Enhancing Chatbot Service User Satisfaction

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Abstract - Chatbots play an essential role in enhancing automated customer support experiences, with the global chatbot market estimated to reach $142 billion in 2024. Despite this growth, limited research addresses the factors influencing user satisfaction with chatbot services. Drawing from the literature on service and information quality, this study investigates how these factors impact chatbot service user satisfaction (CSUS). It hypothesizes that service quality (SQ) and information quality (IQ) are significant predictors of CSUS and that demographic variables like age may influence satisfaction levels. A survey of 385 Thai chatbot users were surveyed concerning their online service opinions, from which the data were analyzed using ANOVA and multiple regression. Results confirmed that both SQ and IQ significantly enhance CSUS. Additionally, age was a significant factor, with younger users (21-30 years) reporting higher satisfaction than older groups. These findings highlight the importance of delivering timely, accurate, and reliable information while ensuring visually appealing and user-friendly chatbot designs. The study underscores the need for businesses to adapt chatbot communication strategies to demographic preferences and to prioritize continuous updates and personalization. Future research should explore other potential influences, such as chatbot personality traits, perceived benefits, and cultural variations.

1. Introduction

The COVID-19 pandemic accelerated the adoption of emerging technologies among consumers [1], with chatbot technologies garnering significant interest in the business world. As research grows in understanding chatbots across various fields [2], Chatbot technology has simultaneously increased for internal and commercial applications. These programs automate responses to text or voice-based conversations on platforms such as Line, Facebook, Instagram, and websites. Chatbots substantially benefit businesses, particularly those focused on service provision [3]. They can automatically answer questions, provide information, present advertisements and promotions, offer advice, handle customer care, and even close sales.

Chatbots serve as organizational and corporate representatives, acting as communication and interaction channels with individuals, while also assisting staff members in customer care tasks. However, their use is not limited to customer service, as chatbots can also be used in learning applications, organizational development, or business processes to enhance efficiency.

Estimated to reach $142 billion in 2024 globally [4], chatbots have been reported to appear in 85% of customer interactions in organizations or businesses that use robotic software.

Other studies have demonstrated the application of chatbots in improving managerial effectiveness [5], with 83% of online buyers having been reported to need consultation during their purchase decision-making process [6].

Therefore, chatbot integration into organizations or businesses has become essential in the digital age, as chatbots provide seamless experiences and expedite responses to customer inquiries, even during off-hours when employees are unavailable. This capability increases sales opportunities, as modern consumers typically expect immediate responses.

Consumers often anticipate replies within 0-4 hours, while organizations or businesses typically take 10 hours to respond on social media platforms.

Utilizing chatbots gives businesses a competitive edge by serving as essential assistants in customer interactions 24/7 and offering other benefits such as reducing errors in information dissemination, increasing sales opportunities, and enhancing customer satisfaction [3].

Implementing chatbots creates the impression of a personal shopkeeper ready to answer questions instantly and help customers find suitable products or services. This leads to higher customer satisfaction and easier purchase decisions.

In 2023, chatbots were utilized by 1.4 billion people, to which an impressive 67% improvement in sales was attributed [7]. Beyond driving sales, chatbots streamlined the process of automatically collecting customer data, offering businesses enhanced insights and efficiency.

This data helps organizations understand customer behaviors and preferences, enabling them to tailor their services accordingly. Chatbots also improve service efficiency and post-sales service by reducing customer service costs by 30%, as they handle repetitive queries and enhance marketing efforts. Chatbots outperform traditional communication channels like email, with customers being up to four times more likely to read messages and ten times more likely to access additional information links. Numerous studies support the positive impact of chatbot technology on sales and customer experiences [8], [9], [10], [11], [12]. Despite the advancements in chatbot technology, there is still a need to explore how to adapt it to different local contexts, with multiple studies working to bridge the knowledge gap between technology and local context knowledge or wisdom [13], [14].

In this study, the authors aim to understand the research gap concerning customer satisfaction with chatbot technology in Thailand by examining the relationships between information quality (IQ), service quality (SQ), and demographic differences in the context of chatbot satisfaction. Recent studies have investigated how organizations apply chatbot technology in various fields, such as sustainable education [15], modern healthcare services [16], and local government [17]. However, the authors aim to explore the general application of chatbots concerning overall satisfaction, believing that the insights gained from this research can be utilized in other industries and institutions.

