



Understanding the Influence of AI Chatbots on Customer Satisfaction: A Case Study of Pakistan's E-Commerce Industry

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ABSTRACT

Purpose: Chatbots are virtual helpers to communicate with customers like an actual customer service representative. This study looks at how AI chatbots influence customer satisfaction in online shopping support systems. It is particularly looking at the impact of customer perceptions of information quality, waiting time, pleasure, and arousal on satisfaction with AI chatbot interactions.

Design, methodology and approach: The study used a quantitative, explanatory research design. The data was collected through a structured questionnaire which was adapted from the one used by Ruan and Mezei (2022). Constructed on a likert scale. First, 200 people were invited, who are online shoppers and use AI chatbots during the shopping process. Of the 184 data returns, 181 responses were used after checking and cleaning the data. Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS was used to analyse the relationships between variables. **Results:** The results indicate that the impact of AI chatbots on perceived information quality, perceived waiting time, pleasure and arousal is positive and strong. Out of the four mediation factors, pleasure and arousal are significant and positively influencing the customer satisfaction. The factors of information quality and perceived waiting time, however, did not significantly affect customer satisfaction. **Originality/Value:** This research joins a small number of studies that take both functional and emotional aspects of customer satisfaction with AI chatbots into account. It is all about online clothing retail business and examines the case study of Karachi, Pakistan and offers evidence as well as recommendations for brands considering implementing conversational AI in their customer service.



Introduction

Background

A chatbot is a digital service that is text-based and communicates with users like a human service agent. Another type of AI-powered conversational technology is virtual assistants like Alexa,

Siri, and Cortana (Chung et al., 2020). AI has revolutionized the world, with the emergence of Chatbots in various sectors like healthcare, retail, and finance (Cheng & Jiang, 2020; Eren, 2021; Rese et al., 2020). In online retailing, AI chatbots have emerged as an integral part of customer service, working alongside the human frontline employees (HFLEs) to serve the customers over the course of their shopping process (Lou et al., 2019).

Customer experiences can be shaped by human service providers and AI chatbots, both in terms of customer interactions and service delivery (Henkel et al., 2020). As such, brands are increasingly investing in chatbot technologies to make service more accessible, responsive and a better customer experience. AI chatbots are far more efficient than their traditional counterparts, offering instant customer support, the ability to serve multiple customers at once, and an ability to be on call around the clock.

AI is also playing a significant role in transforming customer-brand relationships, and technology is also a major influence in the way this is changing. Consumers engage with brands through the effective utilization of their resources and knowledge as well as digital technologies to generate value and inform their buying choices (Campbell et al., 2020). In such setting, AI chatbots can be used alongside traditional customer-service methods and build a positive online shopping experience, thereby boosting customer satisfaction (Lou et al., 2019). Thus, their contribution to customer acceptance, value creation and purchasing experiences has been the subject of growing academic interest (Li et al., 2020; Adam et al., 2021; Luo et al., 2019; Pantano & Pizzi, 2020).

AI systems are able to ingest external data and adjust their output to meet set goals (Kaplan et al., 2019). These abilities enable brands to analyse customer enquiries, offer useful information, and also to make it possible for interactive communication in customer care. But, the effectiveness of Chatbot interaction is not only dependent on functional factors like information quality, response time, but also on customers' emotional reactions. As a result, the functional and affective aspects of interactions between customers and AI chatbots in e-commerce are crucial to the comprehension of customer satisfaction.

Problem Statement

Typically, the human conversational assistant has offered recommendations, product information, and guidance to an online shopper via text messages. Virtual Conversational Shopping Assistants (VCSAs) like chatbots, virtual Customer Service Agents, and digital conversational agents have been introduced into the field by advances in information technology and AI. These technologies have changed the way businesses serve their customers online and how they relate to their customers (Wagner et al., 2019).

AI chatbots can help customers throughout their entire shopping journey, from pre-purchase to transaction and post-purchase. The quick response and constant availability could enhance service convenience and customer satisfaction (Ashfaq et al., 2020). Moreover, as chatbots become more direct and more personal when interacting with customers as a representative of the brand, the quality of the interaction will affect customers' perceptions and attitudes towards the organisation (Chung et al., 2020; Zarouali et al., 2018).

