

Integrating Artificial Intelligence (AI) with Customer Experience (CX) in Banking: An Empirical Study on how Chatbots and Virtual Assistants Enhance Empathy

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Abstract— This study aims to investigate the influence of chatbots and virtual assistants on customer experience in online banking. The study focuses on Albania and Cyprus and analyzes survey data from 209 clients. Using correlation and regression analysis, the research aims to understand how AI tools enhance service quality and customer satisfaction. The study emphasizes the importance of empathy in AI and underlines its role in improving customer interactions. Despite its limited sample size and regional focus, the study offers significant insights, including the importance of digital inclusivity, ethical AI use, and human-centric design. These findings not only apply to the banking sector in the surveyed regions but also have broader implications for global Internet banking practices and AI integration across various industries.

Keywords—chatbot, customer experience, customer service, service quality, virtual assistant.

I. INTRODUCTION

In the ever-evolving banking industry, Artificial Intelligence (AI), particularly chatbots, stands out as a significant innovation. Defined as AI-driven interfaces that enable natural language interactions between users and computer systems, chatbots are revolutionizing customer service in banking. This technological advancement is reshaping banking roles, driving a transition towards more strategic, analytical, and innovative functions [2].

The impact of AI and chatbots is particularly pronounced in developing countries, where the banking sector is undergoing a rapid digital transformation. Here, AI technologies like chatbots and virtual assistants are rapidly becoming integral to banking operations, driven by demographic shifts and technological advancements [19]. Examining how customers perceive their interactions with chatbots and virtual assistants in the financial services industry is the main goal of this research. This research is crucial for guiding banks in these regions to optimize their AI algorithms for enhancing customer experience [2] [8].

Research Question: “How can chatbots and virtual assistants enhance the customer experience in the banking sector of emerging nations?” This question seeks to understand the customer's viewpoint towards AI applications in banking, particularly in terms of interaction quality and service improvement [2] [13].

This study seeks to significantly enhance the European literary landscape concerning the implementation of artificial

intelligence (AI) within the realm of banking. The insights derived from this research are expected to hold significant importance for banks operating in developing nations, potentially shaping their strategy and also having possible implications for global banking practices. The goal is to align banking services with the digital expectations of customers, thereby improving the quality of customer service in the sector [2] [8] [19].

II. CONCEPTUAL FRAMEWORK OF RESEARCH AND HYPOTHESIS DEVELOPMENT

This study develops a conceptual model to deepen the understanding of elements that shape customer experience in customer service support. Central to this model is the influence of Empathy (Emp) on Customer Experience, a concept rooted in the work of [15]. The model utilizes the SERVQUAL model, a reliable and accurate framework validated by [17] and [18] and further adapted by [1] to include additional factors like the firm's image, price, and customer satisfaction. Figure 1 depicts several key factors that affect Service Quality, including Reliability, Responsiveness, Empathy, Assurance, and Tangibles. These variables have an impact on the perception of service quality. When the perceived service quality surpasses the anticipated service quality, it not only exceeds the customers' expectations but also aligns with the elevated standards of the perceived service quality [2].

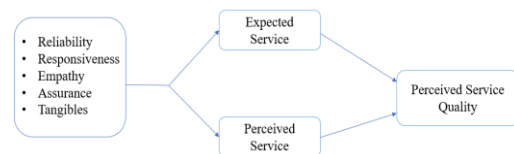


Fig. 1. SERVQUAL- Service Quality Model [15].

This study builds on the findings of an initial analysis [16]. It develops a conceptual model to deepen the understanding of elements that shape customer experience in customer service support. Central to this model is the influence of Empathy (Emp) on Customer Experience, a concept rooted in the work of [15]. The model utilizes the SERVQUAL model, a reliable and accurate framework validated by [17] and [18] and further adapted by [1] to include additional factors like the firm's image, price, and customer satisfaction. However, this research focuses on how service empathy impacts customer service support and overall customer experience. Figure 2 presents a

comprehensive representation of the conceptual framework, illustrating the influence of empathy on both service quality and customer experience. The diagram depicts empathy as a factor affecting service quality and, consequently, influencing the overall customer experience.

This research aims to explore the practical application of artificial intelligence (AI), specifically chatbots and virtual assistants, to enhance and elevate customer service support. These AI tools are hypothesized to demonstrate high empathy, thereby improving the customer service process by understanding and meeting customer needs more effectively [2] [6] [7]. Examining the relationship between customer experience, the dependent variable, and service quality—specifically empathy—as the independent variable, constitutes the focus of this study. This phenomenon gives rise to the formulation of the subsequent hypothesis:

Hypothesis: The empathy demonstrated by chatbots, and virtual assistants positively impacts the customer experience.



