

THE IMPACT OF INTERACTING WITH VIRTUAL ASSISTANTS ON THE OVERALL SATISFACTION

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Abstract. *The article aims to assess how interaction with automated information systems such as virtual assistants - chatbots- can influence overall customer satisfaction with banks. The article reports the results of research focused on Romanian banking customers. It uses an online questionnaire to collect participants' evaluations regarding the quality of client experience when interacting with their bank's virtual assistant. The research results indicate that the overall satisfaction expressed by the banks' clients was significantly influenced by the accessibility to the chatbot's functions and the aspects regarding the privacy and security provided by the interaction with the chatbot. Consistent with the ethical approach to data privacy and protection, the paper concludes that companies must increase customer awareness regarding their high data protection standards. The paper recommends that organizations ensure that their customer is confident that the service provided by the bank's virtual assistant offers high data privacy and protection.*

Keywords: *virtual assistants; chatbots, technology; ethics; data protection; satisfaction.*

Introduction

To have a better user experience, companies invest in developments aimed at ensuring that each Chatbot has the capacity for understanding and intelligence; for this, it is necessary to have professionals who can incorporate elements of Artificial Intelligence as support.

Chatbots are very useful when it comes to business for any need, which is reflected in the customer service part. They mark a beginning to reaching a natural language between a machine and a human being with the help of all the algorithms that were used in their development and that today the most advanced robots have it. Chatbots are more complex than they seem because of their ability to store new questions and associate answers.

These conversation agents act as customer service representatives, giving answers in natural language and offering more focused information for conversation with a user. The Chatbot must have the same tone, sensitivity, and behavior as a human service agent, but it is also required to process information faster than a human.

Literature review

Digital transformation has made and continues to make huge changes in the customer service sector (Setia et al., 2013). Thus, organizations have started introducing different kinds of technologies to improve processes, scalability, and expenditure to simultaneously contribute to a more positive customer experience (Przegalinska et al., 2019; Sahu et al., 2018). These new technologies can lead to improved customer understanding through detailed data analytics and testing. Not only that, but a digital transformation can also lead to faster customer service resolution through multi-channel communication possibilities and via “self-service” tools (Westerman et al., 2014).

Businesses in various industries (including banking) face challenges in meeting customers' wants and needs (Morgeson et al., 2020). There has been an increase in the adoption of digital technologies in business activities (Andrei et al., 2021; Przegalinska et al., 2019; Sahu et al., 2018; Stanescu et al., 2020; Vatamanescu et al., 2016). As a result, customers can buy products or services through different types of online channels that organizations offer (Sun et al., 2020). Online communication channels have exposed new opportunities for businesses to build long-term customer relationships (Rose et al., 2011; Andrei & Zait, 2014).

Managing online mediums for business could be complex. For example, Ozuem et al. (2021) investigated consumers' responses to online service failure during the COVID-19 pandemic. This investigation found that customers have moved their preferences toward online methods due to the impact of the pandemic on societies. As a result, companies have been facing a huge demand for online services and through that, customers have experienced service failures (Ozuem et al., 2021). Also, this examination found that online services have created barriers between organizations and their customers. Thus, this could influence the customer and might form service failures. It is proven that service failures have a negative effect on customer loyalty (Mattila, 2004; Sousa & Voss, 2009). The negative effect on customer loyalty reduces profits and creates a negative online word of mouth (Hedrick et al., 2007; Wilson et al., 2016). Also, Mattila (2004, p. 135) also stated that customers might feel “betrayed” because of service failure. Customers can respond to service failures in different ways but focusing on online communication channels could create certain challenges for businesses as it influences customers' trust and loyalty (Adam et al., 2020; Chari et al., 2016; Kim et al., 2021).

Morgeson et al. (2020) investigated how to turn complaining customers into loyal ones to gain their trust. The investigators found that the increase in technology users might be a reason behind the increase in complaints for any business. For instance, Chari et al. (2016) found that increased user-generated content on online websites has become a new communication channel with customers. Thus, it highlights that certain brands might use such websites to support and promote a specific product or service. Customers might believe that this type of advertisement promotes false information. As a result, it could affect customers' trust in a brand (Chari et al., 2016). Also, regarding social media, Wilson et al. (2016, p. 89) reflected that “consumers are likely to avoid a service provider with too many negative comments and choose a provider with positive comments.” For instance, Facebook has two billion active users, and it is one of the most

used social media platforms (Mei et al., 2018). Hence, it reflects that customers are influenced by their family or friends' perception of online websites (Chari et al., 2016;).