Chatbots have been explored in previous studies for the benefits of online sales and customer relationship management. For instance, the study by Chen et al. (2021) has revealed that chatbots can offer appropriate consultation at the time of purchases and affect customers' decision-making process. Likewise, Sarkar et al. (2020) suggest that there is a significant percentage of online shoppers who find the interactions with chatbots helpful. This research, however, has focused mostly on chatbot adoption, acceptance, and usage intentions and not on the mechanisms by which the customer satisfaction is created from the chatbot interactions (Luo et al., 2019; Barney et al., 2020).

Furthermore, the experiences with the chatbot are studied separately in terms of their functional and emotional aspects. This establishes a need to understand how the perceived information quality, perceived waiting time, pleasure and arousal account for the influence of AI chatbot interaction on customer satisfaction. This also applies to the online clothing retail industry in the specific case of Karachi, Pakistan, where there is limited empirical evidence. This study, therefore, explores the role of both functional and affective aspects in predicting customer satisfaction of online shopping using AI Chatbots.

Research Questions

What are the effects of AI chatbots on customer satisfaction during online shopping?

How is the perceived waiting time connected to customer satisfaction when using AI chatbots for online shopping?

What is the link between perceived waiting time and customer satisfaction in the context of online shopping with AI chatbots?

How does fun influence customer satisfaction during online shopping with AI chatbots?

What role does arousal play in customer satisfaction during online shopping using AI chatbots?

Research Objectives

This study is meant to evaluate how AI chatbots influence customer satisfaction in e-commerce.

The study will also investigate the connections between four elements that affect customer satisfaction when interacting with an AI chatbot: perceived information quality, perceived waiting time, pleasure, and arousal.

Significance of the Study

This research provides a comprehensive insight into the elements that affect the impact of chatbots on customers' satisfaction and on their general customer-brand relationship. As over 70% of online shoppers say that they're satisfied with chatbot interactions, knowing what makes them so satisfied makes it easier for brands to use AI. This can create more significant and authentic communication with customers, which can lead to new marketing opportunities.

Scope of the Study

The study is confined to the factors of AI chatbots that influence customer satisfaction among online clothing shoppers who use chatbots, and extends the existing chain model of customer satisfaction to the context of AI-enabled services. Findings are intended to help brands improve ease of use, customer loyalty, and satisfaction, and to guide the development, adoption, and post-adoption stages of AI chatbot deployment.

Definitions of Key Terms

AI Chatbot: A technology system that evaluates customer needs using data collected from digital sources to provide recommendations, alternatives, and solutions tailored to those needs (Black & Van Esch, 2020).

Perceived Information Quality: The relevance, timeliness, and accuracy of information produced by a technology system; a key driver of perceived service superiority and customer satisfaction (Farrow et al., 2019).

Perceived Waiting Time: The customer's subjective experience of the duration before a request is answered; shorter perceived waiting time reduces uncertainty and increases satisfaction (Harrington & Egede, 2023).

Pleasure: A state of being in a good mood; a typically pleasant sensory experience that contributes to effective quality of life (Haugeland et al., 2022).

Arousal: A triggered emotional state in customers that creates a stimulus for pleasure and contributes to satisfaction (Shin et al., 2023).

Customer Satisfaction: The extent to which a customer perceives that a brand or organization has effectively met their needs, based on a comparison of perceived and expected quality.

Literature Review and Hypothesis Development

Theoretical Background

The study is based on the Cognitive-Affective Model that posits the connection between cognitive appraisals, affective responses, and customer satisfaction outcomes. In this research, perceived information quality and perceived waiting time are conceptualized as cognitive or functional aspects of AI chatbot interactions, and pleasure and arousal are conceptualized as affective or emotional aspects of customers' interactions with AI chatbots. The model offers a suitable theoretical basis for comprehending the functional performance and emotional experiences of those interactions with AI-powered chatbots, and how these evaluations translate into customer satisfaction with online shopping support.

AI Chatbot

An automated chatbot that acts as a service agent to help customers communicate with businesses via digital channels. AI service technologies can handle service tasks that have previously been carried out by human front-line agents, such as delivering text-based customer support (Yadav & Pavlou, 2014). Such intelligent service agents are used more and more in

business to help establish conversational interactions that closely mimic human-to-human communication (Nass & Moon, 2000; Wilson et al., 2017; Wunderlich & Paluch, 2017). With the evolution of anthropomorphic features, chatbots have become more and more human. The more the chats become coherent and conversational, the more likely that the customer starts having a hard time knowing that he is engaging with a human or a bot (Candello et al., 2017). AI chatbots can, therefore, serve as a virtual brand ambassador for online shopping, addressing customer queries, offering information, and assisting customers on their shopping journey.