Fig 2. The Conceptual Framework (Authors' Contribution).

III. METHODOLOGY

The methodology of this study in the online banking sector investigates the impact of chatbots and virtual assistants on service quality, mainly focusing on the empathy component derived from [2]. The research study employs a correlation research design in order to investigate the association between empathy, which serves as the independent variable, and customer experience, which is considered the dependent variable.

Geographically, the research encompasses Albania and Cyprus, targeting individuals over 18 years old engaged with online banking in these developing nations. The study, limited to the online banking sector, employs a quantitative, cross-sectional approach. It aims to evaluate how empathy, as a facet of service quality, affects customer behavior and experience in online banking, referencing methodologies from [11], and service quality models from [15] [17] [18] and [1].

Data were gathered through an online survey using Microsoft Forms, distributed between March and June 2023, focusing on voluntary participation and data privacy. The questionnaire, refined after a pre-test with 133 randomly selected individuals, received 209 responses, primarily from Albania. It consisted of eight sections, with the last section dedicated to demographic questions and the others addressing various components of service quality. The responses were assessed using a five-point Likert scale, in accordance with the suggested methodology of [3]. The study utilized descriptive statistics, correlation, and regression analysis for a comprehensive empirical evaluation.

IV. RESEARCH RESULTS

TABLE I. DESCRIPTIVE STATISTICS

Descriptive Statistics	Descriptive Statistics				
	Obs	Mean	Std. Dev.	Min	Max
emp	209	3.669	0.856	1	5

This analysis focuses on a dataset with 209 responses to gauge customer experience in online banking. It employs descriptive statistics, a method crucial for summarizing and elucidating the primary features of the dataset. Descriptive statistics offer insights into data characteristics, effectively organizing and analyzing information. The main tools in statistical analysis encompass measurements of central tendency, such as the mean, median, and mode, as well as measures of dispersion, including the range, variance, and standard deviation [20]. The variables within the dataset evaluate several dimensions of customer experience and are measured using a Likert scale that ranges from 1 to 5. Higher scores on the scale indicate stronger agreement or more positive evaluations.

A significant variable, "emp," assesses customer experience and empathy towards the company's service. The mean score for this variable stands at 3.669, with a standard deviation of 0.856. This indicates that customers generally hold moderately positive opinions about the company's service quality, though there is some variation in their responses (refer to Table I).

The dataset provides useful insights into several aspects of customer experience and perceptions of service quality, specifically in relation to empathy (as demonstrated in Table I). Further analysis, including econometric methods like pairwise correlation and regression analysis, will explore the relationships between the mentioned aspect (empathy) and the other variables. This will aid in identifying potential areas for improvement in customer experience.

Pairwise correlation, sometimes referred to as bivariate correlation, is a statistical measure utilized to evaluate the magnitude and direction of the linear association between two variables. It determines the degree to which changes in one variable are correlated with changes in the other and evaluates how closely related two variables are to each other [14]. Pairwise correlation is significant because it can shed light on the interrelationships between variables and has numerous uses [14]. **Table II** illustrates the pairwise correlation conducted. Here is how the pairwise correlation matrix can be understood:

(3) The relationship between the variables "emp" (empathy) and "res" (responsiveness), and "ass" (assurance) is 0.649 and 0.783, respectively. The correlation coefficient between variables (1) "res" and (3) "emp" suggests a moderate positive correlation. The correlation coefficient

between variables (2) "ass" and (3) "emp" suggests a strong positive correlation (see **Table II**). These associations imply that customers who believe a bank is more responsive and offers better assurance also believe the organization exhibits higher empathy.

TABLE II. PAIRWISE CORRELATION

Pairwise Correlations	Pairwise Correlations				
	(1)	(2)	(3)	(4)	(5)
(1) res	1.000				
(2) ass	0.687	1.000			
(3) emp	0.649	0.783	1.000		
(4) tan	0.694	0.699	0.730	1.000	
(5) rel	0.777	0.802	0.766	0.741	1.000

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

The Breusch-Pagan/Cook-Weisberg test was employed to evaluate the presence of heteroskedasticity in the dataset. The null hypothesis of the test posits that the error terms in the regression model exhibit homoscedasticity, meaning that their variance remains constant across all levels of the independent variables. With a test statistic (Chi2(1)) of 1.08 and a p-value of 0.2982, the results indicate that the likelihood of observing a test statistic this extreme under the null hypothesis is relatively high. Consequently, we cannot reject the null hypothesis, implying no significant evidence of heteroskedasticity in the regression model. This suggests that the error terms have constant variance, affirming the model's stability across the components of service quality and customer experience examined (refer to Table III).

