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# [The Role of Chatbots' Anthropomorphism to Control and Mitigate Risks of User Suspicion and Persuasion Knowledge]

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**ABSTRACT**

The present study has extended the literature on social response theory and para-social interaction from merely behavioral intentions of the users to actual demonstration of the desired behavior. For instance, the user's actual buying or using behavior is shaped through perceived anthropomorphism of Chatbots and their willingness to self-disclosure. Provided these factors are there, the user shall use the Chatbots for purchase of goods and services. The relationships are moderated by another external factor called persuasion knowledge when users and customers view brand and their associated Chatbots with suspicious and look for actual benefit of the brand and compare with promised promotion. Impact of persuasion knowledge has proven on relationship between self-disclosure and actual usage, whereas it did not moderate relation between perceived anthropomorphism and actual usage significantly which means that anthropomorphic characteristics can control the adverse impact of persuasion knowledge and change the decision in favor. This outcome is of much significance for businesses and industry. Future research studies may test other moderators like gender of customer and gender personality of Chatbot, income level of customer, fun orientation, and personality characteristic of both human users and chatbots. This is a quantities research study and a self-administered questionnaire survey is conducted. The sample of the study constituted on users of e-commerce at famous e-commerce platforms in Pakistan, who were recruited for the study through convenient sampling method. Smart PLS 4.0 has been employed for data analysis and hypotheses testing.

**Key Words** Chatbots, Customer Behavior, Perceived Anthropomorphism, Self-Disclosure, and Persuasion Knowledge.

**Introduction**

The real time information and interaction with brands has always been a competitive advantage and it has risen even further in recent times. The customers are becoming more and more technology oriented and they feel more comfortable with chatbots and AI assistants than talking with a human customer service agents (Aslam et al., 2025). The businesses are becoming more inclined towards self-service technologies (SSTs) like chatbots, and investment for adoption of such technologies is on the rise in business and industry (Robinson et al., 2024). The online businesses and e-commerce have become the fashion of today and customers are more inclined towards buying online (Robinson et al., 2024) from the comfort of their homes, wherein chatbots can assist them a big way. The constructs of technology adoption, trust in AI, riskiness of online purchase decisions and quality of information contribute to online purchase intentions (Malhotra & Ramalingam, 2025). Many industries have adopted chatbots for customer services and online assistants, sales and these are equipped with machine learning for informed decision making (M. Lee et al., 2024).

The growth in AI technologies has brought several opportunities for businesses as well as challenges (Poushneh et al., 2024; Uddin et al., 2024). The challenges posed by advancements in AI chatbots has urged businesses to adopt these technologies for growth and competition (N. Chen & Yang, 2023). The industries adopting AI technologies

## **Journal of Management & Social Science**

### **VOL-2, ISSUE-2, 2025**

for online business existence are focused on innovation and competitiveness (C. Singh et al., 2024). The past research on the e-commerce industry has significantly supported adoption of AI chatbots in e-commerce for efficiencies (Chakraborty & Biswal, 2024).

#### **Research Gaps**

Jalees et al. (2025) established that credibility, parasocial relationship, and self-disclosure had significant impact on online purchase intentions but recommended to assess other predictors of actual decisions, like actual chatbot usage or actual purchase. Traditionally, various researchers have used classical variables of the TAM model like perceived usefulness and perceived ease of use, and trust for assessment of behavioural intentions of users. Whereas the present research endeavour has identified that the actual use of chatbots and purchase decisions through them are also influenced by persuasion, knowledge of the chatbot or voice, or personality etc. Therefore, identifying the research gap from extant literature, the researcher decided to evaluate the moderation impact of persuasion knowledge between the predictor (perceived anthropomorphism and self-disclosure) and the outcome variable of the study, actual chatbot usage, as prescribed in recent research by Aslam et al. (2025) because the past research on AI usage intentions and behavioral intentions elaborated that the intentions did not convert into actual act of buying or behavior hence according to the recommendation for future research (Hassan et al., 2023; Inam et al., 2023; Jabbar et al., 2023; Jalees et al., 2025; F. A. Khan et al., 2024; S. A. R. Khan, Sheikh, Hassan, et al., 2024; S. A. R. Khan, Tahir, et al., 2024; S. A. R. Khan et al., 2023, 2025; S. A. R. Khan, Sheikh, & Tahir, 2024b, 2024a; Rehman Khan et al., 2022; Sheikh et al., 2017, 2024; Y. Zhang et al., 2024b, 2024a). The present research extended the conceptual framework to actual usage behavior. Furthermore, the present study also intended to check moderation role of persuasion knowledge of chatbot on basis of social response theory and parasocial relationships theory.