Perceived Information Quality

Perceived information quality refers to how a customer judges the quality and usefulness of the information they receive during an interaction. This quality can be measured in different ways, such as intrinsic and contextual aspects. Intrinsic information quality relates to how accurate, reliable, and valid the information is (Wang & Strong 1996; Lee et al., 2002). On the other hand, contextual information quality looks at whether the information is relevant, adequate, useful, and suitable for the task or situation (Lee et al., 2002; Ponte et al., 2015). It also considers if the information is accurate, complete, and timely (Rees, 2002). In the context of AI chatbots, perceived information quality is how customers evaluate the accuracy, relevance, sufficiency, and usefulness of the information provided by the chatbot during their online shopping experience.

Perceived Waiting Time

Perceived Waiting Time

Perceived waiting time is the time a customer feels their request took to be processed (Antonides et al., 2002). Importantly, how customers react to waiting time is more influenced by their own feelings about how long they waited, rather than the actual time it took (Baker & Cameron, 1996; Pruyn & Smidts, 1998). In AI chatbot services, this is especially important because customers usually expect quick responses in digital environments. When perceived waiting time is low, it leads to fewer negative reactions and greater satisfaction with the service (Djelassi et al., 2018; McLean & Osei-Frimpong, 2017). Therefore, perceived waiting time is an important way customers judge how well the chatbot service is performing..

Pleasure

Pleasure is a positive emotional state, associated with positive emotions of enjoyment, happiness and positive mood (Watson, 2000; Diener et al., 1991). It is a way of describing how enjoyable or rewarding the experience of an interaction or environment is for an individual. The intensity of pleasure can depend on the perception and response to a specific stimulus. In this research, pleasure is defined as customers' positive emotional reaction to their experience with a brand's AI Chatbot. When customers think that it is convenient, engaging, helpful or enjoyable, it can create more feelings of pleasure. Therefore, pleasure is the affective component that can connect the emotional nature of the interactions between AI chatbots and customers to customer satisfaction.

Arousal is the activation or intensity of an emotional response, from calm and low level of stimulation to excitement and high level of stimulation (Dolcos et al., 2004; Lang et al., 1993; Russell, 1980). In addition to pleasure, arousal is also an important aspect of emotional

responses, which may affect how people react and behave after being exposed to technology mediated environment (Bigne et al., 2005).

Arousal in this study is defined as the degree of emotional stimulation, excitement, or activation triggered by the customers' interactions with a brand's AI chatbot. An engaging and responsive chatbot may stimulate customers and increase their involvement in the interaction. Arousal is thus an emotional reaction that can partially explain the role of the emotional experience of interactions with AI chatbots in customer satisfaction.

Relationship Between the Constructs

The Cognitive-Affective Model proposes that when service experiences occur, the cognitive aspects are first evaluated and then the emotional aspects are experienced that drive customer satisfaction overall. Cognitive evaluations in the current study are perceived information quality and perceived waiting time, while pleasantness and excitement are affective evaluations. The overall assessment of the shopping experience with the chatbot is the Customer satisfaction. As such, the framework incorporates the functional and emotional aspects of conversations featuring AI chatbots. This gives a fuller picture of what it means to be satisfied than focusing on the technical outcomes or the feelings that it evokes in the customer.

Customer Satisfaction

Customer satisfaction is a contemporary benchmark of commercial excellence and a foundation of customer-oriented management (Cengiz, 2010). It reflects a post-consumption evaluation that compares perceived quality against expected quality, and can be experienced differently across goods, services, and situations. It is ultimately defined as the customer's perception that a brand or organization has effectively met their needs.

Hypothesis Development

AI Chatbot and Perceived Information Quality

Ashfaq et al. (2020) found that AI chatbots positively influence perceived information quality and, in turn, user satisfaction, with consumers reporting higher perceived reliability, assurance, and empathy from chatbot agents. Around 35% of customers regularly use chatbots for purchases such as groceries, homecare products, and clothing (Mauze et al., 2018), and while chatbots are increasingly used to replace HFLEs to boost productivity, customers must still be convinced of their competence in handling enquiries. In a similar study, Zhu et al. (2023) determined that when users had more positive experiences with the quality of information provided by the chatbot, trust, purchase intent, and satisfaction with the chatbot increased.

