond to customer inquiries to those that enhance the user experience by suggesting products, AI chatbots can assist e-commerce businesses throughout the entire customer journey in numerous ways, driving improvements in both customer satisfaction and operational efficiency. They are used for customer support, where they can answer common questions, product inquiries, shipping information, and return policies instantly. Chatbots can also act as virtual shopping assistants, providing personalized product suggestions based on browsing and purchasing activities and individual preferences. They assist customers in making comparisons, finding desired products, and facilitating easy transactions. Furthermore, chatbots can keep track of orders, assist with payments, resolve complaints, and provide post-purchase support, enhancing the overall customer experience. Business-wise, implementing chatbots cuts down operational costs, decreases response time, and allows for 24/7 customer engagement regardless of human working hours. This has made AI chatbots an important strategic resource for improving customer relationships and improving sales results in busy online markets. Therefore, AI chatbots are valuable strategic tools for improving client interactions and increasing sales performance in busy online markets<sup>7</sup>.

## 2.3. Growth of Conversational Commerce

AI Chatbots have played a key role in the rise of conversational commerce, where online shoppers engage in natural language interactions with brands to find products, get recommendations, and make purchases. Conversational commerce is the seamless integration of messaging apps, social media, voice assistants, and AI-powered chatbots that help deliver a more interactive and personalised shopping experience. Contrary to the e-commerce interface, where customer interactions are made primarily through search and navigation functions, conversational commerce enables customers to communicate their needs directly and get customised assistance in real-time. The surge in consumer demand for convenience, the rise in messaging platforms, and the growth of generative AI technologies have seen the adoption of conversational commerce in various industries grow faster than ever. Moreover, the evolution of large language models and multimodal AI systems has improved chatbot functionality, making it easier to interact with chatbots in a more intuitive and context-aware way. With the ongoing developments of conversational commerce, it is anticipated to impact consumer engagement methods and significantly alter the way customers engage with digital marketplaces, leading to trust, transparency, and customer satisfaction being more vital for the growth of the business.



### **3. Theoretical Foundations of Consumer Trust**

#### **3.1. Concept of Trust in Digital Environments**

Trust is a key construct that affects consumers' behavior in an online context, especially when they feel uncertainty, risk, and information asymmetry. In digital commerce, trust means that customers are willing to use a technology, platform, and/or service provider on the expectation that it will be reliable, secure, and do what they would like. In contrast to face-to-face exchanges, online interactions are devoid of physical non-verbal signals and human interaction, which may play a vital role in user acceptance and engagement. As AI chatbots become more critical in the e-commerce landscape, their role in delivering trustworthy information, tailored product suggestions, and assistance during transactions has come to the fore, making trust a paramount concern for consumers<sup>8</sup>. Perceived competence, integrity, transparency, security, and responsiveness are a few of the factors that are significant in the formation of trust in a digital environment. This makes it crucial to grasp the dynamics of building trust if AI-driven technologies are to be adopted in the e-commerce sector.

#### **3.2. Cognitive and Affective Trust**

Consumer trust is usually divided into two concepts, namely, cognitive trust and affective trust. Cognitive trust is based on rational assessment and is derived from the consumers' perception of a chatbot's competence, reliability, functionality, and effectiveness in completing tasks. Cognitive trust occurs when users receive consistent and correct information, timely responses, and efficient problem resolution. Affective trust, on the other hand, is emotional relationships and feelings that occur during interactions. It shows what is perceived as warmth, empathy, friendliness, and social presence of the chatbot. With the rise of sophisticated natural language processing and conversational abilities, AI chatbots are becoming more and more human-like, making affective trust a crucial factor in determining user experiences. Studies indicate that the cognitive and affective aspects of trust positively affect consumers' acceptance of chatbot systems, disclosure of personal data, and acceptance of suggestions. Thus, the effective creation of AI chatbots needs to take into account not just their capability to perform efficiently but also their capacity to communicate emotionally, to construct full-fledged trust connections.

#### **3.3. Technology Acceptance Model (TAM)**

The Technology Acceptance Model (TAM) has become one of the most used theories to explain user acceptance of information technologies. According to TAM, two constructs, perceived usefulness and perceived ease of use, were originally proposed by Davis to explain



the technology acceptance. Perceived usefulness is defined as "the user's expectation that use of the technology will increase his/her performance or ability to obtain the desired outcomes," and perceived ease of use is defined as "the ease with which the user expects to use the technology. From the user's point of view, the probability that consumers will trust and use chatbot services increases if they feel these services can help them, are efficient, and are easy to use. Many studies have expanded TAM to include trust as another factor, as a key factor in digital interactions where trust is a key concern, and uncertainty and automation are major parts. Trust's role in TAM has offered insightful understandings of its impact on attitudes, behavioral intentions, and actual use of AI-powered e-commerce services<sup>9</sup>.

### **3.4. Unified Theory of Acceptance and Use of Technology (UTAUT)**

The Unified Theory of Acceptance and Use of Technology (UTAUT) offers a thorough theory to explain why people adopt technology by combining the ideas of various behavioral theories. From the perspective of UTAUT, user acceptance is affected by four main factors: (1) performance expectancy, (2) effort expectancy, (3) social influence, and (4) facilitating conditions. Continuing the themes, performance expectancy is the expectation of benefits from the use of a technology, and effort expectancy is the ease of use. Social influence is defined as the recommendation and opinion of peers, family, and society, while facilitating conditions are defined as the infrastructure and technology making it easy to use. UTAUT has been extensively utilized to investigate influencing factors in consumer acceptance and continued usage intentions in AI chatbot research. In the UTAUT model, trust can act as a mediator or moderator variable, affecting users' perceptions of both system reliability and effectiveness within chatbot systems. The model is especially useful for comprehending the intricate relationships between technological, social, and psychological factors that influence consumer trust and adoption in e-commerce settings<sup>10</sup>.

### **3.5. Trust Transfer Theory**

Trust Transfer Theory is the idea that trust gained in one entity can be passed on to another entity that is related to the first. In the e-commerce context, the customer can use the Internet-based retailer/platform that they already trust and place their trust in the AI chatbot within the platform. For instance, users who have previous experience with the e-commerce brand might be more inclined to communicate with and use its chatbots, even if they haven't used the chatbots themselves. Likewise, when new technologies, payment methods, or customer service channels are launched, users often trust them because it comes from a technology they already know and use. The theory is especially relevant in the case of AI chatbots, as people often have questions about the range of what AI can do and its intentions. The trust formation towards

Chatbot technologies can be greatly affected by the reputation of the hosting platform, brand credibility, and positive experiences from the past. This knowledge of trust transfer mechanisms can offer valuable lessons for organizations on how to take advantage of the existing consumer relationships to smooth the path to the adoption and acceptance of AI-powered customer service solutions<sup>11</sup>.

