

# IMPROVING CUSTOMER SERVICE USING ARTIFICIAL INTELLIGENCE CHATBOTS IN ACADEMIC FILE MANAGEMENT FACILITIES

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**Abstract:** *The advancement of information technology in daily life is progressing rapidly, particularly in the transformation of human resource management in customer service. Chatbots serve as a viable option for enhancing customer service, particularly in the administration of academic records within colleges. The study aims to create an artificial intelligence chatbot model using web WhatsApp as a basis, with the goal of enhancing user convenience. The study encompassed 400 student participants who utilized AI chatbots to manage academic documents. The outcome yielded a 45% favourable impact on the satisfaction measure, which indirectly influences customer loyalty by moderating the system quality variable.*

**Keywords:** *Chatbot, Artificial Intelligence, Satisfaction, Loyalty, SmartPLS*

## Introduction

The process of customer service automation transformation represents a ground breaking shift in the manner in which firms engage with and provide assistance to their customers. Technology in the modern digital era has facilitated the incorporation of intricate automation systems into the customer service operations of enterprises. This entails employing chatbots, intelligent machines, and software powered by artificial intelligence to promptly address consumer inquiries and demands around the clock, without the need for human agents. The aforementioned transition has yielded some notable advantages, such as enhanced operational efficacy, decreased expenses, and accelerated customer response time. Although automation can enhance the customer experience in various ways, it is crucial to acknowledge the significance of human elements such as empathy and attentiveness to individual requirements. Hence, organizations must exercise prudence in integrating automation with more profound human connection to achieve an optimal equilibrium in delivering exceptional customer service.

Customer service chatbot implementation has emerged as one of the most notable features of the digital business transformation occurring today. Chatbots are software applications specifically created to engage in textual or vocal exchanges with humans. They have significantly revolutionized the methods by which corporations communicate with and assist their clients. An inherent benefit of chatbots is their capacity to promptly address client inquiries and demands at all times, without the need for breaks or downtime. This enables organizations to provide expedited and highly responsive services to their clients, hence minimizing waiting periods and enhancing customer contentment.

Furthermore, chatbots can be utilized for executing mundane and repetitive duties, such as validating user data, handling financial transactions, and dispensing automated product or service details. This minimizes the burden on human agents and enables them to concentrate on intricate tasks that demand human knowledge, such as resolving intricate client issues or delivering comprehensive guidance. Nevertheless, the utilization of chatbots encounters certain obstacles. One issue pertains to comprehending words and context[1]. Despite the growing sophistication of chatbots in comprehending human language, their ability to handle complicated and intricate interactions remains restricted. Occasionally, clients may experience frustration when chatbots fail to provide satisfactory responses or accurately comprehend their inquiries. In addition, chatbots exhibit reduced empathy and sensitivity towards the specific requirements of customers compared to human agents, hence potentially compromising the quality of the customer experience. It is crucial to recognize the significance of integrating chatbot automation with more profound human engagement. Certain circumstances may arise in which clients require further personalized human assistance, particularly when dealing with intricate or emotionally charged matters. Hence, it is imperative for firms to devise a well-rounded customer service strategy, encompassing the use of chatbots for automated tasks and human agents for scenarios that necessitate human experience.

As the digital business era expands, the implementation of AI chatbots as a strategy to enhance customer service quality is a crucial stride. Companies must carefully evaluate how technology might assist them in delivering an exceptional client experience. An emerging trend is the incorporation of artificial intelligence-driven (AI) chatbots into their customer care approach. Initially, the integration of AI chatbots can greatly enhance operational efficiency. Chatbots have the ability to promptly and automatically address client requests, eliminating the need for waiting or experiencing periods of inactivity. This not only decreases reaction times, but also enables organizations to conserve human resources that can be assigned to more intricate duties. Consequently, firms have the ability to enhance customer service speed and efficiency, boost production, and decrease operational expenses.