H1: There is a positive relationship between using an AI chatbot and information quality perception.

The AI Chatbot is the second component of the experiment. The second part of the experiment is the AI Chatbot.

According to Følstad et al. (2018), by replacing the waiting time that is part of human agents, AI chatbots provide immediate and reliable customer feedback that customers prefer over waiting

for a human agent. Borsci et al. (2022) have correlated the usability of chatbots with speed and accuracy, and they have found that speed, easy reach and chatbots that are always available helps the customer feel comfortable and valued (Chung et al., 2020, Van den Broeck et al., 2019). In a similar study, Brandtzaeg and Følstad (2017) discovered that the conversations with chatbots tend to be shorter and faster than human–human conversations. H&M's personal fashion advice chatbot led to a decrease in wait time, and 42% of people reported it was because of ease of use, quickness and less waiting time that they adopted a chatbot.

H2: AI chatbot is beneficial to perceived waiting time.H2: AI chatbot is beneficial to perceived waiting time.

AI Chatbot and Pleasure

Cheng and Jiang (2022) illustrate this relationship through Domino's chatbot, which allows customers to order pizza with ease, generating satisfaction and pleasure; more broadly, over 30,000 chatbots operate on platforms such as Facebook Messenger and Viber, exchanging roughly two billion messages a month (Sprout Social, 2019). Chen et al. (2021) found that independence, confidence, novelty, and enjoyment increase users' intention to adopt chatbot technology, while Marjerison et al. (2022) found that Chinese users, who rely heavily on technology, associate chatbot use with an improved quality of life.

H3: AI chatbot has a positive impact on customer pleasure.

AI Chatbot and Arousal

Yu (2021) explains the relationship between AI chatbots and arousal in terms of emotional interaction, noting that chatbots strive for professionalism and closeness to sustain a long-term relationship with users. Zarouali et al. (2018) examined affective determinants pleasure, arousal, and supremacy in chatbot interactions, where arousal reflects the level of excitement and mental stimulation experienced during a conversation. Cheng et al. (2021) similarly found that customers prefer chatbots capable of understanding their perspective and needs, underscoring the importance of arousal for successful interactions.

H4: AI chatbot has a positive impact on the arousal of customers.

Perceived Information Quality and Customer Satisfaction

An et al. (2021) discovered that full and good information creates better customer satisfaction and customer experience, which affects customers' view in a positive way. Similarly, Ayyash (2017) who conducted a study on online banking associated the information quality dimensions with the customer satisfaction, recommending that the policymakers should pay attention to the information quality dimensions that have the highest impact on customer satisfaction.

H5: Perceived information quality positively influences customer satisfaction.

Perceived Waiting Time and Customer Satisfaction

Maister (2019) shows that customer satisfaction during a wait depends on the actual wait, both cognitively and affectively, and that providing unambiguous information about the length of waiting time can increase customer satisfaction and loyalty. Pruyn and Smidts (1998) came to a

similar conclusion. Lahap et al. (2018) found that the online fast-food industry showed that lower perceived waiting time is related to higher customer satisfaction, and Luo et al. (2021) found that the use of AI chatbots, which can cut down the long queues associated with previous times, can lead to increased convenience and satisfaction.

H6: Perceived waiting time is positively associated with customer satisfaction.

An enjoyable and satisfied customer

Online shopping is made easier with AI chatbots, which makes the pleasure customers get from shopping online an indicator of satisfaction, which in turn positively influences loyalty and pleasure (Sharma and Bakour, 2012). El-Adly (2019) further states that the satisfaction and loyalty of customers can be directly predicted by customer pleasure.

H7: Pleasure has a positive impact on customer satisfaction.