#### **4. Determinants of Consumer Trust Toward AI Chatbots**

Consumer trust in AI chatbots is influenced by a combination of technological, psychological, and contextual factors. As AI-driven conversational agents become increasingly integrated into e-commerce platforms, understanding the determinants that shape trust has become essential for both researchers and practitioners. Trust formation is not solely dependent on a chatbot's technical performance but also on consumers' perceptions regarding its intelligence, usefulness, transparency, reliability, and ability to protect personal information. The following sections discuss the major determinants that contribute to the development of trust toward AI chatbots in e-commerce environments<sup>12</sup>.

##### **4.1 Perceived Intelligence**

Perceived intelligence refers to the extent to which consumers believe that an AI chatbot possesses the capability to understand, process, and respond appropriately to user queries. Intelligent chatbots can interpret natural language, recognize user intent, maintain contextual awareness, and provide relevant recommendations or solutions. Consumers tend to trust chatbots that demonstrate a high level of competence and understanding during interactions. The ability to engage in coherent conversations, answer complex questions, and adapt responses based on previous interactions enhances perceptions of intelligence and professionalism. Conversely, repetitive, irrelevant, or inaccurate responses may create doubts regarding the chatbot's capabilities, leading to reduced trust and satisfaction. Therefore, perceived intelligence serves as a critical indicator of a chatbot's effectiveness and significantly influences consumer confidence in AI-assisted shopping experiences<sup>13</sup>.

##### **4.2 Perceived Usefulness**

Perceived usefulness is defined as the degree to which consumers believe that using an AI chatbot enhances their shopping experience and helps them achieve their objectives more efficiently. Chatbots that provide timely information, facilitate product discovery, simplify purchasing decisions, and resolve customer issues effectively are generally perceived as useful. When consumers recognize tangible benefits such as time savings, convenience, and improved

decision-making, they are more likely to trust and continue using chatbot services. In e-commerce settings, usefulness is closely associated with customer satisfaction and behavioral intentions. A chatbot that consistently delivers value by reducing effort and improving service quality fosters positive perceptions and strengthens trust. Consequently, perceived usefulness remains one of the most influential predictors of AI chatbot acceptance and adoption<sup>14</sup>.

#### **4.3 Ease of Use**

Ease of use refers to the extent to which interacting with a chatbot is perceived as simple, intuitive, and free from unnecessary complexity. Consumers generally prefer technologies that require minimal learning and can be used without extensive technical knowledge. A chatbot with a user-friendly interface, clear communication style, and straightforward navigation process can significantly enhance the overall user experience. When consumers encounter difficulties in understanding chatbot responses or completing tasks through the system, frustration and dissatisfaction may arise, negatively affecting trust. In contrast, seamless interactions promote confidence and encourage continued engagement. Research consistently demonstrates that ease of use positively influences both trust and acceptance of AI technologies, making it a fundamental determinant of successful chatbot implementation in e-commerce<sup>15</sup>.

#### **4.4 Transparency and Explainability**

Transparency and explainability are increasingly recognized as essential factors in building trust toward AI systems. Transparency refers to the extent to which consumers understand how a chatbot operates, collects data, and generates recommendations or decisions. Explainability involves providing clear and understandable reasons for chatbot responses and suggested actions. Consumers are more likely to trust AI chatbots when they have insight into the rationale behind recommendations and can comprehend how their information is being utilized. Lack of transparency may create uncertainty, suspicion, and concerns regarding hidden algorithms or biased decision-making processes. As AI systems become more sophisticated, ensuring transparency and explainability is crucial for promoting accountability and fostering consumer confidence. Organizations that communicate openly about chatbot functionalities and limitations are better positioned to establish long-term trust relationships with users<sup>16</sup>.

#### **4.5 Personalization**

Personalization refers to the ability of AI chatbots to tailor interactions, recommendations, and services according to individual consumer preferences, behaviors, and purchase histories. Through data analytics and machine learning techniques, chatbots can provide customized product suggestions, targeted promotions, and personalized customer support experiences. Consumers often perceive personalized interactions as more relevant,

engaging, and valuable, which contributes positively to trust formation. Personalized recommendations can reduce information overload and assist customers in making informed purchasing decisions. However, excessive personalization may also generate concerns about surveillance and privacy if consumers perceive that too much personal information is being collected or analyzed. Therefore, achieving an appropriate balance between personalization and privacy protection is essential for maintaining consumer trust in AI-driven e-commerce platforms<sup>17</sup>.

#### **4.6 Reliability and Accuracy**

Reliability and accuracy represent fundamental attributes that directly influence consumer trust in AI chatbots. Reliability refers to the consistency with which a chatbot performs its intended functions, while accuracy concerns the correctness and relevance of the information provided. Consumers expect chatbots to deliver dependable assistance, accurate recommendations, and error-free responses during every interaction. Frequent inaccuracies, system failures, or inconsistent performance can undermine confidence and discourage future usage. In contrast, reliable and accurate chatbot performance reinforces perceptions of competence and professionalism, thereby enhancing trust. Since consumers often rely on chatbot-generated information when making purchasing decisions, maintaining high standards of reliability and accuracy is essential for ensuring positive customer experiences and long-term adoption<sup>18</sup>.

#### **4.7 Human-Likeness and Anthropomorphism**

Human-likeness and anthropomorphism refer to the tendency of consumers to attribute human characteristics, emotions, and social qualities to AI chatbots. Advances in natural language processing and conversational design have enabled chatbots to engage in increasingly natural and human-like interactions. Features such as conversational language, emotional responsiveness, personalized greetings, and empathetic communication can create a sense of social presence and foster emotional connections with users. Anthropomorphic characteristics often enhance user engagement and increase affective trust by making interactions feel more familiar and comfortable. However, excessive human-likeness may sometimes create unrealistic expectations or trigger discomfort associated with the "uncanny valley" phenomenon, where highly human-like systems appear unnatural or unsettling. Therefore, organizations must carefully design chatbot personalities to balance authenticity, functionality, and user comfort<sup>19</sup>.

#### 4.8 Privacy and Data Security

Privacy and data security are among the most significant determinants of consumer trust in AI chatbots. E-commerce chatbots frequently collect, process, and store personal information, including purchase histories, payment details, browsing behavior, and communication records. Consumers are increasingly aware of potential risks associated with data breaches, unauthorized access, and misuse of personal information. Consequently, trust is strongly influenced by perceptions of how effectively organizations protect consumer data and comply with privacy regulations. Transparent data management practices, secure encryption technologies, user consent mechanisms, and regulatory compliance contribute to enhanced trust and confidence. Conversely, concerns regarding surveillance, data exploitation, and cybersecurity threats can significantly hinder chatbot adoption. As AI technologies continue to evolve, safeguarding privacy and ensuring robust data security measures remain critical prerequisites for establishing and maintaining consumer trust in e-commerce environments.

### 5. Consumer Perceptions and Behavioral Responses

AI chatbots' impact on e-commerce is not just about the technology; it's in how users experience and interact with it. The trust built through conversations with chatbots profoundly impacts the shopping experience, consumer interaction with online platforms, and the decision-making process of consumers. Making customers feel positive towards an AI chatbot can improve satisfaction, build engagement, boost buying intent, and encourage long-term loyalty. On the other hand, negative interactions can lead to a decrease in the number of users using the system and in their trust of the chatbot and the e-commerce platform. To grasp the broader implications of AI chatbots on customer interactions and business outcomes, it is crucial to be aware of these behavioral shifts<sup>20</sup>.