Furthermore, AI chatbots have the capability to enhance uniformity in customer support. They can deliver identical information uniformly to every consumer, hence preventing discrepancies in explanations or responses provided by different human agents. This fosters a standardized experience for clients, so augmenting their happiness levels and fortifying the company's brand image. AI chatbots possess the ability to efficiently handle a large number of consumer inquiries without compromising the quality of service. They possess the ability to promptly react even in situations where there is a sudden increase in demand, such as during promotional campaigns or special occasions. Therefore, organizations may guarantee that clients continue to receive satisfactory service even in challenging circumstances, without compromising the service's quality. Nevertheless, firms must prioritize the enhancement of customer service quality with AI chatbots by ensuring that these technologies possess a strong comprehension of human language and deliver responses that are pertinent and valuable. To accomplish this, it is necessary to train the chatbot using extensive datasets and create advanced natural language understanding algorithms. Furthermore, it is imperative for firms to monitor the effectiveness of their chatbots and consistently enhance them in order to align with client requirements. In addition, it is imperative for organizations to maintain human connection channels for clients who encounter intricate issues or require comprehensive assistance. Chatbots are incapable of fully substituting human engagement in such circumstances. Hence, it is imperative for firms to devise a strategic approach that strikes a harmonious equilibrium between chatbot automation and human assistance.

## Literature Review

### Chatbot satisfaction and acceptance

Prior research has indicated that the key determinant of chatbot acceptance is user happiness. The experience of satisfaction entails the presence of a favourable disposition towards the performance of chatbots and information systems[2]. The pleasure of users can be influenced by their impression of many functionalities of chatbots, such as ease of use, compatibility with the user, as well as the perceived accuracy and completeness of information provided by the chatbot[3]. Furthermore, the factor associated with the enjoyment derived from the chatbot service has the potential to enhance the overall user experience. Research has shown that individuals generally exhibit higher levels of satisfaction when engaging with chatbots that possess enhanced interactivity, human-like qualities, anthropomorphic attributes, a sense of intimacy, and a perception of empowerment [4]. Ultimately, with a multitude of gratifications including utilitarian, hedonic, technological, and social advantages that have the potential to enhance pleasure with chatbots, it is important to acknowledge that the perceived privacy risks by users can have a diminishing effect on this contentment[5]. Despite the existing body of research on chatbot experiences, there remains a need for a thorough and systematic approach to examine the underlying factors influencing chatbot satisfaction. Hence, previous scholarly works frequently examined the goal to utilise chatbots from a certain standpoint. There is a scarcity of comprehensive research that have developed a holistic framework to encompass the multifaceted dimensions of user views about different facets of chatbot performance. This study posits the assumption that chatbots are task-oriented entities that can be classified as a form of information system [6]. Hence, it is imperative to consider three key characteristics of quality in order to ensure satisfaction and adoption of chatbots. Insufficient system quality of a chatbot may lead to user issues, which in turn can result in impaired decision-making and reduced user motivation to utilise the chatbot. Likewise, the impact of the information presented by a high-quality chatbot on user appraisal and dependence on the chatbot system is a relevant consideration[7]. If the quality of service provided by chatbots is unsatisfactory, it is possible that they may be unable to adequately fulfil the requirements and expectations of users. While certain studies have shown data supporting the favourable influence of the three categories of perceived quality on chatbot satisfaction, additional research is required to ascertain the precise constituents that contribute to each aspect of perceptual quality[8][9]. It is important to acknowledge that the initial dimensions and scales of quality may not be suitable when applied to a novel task-oriented chatbot context. Considering the novelty of chatbot technology, the evaluation of its perceived quality may encompass a range of distinct aspects in contrast to the circumstances under which the original idea was formulated. Nevertheless, prior research has incorporated perceived quality factors as an integral component of the comprehensive assessment of the operational procedure. In order to enhance understanding, the primary objective of this study is to elucidate the impacts of factors that are unique to each dimension of quality.

The implementation of cloud computing for AI chatbot modelling represents a paradigm shift in the approach that organizations take to enhancing customer service. Cloud computing is now a crucial basis for creating, overseeing, and improving an AI chatbot that can provide exceptional customer experiences in the expanding digital business landscape. Cloud computing enables firms to effortlessly access computing resources that are both extremely scalable and versatile. Complex AI chatbots necessitate substantial computational resources for the training and execution of machine learning models. Cloud services enable enterprises to effortlessly scale their computing capacity based on their requirements, eliminating the need for costly investments in physical infrastructure. This enables companies to create AI chatbots that are more advanced and effective.