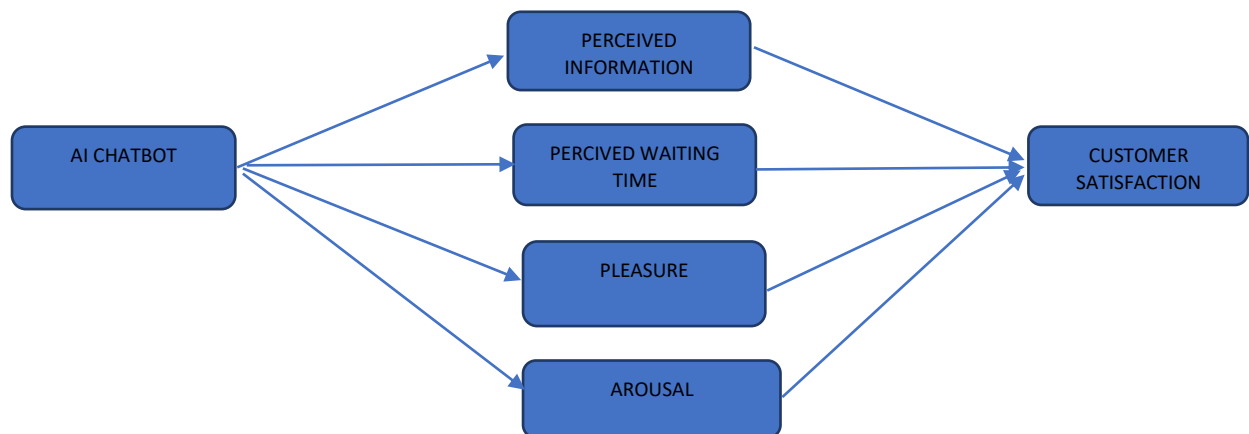
Arousal and Customer Satisfaction

Wirtz et al. (2020) identified that arousal plays a mediating role in consumers' desire to stay engaged with a brand and their willingness to pay via AI chatbots, providing a fruitful framework for comprehending consumers' satisfaction with the brand. Shehata and Alaswadi (2022) concluded that customer arousal significantly and positively influences satisfaction towards AI, as positive arousal that occurs in response to brand's advertisement and involvement is likely to lead to purchase and, in turn, to satisfaction.

H8: Arousal has a direct, significant, positive effect on customer satisfaction.

Conceptual Model

The proposed conceptual model positions AI chatbot as the exogenous construct influencing four intervening constructs perceived information quality, perceived waiting time, pleasure, and arousal. which in turn are hypothesized to predict the endogenous construct, customer satisfaction.



Summary of Hypothesis:

Hypothesis	Hypothesis Statement
H1	AI chatbot has a significant impact on perceived information quality.
H2	AI chatbot has a significant impact on perceived waiting time.
H3	AI chatbot has a significant impact on customer pleasure.
H4	AI chatbot has a significant impact on customer arousal.
H5	Perceived information quality has a significant impact on customer satisfaction.
H6	Perceived waiting time has a significant impact on customer satisfaction.
H7	Customer pleasure has a significant impact on customer satisfaction.

Research Methodology**Research Approach**

Qualitative and quantitative research are the two types of research methods. Numerical data are collected and statistically and conceptually analyzed in quantitative research (Blackstone, 2018) and experiential data such as case studies, personal experiences, and interviews are collected in qualitative research (Denzin & Lincoln, 2019). This research is quantitative research that the data collection technique used is structured questionnaire.

Research Design

Descriptive, experimental, correlational and causal are the typical classification of quantitative research designs (Best, 2019; Arikunto, 2019). The independent variables in this study are believed to be related to the dependent variables and there is a positive relationship between the independent and dependent variables and also have a causal relationship.

Research Purpose

In general, research can be classified as descriptive research, exploratory research or explanatory research (Saunders et al., 2021). The actual purpose of this study, like study conducted by Zhang et al (2019) is Explanatory. It aims to explore how factors such as perceived information quality, perceived waiting time, pleasure, and arousal affect customer satisfaction with AI chatbots in online shopping.

Target Population

The study targets people who have experience with online shopping and who know how to use AI chatbots when shopping online.

Sample Size

Using the Daniel Soper sample size calculator, the minimum sample size to be used in the structural model in this study was calculated as 161. A total of 200 responses were collected, however.

Sampling Technique

The participants were selected by a non-probability sampling technique which is called purposive sampling. This implies that the subjects selected were online shoppers and informed about AI-powered chatbots (Dörnyei, 2019; Zhi, 2022).

Data Collection Instrument

Data were gathered by structured questionnaire, which was based on a Likert-type scale. The questionnaire was divided into two sections: the first section was demographic information including gender, age, level of education, online shopping behavior and favourite online shopping brand. The second section was about the constructs that were being measured, with items adapted from Ruan and Mezei (2022) (as summarized in Table 2)...