#### 5.1. User Satisfaction

One of the most significant measures of the effectiveness of an AI chatbot for e-commerce is user satisfaction. It's the extent to which the user feels their needs and expectations are being met in the user experience with the chatbot system. Some factors that impact satisfaction are response accuracy, interaction speed, ease of use, personalization, and problem solving. If the chatbots offer consumers timely and relevant support, consumers feel more convenient and more efficient, and are more satisfied. When users are satisfied with the chatbot, they are more likely to form positive attitudes towards the chatbot and the e-commerce platform, leading to increased trust and intentions for future use. Moreover, customer satisfaction acts as a vital

intermediary between the chatbot's performance and desirable customer actions like loyalty, repeat purchases and positive recommendations<sup>21</sup>.

## **5.2. The degree of engagement and the quality of interaction.**

Consumer engagement is a measure of the extent to which consumers can think, feel, and act when interacting with AI chatbots. Good interactions have a high level of responsiveness, relevance, personalisation, and conversational fluency. Chatbots that can have meaningful, contextually relevant chats make customer interaction more engaging and offer users more time to learn about products and services. The quality of interaction is crucial as they influence the consumers' perception of the competence and trustworthiness of the chatbot. Positive engagement experiences lead to better emotional connections, higher satisfaction and higher willingness to use the recommendations of a chatbot. With the ongoing development of AI technologies, quality of interactions is now a key strategy for organisations to optimize customer experience and build consumer relationships.

## **5.3. Purchase Intention**

Purchase intention is a customer's probable or desire to purchase products or services following their interaction with an AI chatbot. Trust is a crucial determinant of purchase decisions, especially in an online context where uncertainty and perceived risk may be a factor. AI chatbots have the potential to influence positive buying decisions by offering personalized product suggestions, addressing product-related queries, minimizing information search expenses, and helping customers throughout the buying process. Users are likely to trust the recommendations and make purchases when they believe the chatbots are knowledgeable, reliable, and helpful. On the other hand, worries about accuracy, transparency, or privacy can diminish buy intentions even with the convenience of chatbot services. This means to make a chatbot successful in converting interactions into real sales and revenue generation, building trust is crucial<sup>22</sup>.

## **5.4. Repurchase Behavior**

Repurchase behavior is the inclination of consumers to return to the e-commerce platform they previously engaged with, after a favorable experience. AI chatbots can play a role in repurchase by improving customer satisfaction, streamlining transactions, and offering seamless support throughout the customer journey. Having good encounters with chatbots establishes positive perceptions, which inspires clients to return for additional bargains. Good interactions with chatbots generate good perceptions, which encourage clients to return back for additional purchases. Furthermore, customised suggestions and proactive customer service

can boost the perceived value and enhance customer-platform connection. Positive past interactions can build trust and confidence in the services offered by the platform, which is likely to result in repeat business. Customer retention is often more economical than the costs of obtaining new customers, which is why knowing how chatbots can influence repurchase behavior is crucial to e-commerce companies.

### **5.5. Customer Loyalty**

Customer loyalty is a long-term relationship with a brand, retailer or online platform and is seen as a major factor in achieving sustainable business success. By consistently providing high-quality customer experiences and tailored services, AI chatbots can play a role in fostering customer loyalty. Trust is also key to loyalty, with customers feeling more loyal toward brands that are reliable, competent, and responsive. By engaging regularly and providing personalized assistance, chatbots can enhance both the emotional and functional relationships between companies and their customers. Loyal customers are more likely to show a high degree of tolerance to the occasional service failure, increase their buying frequency, and develop a stronger brand loyalty. In today's digital landscape, AI chatbots are becoming a valuable asset for businesses aiming to build meaningful customer connections and gain a competitive edge<sup>23</sup>.

### **5.6. Word-of-Mouth Intentions**

Word-of-mouth intentions are consumers' intentions to share their experiences with other consumers and their recommendations to other consumers through personal communication, electronic reviews, social media, and electronic communities. When customers have positive interactions with AI chatbots, they can spread positive word of mouth, impacting potential customers' buying habits. If customers feel the chatbot interactions are effective, fun and reliable, they are more inclined to endorse the service to friends, relatives, and online networks. Positive word of mouth can improve brand reputation and is also a cost-effective marketing and customer acquisition tool. However, negative experiences with chatbots can lead to negative reviews and damage to the reputation. Thus, organizations need to have well-designed chatbot systems that provide a consistent, high-quality user experience and motivate people to act as brand advocates and engage in positive electronic word-of-mouth (eWOM)<sup>24</sup>.

## **6. Psychological Factors Influencing Trust**

Consumer trust toward AI chatbots is not solely determined by technological features and system performance but is also shaped by various psychological factors that influence how individuals perceive, evaluate, and interact with intelligent systems. Consumers bring their own beliefs, attitudes, experiences, and emotional predispositions into technology-mediated



interactions, which significantly affect trust formation and adoption behavior. In the context of e-commerce, psychological factors play a crucial role in determining whether consumers view AI chatbots as reliable assistants or as potential sources of uncertainty and risk. Understanding these psychological determinants is essential for developing chatbot systems that effectively address consumer concerns and foster positive user experiences<sup>25</sup>.

### **6.1. Perceived Risk**

Perceived risk refers to a consumer's subjective assessment of the potential negative consequences associated with using AI chatbots during online shopping activities. In e-commerce environments, perceived risk may arise from concerns related to financial loss, privacy breaches, inaccurate recommendations, transaction errors, or misuse of personal information. Since AI chatbots often assist consumers in making purchase decisions and handling sensitive data, uncertainty regarding their capabilities and intentions can negatively influence trust. Consumers who perceive high levels of risk are generally more hesitant to rely on chatbot-generated recommendations or disclose personal information. Conversely, when organizations implement transparent policies, secure systems, and reliable chatbot functionalities, perceived risk is reduced, leading to greater trust and acceptance<sup>26</sup>.

### **6.2. Trust Propensity**

Trust propensity refers to an individual's general tendency to trust others, including technologies and automated systems, regardless of specific situational factors. It is considered a stable personality trait that influences how consumers approach new technologies and unfamiliar interactions. Individuals with high trust propensity are typically more willing to accept chatbot recommendations, engage in conversations, and experiment with innovative digital services. In contrast, consumers with low trust propensity often require greater evidence of reliability, competence, and security before developing confidence in AI systems. Trust propensity can significantly affect initial trust formation, particularly during first-time interactions with chatbots. As a result, organizations should recognize that trust-building strategies may not have identical effects on all users, as individual differences play an important role in shaping perceptions and behavioral responses<sup>27</sup>.

