

## **COMPARISON OF AI AND HUMAN AGENT INTERACTION IN PURCHASING DECISION-MAKING PROCESS – PERCEPTION OF CROATIAN CUSTOMERS**

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### **ABSTRACT**

*Interaction with customers in the purchasing decision-making process has been modernized with the development of digital technologies. In traditional environment, the service providers played a key role in interacting with the customer. Still in the digital age, this role is increasingly being taken over by a virtual assistant (chatbot), a service provider based on artificial intelligence. Customers' opinions vary and depend on the content of the message they expect when interacting with the service provider and today this interaction can take place through contact with a physical person (human agent) and/or a chatbot.*

*Desk research was conducted in order to collect secondary data needed for the creation of a theoretical overview of customer perception through interaction in the purchasing decision-making process, and a conceptual research model was defined based on this. To collect primary data, quantitative descriptive research was conducted to gain insight into customer perception resulting from the interaction between the human agent and the chatbot. The analysis of variance (ANOVA) method is used to compare the dependent variable (customer perception) between the two types of service agents, considering the independent variables.*

*The contribution of this research is the identification of weaknesses arising from the interaction in the purchasing decision-making process, considering the two mentioned types of service providers separately. Based on the identified weaknesses, interpreted through independent variables, recommendations will be provided to improve the interaction with customers in both cases.*

**KEYWORDS:** service provider, human agent interaction, chatbot, purchasing decision-making process, customer perception, customer satisfaction

## **USPOREDBA INTERAKCIJE POTPOMOŠNE UMJETNOM INTELIGENCIJOM I KONTAKTOM S LJUDSKIM AGENTOM U PROCESU DONOŠENJA ODLUKE O KUPNJI - PERCEPCIJA KUPACA U HRVATSKOJ**

### **SAŽETAK**

*Interakcija s kupcima u procesu donošenja odluke o kupnji modernizirala se s razvojem digitalnih tehnologija. U tradicionalnom okruženju pružatelji usluga imali su ključnu ulogu u interakciji s kupcem. No u digitalno doba tu ulogu sve više preuzima virtualni asistent (chatbot), pružatelj usluga temeljen na umjetnoj inteligenciji. Mišljenja kupaca su različita i variraju ovisno o sadržaju poruke koji očekuju primiti kroz interakciju s pružateljem usluge, a danas se ta interakcija može odvijati kroz kontakt s fizičkom osobom (ljudskim agentom) i/ili chatbotom.*

*Istraživanjem za stolom prikupljeni su sekundarni podaci potrebni za kreiranje teorijskog pregled o percepciji kupaca interakcijom u kupoprodajnom procesu te je na temelju toga definiran konceptualni model istraživanja. U svrhu prikupljanja primarnih podataka provedeno je kvantitativno opisno istraživanje kako bi se dobio uvid u percepciju kupaca proizašlu iz interakcije s pružateljem usluge kroz kontakt s ljudskim agentom i chatbotom. Metodom analize varijance (ANOVA) usporedit će se zavisna varijabla (percepcija kupaca) između dva tipa pružanja usluge, uzimajući u obzir nezavisne varijable.*

*Doprinos ovog istraživanja ogleda se u identifikaciji slabosti proizašlih iz interakcije u procesu donošenja odluke o kupnji, promatrajući odvojeno dva spomenuta tipa pružatelja usluge. Temeljem identificiranih slabosti, interpretiranih kroz nezavisne varijable, pružit će se preporuke za poboljšanje interakcije s kupcima u oba slučaja.*

**KLJUČNE RIJEČI:** pružatelj usluge, kontakt s fizičkom osobom, chatbot, proces donošenja odluke o kupnji, percepcija kupaca, zadovoljstvo kupca

### **1. INTRODUCTION**

In the traditional business environment, the interaction between customers and companies usually takes place face-to-face. As telephony, television, and the first web services emerged, novel methods of information exchange or mentioned interaction were implemented [Kira et al., 2009]. This interaction involved two actors: the customer and the human agent. A human agent was responsible for communicating with customers, either in person or through various channels. Its tasks included providing information about products or services, as well as helping customers with the selection of appropriate products or services and making a purchase decision [Hoyer et al., 2020; Song et al., 2022]. In addition to acting as a service agent, the human agent developed a relationship with customers, showed emotion and empathy, and encouraged customers' purchasing decisions [Shmueli-Scheuer et al., 2018; Aattouri et al., 2023].