Table 2: Constructs, Sources, and Measurement Items

Construct (Source: Ruan & Mezei, 2022)	Sample Items
AI Chatbot (AICB)	Chatbot services are reliable and comfortable; easy to use; effective for online shopping; I felt satisfied using the chatbot for online shopping.
Perceived Information Quality (PIQ)	Information provided includes all necessary values; is complete; is accurate; is believable.
Perceived Waiting Time (PWT)	I wait for the right amount of time; the wait was reasonable; the agent is quick to respond; waiting time includes complete information.
Pleasure (PSURE)	Interacting with the agent, I feel happy / pleased / annoyed (reverse) / hopeful.
Arousal (AROU)	Interacting with the agent, I feel relaxed / excited; use of the chatbot is enjoyable; I feel enthusiastic.
Customer Satisfaction (CS)	Satisfied with agent performance; performance met expectations; meets ideal standard for support; satisfied with information completeness.

Data Collection Procedure

The survey was sent via online form to consumers who shop online and use AI chatbots, and aimed to generate a minimum of 161 responses, per the Daniel Soper calculator.

Data Analysis Technique

For descriptive statistics, reliability and data-screening procedures, IBM SPSS was used and for structural equation modeling, SmartPLS was used (Ringle et al., 2019).

Ethical Considerations

The study avoided the physical, social and psychological harm of respondents, was plagiarism-free, and ensured the confidentiality of the respondents during data collection and reporting.

Data Analysis and Results

Pilot Study

A pilot test was done with 30 respondents using IBM SPSS v29.0 to test the reliability using the Cronbach's alpha range above 0.7 is acceptable (Hasim et al., 2022; Teresi et al., 2022). As presented in Table 3, all six constructs were above this threshold.

Table 3: Pilot Study Reliability (Cronbach's Alpha, $n = 30$)

Construct	No. of Items	Cronbach's Alpha
AI Chatbot	4	0.996
Perceived Information Quality	4	0.797
Perceived Waiting Time	4	0.985
Pleasure	4	0.786
Arousal	4	0.836
Customer Satisfaction	4	0.934

Data Screening

The entire survey resulted in 200 responses, which were checked for outliers and missing values (Hair et al., 2022). Univariate and multivariate outliers were detected by z-scores > 3.29 and Mahalanobis distance ($p < 0.001$), respectively. There were no missing values. There were 19 outlier cases that were removed, leaving 181 cases for useable data.

Demographic Profile of Respondents

The 181 valid responses included 61.9% male and 38.1% female. The largest age group was 20–25 years (29.8%), followed by 26–30 years (27.1%). Of those who responded 43.6% had a graduate degree, 24.9% had a master's degree. The most common brand category preferred was Other (35.9%) followed by Saya (18.2%) and 61.9% said they shop online regularly (18.2%).

Table 4: Demographic Profile of Respondents ($n = 181$)

Category	Group	Frequency	Percent
Gender	Male	112	61.9%
	Female	69	38.1%
Age	20–25	54	29.8%
	26–30	49	27.1%
	31–35	37	20.4%
	36–40	15	8.3%
	41–45	12	6.6%
	Above 46	14	7.7%
Education	Intermediate	35	19.3%
	Graduate	79	43.6%
	Master's	45	24.9%
	PhD	22	12.2%

Shop online	Yes	112	61.9%
	No	26	14.4%
	Sometimes	42	23.2%
Preferred brand	Saya	33	18.2%
	Expo Store	30	16.6%
	Zellbury	24	13.3%
	Eden Robe	29	16.0%
	Other	65	35.9%

Measurement model: Construct Validity

The construct validity of the model used in the measurement was tested. Construct validity was evaluated by outer loadings, composite reliability (CR) and average variance extracted (AVE). The factor loadings of the 3 items were below the suggested threshold of Huta Galung et al. (2023) which was less than 0.70 and were therefore dropped. All items loaded above 0.70 and all constructs attained the recommended values of $0.70 > CR > 0.50$ and $AVE > 0.50$ as indicated in Table 5.