2. Conceptual Development

The rapidly growing field of chatbot interactions has prompted a deeper investigation into the factors influencing chatbot service user satisfaction (CSUS). This study sets out to achieve several key objectives, each aimed at enhancing understanding of how users perceive and evaluate their experiences with chatbots.

First, the authors endeavor to analyze the combined effects of demographic factors, service quality (SQ), and information quality (IQ) on CSUS. It is essential to understand the individual impact of these factors and how they interact and influence each other. For example, how demographic factors shape user expectations might alter the perception of SQ and IQ. This holistic approach is expected to yield more profound insights into the multifaceted nature of user experiences with chatbots.

Next, the study seeks to investigate how demographic factors influence user satisfaction, including age, gender, and educational background. This is crucial as tailoring chatbot interactions to meet diverse user needs is essential for success [18]. For instance, younger users may have different expectations and comfort levels with technology than older users. Similarly, gender and educational background might shape how users interact with and perceive the efficacy of chatbots. The research aims to uncover patterns and preferences that can inform more personalized and effective chatbot designs by analyzing these demographic variables.

Third, the research identifies critical aspects of SQ, such as reliability, responsiveness, and ease of use [19], [20]. Reliability pertains to the consistency and dependability of the chatbot's performance; responsiveness refers to how quickly and effectively a chatbot can address user queries, and ease of use involves the user-friendly nature of the interface and interaction process. By dissecting these aspects, the study aims to pinpoint which features are most valued by users and how they contribute to overall satisfaction.

The study's third goal is to evaluate the effect of IQ on user satisfaction, as IQ is a critical determinant of the perceived usefulness of chatbots [20]. This includes how accurate, relevant, and clear the chatbot's information is. Accurate information ensures that users receive correct and precise answers to their queries. Relevance ensures that the information is pertinent to the user's needs, and clarity involves the ease with which users can understand the information provided. By exploring these dimensions, the study seeks to determine how information quality influences user satisfaction and identify potential improvement areas in chatbot communication strategies.

These objectives aim to provide an understanding of the factors driving user satisfaction in chatbot interactions. By integrating insights from demographic analysis, SQ assessment, and IQ evaluation, the study offers a framework for improving chatbot design and implementation strategies. This research has the potential to contribute significantly to the development of more sophisticated and user-friendly chatbot services, thereby fostering greater user satisfaction and engagement.

2.1. Demographic Factors

Demography explains the characteristics of population behavior in terms of size, distribution, and structure. It includes gender, occupation, education, age, and income [18]. These demographic characteristics are commonly used in market segmentation because they directly and indirectly influence consumer behavior through individual preferences and decision-making patterns. Demographic factors in this study include gender, occupation, education, age, income, and marital status.

2.2. Information Quality (IQ)

Information quality is a critical factor that influences the effectiveness of data use, which should be evaluated by the data users themselves [21]. Since data users may have varying perspectives on the same dataset, quality information must come from reliable sources and ensure completeness, accuracy, and trustworthiness. Additionally, the information should be presented in an easily understandable manner.

Data quality is related to the information quality that service users receive from service providers. This quality should be assessed by the users, who are the ultimate judges of the information's utility. To meet user's needs, the information provided should be clear, current, reliable, and readily accessible at any time. The Information System Success Model (ISSM) theory emphasizes measuring the quality of information disseminated by a system [22]. Users assess this quality based on the completeness and accuracy of the information they receive.

Key characteristics of IQ include:

1. **Accessibility**, which is related to users' ease of access to information whenever they need it.

2. **Accuracy** relates to information correctness and is free of errors.

3. **Completeness** covers how comprehensive the information is.

4. **Economy** factors in information cost-effectiveness and the price value.

5. **Flexibility** relates to information adaptability to different user needs and contexts.

6. **Reliability** covers user information trust.

7. **Security** involves safeguarding information from unauthorized access and ensuring its confidentiality, integrity, and availability. This includes protecting data against breaches, misuse, and unauthorized alterations to maintain trust and compliance with relevant standards.