Nowadays, companies often streamline their business processes, allowing customers to interact with virtual agents as a substitute for the services of a human agent. With the advent of advanced digital technologies, especially artificial intelligence, digital entities have been created that take on the role of intermediaries in interaction. These digital entities represent virtual agents created by artificial intelligence, and the most popular is chatbot. A chatbot is an autonomous, artificial intelligence-based computer program that mimics the communication process with a human, either in written or verbal form, by relying on predefined, automated, repetitive and standardized phrases [Schanke et al., 2021]. Their role goes beyond the traditional framework and enables interaction with customers on new levels. Chatbots can provide information, analyze data and respond to customers' needs more quickly and efficiently. In addition, their presence is not limited to a specific time or place, which enables continuous support and interaction with customers [Sun et al., 2023].

Given the perceived shortcomings of interacting with a chatbot identified in scientific literature, which includes a lack of humanity, empathy, and emotional sharing, numerous researchers have devoted themselves to researching customer satisfaction with interacting with a chatbot versus a human agent [Shmueli-Scheuer et al., 2018; Aattouri et al., 2023]. Previous literature has shown that adding humanity (virtual traits) to a chatbot increases customer satisfaction [Rapp et al., 2023]. The literature lacks sufficient examination of customer satisfaction regarding the information (feedback) obtained during interaction with a chatbot compared to a human agent. Based on this, the main aim of this paper was to examine whether customers are satisfied with interaction with the chatbot compared to human agents. The quality of the obtained information can be assessed through four variables mentioned in the paper written by Ruan & Mezei [2022]: perceived information quality, perceived waiting time, pleasure, and arousal [Ruan & Mezei, 2022]. These variables represent the basis of the research conceptual model for the examination of customer perception of their (dis)satisfaction with interaction with the mentioned types of service providers: chatbot and human agent.

The paper comprises seven chapters, with the first one being the introduction. This section defines relevant points related to the research and the paper's structure. In the second chapter, the research methodology is elaborated. The third chapter provides an overview of previous research, emphasizing relevant findings in the research field. Research results are presented in the fifth chapter, while the sixth chapter includes discussion questions according to research limitations. The overall understanding of the research is summarized in the conclusion.

## **2. LITERATURE REVIEW**

A literature review was based on secondary data obtained through desk research, from a total of 31 papers that were taken into consideration. According to that data, the purchasing decision-making process is one of the key processes in the interaction with the customer, as the customer receives relevant information to make a purchase decision [Aattouri et al., 2023]. The central figures in this process were the potential customer and the human agent (seller). Through their presence and active participation, human agents aim to provide the customer with essential information about products and services. However, with the advent of digital technologies, the landscape of the purchase decision-making process is evolving. In a digital environment, customers demand immediate, real-time access to comprehensive, high-quality information [Krishnan et al., 2021]. Simultaneously, they seek clarity regarding their interests. This shift necessitates adjustments in how businesses engage with customers during the decision-making process. Understanding these dynamics empowers businesses to meet customer expectations

effectively and create positive experiences. Artificial intelligence (AI) – powered by computer agents, including chatbots, actively engage with customers in today's digital era [Song et al., 2022]. These AI-powered digital entities facilitate conversations, correspondence, negotiations, and communication with customers [Shreekumar et al., 2020; Bouras et al., 2024]. They are used in different industries, and their role is to provide 24/7 customer support, quick problem-solving, or personalized interaction with customers [Bouras et al., 2023; Bouras et al., 2024]. As a result, daily tasks typically handled by human agents are circumvented. Using chatbots provides opportunities to reduce customer waiting times, improve efficiency and minimize costs. But some drawbacks have also been identified. The negative impact on customer experiences is reflected in problems such as a lack of knowledge of IT systems, the inability to correctly answer individualized customer questions, and more [Sun et al., 2023]. The question arises whether customers are satisfied with the chatbot service and the information they receive back in the buying and selling process. Some scientists believe that there should be an optimal balance in the use of virtual and human agents taking into account the requirements and preferences of customers [Al-Araj et al., 2022].