Table 5: Factor Loadings, Reliability, and Convergent Validity

Construct (reliability statistics)			Item	Loading
AI Chatbot (CA=0.941, CR=0.958, AVE=0.849)			Reliable and comfortable	0.914
			Easy to use	0.926
			Effective for online shopping	0.928
			Satisfied using chatbot	0.918
Perceived Information Quality (CA=0.897, CR=0.936, AVE=0.830)			Includes all necessary values	Deleted
			Information is complete	0.861
			Information is accurate	0.925
			Information is believable	0.944
Perceived Waiting Time (CA=0.895, CR=0.927, AVE=0.759)			Right amount of wait time	0.847
			Wait was reasonable	0.889
			Agent quick in response	0.880
			Waiting includes complete info.	0.868
Pleasure (CA=0.809, CR=0.874, AVE=0.634)			Feel happy	0.768
			Feel pleased	0.801
			Feel annoyed (reverse)	0.829
			Feel hopeful	0.786
Arousal (CA=0.724, CR=0.876, AVE=0.780)			Feel relaxed	Deleted
			Feel excited	0.846
			Use is enjoyable	0.919
			Feel enthusiastic	Deleted
Customer Satisfaction (CA=0.863, CR=0.907, AVE=0.709)			Satisfied with performance	0.826

Met expectations	0.848
Meets ideal standard	0.844
Satisfied with information completeness	0.850

Discriminant Validity

Discriminant validity the range to which a construct is empirically distinct from other constructs (Rasoolimanesh, 2022) was measured using three methods: the Fornell-Larcker criterion, the Heterotrait-Monotrait ratio (HTMT), and cross-loadings.

Measurement Model: Construct Validity

Fornell-Larcker criterion: the square root of each construct's AVE (diagonal) exceeded its correlations with all other constructs, satisfying the criterion (Table 6).

Table 6: Fornell-Larcker Criterion

	AICB	AROU	CS	PIQ	PWT	PSURE
AICB	0.922					
AROU	0.543	0.883				
CS	0.636	0.656	0.842			
PIQ	0.361	0.338	0.300	0.911		
PWT	0.750	0.492	0.576	0.340	0.871	
PSURE	0.652	0.499	0.735	0.264	0.681	0.796

All construct pairs yielded HTMT values lower than the conservative limit of 0.90 (Rasoolimanesh, 2022), which further confirmed the discriminant validity. All loadings were cross-loadings, which is the third criterion of the test– retrospectively, the strongest loading being highest on the indicator compared to all other indicators, as per the third criterion.

Structural Model: Path Analysis

The sample for the structural model was the 181 valid responses where bootstrapping (5,000 subsamples) was conducted at a level of 0.05 to identify the support for the hypothesis (Du et al., 2021). Table 7 indicates that six of the hypothesized paths were statistically significant. All four mediating constructs (H1–H4) were predicted with a high level of accuracy using AI chatbot. The paths leading to customer satisfaction, pleasure (H7) and arousal (H8) were significant and positive, while perceived information quality (H5) and perceived waiting time (H6) were not statistically significant.

Table 7: Path Coefficients and Hypothesis Testing

Path	β (original sample)	T-statistic	p-value	Decision
AICB $\rightarrow$ PIQ (H1)	0.543	8.285	0.000	Supported
AICB $\rightarrow$ PWT (H2)	0.750	14.422	0.000	Supported
AICB $\rightarrow$ PSURE (H3)	0.652	13.921	0.000	Supported
AICB $\rightarrow$ AROU (H4)	0.543	8.285	0.000	Supported
PIQ $\rightarrow$ CS (H5)	0.027	0.524	0.600	Not supported

PWT → CS (H6)	0.028	0.358	0.721	Not supported
PSURE → CS (H7)	0.523	7.532	0.000	Supported
AROU → CS (H8)	0.327	5.449	0.000	Supported

Coefficient of Determination (R^2)

R^2 values indicate the proportion of variance in each endogenous construct explained by its predictors (Ozili, 2023). As shown in Table 8, AI chatbot explained 13.0% of the variance in perceived information quality, 56.2% in perceived waiting time, 42.6% in pleasure, and 29.5% in arousal; together, the model's predictors explained 65.2% of the variance in customer satisfaction a substantial effect size for a behavioral model of this kind.