8. **Understandability** includes how easy the information is to comprehend.

9. **Timeliness** entails up-to-date information and availability when needed.

10. **Verifiability** covers the ability of users to verify information authenticity and accuracy [23]. Other studies have also shown the direct relationships between chatbot IQ and user satisfaction in various technological contexts across different nations [20], [24]. These findings highlight the importance of high-quality information in enhancing user satisfaction.

In this study, the authors propose that information quality factors correlate with satisfaction in using chatbot services. Ensuring that information provided by chatbots is accurate, complete, relevant, secure, and easily understandable can significantly improve user satisfaction. By focusing on these dimensions, organizations can enhance the overall quality of their chatbot services, leading to higher user satisfaction and better service outcomes.

2.3. Service Quality (SQ)

Service quality is an essential determinant of the success of an organization or business, particularly in competitive environments where many entities offer similar services in the same geographic area. High SQ meets and often exceeds user expectations, creating a positive and memorable user experience [15]. Exceeding user expectations or providing an "excess of needs" can significantly enhance user satisfaction and loyalty.

To effectively manage SQ, organizations must accurately understand and set user expectations. This involves measuring the expectations of the target service users and striving to maintain service quality above these expectations. Therefore, SQ can be interpreted as the delivery of quality services that consistently meet or exceed user expectations. This approach helps organizations differentiate themselves in the market, attract more users, and build a loyal customer base.

The concept of SQ is often assessed using five key dimensions [25]. These are:

1. **Tangibility** refers to the service's physical aspects, such as the appearance of facilities, equipment, and personnel. In the context of chatbots, tangibility relates to the user interface design and the overall professionalism of the service presentation.

2. **Reliability** involves how dependable and accurate the promised service is. For chatbots, this means consistently delivering correct and valuable information without errors.

3. **Responsiveness** measures the service provider's ability and willingness to assist users promptly and effectively. In chatbot services, responsiveness encompasses the speed of replies and the accuracy, relevance, and adaptability of the chatbot's responses to diverse user inquiries.

4. **Assurance** entails staff courtesy and knowledge, thus instilling user confidence and trust. In chatbots, assurance is demonstrated through accurate, trustworthy responses and the ability to handle user queries with confidence and authority.

5. **Empathy** involves providing personalized and caring attention to users. For chatbots, this means recognizing and understanding user needs, preferences, and concerns and addressing them in a personalized manner.

Both technical and functional aspects of service quality are crucial. Technical quality refers to the outcome of the service, while functional quality pertains to the process of service delivery [26]. Together, these dimensions ensure a comprehensive approach to service quality.

In this study, the authors propose that there are strong correlations between SQ and CSUS. High-quality SQ in chatbots, characterized by tangibility, reliability, responsiveness, assurance, and empathy, will likely significantly enhance user satisfaction. By focusing on these dimensions, organizations can improve their chatbot services, increasing user satisfaction and ensuring a competitive edge in the market.

2.4. Satisfaction

Satisfaction refers to the feeling or attitude of individuals towards something, which can be evaluated as either positive or negative [27]. It is an abstract behavior that cannot be directly observed but can be inferred from the complex human responses to stimuli. When stimuli meet human needs, satisfaction is likely to occur. For instance, in seeking social acceptance, individuals tend to favor things that appear favorable and prestigious. From these definitions, satisfaction can be concluded as humans' positive feelings and attitudes towards something, contingent upon fulfilling their needs. Conversely, if needs are not met, satisfaction will diminish accordingly.

2.5. Chatbot Technology

Chatbots are software applications designed to perform tasks automatically. In the technology industry, chatbots refer to services that operate under pre-set conditions and, in some cases, utilize artificial intelligence (AI) technology. Users interact with chatbots through conversation, allowing for natural language communication [28]. Chatbots are engineered to learn and mimic human behavior, making their interactions as human-like as possible. They can be limited to specific uses or developed as virtual assistants. Although the terms "chatbot" and "virtual assistant" are often used interchangeably [29], chatbots typically function by presenting information or answering questions embedded within websites or applications.