There are several studies in which the satisfaction of interacting with a chatbot or with a human agent was researched. Zhou et al., [2023] found in their experimental study that the expected quality of customer communication with chatbots was lower than with human agents. The problem was observed in the attention the chatbot paid to the customer during the interaction and the lack of empathy. As some researchers mentioned, adding an emotional dimension and empathy to the chatbot influences an increase in customer satisfaction and service efficiency [Aattouri et al., 2023]. Analysis of customer behavior and interaction with them indicates that emotional responses enhance the quality of dialogue and contribute to customer satisfaction. Additionally, expressing emotion by simply adding an emotional confirmation at the beginning of the response has been demonstrated to contribute to positive customer opinion and customer experience [Shmueli-Scheuer et al., 2018; Söderlund et al., 2022]. But, the challenge in communication with a chatbot is humanity [Rapp et al., 2023]. Some of the human factors that are proposed to be incorporated into the interaction with the chatbot are the understanding ability, the reasoning ability, the memory ability, the emotional ability and the ability to act [Rapp et al., 2023]. Crucial moments for a chatbot to successfully replace a human agent are: understanding the message it receives, drawing conclusions based on the received message, remembering past interactions, recognizing the customers' emotions and empathizing with customers, and at the end fulfilling his/her requests. Despite potential drawbacks, there are positive aspects to the influence of chatbots on customers. Notably, studies indicate that AI agents exhibit unbiased intentions when providing products or services to customers [Garvey et al., 2023].

Based on the literature review, it is clear that scientific papers address customer satisfaction in chatbot interactions and propose ways to enhance their effectiveness. However, none of the analyzed research papers specifically examine whether customers are satisfied with the feedback they receive during interactions with chatbots. It is essential to separately assess overall satisfaction with the interaction process and satisfaction with the results and feedback based on customer requests. Therefore, this paper fills the research gap observed from conducted desk research. Based on it, the main goal of the paper, as well as the conducted empirical research, was set.

### 3. METHODOLOGY

The main aim of this paper was to examine whether customers are satisfied with the feedback received from the chatbot compared to the feedback they receive from human agents. According to the aim two research was conducted: desk research and quantitative, descriptive research. The desk research entailed gathering and summarizing secondary data from various sources. Conducted desk research facilitated, the establishment of the theoretical background and the development of a questionnaire as a research instrument for collecting primary data. As a part of the research, a search was conducted in the Web of Science (WoS) platform and Scopus databases with the search query ("chatbot assistant" OR "sales assistant" OR "human agent") AND ("customer satisfaction"). The search was carried out by topic and there were no additional criteria related to the total number of papers available on this topic. According to a search query in the Scopus database, 29 papers were available, while 7 papers were available on the Web of Science platform. Of the total of 36 papers, 5 duplicate papers were identified. Finally, a total of 31 papers were included in the analysis to present the theoretical background of the research topic. Furthermore, the most pertinent paper in the research field was identified and selected to provide a conceptual research model for the development of a measuring instrument, a questionnaire. It is a paper written by Ruan and Mezei, published in 2022, entitled "When do AI chatbots lead to higher customer satisfaction than human staff in online shopping assistance?". The research model proposed in the referenced paper played a crucial role in shaping the questionnaire by informing the creation of its components (questions).

The questionnaire, created in Google Forms survey administration software, included a total of 12 questions, from which 2 were related to demographic characteristics of respondents and 10 of them covered statements measured with a Likert scale to determine the respondents' perception of the defined variables. The questionnaire was distributed via social media and e-mail, so a non-probability sample (convenience sample) was used. Primary data was collected by snowballing method, by sending e-mails to acquaintances and sharing on social media with friends. The authors of the paper assessed the reliability and validity of the measurement instrument, examining each construct. Cronbach's alpha for each construct was between 0.793 and 0.886, which is above the recommended value of 0.7 and indicates good reliability of the questionnaire. Convergent validity was acceptable, i.e. the average variance extracted (AVE) value of the constructs was between 0.670 and 0.899, above the acceptable value of 0.5, and the loading of each particle was above the limit of 0.7.