Calahorra-Candao and Martín-de Hoyos (2024) took over the study of voice shopping intentions with virtual assistants through the Technology Acceptance Model (TAM), Uses and Gratifications Theory (UGT) and Diffusion of Innovation Theory for relationships between functionality and enjoyment. The study suggested evaluating the use of virtual assistants or chatbots on customer relationships by integrating anthropomorphic features in them (Calahorra-Candao & Martín-de Hoyos, 2024). Hence, the literature reveals that certain predictors should be highlighted that induce actual usage behavior of chatbots. In this regard, combination of perceived anthropomorphism, credibility and self-disclosure is identified to have facilitated the actual usage for decision and the moderator of persuasion knowledge personality of chatbot to be evaluated in the study relationships.

Social response theory primarily became affective in Human Computers Interaction paradigm which now require further extension due to the continuous enhancement of interactive AI technologies like digital chatbots assistants and customer services agents which can be realized by integrating concepts of AI avatars in the business and industry (Miao et al., 2022). The customer's emotional attachment with chatbots is evidently dependent on the anthropomorphic features but the actual decision or adoption behavior directly is yet to be explored in a research study especially in the context of Pakistani e-commerce businesses and industry, wherein human-like

interaction is predictable.

Practically, the Pakistan's e-commerce business and market is relatively unexplored and there is a large gap in technology adoption in the country and the same disparity lies in academia as well. There are only a few research studies that have indicated chatbots use in e-commerce sector of Pakistan. Significantly, there is a definite research gap with respect to online retail experience through AI based chatbots and there is only a few research studies for online retailers and and use novel interaction technology (Jham et al., 2023). Only a few past studies have investigated the integration of automation and human-AI interaction for efficiency and service quality (Barone et al., 2024; van Doorn et al., 2023) but it has not been investigated in the context of online retailers and e-commerce in Pakistan.

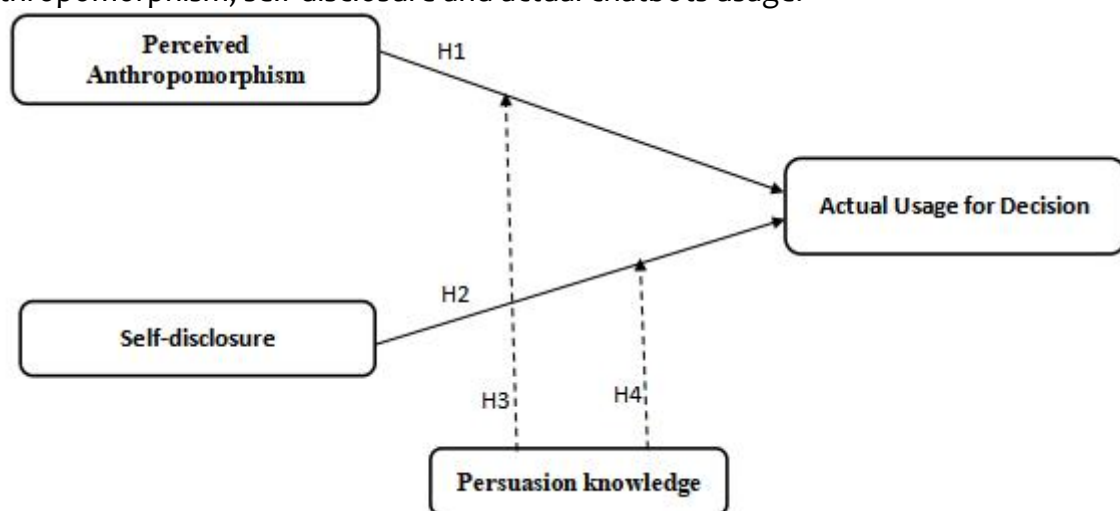
The aforementioned research studies reflected that there exists a significant disparity in the findings about AI based marketing interactions with the customers and human agent interactions that should be studied in the context of developing countries like Pakistan which are still in initial stage of adopting such innovative technologies in businesses (Pentina, Xie, et al., 2023). There is not much research work in the context of Pakistani online retailers in e-commerce (Idrees, 2023; Idrees et al., 2020). Therefore, the research studies should focus marketing strategies building and business especially the social aspects of customer experience and technological improvement for efficiency (Huang & Rust, 2021b; Puntoni et al., 2021).