Furthermore, cloud computing offers a protected and supervised setting for the administration of consumer data. Data plays a crucial role in the development of an efficient AI chatbot, as chatbots require a comprehensive understanding of user preferences and history in order to deliver highly tailored responses. Cloud computing provides advanced data security and seamless compliance with stringent privacy rules, such as GDPR in Europe, enabling organizations to guarantee the protection of their customer data. The cloud enables the utilization of cognitive services and artificial intelligence, which can augment the capacity of chatbots to comprehend human language and the conversational context. Companies can expedite the development of more intelligent and adaptable chatbots by utilizing technologies like natural language processing (NLP) offered by major cloud providers. This enables the chatbot to deliver more pertinent responses and more efficient resolutions to clients. Cloud computing offers the benefit of facilitating integration with diverse systems and applications utilized in customer care. AI chatbots that are well-designed have the capability to integrate with customer databases, customer relationship management systems (CRM), and other communication platforms. This integration allows them to provide clients with more extensive solutions and a greater amount of valuable information.

Nevertheless, while employing cloud technology to develop AI chatbots, firms must also be mindful of some obstacles. One factor to consider is the cost, as the utilization of cloud services can be costly if not effectively controlled. Hence, it is imperative for organizations to meticulously strategize and oversee their budgets. Furthermore, firms should prioritize the importance of data security concerns. It is imperative to adequately safeguard sensitive consumer data and maintain adherence to relevant privacy legislation. Utilizing cloud computing to develop AI chatbots is a crucial measure in enhancing client service. It allows enterprises to utilize expandable computer resources, securely handle client data, and seamlessly link chatbot systems with other customer care systems. Nevertheless, it is imperative for firms to prioritize cost and data security during the process of building and deploying these solutions. By doing so, they may enhance the client experience and gain a competitive edge in a progressively fierce market.

## **Method**

This study employed a mixed-method approach, which involved conducting focus group sessions and administering online questionnaires. The mixed methods approach possesses the capacity to investigate the underlying factors of enjoyment and usage intentions from both qualitative and quantitative viewpoints. Moreover, it has the capacity to improve our comprehension by enabling the creation of an innovative framework. The first phase involved conducting a focus group interview to investigate the elements that influence usage intentions. This was done by applying the Chatbot success model and considering the concept of privacy focus. The research study focused on the concept of privacy, particularly in the context of investigating emerging technologies. This specific technique was selected due to its potential for gathering qualitative data. Qualitative approaches also facilitate the detection of unforeseen factors. To enhance clarity, the study incorporated the utilization of two focus group interviews. The interviews were conducted with individuals who had first hand experience with academic service providers and student consumers of administrative services. The main purpose of these interviews was to investigate the participants' experiences and cognitive needs, emotional experiences, and privacy issues related to chatbot technology. The study had a cohort of 400 students who were registered in 14 distinct courses. Each participant in the study has been given the chance to interact with a task-oriented chatbot. Participants will have access to academic mail services by using the chatbot service on the WhatsApp chatbot platform.

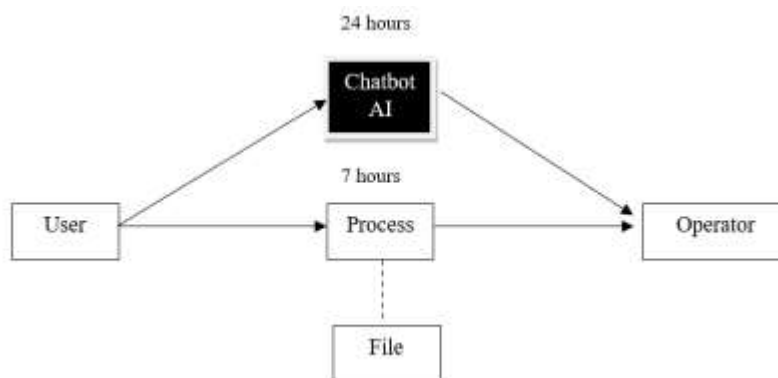


Figure 1. Chatbot process

Figure 1 illustrates the portrayal of administrative management, emphasizing the observed fluctuation in the duration of service given. The manual service operates for a duration of 7 working hours, but the Chatbot AI offers round-the-clock customer support. The duration of employment will significantly influence the handling of client connections inside a firm.

