

# Effectiveness of AI-Powered Chatbots in Enhancing Customer Service Delivery in Retail Businesses in Southwestern Nigeria

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**Abstract**—The rapid growth of Artificial Intelligence (AI) has significantly changed customer service delivery in modern retail businesses through the introduction of intelligent chatbot systems. This study examined the effectiveness of AI-powered chatbots in enhancing customer service delivery in retail businesses in Southwestern Nigeria. The study focused on determining the extent to which chatbot adoption influences customer satisfaction, response time, and operational efficiency within selected retail organizations. A descriptive survey research design was adopted for the study, and data were collected from customers and retail staff through structured questionnaires. The collected data were analyzed using descriptive statistics such as frequency distribution, percentages, mean scores, and inferential statistical methods to evaluate the relationship between chatbot usage and service performance. Findings revealed that AI-powered chatbots significantly improved customer interaction by providing instant responses, reducing waiting time, and offering twenty-four-hour service availability. The results further showed that businesses using chatbot systems experienced improved workflow efficiency, reduced staff workload, and increased customer engagement. The study also found that chatbot personalization and natural language processing capabilities contributed positively to user satisfaction and repeated patronage. Despite these benefits, challenges such as privacy concerns, limited local language understanding, and occasional inaccurate responses were identified as barriers to full implementation. The study concluded that AI-powered chatbots can serve as an effective tool for improving customer service delivery in retail businesses when properly integrated with human support systems. It was recommended that retail businesses invest in adaptive chatbot technologies, improve data security measures, and develop multilingual chatbot systems that reflect

local customer communication patterns. The study contributes to the growing body of knowledge on conversational AI in emerging markets and provides practical insights for businesses seeking to improve service quality through digital innovation.

**Index Terms**—Artificial Intelligence, Chatbots, Customer Service Delivery, Retail Business, Customer Satisfaction, Operational Efficiency, Southwestern Nigeria.

## I. INTRODUCTION

### A. Background of the Study

The rapid advancement of Artificial Intelligence has transformed the way organizations interact with customers across multiple sectors, particularly in customer service delivery. AI-powered chatbots have emerged as intelligent conversational systems capable of handling customer inquiries, providing instant responses, and improving service efficiency. Recent studies indicate that AI-driven customer support systems can significantly enhance user experience while reducing operational costs for businesses [1]. In retail businesses, where customer satisfaction and timely service are critical, AI-powered chatbots are increasingly being adopted to manage repetitive customer interactions and support business decision-making [17], [25].

Retail businesses in Southwestern Nigeria are experiencing increased digital transformation due to changing consumer behavior and growing internet penetration. Customers now expect faster and more personalized responses from businesses. Research has shown that chatbot problem-solving capability

positively influences customers' continued use of digital service platforms [10]. Similarly, AI systems that integrate natural language processing and machine learning can improve customer engagement and provide real-time assistance [4], [23]. This suggests that chatbot technology may offer a sustainable solution to service delivery challenges in Nigeria's retail environment.

Furthermore, modern conversational AI systems are becoming more adaptive and context-aware, allowing businesses to serve diverse customer populations more effectively [6], [8]. This adaptability is especially relevant in a culturally diverse region such as Southwestern Nigeria, where language and customer preferences vary significantly. Consequently, studying the effectiveness of AI-powered chatbots in enhancing customer service delivery in retail businesses has become necessary to understand their contribution to customer satisfaction, operational efficiency, and business growth.

The concept of customer service has evolved from traditional face-to-face interaction into technology-assisted engagement, where businesses can now provide support beyond normal working hours. In highly competitive retail environments, service quality often determines whether customers remain loyal to a brand or move to competitors. AI-powered chatbots offer retailers the ability to provide twenty-four-hour assistance, automate responses to frequently asked questions, and maintain consistent communication with customers. According to recent findings, chatbot acceptance largely depends on the system's ability to provide transparent and reliable interactions that align with user expectations [12]. This means that the successful implementation of chatbot technology depends not only on technical performance but also on customer trust and perceived usefulness.

In developing economies such as Nigeria, retail businesses face increasing pressure to adopt digital tools that improve operational performance while minimizing costs. Small and medium-sized enterprises often struggle with staffing limitations and high service demand, making automation an attractive option. AI-powered automation in management systems has been shown to improve decision-making speed and enhance organizational responsiveness [14]. By integrating chatbot

technology into customer service channels such as websites, social media platforms, and mobile applications, retail firms can streamline communication and reduce delays in customer response. Such improvements can strengthen customer relationships and create more efficient retail operations.