The hypotheses defined in this research are:

H<sub>0</sub>: There are no significant differences in customer interaction between human agents and chatbots.

H<sub>1</sub>: There are significant differences in customer interaction between human agents and chatbots.

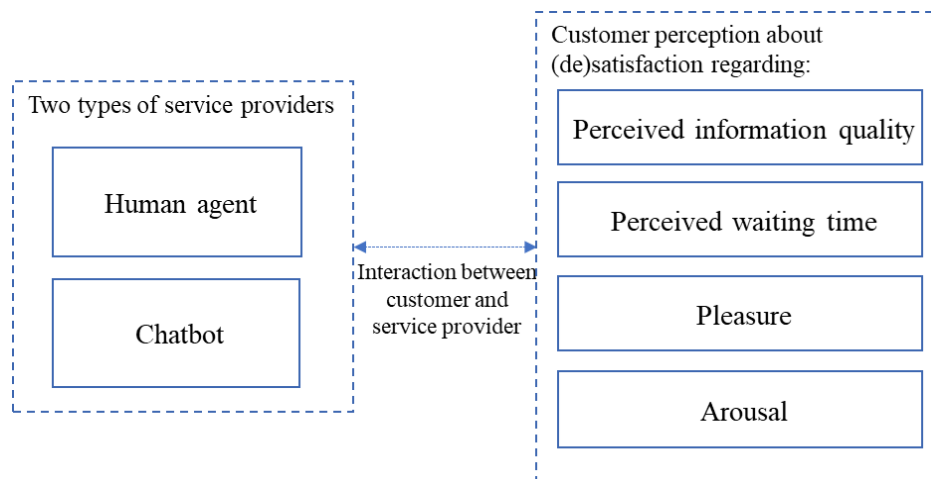
The second phase of the study was focused on quantitative, descriptive research. The primary data was gathered through a questionnaire and analyzed using the analysis of variance (ANOVA) method. Additionally, the Kruskal-Wallis test was applied for the analysis due to the small sample of data for individual variables in the groups and the ordinal nature of the data. The results analysis involved comparing customer satisfaction, as a dependent variable, between two different types of service providers while considering the independent variables (Perceived quality of information, Perceived waiting time for feedback, Pleasure derived from the interaction, Arousal derived from the interaction).

#### 4. CONCEPTUAL RESEARCH MODEL

An effective interaction process between a company and its customers establishes an interaction between them, where the service provider engaged by the company plays a crucial role as an intermediary in building customer relationships. By collecting relevant information, the company can shape customer perception, which is essential for creating and fostering customer loyalty, satisfaction, and brand commitment [Malhotra et al., 2013]. The research model, presented in Figure 1, is based on two types of service providers: a human agent and a chatbot that interacts with the customer and creates their perception [Ruan & Mezei, 2022]. According to the literature, customer perception consists of four independent variables that synergistically influence the emergence of customer (dis)satisfaction and they are [Ruan & Mezei, 2022]:

1. Perceived information quality – a cognitive dimension that allows customers to assess sub-variables Completeness of information, Accuracy of information, Credibility of information, Significance of information, Timeliness of information, Quantity of information;
2. Perceived waiting time – a cognitive dimension by which customers define the duration of waiting for feedback, whether it's reasonable, expected or acceptable;
3. Pleasure – an affective dimension that reflects the positive emotions customers experience during their interaction with a service provider and presents unhappy or happy feelings of the customer; and
4. Arousal – an affective dimension that customers use to express their emotions resulting from their interaction with the service provider and present relaxed/calm or stimulated/excited feelings of the customer [Ruan & Mezei, 2022].