## Result and Discussion

### Chatbot Modelling

Understanding the fundamental principles of utilizing cloud technology to create AI chatbots is crucial for building a streamlined and successful customer care solution. To comprehend this reasoning, it is essential to acknowledge that an AI chatbot is a computer program specifically engineered to engage in conversation with humans using natural language and deliver pertinent replies. Cloud computing offers the essential infrastructure for the development and operation of an AI chatbot, with the advantage of infinite computational capability. Training and testing an AI Chatbot necessitates substantial computational resources, particularly when employing deep learning methodologies and intricate natural language processing. Cloud computing enables firms to flexibly assign computational resources as required, hence facilitating the continuous enhancement and refinement of chatbots without incurring costly physical limitations. The fundamental principle is that the cloud offers a secure setting for the management of confidential client data. In order to deliver more personalized and pertinent responses, AI chatbots necessitate the ability to retrieve and comprehend client data. Major cloud service providers have made significant investments in cutting-edge security technology, including data encryption and access management, to guarantee the protection of customer information against potential security risks. Cloud computing facilitates the integration of chatbots with customer service systems and other applications, constituting the third fundamental logic. Efficient chatbots must possess the capability to retrieve data from diverse sources, like customer databases, CRM systems, or other communication platforms. Cloud computing enables firms to seamlessly connect chatbots to these systems and seamlessly incorporate them into pre-existing customer support procedures. In addition, the fourth fundamental principle is that cloud computing enables the utilization of cognitive and artificial intelligence technologies that facilitate chatbots in comprehending human language and the contextual nuances of discussion. Cloud services, such as natural language processing (NLP) and text interpretation, assist chatbots in analysing interactions and delivering more pertinent responses. This enables the chatbot to accurately identify client inquiries, provide responses, and effectively resolve issues.



Figure 2. Main login chatbot developing

Nevertheless, it is crucial to bear in mind that although cloud computing has numerous advantages in AI chatbot modelling, there exist certain obstacles to contemplate, such as the expense of utilizing cloud services, ensuring secure data administration, and adhering to privacy rules. The fundamental rationale behind utilizing cloud computing for modelling AI chatbots is that it offers the necessary infrastructure, security, scalability, and integration to construct highly efficient and successful chatbots that enhance customer service. By comprehending this rationale, firms may employ these technologies judiciously to enhance customer experience and maintain competitiveness in an ever more digital and cutthroat market.