### **6.3. Technology Readiness**

Technology readiness describes an individual's willingness and ability to embrace and use new technologies to accomplish personal or professional objectives. It encompasses both positive drivers, such as optimism and innovativeness, and negative inhibitors, including discomfort and insecurity. Consumers with high levels of technology readiness are generally

more receptive to AI chatbot adoption because they perceive technological innovations as beneficial and useful. These individuals are often willing to explore chatbot functionalities, tolerate minor system limitations, and adapt to evolving digital environments. Conversely, consumers with low technology readiness may experience anxiety or skepticism when interacting with AI systems, reducing their willingness to trust and use chatbot services. Consequently, technology readiness serves as an important predictor of consumer attitudes toward AI chatbots and influences the extent to which trust can be established in e-commerce settings<sup>28</sup>.

#### **6.4. Consumer Innovativeness**

Consumer innovativeness refers to the tendency of individuals to adopt new products, services, and technologies earlier than others. Innovative consumers are typically curious, open to experimentation, and eager to explore emerging technological solutions. In the context of AI chatbots, highly innovative consumers are more likely to engage with chatbot systems, evaluate their capabilities positively, and develop trust through repeated interactions. These individuals often perceive technological innovations as opportunities rather than threats, making them more receptive to AI-assisted shopping experiences. In contrast, less innovative consumers may exhibit resistance to change and prefer traditional customer service channels. Research suggests that consumer innovativeness positively influences technology acceptance, user engagement, and trust formation, particularly during the early stages of technology adoption. Therefore, understanding levels of consumer innovativeness can help organizations design targeted strategies to encourage chatbot acceptance among different customer segments<sup>29</sup>.

#### **6.5. Perceived Control**

Perceived control refers to the extent to which consumers believe they can influence, manage, and direct their interactions with AI chatbot systems. Consumers generally prefer technologies that allow them to maintain autonomy and make independent decisions during the shopping process. When users feel that they have control over the conversation, data sharing preferences, and purchasing decisions, they are more likely to trust the chatbot and engage with its services. Features such as customizable settings, clear navigation options, and the ability to escalate interactions to human representatives can enhance perceptions of control. Conversely, consumers may experience distrust when chatbot systems appear overly autonomous, manipulative, or difficult to override. As AI technologies become increasingly sophisticated, ensuring that users retain a sense of control is essential for promoting positive attitudes and sustained trust in e-commerce environments<sup>30</sup>.

## 6.6. Emotional Responses

Emotional responses play a significant role in shaping consumer trust toward AI chatbots. During interactions, consumers may experience a range of emotions, including satisfaction, enjoyment, confidence, frustration, anxiety, or skepticism. Positive emotions generated through friendly communication, personalized assistance, and successful problem resolution can strengthen trust and encourage continued engagement. Conversely, negative emotions arising from misunderstandings, inaccurate responses, or privacy concerns may undermine confidence and reduce acceptance. Advances in conversational AI have enabled chatbots to exhibit empathetic communication and emotional intelligence, helping create more human-like and emotionally engaging interactions. Such capabilities can enhance affective trust by fostering feelings of comfort and social connection. Given the strong relationship between emotions and decision-making, understanding emotional responses is critical for designing chatbot experiences that support trust development and long-term consumer satisfaction<sup>31</sup>.

## 7. Ethical and Privacy Concerns

Ethical and privacy concerns are growing issues that impact consumer trust and technology acceptance, as AI chatbots are increasingly embedded in e-commerce platforms. Although AI-powered conversational agents have many advantages, such as providing personalized services, making things more efficient, and improving the process for customers, they also have certain problems, including data usage, fairness, accountability, and consumer rights. As consumers gain deeper understanding of the ethical concerns linked to AI technology, especially regarding the utilization of personal data to shape buying habits, it is essential to implement the necessary safeguards to guarantee that the advantages of these innovations are not outweighed by their dangers. With the rise in awareness among consumers of the ethical concerns surrounding AI technology, particularly with the use of personal data to inform purchasing decisions, it is vital to take the necessary measures to ensure that the benefits of these innovations do not outweigh the risks. To ensure that these concerns are taken care of proactively and that trust is established, responsible innovation is ensured and long-term customer relationships are maintained<sup>32</sup>.

### 7.1. The collection and tracking of data. Data gathering and monitoring.

Data collection is a key factor in achieving personalized and contextually relevant services, which is essential for AI chatbots. In interactions, chatbots can collect a range of data about the consumer, such as browsing habits, buying history, demographics, communication

history, and preferences. The information can be used to provide personalized suggestions and enhance user experiences, but it also raises privacy and digital surveillance issues. Consumers might not feel at ease if they believe they are being monitored, stored, or analyzed by an excessive amount of personal information without sufficient transparency. Anticipation of constant oversight may lead to a sense of insecurity and diminish trust in the chatbot and e-commerce platform. Moreover, consumers might be deterred from using AI-powered services due to data privacy and security risks, such as potential data leaks, unauthorized access, and misuse of personal information. Hence, it is important for organizations to have transparency in how they collect data and to clearly communicate to consumers how their data is being collected, processed, and secured<sup>33</sup>.

## **7.2. Algorithmic Bias**

Algorithmic bias is a recurring error or inequity that results from AI systems based on biases present in the data they use to train the models, in the way models are constructed or in the way they are used to make decisions. AI chatbots can be trained on vast amounts of data that can include historical inequities, societal stereotypes or imperfect data, resulting in potential discriminatory results. Biased algorithms can be used in e-commerce systems to make recommendations, segment customers, offer promotions, or provide service, and can have negative consequences for some customer groups. This can negatively affect trust, fairness and equity. The worry among consumers is that AI systems make decisions that are objective or that they continue to reflect existing biases. To tackle algorithmic bias, organizations must adopt a rigorous testing process, diverse training data sets, ongoing monitoring, and fairness evaluations throughout the AI lifecycle. Addressing the fairness of treatment for all users is crucial for ethical AI usage and to build confidence in consumers<sup>34</sup>.

## **7.3. Transparency Issues**

One of the biggest challenges with implementing AI chatbots is transparency. Many sophisticated AI systems are what is known as “black-box” models where the consumer is not able to understand how the system arrives at decisions and the recommendations it makes. When the recommendations are personalized and not transparently explained, there may be uncertainties and scepticism about the process, especially when the recommendations are unclear to the consumers. Additionally, users might not be aware that they are dealing with an AI system instead of a human representative, resulting in worries about deception and authenticity. When chatbots are used in purchasing decisions, for data collection, or to automate customer service processes, transparency becomes an even greater matter. Transparency regarding the identity of the chatbot, how it processes information, and its decision-making

process can help mitigate uncertainty and improve trust. Enhancing transparency and explainability will continue to be vital in the era of evolving AI systems, particularly in building consumer acceptance and accountability<sup>35</sup>.

#### **7.4. Ethical AI Practices**

Ethical AI practices include principles, guidelines, and organizational strategies that contribute to the responsible development and use of AI technologies. Ethical AI in e-commerce chatbots is about fostering fairness, accountability, transparency, safeguarding privacy, and prioritizing consumer well-being. It is important to ensure that chatbot systems consider the user's interests above all else, do not engage in manipulative behaviors, and do not interfere with consumer autonomy in their decision-making. Ethical considerations also include preventing misinformation, safeguarding vulnerable consumers, and ensuring that AI-generated recommendations are aligned with consumer needs rather than solely commercial objectives. Organizations can foster responsible AI practices by setting up ethical governance frameworks, regularly auditing their practices, and implementing human oversight mechanisms. When businesses uphold ethical standards, they can build trust with consumers and improve their reputation in the ever-changing digital landscape<sup>36</sup>.