Figure 1. Conceptual research model



Source: Authors according to [Ruan & Mezei, 2022]

According to Figure 1, the primary goal of this research model is to characterize the extent of customer (dis)satisfaction in interaction with chatbot and human agents [Ruan & Mezei, 2022]. The reason lies in customer satisfaction which is a pivotal factor that can significantly influence their purchase decision [Intyas & Primyastanto, 2020]. The presented conceptual model shows two service providers and the perception of customer satisfaction with the actions in the interaction as well as their satisfaction with the outcomes of the interaction is reexamined.

## 5. RESULTS

Out of the 128 participants who took part in the questionnaire, 100 of them provided complete answers to all the questions. The statistical analysis presented below is based on their responses. 64% of respondents were women and 36% were men. The respondents were predominantly a younger population. 45% of them were between the ages of 25 and 34. Respondents between 35 and 44 years old followed with 25% and next were respondents aged 15 to 24 (13%). A slightly smaller percentage of respondents who filled out the questionnaire were between the ages of 45 and 54 (9%) and 5% of respondents were between 55 and 64 years old, while the smallest distribution of answers provided respondents over 65 years, only 3% of the sample.

According to the analysis of variance (ANOVA), for the variable *Perceived quality of information*, a statistically significant difference was found between the analyzed service providers with a *P-value* of 0.01609. For the variable *Perceived waiting time for feedback*, a statistically significant difference between the observed groups was determined, and the *P-value* is 0.01518 and is less than the *Alpha value*. A statistically significant difference between the observed groups was also determined for the variable *Pleasure*, with a *P-value* of 0,02699. From the results, it can be concluded that the *P-value* is less than Alpha (the value is set to 0.05) in analyzed variables, while the *F value* is greater than the *F crit value*. This indicates statistically significant differences between human agents and chatbots in interaction with customers. The variable *Arousal* with a *P-value* of 0.91110 achieves a non-significant difference between the observed groups, i.e. the *P-value* is greater than the *Alpha value*.

Observing together all the independent variables that influence customer satisfaction with the services received from the two types of providers, a statistically significant difference was confirmed between the human agent and the chatbot, with a *P-value* of 0.01299 (Table 1).

Table 1. Analysis of variance – customer satisfaction in interaction with human agent and chatbot

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
<b>Between Groups</b>	0,527439	1	0,527439	6,542391	0,012992	3,995887
<b>Within Groups</b>	4,998359	62	0,080619			
<b>Total</b>	5,525798	63				

Source: Authors

By analyzing the results obtained by the Kruskal-Wallis test, it is determined that there are differences in the variables between the observed groups (human agent and chatbot) confirming the results obtained by the analysis of variance (ANOVA) can be confirmed. This indicates that there are statistically significant differences in the variables *Perceived information quality*, *Perceived waiting time* and *Pleasure* based on analyzed results. The values obtained by the Kruskal-Wallis test, for the variable *Perceived information quality* is  $H=14.14$ , for the variable *Perceived waiting time*  $H=3.86$ , for the variable *Pleasure*  $H=3.86$ .

## 6. DISCUSSION

Customers exhibit greater satisfaction when interacting with chatbots in the quest for information about product functionality, whereas they still prefer human agents for transferring experiences [Ruan & Mezei, 2022]. Consequently, chatbots enhance customer satisfaction by reducing *Perceived waiting time* [Ruan & Mezei, 2022], as evidenced by this research. When service agents are requested to transfer experiences or provide additional product information, customers report higher satisfaction with the *Perceived quality of information* and *Pleasure* [Ruan & Mezei, 2022; Shmueli-Scheuer et al., 2018], while the *Perceived waiting time* remains similar for both types of agents. The results of this study verify these findings.

No significant difference in customer satisfaction between the two types of service providers was observed concerning the variable *Arousal*. Findings from existing literature have shown that customers are more satisfied when interacting with human agents precisely because of the emotional character of the interaction, which contributes to the quality of the dialogue (*Perceived quality of information*) [Rapp et al., 2023], while chatbots are better because of the impartial influence in the interaction (*Pleasure*) [Shmueli-Scheuer et al., 2018].