Sun et al. (2020) stated that recently there has been an increase in adapting live chat options to improve customer service. This investigation illustrated that 42% of the customers prefer to use live chat compared to other online communication channels due to the online satisfaction they experience. Customers use live chat services when they need support or cannot find an answer to their questions about a specific product or service. Thus, live chat services are handled by human interactions, and the literature suggests that businesses should invest in training together with employing skilled staff. As a result, this investigation argues that in the long run, customers will become more satisfied with the service and could turn into loyal customers for the brand. However, this investigation creates an argument about whether live chat services are recognized as a servant for existing call centers.

Considering the previous section and the arguments from Sun et al. (2020) and Adam et al. (2020) discussing the customer preferences for live chats, versus high levels of unsatisfactory service quality from conversational software agents (CAs) several advantages and disadvantages for businesses as well as for customers can be assumed. First, for businesses, a main advantage can be the cost savings that a chatbot can offer, on average labor costs are the largest expenses for call center operation (Agarwal et al., 2020; Manno et al., 2021; Przegalinska et al., 2019). Not only that, as noted in previous chapters, call centers notoriously have issues with employee turnover, due to employee dissatisfaction and high operation costs (Ormezi et al., 2014). Considering the costs of recruiting, selecting, onboarding, and training, this can become costly (Valle et al., 2017). Moreover, chatbots can help save time at call centers, as they are always available and able to help customers with basic and simple questions, and when questions or requests are more complex, users can be connected with an agent to follow up (Chung et al., 2020). Using chatbots and further digitalizing such processes through data analytics can contribute to improved business insights. Thus, businesses can better understand questions and requests that are put forward by customers and eventually adjust and adapt communications and marketing based on these analyses, therefore contributing to an improved customer experience (Agarwal et al., 2020; Chung et al., 2020).

Chatbots can be advantageous for customers as they can primarily decrease barriers to communication, being available 24/7 and easily accessible (Atiyah et al., 2018; Jenneboer et al., 2022). Chatbots can also provide highly personalized content and information to the customer, which could be one of the main reasons for influencing trust in AI technology (Jenneboer et al., 2022). Additionally, as mentioned earlier, a decrease in expenses for a business can usually translate to a stable continuation or decrease in price for the consumer (Agarwal et al., 2020; Manno et al., 2021; Przegalinska et al., 2019). Thus, the concept of the chatbot can prove to be an advantageous tool for businesses and consumers; however, the development of the chatbot must be able to meet consumer expectations to aid in building trust and loyalty.

While interacting with a virtual assistant is a rather new phenomenon, users might be more aware of the direct requests, inducing more privacy concerns. Online services collect personal information to make recommendations. Jenneboer, Herrando, and Constantinides (2022) briefly discuss the topic of privacy with chatbot technology and mention that privacy is mainly an issue for consumers due to a lack of trust. The authors

continue to explain that a human-like interaction with a chatbot aids in easing worries about privacy and can increase customer trust. Previous research by Følstad et al. (2018) showed that customers have a concern for privacy and security when it comes to interactions with chatbots and they have a need to be provided with a secure online service.

Customer satisfaction is a significant determinant of customer retention and aids in shaping customer trust in a business (Jenneboer et al., 2022). However, some researchers argue that mere satisfaction is insufficient to retain customers (Deming, 1986; Jones & Sasser, 1995; Nath, 2007). Deming (1986) and Nath (2007) explain that satisfied customers are still likely to switch to alternatives fundamentally because they may not have much to lose or because a higher perceived level of trust can be found elsewhere.

Methodology

The aim of the paper is to assess how the interaction with a chatbot can influence the respondents' overall satisfaction with the banks' performance.

H1: A client's overall satisfaction with the bank positively correlates with the general satisfaction of interacting with the chatbot.

H2: A positive interaction with the chatbot increases overall satisfaction with the bank.

The data are collected using an online questionnaire, which is applied to 164 eligible respondents. The respondents are asked to evaluate, on a scale from 1 (Strongly disagree) to 7 (Strongly agree), the overall satisfaction toward the bank and the quality of interactions they had with the virtual assistant chatbot. Several dimensions are followed when evaluating the quality of the experience when interacting with the chatbot, as presented in Table 1.