#### **7.5. Regulatory Considerations**

AI technologies are evolving quickly, leading governments and regulators around the world to design frameworks to safeguard consumer rights and promote responsible use of AI technologies. AI Chatbot deployment challenges include data protection, privacy compliance, algorithmic accountability, consumer transparency, and cybersecurity requirements. Data privacy laws and consumer protection policies mandate informed consent, the protection of personal information and enhanced user control over their data. Moreover, new AI governance principles include principles that promote transparency, fairness, and explainability in AI-driven decision-making systems. Meeting regulatory requirements helps minimise legal and operational risk and instils consumer confidence through evidence of accountability within the organisation. Indeed, as AI regulations develop across the world, companies should stay proactive in modifying their chatbot systems to comply with legal specifications and make sure of moral obligations. The future of trustworthy AI-powered e-commerce ecosystems is set to be influenced by effective regulatory compliance<sup>37</sup>.

### **8. Impact of AI Chatbots on E-Commerce Performance**

AI chatbots have revolutionized eCommerce by improving both the tasks and strategies of retail businesses. In addition to being customer support representatives, chatbots have a

significant impact on various organizational functions, such as customer experience, relationship management, sales growth, operational efficiency, and cost optimization. AI chatbots offer immediate, individualized, and scalable interactions, helping businesses keep pace with changing consumer demands and gain a competitive edge in the ever-evolving digital landscape. As businesses have adopted AI technologies, it has become important to recognize the role that chatbots play in the e-commerce sector's performance to be able to assess the contribution of these bots to any business in the long term<sup>38</sup>.

### **8.1. Customer Experience Enhancement**

In today's e-commerce landscape, customer experience has become a key factor in determining the outcome of any business. AI-powered chatbots are one of the most important tools that can help improve the customer experience. Chatbots can help guide users through websites more efficiently and effectively through real-time assistance, personalized recommendations, and seamless communication. AI chatbots offer instant responses and support that is available anytime, unlike traditional customer support channels that can be time-consuming and less flexible. This accessibility not only makes the shopping experience more convenient but also helps to minimize customer frustration, which is valuable throughout the buying process. Additionally, a smart chatbot can understand customer behavior and preferences, providing personalized product recommendations and enhancing the shopping experience, which boosts customer satisfaction and engagement. AI chatbots play a crucial role in fostering positive customer experiences, which improves customer trust, retention, and engagement, while also ensuring seamless interactions and reducing service disruptions<sup>39</sup>.

### **8.2. Customer Relationship Management**

In the world of e-commerce, AI-powered chatbots have emerged as an invaluable asset for enhancing Customer Relationship Management (CRM) efforts. Good CRM is about establishing and maintaining a relationship with the customer for the long term, through personalised communication, responsiveness, and ongoing customer interactions. By achieving these goals, Chatbots can gather customer information, keep records of interactions, and provide tailored suggestions on consumer tastes and actions. They can reach out to customers on a proactive basis with product suggestions, promotions, and post-sale communications, effectively building customer relationships beyond the transaction. Furthermore, chatbots can be used to provide customers with timely assistance whenever they need it, and they can be programmed to handle a wide range of common customer questions. In addition, chatbots can be integrated with a wide range of common customer inquiries, and they can be used to provide customers with timely assistance when they need it, in a consistent and efficient manner, across

multiple touchpoints. AI chatbots can improve communication quality, customer engagement, and lead to better customer relationships and increased customer lifetime value<sup>40</sup>.

### **8.3. Sales Conversion**

AI chatbots can have a substantial impact on sales conversion rates, which is one of the most notable advantages for businesses. Chatbots can guide consumers through the entire buying funnel, offering them answers to product-related queries, comparisons, addressing concerns, and suggesting appropriate products. Chatbots can decrease information search costs and lessen the uncertainty, thus making consumers more confident to make a purchasing decision. Machine learning algorithms can also produce personalized suggestions that further boost the probability of product discovery and completion of purchases. Moreover, when a customer is likely to abandon a product on the website, the chatbot can detect the hesitation and provide the necessary help, which decreases the chances of abandoning the cart<sup>41</sup>. AI chatbots can enhance the customer experience by providing personalized help, answering frequently asked questions, and handling customer inquiries, which can lead to improved conversion rates and revenue generation for e-commerce businesses.