In contrast, virtual assistants often exist as standalone applications.

Chatbots provide quick, automated responses to conversations via text or voice and can be accessed through platforms such as Line, Facebook, Instagram, or websites [30].

2.6. Research Questions

RQ01. How do demographic factors influence user satisfaction in chatbot interactions?

RQ02. What aspects of service quality significantly impact user satisfaction with chatbot services?

RQ03. In what ways does information quality affect user satisfaction in chatbot interactions?

RQ04. What is the combined effect of demographic factors, IQ, and SQ on CSUS?

Understanding the key drivers of user satisfaction in chatbot interactions is crucial for enhancing the effectiveness of these digital tools. This study aims to explore several dimensions influencing user satisfaction, starting with demographic factors, which can provide insights into how different user groups perceive chatbot interactions. Additionally, the study examines specific aspects of service quality to determine which elements are most impactful in shaping user experiences. Information quality, another critical factor, is assessed to understand its role in delivering satisfactory chatbot interactions. Finally, the research investigates the combined effects of demographic factors, service quality, and information quality to understand what drives satisfaction in chatbot services comprehensively. These research questions aim to uncover the multifaceted nature of user satisfaction in chatbot interactions and provide valuable guidance for enhancing chatbot design and functionality.

From the conceptual framework of the research, the following seven hypotheses are proposed:

Hypothesis 1: Gender influences CSUS.
Hypothesis 2: Age influences CSUS.
Hypothesis 3: Education influences CSUS.
Hypothesis 4: Occupation influences CSUS.
Hypothesis 5: Income influences CSUS.
Hypothesis 6: Information quality influences CSUS.
Hypothesis 7: Service quality influences CSUS.

3. Methodology

The research employed a quantitative research methodology, employing survey questionnaires to examine the interrelationships among various key drivers for enhancing chatbot user satisfaction interactions. This research adopts a quantitative approach characterized by descriptive and inferential analyses and a causal research approach.

3.1. Target Population and Sample

The research targeted 385 Thai online consumers who had utilized online services employing chatbots for information provision or issue reporting.

Sample size determination used Cochran's formula due to the unavailability of an exact population size from reliable sources [31]. The formula yielded a sample size suggestion of 385 individuals selected through convenience sampling. An online questionnaire was distributed to ensure diverse data collection.

3.2. Instrument Development

The research tool used was a questionnaire consisting of closed-ended questions, where respondents select only one option that best fits their answer. The questionnaire was divided into four parts:

1. Screening questions regarding the use of chatbot services consisted of binary choice answers in which respondents were asked to choose the most suitable option.

2. Demographic items consisted of multiple-choice questions where respondents selected the most appropriate option.

3. Factors influencing information quality using chatbot services comprised items using opposite meaning scales in which respondents were required to choose the most suitable option. The data measurement scale used was ordinal.

4. Level of satisfaction with using chatbot services comprised items using opposite meaning scales in which respondents were required to choose the most suitable option. The data measurement scale used was ordinal.

3.3. Measurement Validity Assessment

To ensure the measurement tool's validity, the Index of Item-Objective Congruence (IOC) was utilized to analyze the feedback from five experts who reviewed the questionnaire. In the IOC evaluation process, experts assigned scores of -1 (clearly does not measure the objective), 0 (unclear), and 1 (measures the objective) to each item. Items with IOC values less than or equal to 0.67 were either revised or removed based on the experts' recommendations. The IOC scores for the questionnaire items ranged from 0.8 to 1.0, indicating that the items provided satisfactory objective measurements.

3.4. Data Collection

Data was gathered through an online questionnaire, where respondents provided direct answers.

This method ensures factual accuracy and offers convenience and efficiency, thereby saving time and costs.

3.5. Data Analysis

Data analysis and hypothesis testing were conducted at a 95% confidence level and divided into two parts:

3.5.1. Descriptive Research

Demographic data of the sample group were summarized using frequency distribution tables and percentages. Analysis of factors such as IQ, SQ, and CSUS was performed using SPSS software. Results were presented through tables showing frequency distributions, percentages, means, and standard deviations.