Table 1. Dimensions and sub-dimensions of users' experience when interacting with a chatbot (Author's Own Source)

Dimensions of users' experience in interacting with the chatbot*	Sub-dimension
Accessibility to the chatbot's functions (Accessibility)	Ease in conversation with the chatbot Ease in accessing the chatbot
Quality of the chatbot's functions (Functions_quality)	Clear expectation regarding the chatbot's capability Capacity of maintaining a topical discussion Quality of guiding to relevant service Quality of answers in unexpected situations Clear answers Reliable answers
Quality of conversation and information provided by the chatbot (Conversation_quality)	Effort in communicating with the chatbot Acknowledging and facilitating reaching the user's goal Relevance of provided information Appropriate amount of information provided Social presence of the chatbot
Privacy and security provided by the interaction with the chatbot (Privacy_security)	Privacy and security
Speed in interacting with the chatbot (Speed)	Speed

* Variables' names in brackets

To assess the influence that the experience when interacting with the chatbot has on the overall bank satisfaction, a linear regression model is estimated. The functional form of the model is:

$$Y = \beta_0 + \beta_i X_i + \gamma_i Z_i + \varepsilon$$

where X_i is the independent variable, the five dimensions through which the experience when interacting with the chatbot is measured; Z_i is the control variable – respondent's gender (1-male, 0-female) and level of education (1-tertiary education, 0-otherwise); ε is the residual term, normally distributed, with zero mean and constant variance.

Results and discussion

For each dimension evaluating the experience of interacting with a chatbot, an internal consistency of the questionnaire's items that compose a dimension is employed, calculating Cronbach's Alpha reliability coefficient, as presented in Table 2.

Table 2. Cronbach's alpha for each sub-dimension (Author's Own Source)

Sub-dimension	Cronbach's Alpha coefficient
Accessibility to the chatbot's functions	0.978
Quality of the chatbot's functions	0.984
Quality of conversation and information provided by the chatbot	0.961
Privacy and security provided by the interaction with the chatbot	0.939
Speed in interacting with the chatbot	0.945

The scale reliability is very good and consistent across the items of each dimension (the coefficient is over 0,7 and positive in all cases).

Summary statistics are provided in order to evaluate the distributions of responses for all of the interest variables. The results are presented in Table 3.

Table 3. Descriptive indicators (Author's Own Source)

	Overall bank satisfaction	Accessibility	Functions_ quality	Conversati on_ quality	Privacy_ security	Speed	
Mean	5.13	4.8926	4.5898	4.5475	4.6768	4.8455	
Median	5.00	5.0000	4.7500	4.7333	5.0000	5.0000	
Std. Deviation	1.579	1.72281	1.53931	1.47042	1.74027	1.69380	
Skewness	-.520	-.468	-.436	-.491	-.444	-.444	
Kurtosis	-.472	-.811	-.535	-.430	-.866	-.795	
Percentiles	25	4.00	3.8333	3.7917	3.6167	3.3333	3.6667
	50	5.00	5.0000	4.7500	4.7333	5.0000	5.0000
	75	7.00	6.5000	5.8750	5.6000	6.0000	6.3333

The average score for the overall bank satisfaction is higher than the satisfaction when interacting with the chatbot, for all dimensions, at least 25% of respondents giving the maximum satisfaction score for the bank performance. The means are over 4.5, with respondents declaring, on average, a moderately satisfactory experience when interacting with the chatbot.

A correlation matrix is presented in Table 4, to evaluate whether a client's overall satisfaction with the bank is positively correlated with the general satisfaction of interacting with the chatbot.

Table 4. Correlation matrix for the interest variables (Author's Own Source)

	Overall bank satisfaction	Accesibility	Functions_quality	Conversation_quality	Privacy_security	Speed
Overall bank satisfaction	1	,437**	,465**	,442**	,460**	,412**
Accesibility	,437**	1	,832**	,802**	,732**	,750**
Functions_quality	,465**	,832**	1	,958**	,870**	,853**
Conversation_quality_rec	,442**	,802**	,958**	1	,871**	,854**
Privacy_security	,460**	,732**	,870**	,871**	1	,761**
Speed	,412**	,750**	,853**	,854**	,761**	1

** Correlation is significant at the 0.01 level (2-tailed).

When interacting with the chatbot, respondents moderately associate a positive experience of this interaction with good overall satisfaction with the bank. The Pearson correlation coefficient is close to 0.5 and has a significant positive value, showing a moderate correlation between the level of satisfaction when engaging in interaction with the chatbot and the overall satisfaction with the bank.

The results for the estimated regression model are presented in Table 6. These results help assess the impact that different dimensions of interacting with the chatbot have on the overall bank satisfaction expressed by respondents.

The backward method for selecting the independent variables is applied, where all independents are entered into the model's equation and then serially removed when the criteria for elimination are satisfied. The variables are considered for elimination according to their partial correlation with the dependent. The extensive results of applying the backward method are presented in Table 5. After identifying the significant factors, the model is re-estimated with these factors and the controls (Table 6).