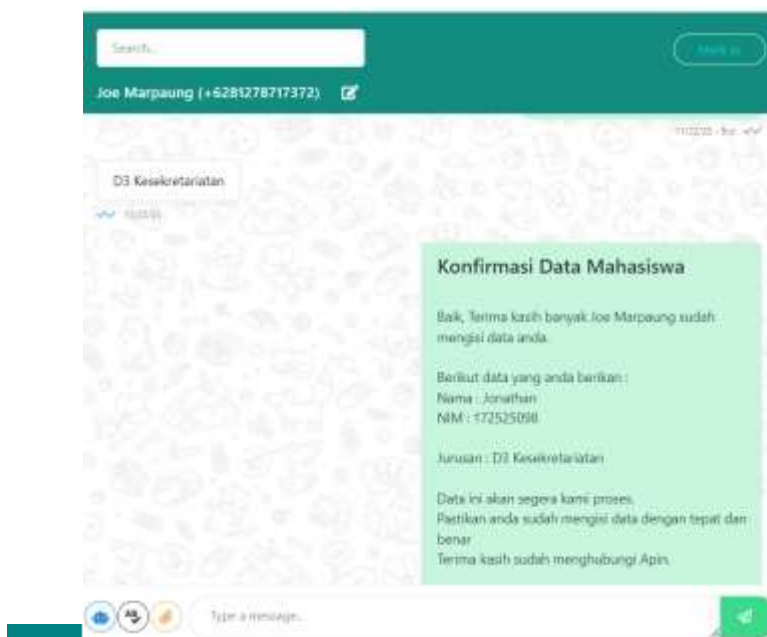


Figure 3. Chatbot AI Responses the user

The efficacy of AI chatbot responses in promptly attending to consumers is a pivotal factor in enhancing customer service in the expanding digital era. The advent of AI chatbots has enabled firms to offer prompt and efficient customer service, hence enhancing the overall consumer experience. The primary benefit of real-time AI chatbots is their capacity to deliver prompt responses and immediate solutions around the clock. This overcomes the temporal limitations that human agents may encounter, such as the need for sleep or unavailability during non-working hours. Customers have the ability to inquire or make requests at any given moment, and the chatbot will promptly provide a response without any delay. It provides clients with a feeling of reassurance and enhances their contentment, particularly in a crisis or when they

require immediate information. AI chatbots exhibit a high level of consistency by consistently providing same responses. When a consumer poses a question to the same chatbot, they will consistently receive similar or identical responses, thereby eliminating the inconsistencies that frequently arise when engaging with different human agents. Implementing this approach ensures a consistent and standardized customer experience, which can elevate the overall corporate brand perception. The real-time success of the AI chatbot's response is contingent upon its ability to comprehend human language and the contextual nuances of the interaction. Despite the rapid evolution of natural language processing (NLP) technology, chatbots still face constraints when it comes to handling complicated or ambiguous inquiries or requests. Lack of comprehension might result in consumer dissatisfaction and diminish the efficiency of chatbots. In addition, AI chatbots are constrained by their inability to exhibit empathy and comprehend subtle aspects of human communication. They lack the ability to discern consumer sentiments or emotions, and their capacity to offer comprehensive assistance or resolve highly intricate issues is not always guaranteed. During such circumstances, engaging with human agents that possess empathy and competence can prove to be a more efficient resolution.

Hence, to enhance the efficiency of AI chatbot responses in real-time, firms should allocate resources towards the training and advancement of complex chatbots. This entails the utilization of modern NLP technology, incorporation with an extensive knowledge base, and chatbot training using high-quality datasets. Furthermore, it is imperative for organizations to monitor the effectiveness of chatbots and address user feedback in order to enhance their capabilities. It is crucial to bear in mind that the AI chatbot should not be employed as a complete replacement for human engagement in customer assistance within this particular situation. When faced with situations that need empathetic comprehension, intricate puzzle-solving, or emotionally delicate circumstances, engaging with human agents continues to be crucial. Hence, it is imperative for organizations to have a well-rounded customer service strategy, incorporating chatbots for automated tasks and human agents for instances necessitating more profound human engagement. AI chatbot responses have the potential to improve customer experience by offering prompt and responsive assistance in real time. Nevertheless, firms must be mindful of the constraints that chatbots face in comprehending human language and contextual discourse. Additionally, it is crucial for companies to incorporate human connection into their customer support plan. By adopting a strategic strategy, chatbots can serve as a potent instrument for enhancing customer service and upholding client happiness within a more competitive company landscape.

### **Experimental Survey**

To conduct a more thorough examination of the results obtained from the qualitative inquiry, a follow-up online survey was conducted with a sample of 400 students. The poll was conducted using chatbots on the WhatsApp platform. Before participating in the survey, all participants expressed their agreement. The survey consists of three main portions. At first, the participants were told to carefully read the introductory section and analyse a few examples of task-oriented chatbots. Afterwards, they were instructed to answer a filtering question, indicating whether or not they had previous familiarity with this specific type of chatbot. Participants without prior familiarity with task-oriented chatbots were excluded from the study, and their data was excluded from the subsequent analysis. Subsequently, participants are directed to specify the frequency of their engagements with a task-oriented chatbot. Participants were also asked to answer questions designed to evaluate variables within the specified theoretical framework. The sample measurement was undertaken in accordance with the research phases, utilising a structural model implemented by SMARTPLS 4.0.

Table 1. Analysis of respondent data

Measure	Type	Frequency	Percentage
Gender	Male	180	45%
	Female	220	55%
Program	Secretary	109	27,25%
	Finance	93	23,25%
	Statistics	75	18,75%
	Computer	123	30,75%
	Engineering		

Table 1 illustrates the distribution of participants who utilized AI chatbots, as well as those who engaged with AI chatbots through CRM enhancement surveys.