Based on these research gaps and theoretical comprehension for extension of theory especially social response theory following research framework is suggested

### Research Objectives

Above discussion in view, following research objectives have been formulated.

1. To discover the impact of perceived anthropomorphism, credibility, para-social relationships, and self-disclosure on Chatbot usage for Decision
2. To determine the moderating role of persuasion knowledge for relationships with anthropomorphism, self-disclosure and actual chatbots usage.



**Figure 1.0 Research Framework**

### Literature Review

The concerned theories used for chatbots interactions and usage in past researches

included TAM model, SOR model, social exchange theory, social response theory and para social interaction theory etc. The extant literature has adopted various theories in the same context for their impact on consumer attitude and behavioral outcomes. Goh and Wen (2021) used Technology Acceptance Model (TAM) to evaluate AI chatbots adoption through usefulness and ease of use and concluded that AI adoption shall enhance customer care and services. Bai et al., (2024) employed social cognitive theory and social response theory in for warmth perception and competence perception in smart devices for better customer experience. Wu et al., (2023) has employed social response theory for virtual live streamers end determined socialness. Likewise, Uncanny Valley theory is employed to assess realness and intimacy of AI chatbots establishing eeriness, trust and corresponding behavioral intentions (Song & Shin, 2024).

Whereas, the present study is intended to meet aforementioned study gaps for actual adoption behavior of AI chatbots in Pakistani e-commerce market for conversation with the customers of online shopping and achieving desired behavioral outcomes like actual use of AI chatbots. In this regard, the present study utilizes Social response theory, and anthropomorphism theory to explain the study relationships in the study framework.

#### **Perceived Anthropomorphism**

The anthropomorphism means attributing human characteristics to non-human like animals, brands or digital entities (Sarraf et al., 2024). Recent research in human-computer interaction has evaluated impact of anthropomorphism on behaviors (Ahn et al., 2022). Anthropomorphism in the context of AI is related to designing chatbots in a way that human like attributes are inculcated in the digital entities (Pentina, Hancock, et al., 2023). In anthropomorphism of digital assistants or avatars, the attributes are made as natural as the user feel a sense of social presence (Kaushal & Yadav, 2022) during the interaction. Anthropomorphic chatbots range from a simple photograph to digital avatars having natural language processing capabilities (da Silva et al., 2022). The continuous improvement in digital assistants related technological advancements and smart devices, anthropomorphism still remains a popular research theme in the literature (Festerling & Siraj, 2022).

The AI gives liberty to program devices for human like behavior display such as emotions, body language and gestures etc (Pelau et al., 2021). The customers feel emotionally attached to brands and AI assistants due to the anthropomorphic attributes like voice quality, variations, and pitch (Hameed, 2021). The anthropomorphic virtual live streamers have been adopted by many marketers due to their features of interactivity, and ability to engage in interactions with the users (Miao et al., 2022). Through natural human like language, voices, and features, businesses can create a more engaging and personalized user experience (van Pinxteren et al., 2023). Hence it is proposed that;

*H1: Perceived anthropomorphism of chatbots has significant impact on actual usage of chatbot by customers.*

#### **Self-Disclosure**

Self-disclosure is related to revealing personal information to some entity (Croes et al., 2022). which is regarded as a critical factor in conversational commerce. The past studies have shown that self-disclosure improves satisfaction and relationship (Ischen et al., 2023; Skjuve et al., 2022) and has positive impact on users' behavioral outcomes (Sultan, 2023).

# **Journal of Management & Social Science**

## **VOL-2, ISSUE-2, 2025**

The literature on human-computer interaction has put significant emphasis on the impact of self-disclosure, particularly disclosure on emotional relationships (Croes & Antheunis, 2021; Y. C. Lee et al., 2020). The self-disclosure is impacted by various conditions and factors like income, gender specifications, conversation style and privacy (Choi & Zhou, 2023; Walters & Ashley, 2024). Whereas, the literature has shown different outcomes on level of self-disclosure with varying degree of anthropomorphic attributes in chatbots (Bawack et al., 2024; Sultan, 2023; A. Zhang & Rau, 2022).