Table 5. Regression model results after applying the backward method of estimation (Author's Own Source)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.664	.457		5.829	.000		
	Accesibility	.141	.118	.154	1.200	.232	.302	3.311
	Privacy_security	.238	.135	.262	1.769	.079	.226	4.425
	Speed	.073	.132	.078	.550	.583	.250	3.993
	Gender	.367	.255	.104	1.443	.151	.954	1.049
	Education	.029	.272	.008	.108	.914	.971	1.030
	Functions_quality	.271	.283	.263	.958	.340	.066	15.099
2	Conversation_quality	-.235	.282	-.217	-.834	.405	.074	13.565
	(Constant)	2.690	.389		6.918	.000		
	Accesibility	.142	.117	.155	1.215	.226	.304	3.292
	Privacy_security	.239	.134	.263	1.779	.077	.226	4.421
	Speed	.072	.131	.077	.547	.585	.251	3.979
	Gender	.367	.254	.104	1.447	.150	.954	1.049

	Functions_quality	.267	.280	.259	.955	.341	.067	14.850
	Conversation_quality	-.232	.280	-.214	-.831	.407	.074	13.453
3	(Constant)	2.720	.384		7.082	.000		
	Accesibility	.151	.116	.164	1.302	.195	.309	3.235
	Privacy_security	.238	.134	.262	1.779	.077	.226	4.421
	Gender	.345	.250	.098	1.381	.169	.978	1.022
	Functions_quality	.292	.276	.283	1.059	.291	.069	14.464
	Conversation_quality	-.195	.270	-.179	-.720	.473	.079	12.632
4	(Constant)	2.660	.374		7.108	.000		
	Accesibility	.148	.115	.162	1.286	.200	.309	3.233
	Privacy_security	.212	.129	.234	1.648	.101	.244	4.096
	Gender	.334	.249	.095	1.339	.183	.982	1.018
	Functions_quality	.142	.180	.138	.788	.432	.161	6.207
5	(Constant)	2.725	.364		7.477	.000		
	Accesibility	.202	.094	.220	2.157	.033	.470	2.127
	Privacy_security	.282	.093	.311	3.035	.003	.467	2.143
	Gender	.331	.249	.094	1.332	.185	.983	1.018
6	(Constant)	2.871	.349		8.236	.000		
	Accesibility	.201	.094	.219	2.143	.034	.470	2.127
	Privacy_security	.272	.093	.299	2.924	.004	.470	2.127

a. Dependent Variable: Overall bank satisfaction

Table 6. Regression model estimation (Author's Own Source)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.742	.431		6.369	.000		
	Accesibility	.202	.094	.220	2.149	.033	.470	2.127
	Privacy_security	.282	.093	.310	3.020	.003	.466	2.146
	Gender	.332	.250	.094	1.329	.186	.982	1.018
	Education	-.021	.268	-.005	-.077	.939	.995	1.005

a. Dependent Variable: Overall bank satisfaction

The only dimensions that significantly impact the overall bank satisfaction expressed by the banks’ clients are the accessibility to the chatbot’s functions and the privacy and security that the interaction with the chatbot provided. Both dimensions have a positive impact, an increase of one point in the score given for the experience with the chatbot determines an average increase of 0.202 and 0.282 points, respectively, in the overall bank satisfaction, for the same gender and education level of respondents.

The collinearity statistics indicators show that the independent variables in the model are not linear functions of the other independents, so do not introduce collinearity problems when estimating the regression coefficients - the Tolerance indicator is above 0.1 and VIF is well below 10.

The average score for overall bank satisfaction is higher than the satisfaction when interacting with the chatbot, for all dimensions. When interacting with the chatbot, respondents moderately associate a positive experience of this interaction with good overall satisfaction with the bank.

Conclusions

The research results indicate that dimensions that significantly impact the overall bank satisfaction expressed by the banks' clients are the accessibility to the chatbot's functions and the privacy and security that the interaction with the chatbot provided.

Of course, study limitations may influence the interpretation and application of presented results - even though surveys presented descriptions for each dimension, it is not clear how respondents interpreted the descriptions and the survey items.

However, we can conclude it is recommended that organizations should ensure that their customer is realizing that the provided service is secured, and the risks of service failure are minimized. Consistent with the ethical approach of data privacy protection, this aspect is essential for customer satisfaction and loyalty.

The idea of communicating with automated information systems is not entirely integrated into our society, considering that AI technology has always been controversial. Moreover, chatbots are very often linked to social network platforms, so customers' personal data can easily be accessed by the platform's administrators. Therefore, companies must ensure that their customers' data is well protected, even more so when financial transactions or any confidential information about financial accounts are involved. It is recommended that organizations should ensure that their customer is realizing that the provided service is secured.

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