For the variable *Perceived quality of information*, a statistically significant difference was found between the human agent and the chatbot. This variable required a deeper analysis because it included six sub-variables, however, the variable *Perceived quality of information*, as a main variable, is analyzed taking into account all sub-variables together. With the first sub-variable *Completeness of information*, more respondents believe that a human agent provides more complete information. It is interesting that when asked questions related to the sub-variable *Accuracy of information*, the respondents confirmed that they believe in the accuracy of the information provided by the human agent, even though the literature states that human agents are biased in providing service as well as trust in the accuracy of the information they provide. In the case of chatbots, the respondents have a little more doubt about the accuracy of the information. Analyzing the data for the sub-variable *Credibility of information*, respondents give a slight advantage in agreeing with the statements that a human agent provides credible, true and reliable information compared to a chatbot. The same applies to the analysis of the sub-variable *Significance of information*. As for the sub-variable *Timeliness of information*, the respondents believe that they receive sufficiently current, timely and up-to-date information without a time gap from both service providers. The analysis of the sub-variable *Quantity of information* revealed that the respondents get more information from the human agent, while the opinions about the chatbot are divided.

An analysis of the variable *Perceived waiting time* showed that the chatbot is still ahead here. Several respondents agreed that the waiting time in the interaction with the chatbot was appropriate and that the response arrived within the expected time.

Regarding the variable *Pleasure*, respondents confirmed that they felt happier, more satisfied and optimistic when interacting with a human agent. In interaction with the chatbot, the respondents' opinions were divided, i.e. a large number of respondents remained indifferent. This confirms findings from the literature that indicate the shortcomings of chatbots, namely humanity, empathy and emotional aspects. With a human agent, respondents feel more connected and better during the interaction.

Analyzing the variable *Arousal*, the respondents agreed that feelings such as nervousness or relaxation and boredom or excitement could not be distinguished in interaction with service

providers. The respondents agreed with these claims and there was no excitement in the interaction with human agents and chatbot.

The data analysis and its results have shown that a statistically significant difference exists in comparing customer interaction between the human agent and the chatbot, and thus the null hypothesis (H0) is rejected, i.e. the alternative hypothesis (H1) is accepted. Limitations in the paper were the small sample of respondents and the distribution of the sample among different groups of respondents (age and gender). So, the precision and the generalization of the results to the wider population can be questionable. However, this limitation can be minimized in future research when a broader sample can be taken into consideration. Additionally, in the desk research, a small number of relevant papers were included in the research field analysis, which points to a still not enough explored area in this context. So, in future research, it is necessary to expand the research query and search in other relevant databases to diminish this limitation.

## 7. CONCLUSION

This research tried to determine the difference between customer perception resulting from interaction with two types of service providers, human agents and chatbots in the purchasing decision-making process. For this purpose, a theoretical review of the literature was made and quantitative research was conducted using the analysis of variance (ANOVA) method and additionally, the Kruskal-Wallis test.

The advent of digital technologies has led to innovative ways of interacting with customers. In this context, human agents as service providers have been supplanted by chatbots. In the existing literature, customer satisfaction with chatbots is analyzed in general, while this paper provides a broader overview of customer perception of activities in the interaction process and the outcomes of that interaction. Observing human agents, their subjective influence on making a purchase decision is criticized, while the lack of humanity and emotional dimension of chatbots is emphasized.

Based on the respondent's perception of their satisfaction when interacting with service providers, it can be concluded that there are certain differences. Additionally, the respondents prefer a certain service provider depending on the observed variables. For example, when analyzing the variable's *Perceived quality of information* and *Pleasure*, respondents give priority to the human agent. Furthermore, according to the *Perceived waiting time for feedback*, respondents prefer chatbots. For the variable *Arousal*, it was determined that the respondents did not have a specific opinion and no statistically significant difference was found.

One of the key limitations that need to be addressed in future research is the small sample size and unequal distribution among demographic characteristics of respondents. Future research will include a comparison of the effectiveness of human agents and chatbots in customer service by observing the variables analyzed in the paper, which aims to compare the performance of two different service providers and assess their effectiveness and impact on the customer experience.

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