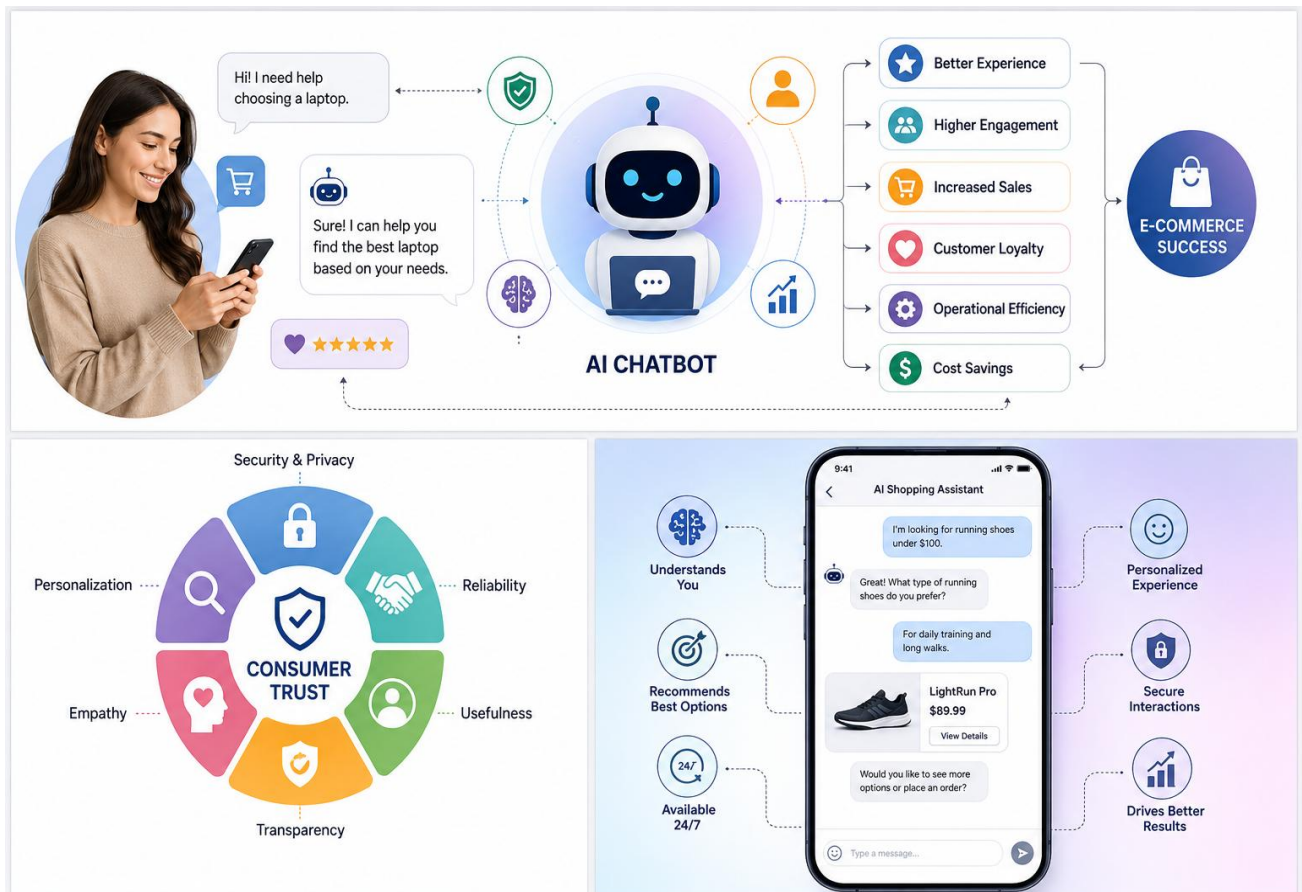
### **8.4. Operational Efficiency**

AI chatbots offer significant value to e-commerce businesses, particularly in enhancing their operational efficiency. Customer service operations are typically labor-intensive and must deal with a considerable amount of inquiries and support requests. Many repetitive and repetitive activities, such as answering frequently asked questions, processing order enquiries, handling return requests, and providing account-related assistance, are automated by AI chatbots. This automation helps businesses handle a high volume of customer interactions without compromising service quality or response time<sup>42</sup>. Moreover, bots can work around the clock without any breaks, providing services round the clock, irrespective of the time zone or the busy shopping season. AI chatbots optimize workflows, minimize reliance on manual processes, and boost overall productivity while ensuring a more consistent customer experience, thereby enabling human agents to engage in more in-depth and strategic tasks.

### **8.5. Cost Reduction**

AI chatbots provide substantial potential for cost savings in the e-commerce business. Customer service operations can be a significant portion of the business costs because of employees, training, and infrastructure needs. Chatbots streamline customer communication by handling repetitive tasks, thereby decreasing the need for large human support teams and ensuring that customer service is readily available. Handling several customer inquiries at once

again boosts cost efficiency and resource usage. Moreover, chatbots help in saving costs by preventing errors, decreasing service delays, and enhancing processes. The improved customer satisfaction and retention that can be achieved through effective chatbot implementation can also help to reduce customer acquisition costs by fostering repeat business and positive word-of-mouth referrals<sup>43</sup>. As a result, AI chatbots are a cost-effective technological answer that can assist organizations in optimizing their economic efficiency while supplying better services (Fig.2).



**Fig.2. Consumer Trust Framework for AI-Powered Chatbots in E-Commerce**

## 9. Challenges and Barriers to Consumer Trust

While AI chatbots bring numerous advantages to e-commerce, there are still hurdles to overcome in building and sustaining trust among consumers. Trust is a fragile construct and is easily undermined by negative experiences, technological limitations, and perceived risk. Although AI technologies have enhanced the ability of chatbots, there is a growing scepticism among consumers to use AI for information, recommendations, and buying. Inaccurate answers, poor emotional understanding, security issues, cultural miscommunications, over-automated systems, and service issues can negatively impact the consumer's perception and



trust. Awareness of these challenges is crucial for developing reliable chatbot systems and creating sustainable customer relationships<sup>44</sup>.

### **9.1. Inaccurate Responses**

Inaccurate or misleading responses are one of the most common issues that impact consumer trust in AI chatbots. Consumers want bots to be reliable sources of product information, prices, availability, delivery time, and return policy. But sometimes AI systems can provide imperfect answers as a result of incomplete training data, context misunderstandings, out-of-date information, or algorithmic mistakes. These inaccuracies can lead to misunderstandings, heightened customer risk perception, and adverse customer decision-making. In an e-commerce context, even small mistakes can lead to dissatisfaction, loss of money, or unfulfilled expectations, which can negatively impact the trust customers have in not just the chatbot, but also in the platform itself. When the answers provided by the chatbots are wrong, consumers may stop seeking help in the future. Hence, proper information accuracy and continuous systems improvement are crucial for a consumer's trust<sup>45</sup>.

### **9.2. Lack of Empathy**

While AI chatbots are evolving to sound like humans, they don't always show empathy and emotional intelligence. Human Customer Service Representatives can interpret emotions, adjust communication methods, and offer empathy in difficult or delicate situations. On the other hand, chatbots are mostly programmed and algorithmic in their responses, and may not be able to respond well to emotional needs. When customers are frustrated, disappointed, or anxious, a chatbot interaction might feel impersonal and insensitive, especially regarding a complaint, service issues, or urgent matters. Without genuine emotional involvement, affective trust is diminished, and so is the overall satisfaction. Hence, corporations need to invest in conversational design and emotional intelligence skills to foster a more supportive and empathetic chatbot experience<sup>46</sup>.

### **9.3. Security Concerns**

One of the significant challenges to consumer trust in AI-powered e-commerce systems is the issue of security. Chatbots often process sensitive data like payment information, transaction logs, and communication history. Consumers may be concerned about risks of cybercrime, data breaches, identity theft, and unauthorized access to information. Major breaches of consumers' information have made them more aware of digital risks, causing consumers to become wary of interactions with AI systems. Lacking proper security measures on chatbot platforms can also deter users from providing their information or making

transactions. Building trust requires organisations to show their dedication to cybersecurity by deploying encryption technologies, secure authentication protocols, monitoring systems, and clear data protection procedures. So, it is essential to solve security issues to cultivate consumers' trust and long-term use<sup>47</sup>.

#### **9.4. Cultural Differences**

There can be significant cultural variations in consumer receptivity towards AI Chatbots, as a result of communication culture, social norms, values, and perceptions of technology. Cultural factors affect the understanding, trust, and reaction of consumers to the behaviours of chatbots in their interactions with them. For instance, people from collectivist cultures might be more concerned with social relationships and interpersonal trust, while those in individualistic cultures may be focused on efficiency and functional performance. There are also regional and demographic differences in language preferences and in communication etiquette and expectations for customer service. Inability to include cultural diversity in chatbots can lead to misinterpretation, user dissatisfaction, and trust-building challenges. This leads to the need for culturally responsive chatbots that can provide culturally relevant and localized interactions with a diverse audience in global e-commerce markets<sup>48</sup>.

#### **9.5. Over-Automation**

Automation is a great thing for efficiency and scalability, but overuse of AI chatbots can have a negative impact on consumer experiences. Over-automation is when too many of the human interactions are substituted with automated systems, losing out on opportunities for consumers to receive personalized assistance from human representatives. While chatbots can be useful for simple or routine questions, they may not perform well with more complex or rare questions, or with questions that involve emotional content and require human judgment. When consumers can't take their issue up the escalation chain or get any meaningful assistance beyond standard responses, they may become frustrated. Over-automation can lead to a sense of disaffection in the organization and a lack of personal touch with the brand. Striking a balance will ensure that businesses can keep the consumer happy while maximizing the efficiency of their chatbots and offering human contact when it is needed<sup>49</sup>.