TABLE III. LINEAR REGRESSION

Linear Regression		Linear Regression				
Number of obs= 209						
F (5,203) = 68.98						
Prob > F=0.0000						
R-squared=0.6445						
Root MSE= 0.4657						
cust	Coef.	Robust Std. Err.	t	P>t	Conf. % (95 % Interval)	
emp	0.1305416	0.0773497	1.69	0.093	-0.0219703	0.2830535

Considering the equation's result, the output has been provided with the respective values.

Empathy --- Related to the EMP variable, a one percent change of it increases customer experience by 0.13 points CP considering a 5 percent significance level. As a result, it displays a positive impact on customer experience, and it is statistically significant at the conventional levels ($p < 0.01$) (see **Table III**). Consequently, it is considered highly significant and essential and impacts the customer experience. As a result, the hypothesis concerning the influence of chatbots/virtual assistants' empathy on customer experience is deemed valid, as indicated in **Table IV**.

Further to the analysis, prob f(stat) is 0,0000, demonstrating an accurate and significant result of the constructed model. Regards to the R-square, it explains only 64,45% of the variation in customer experience, indicating a high inclusion of the explained variables. Furthermore, the Root MSE, based on the results of 0,4657, specifies the role of the data precision to be more reasonably predicted. **Table IV** illustrates the hypotheses and their acceptance or rejection when studying, in more detail, the service quality component and customer experience.

TABLE IV. HYPOTHESIS TESTING

Hypothesis Testing	Hypothesis Testing
The empathy of the chatbots/virtual assistants positively impacts the customer experience.	✓ H ₀ : Failed to Reject

V. DISCUSSION OF FINDINGS

This research endeavor aimed to examine the influence of chatbots and virtual assistants on customer experience and service quality within the banking sector. The analysis was conducted based on the feedback received from a sample of 209 consumers, representing six banks operating in two developing nations. Key focus areas included customer behavior, satisfaction, and service quality evaluation through the SERVQUAL model, emphasizing the importance of customer expectations and perceptions.

The research revealed positive relationships between service quality elements like empathy and customer experience. Regression analysis further demonstrated that empathy significantly enhances customer experience [12].

The study's shortcomings encompass a restricted sample size and a dependence on self-reported data, which may have implications for the study's capacity to be generalized. Future research directions suggest exploring the role of tangibles, expanding on service quality aspects like security and customization, and employing diverse methods like qualitative interviews for a more comprehensive understanding [4] [5]. In conclusion, the integration of AI in banking significantly impacts customer satisfaction, with an emphasis on empathy as a key factor. The findings imply broad implications for global banking, suggesting that AI integration can enhance customer service worldwide. Future research should continue to explore AI's evolving role in banking, considering its potential to transform customer experience in the digital era [9] [10].

VI. CONCLUSION

This research demonstrated the significant impact of artificial intelligence (AI) tools, particularly chatbots and virtual assistants, on customer experience and service quality in the banking sector. Focusing on empathy as a key service quality dimension, the study analyzed responses from 209 customers across six banks in two developing nations. The findings revealed a strong correlation between customer experience and the quality of service provided by these AI technologies. These tools enhanced the customer experience by offering consistent and valuable support, boosting customer confidence.

This study emphasizes the significant significance of comprehending client attitudes and expectations in the era of

digitalization, as well as the necessity for banks to augment service quality through the integration of artificial intelligence (AI) technologies. Although the research focused on specific banks in developing nations, its implications extend globally, suggesting that chatbot and virtual assistant integration can significantly improve customer service and experience worldwide.

Future research directions include exploring the effects of AI on customer experience across various online banking scenarios and examining additional service quality aspects. Further work is warranted to explore the possible consequences on customer experience in the banking sector as AI continues to improve and new applications emerge.

In conclusion, the banking industry stands at a pivotal point where leveraging AI, especially chatbots and virtual assistants, offers immense potential to improve service quality and customer experience. By efficiently utilizing these technologies, banks can meet the changing expectations of customers in the digital era. Based on the SERVQUAL model and focusing on customer experience and empathy, the study's conceptual framework provides a basis for understanding how AI-enhanced banking services impact customer perceptions and satisfaction.

VII. REFERENCES

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