The factors inducing self-disclosure include attractive human-like voices, anthropomorphism and attractiveness. Such characteristics might induce disclosure sensitive information from customer to chatbots which is of strategic importance for businesses (A. Zhang & Patrick Rau, 2023). Likewise, sharing of personal information to chatbots enhances the impact of anthropomorphic chatbots on emotional attachment (R. Singh, 2022). Above discussion in view it is proposed that;

*H2: self-disclosure of customers to chatbots has significant impact on actual usage of chatbot by customers.*

### **Actual Chatbot Usage**

The past research revealed several studies wherein behavioral intentions are formed through use of AI chatbots (Dwivedi et al., 2023; Pirzado et al., 2025; C. Singh et al., 2024) but it is also evident that these intentions are not always transformed into actual behavior which is ultimate goal of industry and businesses (Jalees et al., 2025). Hence the antecedents of actual chatbot usage by customers are identified by the present study as perceived anthropomorphism and self-disclosure according to the recommendations by Jalees et al. (2025) and Aslam et al. (2025). Whereas these relationships are altered by persuasion knowledge and its impact on users biases and behavior, which is explained in the following.

### **Persuasion Knowledge**

The persuasion knowledge about advertising catch by the marketers enable users and customers to identify which product or service is suitable despite being less promoted (Wang et al., 2025) hence in case of chatbot interactions the users take educated decision to indulge in actual usage or purchase decisions or otherwise (Q. Chen et al., 2023). Such attitude of customers and users towards various goods or services alter their behavior towards a chatbot interaction, whether it is willingness or actual behavior (Yang et al., 2025). However, persuasion knowledge might hinder the creative experiences and adoption to the new technologies and brands due to being suspicious about product or services offering (Yang et al., 2025). This attitude is prospectively impacting customer actual adoption and usage behavior hence we consider it as a moderator of the study relationships and propose following hypotheses;

*H3: Persuasion knowledge moderates the relationship between Perceived anthropomorphism of chatbots and actual usage of chatbot by customers.*

*H4: Persuasion knowledge moderates the relationship between self-disclosure of customers to chatbots and actual usage of chatbot by customers.*

### **Methodology**

The quantitative research methodology is employed in this research wherein a self-administered questionnaire is integrated on basis of items adopted / adapted from past

# Journal of Management & Social Science

## VOL-2, ISSUE-2, 2025

research studies. The sample of the study constitute on users of e-commerce who were recruited from famous e-commerce platforms in Pakistan including Daraz and social media like Meta and Instagram. The convenient sampling method was employed as user's / study respondents were easily available who were offered a coupon for shopping at reduced prices from famous malls in Pakistan upto 10% discount. A total of 388 study questionnaire were received form respondents and after removing missing values and incomplete questionnaire analyses was performed on 375 study responses. Smart PLS was used for data quality and data analysis as described below.

### Analysis

The results obtained form Smart PLS 4 have been assessed for quality then hypotheses testing as described below.

### Construct Validity and reliability

Validity and reliability of results is measured through PLS 4 as described in the tables below.

**Table 4.1**      **Constructs Validity and Reliability as per HTMT**

|                            | Cronbach's<br>alpha | Composite<br>reliability<br>(rho_a) | Composite<br>reliability<br>(rho_c) | Average<br>variance<br>extracted<br>(AVE) |
|----------------------------|---------------------|-------------------------------------|-------------------------------------|-------------------------------------------|
| Actual Usage               | 0.811               | 0.829                               | 0.875                               | 0.637                                     |
| Perceived Anthropomorphism | 0.873               | 0.882                               | 0.907                               | 0.662                                     |
| Persuasion Knowledge       | 0.707               | 0.713                               | 0.838                               | 0.634                                     |
| Self disclosure            | 0.852               | 0.871                               | 0.899                               | 0.692                                     |

As per results from table 4.1 all the constructs and corresponding statistics are well within the threshold criteria and limit hence the discriminant validity is established.