#### **9.6. Strengthening the bond of trust after mistakes**

Establishing trust is hard, but also easy to break when chatbot systems make errors or don't live up to the consumer's expectations. The quality of service may also be affected by recommending wrong items, transaction mistakes, wrong answers, downtime, privacy breaches, and the like, which can seriously undermine the consumer's trust. When trust is broken, consumers might be less likely to use a chatbot service and might doubt the

trustworthiness of the entire e-commerce platform. How severe the erosion of trust can be depends on the type of mistake, the effects of the mistake, and the response of the organisation to the incident. The willingness to admit errors, open communication, corrective measures, and effective service recovery plans can assist in restoring consumer confidence. But if the mistakes keep on happening or the lessons learnt from failures are not applied, the long-term consequences can be a bad reputation and loss of customers. Hence, it is important for organizations to put in place systems of ongoing monitoring, quality assurance, and trust rebuilding to maintain good relationships with consumers<sup>50</sup>.

## **10. Emerging Trends in AI Chatbots**

As AI continues to advance at a fast pace, its potential to enhance e-commerce is continually changing. The traditional chatbot systems, which focused primarily on predefined responses and simple conversational skills, are being replaced by more advanced AI-powered chatbots that can interpret context, respond naturally, and even execute complex tasks independently. These technological advances are changing the way that customers interact with businesses, providing them with more intelligent, personalized, and immersive shopping experiences. With the evolving nature of consumer expectations, these trends in AI chatbot development are likely to have a significant impact on the future of digital commerce. Comprehending these trends is crucial for organizations looking to stay competitive and earn trust in the ever-evolving AI-driven landscape markets<sup>51</sup>.

### **10.1. Generative AI Chatbots**

Generative AI chatbots are a major leap forward in conversational AI, as they can generate content that isn't simply a list of responses. These chatbots have the power to respond in a contextually relevant, coherent, and human-like manner, all in real-time, thanks to their use of cutting-edge machine learning techniques. Generative AI chatbots can interpret intricate user inquiries, sustain conversation flow, and adjust to context. Unlike traditional rule-based systems, generative AI chatbots can grasp complex user queries, keep the conversation flow, and respond contextually. These can be used to offer tailored product suggestions, respond to in-depth queries, generate personalized shopping recommendations, and guide customers through the buying process in e-commerce settings. They take care to provide natural and engaging interactions, which leads to higher satisfaction among users and better customer experience. But response accuracy, hallucinations, and ethical issues are still significant factors to consider for companies using generative AI solutions<sup>52</sup>.

## 10.2. These are known as Large Language Models (LLMs).

One of the most impactful innovations that is shaping the future of AI chatbots is Large Language Models (LLMs). LLMs have been trained on tremendous amounts of text data, and they have strong language-understanding, content production, reasoning, and context-understanding capabilities. These models allow for more nuanced interactions between the chatbot and the user, mimicking human communication and making interactions more intuitive and effective. LLMs can be used in e-commerce to offer detailed product information, compare options, summarize customer reviews, and deliver personalized product suggestions. LLMs can be used in e-commerce to provide detailed product information, compare options, summarize customer reviews, and deliver personalized product suggestions. They are able to answer complex questions and provide detailed answers, improving cognitive trust and encouraging consumers to think about the products and services they are interested in. They can answer complex questions and provide detailed answers, enhancing both cognitive and affective elements of consumers' trust. Notwithstanding their impressive abilities, organisations are recognizing the need to tackle issues of transparency, explainability, misinformation, and responsible governance of LLM-powered systems to ensure trustworthy use<sup>53</sup>.

## 10.3. Voice-Based Commerce

The trend of voice commerce, or virtual shopping with voice inputs, has been growing over time as consumers have come to rely on voice input devices and virtual assistants. This new trend enables consumers to use voice commands instead of a keyboard and mouse to shop online. By leveraging AI-driven voice command interfaces, consumers can ask questions, make comparisons, place orders, check shipping status, and get recommended products, all while interacting with the AI's voice. Voice interaction is convenient, fast, and hands-free, which helps to increase user engagement and accessibility. In addition, developments in speech recognition and natural language understanding (NLU) technologies have greatly enhanced the effectiveness and accuracy of voice-based systems. With the rise of voice commerce, security and reliability concerns with privacy, authentication, and consumer trust are becoming more difficult to address within organizations<sup>54</sup>.

## 10.4. Agentic AI Shopping Assistants

AI shopping agents are a new breed of AI systems that can make decisions on their own for consumers. Agentic AI systems can anticipate customer needs, collect information, consider options, and take actions, all without relying heavily on manual input. Agentic AI can be proactive in identifying customer needs, information collection, option analysis, and action, all with less human involvement. These bots can navigate various e-commerce platforms, compare

products, track prices, suggest the best buying options, and even place orders according to preprogrammed consumer preferences in e-commerce environments. The potential for these capabilities to greatly streamline shopping processes and improve the effectiveness of decision-making is significant. The growing independence of agentic AI, however, also poses significant questions about the accountability, transparency, consumer control, and trust of AI systems. Of course, consumers must continue to have control and make decisions, which will be necessary to ensure their acceptance of these more sophisticated AI assistants<sup>55</sup>.

### **10.5. Multimodal AI Systems**

In a multimodal AI system, the chatbot can access and assimilate diverse data types, such as text, voice, images, videos, and more. In contrast to traditional chatbot systems, which only use text, multimodal chatbots can understand visual and auditory data to deliver enhanced and contextually enriched interactions. In e-commerce, for instance, they can upload product photos, give verbal instructions, or work with a visual interface and enjoy tailor-made support from AI systems. For instance, when a customer posts a picture of a product they are interested in, they can get suggestions for other products that are similar but available on a website. Multimodal AI systems enable more engaging interactions, better accessibility, and more immersive shopping experiences by merging various communication channels. They are expected to play a major role in the expansion of the role of AI chatbots in digital commerce, especially regarding understanding various inputs<sup>56</sup>.

### **10.6. Hyper-Personalized Shopping Experiences**

Hyper-personalization is one of the most prevalent trends driving the future of AI-powered e-commerce. AI chatbots can provide highly personalised experiences, based on advanced analytics, machine learning algorithms, and real-time consumer data, which can reflect consumer preferences, behaviours, purchases, and contextual factors. Hyper-personalization differs from traditional personalization methods, which target general segments of customers, by actually catering to the specific needs of each customer. Chatbots can recommend products, customize promotional offers, predict future preferences, and provide personalized assistance throughout the customer journey. The customization of these experiences can help to boost customer satisfaction, engagement, and buy intent, as well as build trust and loyalty. However, companies need to strike a balance between personalization and privacy concerns to prevent the appearance of overstepping their bounds and invading people's privacy in ways they did not anticipate<sup>57</sup>.