3.5.2. Causal Research

This phase involved testing hypotheses derived from sample group data using SPSS software. It included factor analysis to group correlated factors. Cronbach's Alpha coefficient values were used to assess questionnaire item reliability and consistency (considered reliable if $\alpha > 0.7$). Further analysis encompassed one-way ANOVA for variance and multiple regression analysis (MRA).

4. Results

This section presents the findings from a survey of 385 participants, focusing on demographic characteristics and factors influencing chatbot service user satisfaction (CSUS). Key analyses include descriptive statistics, one-way ANOVA, and multiple regression, highlighting the significant roles of service quality (SQ) and information quality (IQ) in shaping user satisfaction, alongside other demographic and contextual insights.

4.1. Survey Participant Characteristics

The authors used SPSS software to analyze factors influencing CSUS based on data from a survey of 385 individuals. Demographic characteristics of the sample group, including gender, age, level of education, profession, and monthly income, were examined using frequency and percentage.

The findings revealed that the majority of participants were female (60.35%), with the most significant age group segments being 21-30 years (56.20%), followed by 31-40 years (33.42%), then 41-50 years (7.85%). Regarding education, 60.51% had achieved some form of an undergraduate degree, while 35.20% had a graduate degree.

Occupation-wise, 66.84% indicated they were working in private companies, followed by government or state enterprise employees (13.67%), self-employed (8.86%), students (5.06%), freelancers (3.29%), and homemakers (1.52%). Regarding income, 6.84% earned less than 15,000 baht per month, 30.89% earned 15,000-30,000 baht per month ($409-$818), 24.05% earned 30,001-45,000 baht, 16.96% earned 45,001-60,000 baht, 11.39% earned over 75,000 baht, 9.87% earned 60,001-75,000 baht.

4.2. Analysis of One-Way ANOVA

One-way ANOVA was conducted to test hypotheses, with a significance level 0.05. Results indicated that gender (Sig. = 0.490), education level (Sig. = 0.267), occupation (Sig. = 0.272), and average monthly income (Sig. = 0.236) did not significantly influence satisfaction with chatbot services. However, age was found to be significant (Sig. = 0.036), revealing variations in satisfaction among different age groups. Post hoc tests using the Bonferroni method showed higher satisfaction among those aged 21-30 than those aged 31-40 (Sig. = 0.030) [32].

4.3. Information Quality's Effect on Chatbot Service User Satisfaction (CSUS)

The analysis of the sample group's feedback on factors influencing CSUS information quality revealed that the prompt receipt of information when needed was the most significant factor (mean = 3.79). Overall, the sample group showed high agreement on IQ factors (mean =3.44).

4.4. Service Quality's Effect on Chatbot Service User Satisfaction (CSUS)

The analysis of the sample group's feedback on factors influencing satisfaction with CSUS related to SQ identified the promptness of responses during conversations as the most significant factor (mean = 4.01). Overall, the sample group also demonstrated a high level of agreement on SQ factors (mean = 3.48).

4.5. Analysis of Factors Influencing Chatbot Service User Satisfaction (CSUS)

This section delves into the analysis of factors affecting user satisfaction with chatbot services (CSUS). The study employs statistical techniques, including factor analysis, reliability testing, multiple regression analysis (MRA), and ANOVA, to evaluate the impact of information quality (IQ) and service quality (SQ) on satisfaction levels. Key findings highlight the strong influence of IQ and SQ on CSUS, with SQ playing a more prominent role. The analysis also identifies non-significant demographic variables, providing actionable insights for improving chatbot services.

4.5.1. Analysis of Variables/Components

The study employed SPSS software to analyze study variables, comprising seven items for IQ, six for SQ, and six for CSUS. Factor analysis was utilized to explore the underlying structure of the data by grouping related variables into factors, ensuring correlations within factors were higher than between factors. The Varimax rotation technique was employed, specifying eigenvalues at 1 to establish the number of factors. Post-rotation, all variables demonstrated factor loadings greater than 0.5. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.904, significantly surpassing the acceptable limit [33].

4.5.2. Reliability Test

Cronbach's Alpha coefficients, assessing internal consistency, ranged from 0.70 to 0.94 across all variables, with an average α of 0.885. These results confirmed measurement instrument reliability and consistency for the study's items.