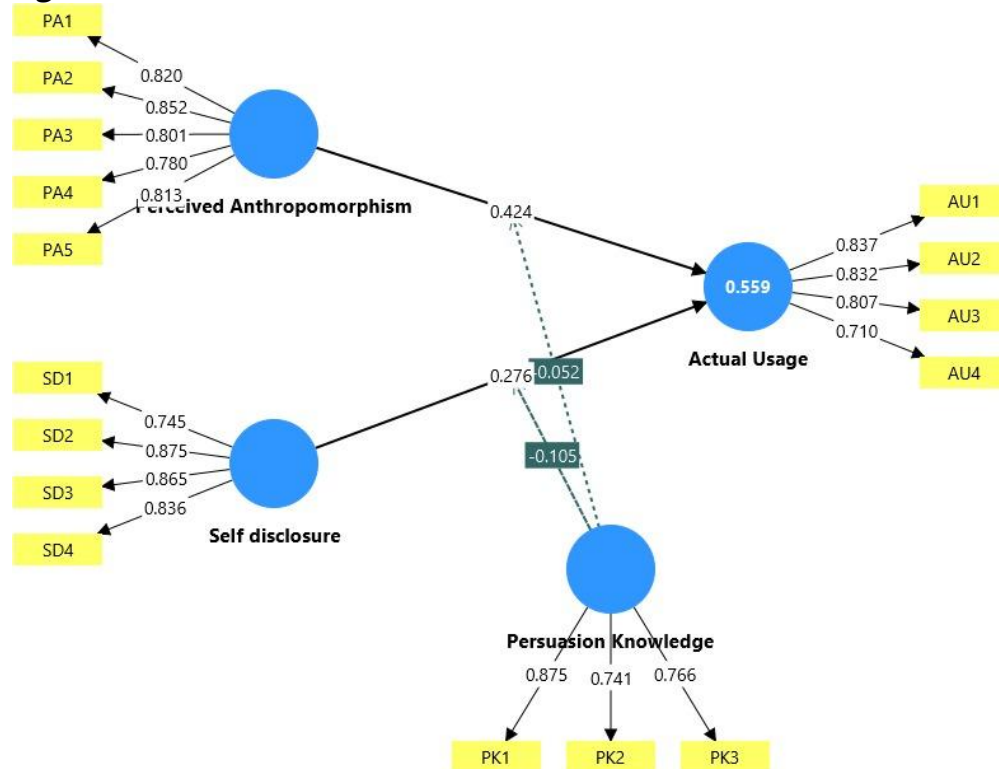
**Table 4.2**      **Fornell-Larcker Criterion**

|                            | Actual<br>Usage | Perceived<br>Anthropomorphism | Persuasion<br>Knowledge | Self<br>disclosure |
|----------------------------|-----------------|-------------------------------|-------------------------|--------------------|
| Actual Usage               | 0.798           |                               |                         |                    |
| Perceived Anthropomorphism | 0.648           | 0.814                         |                         |                    |
| Persuasion Knowledge       | 0.529           | 0.431                         | 0.796                   |                    |
| Self disclosure            | 0.613           | 0.556                         | 0.604                   | 0.832              |