## 11. Research Gaps and Future Research Directions

While there are ongoing studies on the impacts of AI chatbots on the e-commerce sector, there are still some areas in need of further investigation. Although there are many articles written about the effects of AI chatbots on e-commerce, there are still some things that need to be explored further. Previous research has greatly contributed to the knowledge of consumer trust, technology acceptance, and consumer behaviors with chatbots. Yet, the swift advancement of AI technologies, the shifting preferences of consumers, and the new ethical issues continue to present novel challenges and opportunities for future exploration. The majority of existing research is limited by having a cross-sectional design, geographically limited samples, and a strong focus on technological factors that influence trust. Therefore, further in-depth and multi-disciplinary studies are needed to investigate the phenomenon of trust as a dynamic and multi-faceted one. Closing these gaps will lead to a better understanding of consumer-AI interactions and help build a trustworthy and sustainable e-commerce ecosystem<sup>58</sup>.

### 11.1. Longitudinal Studies

One key weakness of the current research on chatbots is the focus on cross-sectional studies, measuring consumer perceptions and behaviors at a single moment in time. However, these investigations are helpful in understanding the formation of initial trust and technology acceptance, but are less useful for an understanding of the evolution of trust during ongoing engagement with AI systems. Consumer trust is a dynamic concept that can be increased, decreased, and changed according to the experiences they have had, the improvements in technology, and the results of the service. Longitudinal studies can contribute to the exploration of how trust may build up, consolidate, or fall over longer research periods. The study would shed light on customer retention, long-term adoption trends, trust-building after service downtime, and the viability of AI-powered customer relationships. Therefore, future research should adopt a longitudinal design to gain more insights into the temporality of AI chatbot trust<sup>59</sup>.

### 11.2. Cross-Cultural Comparisons

The findings from the majority of the studies conducted so far on consumer trust in AI chatbots have been limited to specific cultural and/or geographical contexts, making them less generalizable. Consumer perceptions and interactions with AI systems can differ significantly between countries and regions, as cultural values and social norms, communication styles, and attitudes towards technology can vary. Factors that promote trust in one cultural setting may not necessarily have the same effect in another. For instance, consumers with collectivist values

might likely value the relational and social aspects of a chatbot conversation more, while those with individualistic values might be more focused on efficiency and functionality. The presentation of future research ought to involve cross-cultural comparative analysis to delineate cultural differences in the formation of trust, adoption behavior, privacy concerns, and user expectations. These explorations would help shape the evolution of culturally responsive chatbot systems that can better cater to a range of markets around the world<sup>60</sup>.

### **11.3. Ethical Trust Frameworks**

While ethical issues are gaining increasing traction in the debates about the technologies of AI, there are still no comprehensive and systematic models that encompass ethical principles in consumer trust models. While trust has been studied in technology, the existing studies tend to focus on the technological aspects of usefulness, reliability, and ease of use, with limited attention to the broader ethical aspects of fairness, accountability, transparency, and social responsibility. Ethical aspects are likely to be important in influencing perceptions of trust as AI chatbots become more autonomous and influential in consumer decision-making. Future studies should create and test ethical trust models that integrate elements of responsible governance of AI with historical trust factors. These types of frameworks may be useful for assessing the ethical concerns surrounding the use of chatbots and offer guidance on creating AI systems that are consistent with consumer expectations and societal values<sup>61</sup>.

### **11.4. Human–AI Collaboration Models**

The existing literature on chatbots focuses primarily on AI chatbots as stand-alone service providers, neglecting the possible benefits of human-AI interactions. AI chatbots are great for answering simple questions and giving quick responses, but human agents have specific skills like empathy, creativity, judgment, and problem-solving. Further studies are needed on the hybrid service models that can leverage the efficiency of AI and human interaction. Understanding best practices for allocating tasks, escalation procedures, and collaborative decision-making may yield important insights into the ways that organizations can improve their customer experiences without compromising trust. Human–AI collaboration models can also help to mitigate concerns about over-automation, service quality, and customer satisfaction, aiding in creating a more balanced and effective customer service system<sup>62</sup>.

### **11.5. Trust Repair Mechanisms**

The study of trust formation has been widely studied, but there have been few studies that focus on the restoration of trust when a chatbot fails. When the service breaks down, e.g., due to inaccurate recommendations, inappropriate responses, privacy issues, or transaction issues,

consumer confidence can be negatively affected, and customers may be dissuaded from returning to the service. It is important for future study, therefore, to understand how to mend trust after such events. The different approaches to trust recovery, such as communicating clearly, apologizing, fixing a mistake, offering compensation, and human interventions, should be analyzed to determine their effectiveness. Further research is needed to examine the relationship between the severity of service failures, consumer characteristics, and consumer responses to service failures and how these factors relate to the process of restoring trust. Effective repair mechanisms for trust are going to be key to the sustainability of AI-powered customer service systems<sup>63</sup>.

### 11.6. Explainable AI in Commerce

The sophistication of AI chatbot technologies has risen, and the issue of opacity of algorithmic decision-making processes has been growing. Many advanced AI systems are a “black box” and do not allow for understanding how recommendations, responses, or decisions are being made for their consumers. The lack of explainability can lead to uncertainty, loss of perceived transparency, and an impact on trust. While explainable AI (XAI) has become a significant research field in recent years, there is not yet much research on its use in the context of e-commerce chatbots. Future studies are needed to examine the effects of various explanation mechanisms on consumers' perceptions, building of trust, confidence in the decision-making process, and acceptance of AI recommendations. Studies should also identify the types of explanations that are most effective for various consumer groups and shopping scenarios. Explainable AI can help build trust and responsible use of AI in business by increasing transparency and understanding<sup>64</sup>.

## 12. Conclusion

As AI chatbots become more prevalent in the e-commerce industry, they are changing the way businesses engage with customers, providing better customer support, customised shopping experiences, and greater operational efficiency. This review points out that trust is still one of the most vital factors in determining consumer receptivity to chatbots and their ongoing use. Factors that contribute to trust are perceived intelligence, usefulness, and ease of use, transparency, personalization, reliability, human-likeness, and data security. The review also shows that the trust has a significant impact on consumer satisfaction, engagement, buying intention, repurchase intention, customer loyalty, and positive word-of-mouth communication. Meanwhile, issues like misinformation, empathy problems, privacy concerns, algorithmic bias, over-automation, and mistrust due to service failures persist in impeding the adoption of AI-



powered customer interactions. In practical terms, enterprises need to invest in creating chatbots that are both technically efficient and ethically responsible, with a focus on user experience and ensuring security and reliability. Building trust with consumers will help organizations to build better customer relationships, outperform their competitors, and continue to be successful. The future promises more game-changers, including generative AI, large language models, multimodal systems, voice commerce, and agentic AI assistants, which will continue to transform the world of digital commerce. But for the innovations to be successful over time, trustworthy AI ecosystems will need to be built, which would include transparency, accountability, explainability, fairness, and strong privacy protection. In the ever-evolving landscape of AI technologies, establishing and maintaining consumer trust will continue to be a vital foundation for the long-term development and success of AI-powered eCommerce.

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