**Structural Model**

SMARTPLS 4 is utilized to generate predictions on the basis of the parameter estimates obtained from the analysis of the questionnaire results. By utilizing this software, a weight test of the indicators can be performed, with the PLS Algorithm serving as the foundational test. Following that, 5000 subsamples are bootstrapped with a significance level of 0.05 (5%), followed by the application of a two-way test. Following the conclusion of the bootstrapping study, the structural model will be subjected to a blindfolding test in order to evaluate its reliability. In this experiment, seven samples will be omitted at a distance during each iteration. The results of the evaluation of the structural model are illustrated in Figure 4.

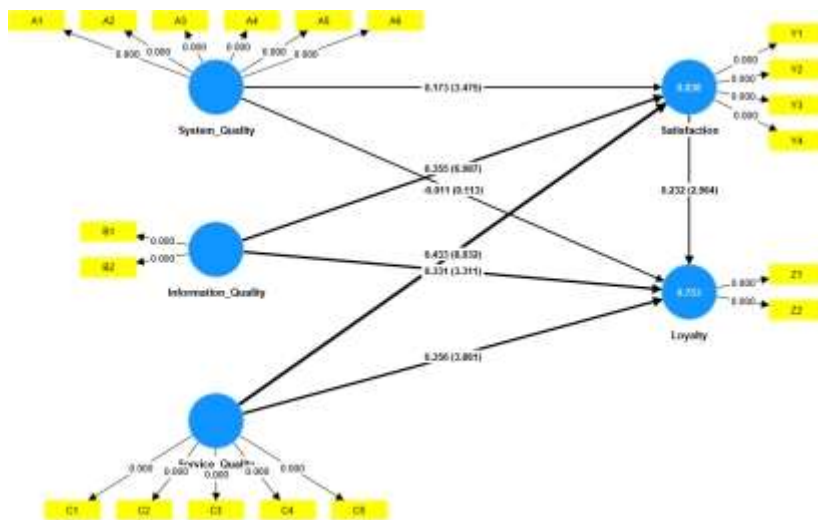


Figure 4. Inner model path coefficients and t values

An important correlation was found between the variables in the group shown in Figure 3. This means that there is a strong and very likely link between them.

Table 2. Latent variable correlation

	Information_Quality	Loyalty	Satisfaction	Service_Quality	System_Quality
Information_Quality	1,00	0,57	0,60	0,59	0,58
Loyalty	0,57	1,00	0,57	0,58	0,54
Satisfaction	0,60	0,57	1,00	0,62	0,59
Service_Quality	0,59	0,58	0,62	1,00	0,61

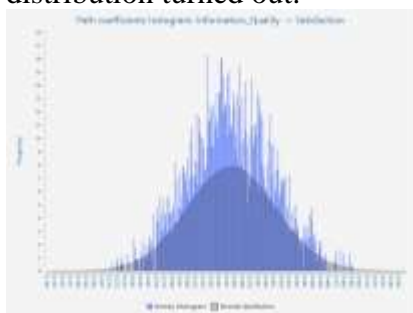
System_Quality	0,58	0,54	0,59	0,61	1,00
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The correlation values for each latent variable are shown in Table 2. The satisfaction variable acts as a link between the three latent variables and loyalty. Along with a coefficient of determination of 62%, the test results clearly show that there is a strong link between service quality and customer happiness. Interestingly, the indicator of system quality has the weakest link to loyalty (54%), when looking at its relationship with loyalty. The variables do not have a statistically significant lack of connection, but it is important to remember that they do have a strong relationship as a whole. This study includes a satisfaction mediator variable that helps mediate between endogenous and exogenous factors so that the latent variable works as well as possible. Table 3 shows the results of the statistical tests.