4.5.3. Multiple Regression Analysis (MRA)

MRA was used to determine the combined influence of variables on satisfaction with chatbot services (Table 1). The model accounted for 61.6% of the variance in satisfaction as R Square (Adjusted) = 0.616 and F-test Sig. = 0.000, indicating a significant relationship.

Table 1. Multiple regression analysis summary

Model	R (correlation coefficient)	R (correlation coefficient) Squared	R Square (Adjusted)	Estimated Standard Error (ESE)
1	0.786	0.618	0.616	0.538

Table 1 summarizes the results of the MRA conducted on the relationships between SQ and IQ (the independent variables) and CSUS (the dependent variable).

It also depicts that the correlation coefficient (R = 0.786) shows a strong and positive linear relationship between the predictors and the outcome.

Similarly, the coefficient of determination (R Square = 0.618) represents the proportion of variance in the CSUS dependent variable, which is explained by the SQ and IQ independent variables. Here, the predictors can explain 61.8% of the variance in CSUS.

The R square (adjusted) provides an even more accurate estimate of the proportion of variance explained, with the R Square (Adjusted) = 0.616, indicating that the model accounts for 61.6% of the variance in CSUS.

The ESE represents the residuals' standard deviation (SD) (the differences between observed and predicted values).

A lower value (0.538 in this case) indicates a better fit of the model to the data.

SQ ($\beta = 0.546$) and IQ ($\beta = 0.320$) were identified as significant predictors of CSUS (Table 2).

The positive coefficients indicate that higher levels of SQ and IQ are associated with increased user satisfaction. Specifically, SQ has a stronger impact on CSUS when compared to IQ.

Table 2. MRA of IQ and SQ on CSUS

Model	Unstandardized Coefficients		Standardized Coefficients	t-value	Sig.
	B	Std. Error	Beta		
(Constant)	-0.367	0.146		-2.513	0.012
IQ	0.405	0.050	0.320	8.025	0.000
SQ	0.623	0.046	0.546	13.680	0.000

The constant (-0.367) is the regression line intercept point, the expected satisfaction level when both SQ and IQ are zero. Additionally, IQ has an unstandardized coefficient (B) of 0.405, indicating that for each unit increase in IQ, CSUS increases by 0.405 units, holding SQ constant. The standardized coefficient (Beta) of 0.320 indicates the relative contribution of the model's IQ, with a t-value of 8.025 and a significance level (Sig.) of 0.000, indicating it is a significant predictor.

SQ has an unstandardized coefficient (B) of 0.623, indicating that CSUS increases by 0.623 units, holding IQ constant for each unit increase in SQ.

The standardized coefficient (Beta) of 0.546 indicates the relative contribution of SQ to the model, with a t-value of 13.680 and a significance level (Sig.) of 0.000, indicating it is also a significant predictor. Overall, both SQ and IQ significantly contribute to CSUS, with SQ having a greater impact.

4.5.4. Analysis of Variance (ANOVA)

Table 3 provides an overview of MRA's ANOVA results, which evaluates the overall significance of the regression model.

Table 3. MRA ANOVA

	Model	Sum of Squared	df	Mean Square	F	Sig.
1	Regression	183.65	2	91.88	317.37	0.000
	Residual	113.42	392	0.29		
	Total		297.08	394		

The following tools and data provide an overview of how well the model fits the data:

ANOVA is used to evaluate the regression model's overall significance, while the sum of squares (183.654), degrees of freedom (df = 2), and mean square (91.827) are components of the variance explained by the predictors. The residual's sum of squares = 113.421 and df = 392 relate to unexplained variance or error in the model. The F-statistic (317.367) tests whether a significant linear relationship exists between the predictors and the dependent variable. Larger F-values indicate stronger relationships.

The significance (Sig.) level (0.000) indicates the probability that the observed relationship could have occurred by chance.

A significance level below 0.05 (typically considered significant) suggests that the model is statistically significant.

The results indicate that the MRA, which includes SQ and IQ as predictors, significantly predicts CSUS. The high R Square value (61.8%) indicates that these factors can explain a substantial portion of satisfaction variability, highlighting their critical role in enhancing user experience and satisfaction.