Table 8: R^2 Values

Endogenous construct	R^2
Perceived Information Quality	0.130
Perceived Waiting Time	0.562
Pleasure	0.426
Arousal	0.295
Customer Satisfaction	0.652

Discussion and Conclusion

Discussion of Findings

The results show that AI chatbots have a strong positive impact on how customers perceive the quality of information, which matches earlier studies that found chatbots provide accurate, complete, and consistent information across different aspects of information quality (Goli et al., 2023; Jörling et al., 2019; Luo et al., 2019; Thomaz et al., 2020). AI chatbots also help improve how customers feel about the time they wait, as they can handle many customer requests at the same time with correct information, which reduces the delays that often happen when talking to a human agent (Cheng et al., 2021). In a similar way, AI chatbots positively influence both pleasure and arousal, which aligns with Marjerison et al., (2022) and Kim et al.(2021), who found that using chatbots leads to positive feelings and emotional involvement, and with Chhikara et al.(2022), who linked arousal to how much customers enjoy using chatbots.

However, when looking at customer satisfaction itself, perceived information quality and perceived waiting time didn't turn out to be important predictors.

This is similar to what Ciechanowski et al.(2020) found, where customers often think information from a human employee is more complete than from an AI chatbot, since people usually feel more open, friendly, and willing to share with others rather than with AI. Tran et al.(2021) also noted that if a chatbot can't handle a complicated request, switching to a human agent can make the waiting time feel longer and affect satisfaction, which matches the non-significant relationship between perceived waiting time and customer satisfaction found here. On the other hand, pleasure and arousal, which are emotion-based feelings, were strong and important predictors of satisfaction, consistent with Grewal et al.(2021) and Durak (2022), suggesting that in this study, customers' emotional reactions to the chatbot experience were more

important in determining their satisfaction than their evaluations of the information quality or the waiting time.

Conclusion

This study looked at how AI chatbots affect customer satisfaction by examining the four key factors: perceived information quality, perceived waiting time, pleasure, and arousal. It used PLS-SEM with responses from 181 online clothing shoppers in Karachi. The study found that AI chatbots have a significant positive impact on all four factors. However, only when pleasure and arousal increased did perceived information quality and perceived waiting time significantly improve, leading to higher customer satisfaction.. A total of the variance in customer satisfaction explained by the model was 65.2%, highlighting the importance of the affective aspects of chatbot interaction. The findings are the continuation of the chain model of customer satisfaction to the context of AI services and provide practical implications for organizations regarding the design, implementation, and management of customer service using chatbots after their implementation.

Theoretical and Practical Implications

The results of this research have some implications for theory and practice. This is important because it showcases the growing influence of AI chatbot technology in the eCommerce realm and why it is crucial businesses need to understand the technology to remain competitive. It highlights the increasing significance of AI chatbot technology in eCommerce and why organisations need to know about to ensure they remain competitive. Second, it offers granular data on the factors associated with and not associated with customer satisfaction with chatbots – complementing the current chain of evidence model of AI based satisfaction. Thirdly, the results support the improvement of ease of use and customer loyalty and satisfaction and provide a guidance on how to develop, adopt and post-adopt AI chatbots. Emotionally, the results show that the tone, responses, and fun of the bots' interactions are more important than whether they have all the information and are quick. Practically speaking, the latter two factors (information completeness and raw speed) are more impactful on satisfaction with the brand in this context than the first (tone, responses, fun). AI-driven data can also contribute towards improved customer engagement, empowering more personalized and real-time customer communication, which can further boost value co-creation and engagement.

Limitations of the Study

There are several limitations of this study. First, it delves into the use of AI chatbots in the eCommerce clothing industry, where the outcomes may vary. It first explores the role of AI Chatbots in the eCommerce apparel industry, and the impact this will have in other product segments. Second, only four factors of customer satisfaction are included in the model; future studies might include other factors like usability, responsiveness, perceived trust, empathy and accessibility to further improve generalizability. Thirdly, data were restricted to Karachi, and the model has not been tested in other cities of Pakistan and elsewhere in the world and so results are not generalizable.

Future Research Directions

Due to the limited number of participants, the results of this study cannot be considered as definitive conclusions about AI chatbots and its features. The study could be expanded in several ways: Use a more diverse and larger sample across the globe, focus on other product categories, cities, and countries to gain a better understanding of the relationship between AI chatbots and customer satisfaction in shopping assistance; and use a larger and more geographically diverse sample, include additional antecedents of satisfaction, and extend the analysis to other product categories, cities, and countries to develop a deeper understanding of the relationship between AI chatbots and customer satisfaction in shopping assistance.

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