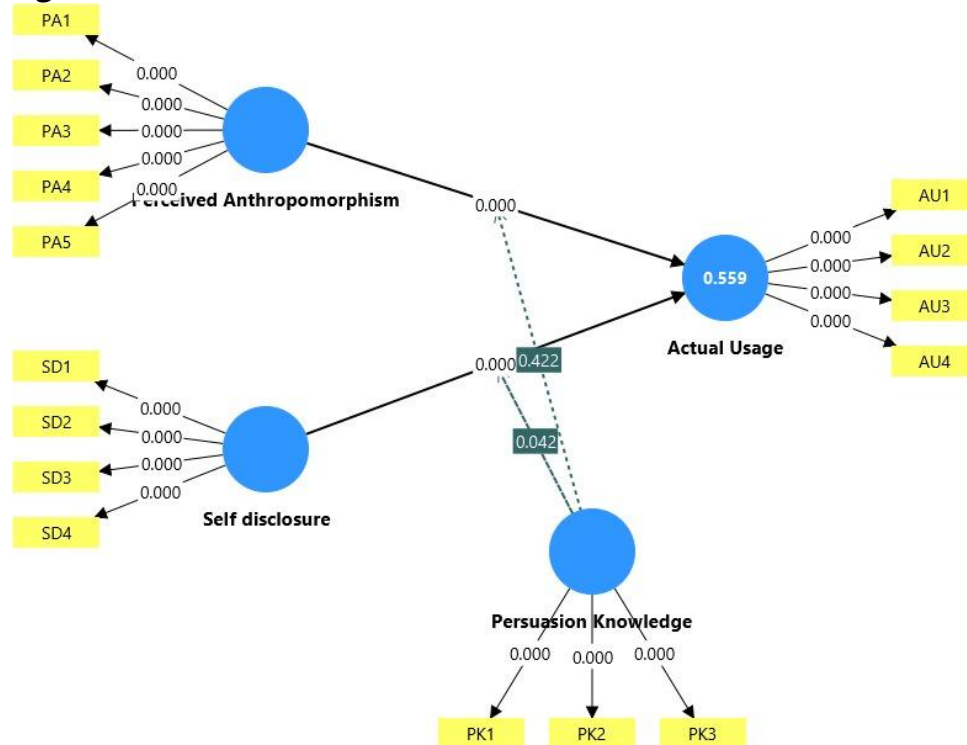
Table 4.2 through Fornell-Larcker criterion also reveals discriminant validity of the study as all the constructs have more variance with own indicators.

Below are the Path coefficient model and Measurement Model / Structural Model diagrams executed on study constructs through Smart PLS -4 for structural equation modeling.

**Figure 4.1 Path Coefficients**



**Figure 4.2 Measurement Model / Structural Model**



# Journal of Management & Social Science

## VOL-2, ISSUE-2, 2025

### Hypotheses Testing

**Table 4.3** Path coefficients (Mean, STDEV, T values, p values)

|    |                                                                            | Original<br>sample (O) | Sample<br>mean (M) | Standard<br>deviation<br>(STDEV) | T statistics<br>( O/STDEV ) | P values |
|----|----------------------------------------------------------------------------|------------------------|--------------------|----------------------------------|-----------------------------|----------|
| H1 | Perceived<br>Anthropomorphism -><br>Actual Usage                           | 0.424                  | 0.422              | 0.051                            | 8.399                       | 0.000    |
| H2 | Self-disclosure -> Actual<br>Usage                                         | 0.276                  | 0.282              | 0.057                            | 4.875                       | 0.000    |
| H3 | Persuasion Knowledge x<br>Perceived<br>Anthropomorphism -><br>Actual Usage | -0.052                 | -0.048             | 0.064                            | 0.803                       | 0.422    |
| H4 | Persuasion Knowledge x<br>Self disclosure -><br>Actual Usage               | -0.105                 | -0.096             | 0.051                            | 2.035                       | 0.042    |

Table 4.3 describe beta values, t statistics and p statistics value for hypotheses testing. The statistics values of H1, H2, and H4 reveal significant results whereas, that of H3 is insignificant hence H1, H2, and H4 are proved while H3 is not proven.

### Discussion

The study results have shown that the actual behavior not only intentions to behave, is influenced by perceived anthropomorphism by the users and their willingness to self-disclosure is when the user are actually intending to use the chatbot for services or products and actual buying behavior. The information revealed by users to the chatbots as fun activity is actually of much significance because users reveal personal things during the conversation which is vital for firms while making business strategies which is in line with the existing research studies (Jin et al., 2024; Rafikova & Voronin, 2025). Whereas these benefits could be impacted by another external factor called persuasion knowledge when users and customer view brand and their associated chatbots with suspicious and look for actual catch behind the promised promotion. This factor could potentially alter the relationships. The above findings confirm that moderating impact of knowledge persuasion can alter relationship between self disclosure and actual usage, but it did not moderate relation between perceived anthropomorphism and actual usage. Once anthropomorphic characteristics are developed, user biases and suspicion through persuasion knowledge can be controlled and altered. This phenomenon is quite significant for businesses and industry. Theoretically present study has put forward important understanding and extension of social response theory and para social interaction with anthropomorphic chatbots. Future research studies should look into other moderators of the aforementioned relationships such as gender of customer and

# Journal of Management & Social Science

## VOL-2, ISSUE-2, 2025

chatbot, income level of customer, fun orientation, personality characteristic of both human users and chatbots.

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