The tables provide essential statistical evidence supporting the study's hypotheses regarding the influential factors affecting satisfaction with chatbot services. These findings can guide policymakers and practitioners in optimizing service and information quality to improve user satisfaction effectively.

While several hypotheses were not supported by the data (Table 4), this outcome provides valuable insights. It suggests that gender, education level, occupation, and income do not significantly affect satisfaction with chatbot services in this context. This finding can be interpreted positively as it underscores the strength of SQ and IQ in driving CSUS. Understanding these nuances helps refine strategies to enhance user satisfaction effectively.

Table 4. Research hypothesis testing

Research Hypotheses		Testing Result
H1	Gender influences chatbot service user satisfaction (CSUS).	Not supported
H2	Age influences CSUS.	Supported
H3	Education influences CSUS.	Not supported
H4	Occupation influences CSUS.	Not supported
H5	Income influences CSUS.	Not supported
H6	Information quality influences CSUS.	Supported
H7	Service quality influences CSUS.	Supported

5. Discussion

This study explored the influence of Information Quality (IQ) and Service Quality (SQ) on chatbot Service User Satisfaction (CSUS), analyzing data from 385 participants. The results align with existing research on user satisfaction with AI-powered services, highlighting the critical roles of IQ and SQ in shaping user experiences. Age differences in motivations for and acceptance of chatbot communication have been noted in prior studies, emphasizing the importance of tailoring services to different demographic groups [34]. Similarly, factors influencing users' satisfaction and continuance intention of AI-powered service agents have been extensively modeled in the literature, underscoring the relevance of service-related attributes [35].

5.1. Age and Satisfaction

The analysis revealed that age significantly influences CSUS, with users aged 21-30 reporting higher satisfaction than those aged 31-40. These results align with prior research suggesting that younger users are more open to adopting innovative communication technologies, while older users prefer straightforward and explicit language.

This finding highlights the importance of tailoring chatbot communication strategies to the preferences of different age groups, leveraging innovative designs for younger users and clear, concise messaging for older demographics.

5.2. Information Quality (IQ)

IQ emerged as a critical determinant of satisfaction, emphasizing timely, accurate, and reliable information delivery. Data clarity, sufficiency, and regular updates improve user trust and decision-making. Organizations must integrate high-quality data collection and training processes to ensure chatbots can cater effectively to diverse conversational patterns. Developing concise, user-friendly messaging minimizes confusion and enhances user trust, underscoring the importance of ongoing updates to maintain relevance and reliability.

5.3. Service Quality (SQ)

SQ also strongly impacts CSUS, with users appreciating features that mimic personalized human interactions. Aesthetic design elements, seamless service access, and round-the-clock responsiveness enhance user satisfaction. Modernizing chatbots with visually appealing interfaces, personalized responses, and data-driven insights supports deeper user engagement and builds stronger user-business relationships. Prioritizing user privacy and obtaining consent when utilizing personal data is essential for sustaining trust while improving chatbot capabilities.

6. Conclusion

This study highlights the significant roles of Information Quality and Service Quality in shaping user satisfaction with chatbot services. Key findings suggest that age influences satisfaction levels, with younger users (21-30 years) demonstrating greater acceptance of chatbot communication. Information quality factors, such as timeliness, accuracy, and reliability, alongside service quality attributes like responsiveness and personalization, are pivotal in enhancing CSUS.

Organizations aiming to optimize chatbot services should focus on the following:

1. Delivering accurate, concise, and timely information tailored to diverse demographics.
2. Regularly updating chatbot training to adapt to emerging user needs.
3. Enhancing service quality with visually appealing, user-friendly interfaces and personalized interactions.

4. Maintaining user privacy and ensuring consent in data use to build trust and credibility.

Future research should explore additional factors such as chatbot personality, perceived benefits, and cultural variations in satisfaction. Employing qualitative methods could provide richer insights into user motivations, supporting the design of more user-centric chatbot systems. These findings and recommendations are a foundation for organizations and researchers to refine chatbot services, fostering improved user experiences and global satisfaction.

Acknowledgments

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