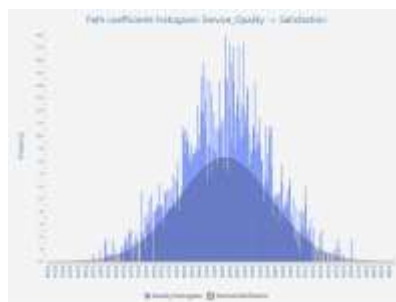
Table 3. The Effect of Satisfaction as a Mediator of Loyalty

Model	Direct effects	Indirect effects	Total effects
Information_Quality -> Satisfaction -> Loyalty	0.083	0.082	0.411
System_Quality -> Satisfaction -> Loyalty	0.040	0.100	0.454
Service_Quality -> Satisfaction -> Loyalty	0.102	0.040	0.034

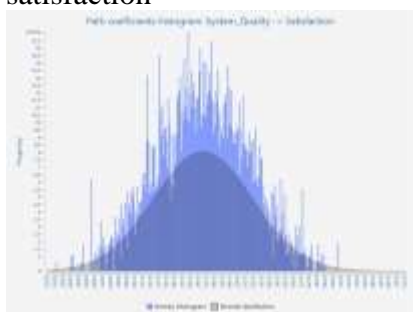
The test results in Table 3 show that the satisfaction variable can connect the exogenous variable to the endogenous variable. This is shown by the total value of each variable's effect. If the t-test value is greater than 0.02, this supports the idea that satisfaction can be the link between the exogenous and endogenous variables. Figure 5 shows how the test's sample distribution turned out.



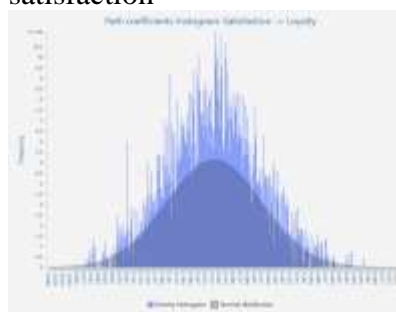
(a) Path coefficients Information Quality - satisfaction



(b) Path coefficients Service Quality - satisfaction



(c) Path coefficients System Quality - satisfaction



(d) Path coefficients satisfaction-Loyalty

Figure 5. Path coefficients pada latent variable

The sample distribution in the hypothesis test provides insights into the dispersion of data across two variables, highlighting the association between the density of the histogram and the normal distribution. The findings of the hypothesis are presented in Table 4.

Table 4. Hypothesis test results

Hypotheses	Path Coefficients	Support
H1a System Quality will have a positive impact on user satisfaction with chatbots	0.172	Yes
H1b System Quality will have a positive impact on the Loyalty of users with chatbots	-0.006	No
H2a Information Quality will have a positive impact on user satisfaction with chatbots	0.356	Yes
H2b Information Quality will have a positive impact on user loyalty with chatbots	0.328	Yes
H3a Service Quality will positively affect user satisfaction with chatbots	0.432	Yes
H3b Service Quality will positively affect user loyalty with chatbots	0.352	Yes
H4 Satisfaction will positively affect user satisfaction with chatbots	0.234	Yes
H5a Satisfaction mediates System Quality on loyalty	0.020	Yes
H5b Satisfaction mediates Information Quality on loyalty	0.005	Yes
H5c Satisfaction mediates Service Quality on loyalty	0.009	Yes

The information in Table 4 makes it clear that the test results regularly show that using Chatbot AI could make CRM service a lot better. After running the tests, we found that System Quality is positively related to user happiness with chatbots ( $t = 3.475, p < 0.001$ ). This means that hypothesis H1a is true. However, the p-value for hypothesis H2a, which says that System Quality will make users more loyal to robots, is negative ( $t = 0.320, p > 0.001$ ). This means that hypothesis H2a is not true.

**Conclusion**

According to the results obtained from the research, it can be deduced that the implementation of Chatbot AI to improve customer relationship management services is expected to have a positive impact on customer loyalty, as suggested by the established structural model. The implementation of this analysis results in a client loyalty probability of 75.3% and a customer satisfaction probability of 83.8%. This discovery offers substantiation for the effectiveness of chatbots in the realm of customer service, given that their capacity to decrease service duration significantly impacts customer contentment. The AI chatbot is a product of artificial intelligence that was created utilizing the WhatsApp platform. As a result, it guarantees effortless operation and convenient utilization of the recommended features.

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