Another important dimension of AI-powered chatbots is their ability to collect and analyze customer interaction data. Every conversation with a chatbot can generate valuable information regarding customer preferences, purchasing patterns, and service challenges. Businesses can use this information to refine marketing strategies and improve product offerings. Studies on business decision support systems have emphasized that AI can enhance organizational intelligence by transforming raw customer data into actionable insights [25]. In retail businesses, this means that chatbots may serve not only as service tools but also as strategic instruments for business growth and competitiveness.

Despite these benefits, the adoption of AI-powered chatbots also raises concerns about security, privacy, and ethical use. Customers may hesitate to engage with automated systems if they fear misuse of personal information or biased service outcomes. Research has shown that users' attitudes toward conversational AI are strongly influenced by concerns about privacy and trust [3]. Similarly, issues of algorithmic bias in AI systems can affect fairness in customer interaction [11]. For retail businesses in Southwestern Nigeria, understanding these challenges is essential because trust remains a critical factor in digital service acceptance, particularly in regions where technological adoption is still emerging.

The retail sector in Southwestern Nigeria represents one of the most economically active commercial regions in the country, with growing urban centers such as Lagos and Ibadan driving consumer activity. As urbanization continues, customer expectations for convenience and immediate support are increasing. Many consumers now prefer digital communication channels over physical visits or telephone calls. AI-powered chatbots can meet this demand by providing personalized support through instant messaging platforms, thereby reducing customer frustration and improving service accessibility. The increasing use of

smartphones and internet-enabled devices further creates a favorable environment for chatbot deployment in the region.

Moreover, conversational AI continues to improve through advancements in large language models and contextual learning. New chatbot systems can understand user intent more accurately, recognize emotional cues, and deliver human-like responses [8], [22]. These improvements may significantly enhance customer satisfaction by making digital interactions feel more natural and responsive. For retail businesses, this creates opportunities to deliver better customer experiences while maintaining cost efficiency. Therefore, investigating the effectiveness of AI-powered chatbots in customer service delivery within retail businesses in Southwestern Nigeria is both timely and relevant for understanding how emerging technologies can support sustainable business development.

#### B. Statement of the Problem

Many retail businesses in Southwestern Nigeria continue to face challenges in delivering efficient customer service due to long response times, inconsistent communication, and limited staff availability. Traditional customer service systems often struggle to manage increasing customer demands, leading to customer dissatisfaction and reduced loyalty. Although AI-powered chatbots have shown promising results in improving service efficiency in various industries [1], [12], many retail businesses in the region have not fully explored their practical effectiveness.

Existing studies largely focus on chatbot applications in healthcare, education, and financial services [2], [9], [24], with limited empirical evidence on their impact within Nigerian retail businesses. Additionally, concerns regarding privacy, trust, and system bias remain barriers to adoption [3], [11], [20]. Therefore, there is a need to investigate whether AI-powered chatbots can effectively improve customer service delivery in retail businesses in Southwestern Nigeria and identify the challenges affecting their implementation.

#### C. Research Objectives

The main objective of this study is to examine the effectiveness of AI-powered chatbots in enhancing

customer service delivery in retail businesses in Southwestern Nigeria.

The specific objectives are to:

1. determine the level of adoption of AI-powered chatbots in retail businesses in Southwestern Nigeria;
2. examine the effect of AI-powered chatbots on customer response time;
3. assess the influence of AI-powered chatbots on customer satisfaction;
4. evaluate the contribution of AI-powered chatbots to operational efficiency;
5. identify challenges associated with implementing AI-powered chatbots in retail businesses.

#### D. Research Questions

The study seeks to answer the following questions:

1. What is the level of adoption of AI-powered chatbots in retail businesses in Southwestern Nigeria?
2. How do AI-powered chatbots affect customer response time?
3. To what extent do AI-powered chatbots improve customer satisfaction?
4. How do AI-powered chatbots contribute to operational efficiency?
5. What challenges affect the implementation of AI-powered chatbots in retail businesses?

#### E. Significance of the Study

This study will be beneficial to retail business owners by providing insights into how AI-powered chatbots can improve customer service performance and business efficiency. The findings may help managers understand how chatbot systems can reduce workload, improve response speed, and strengthen customer relationships [14], [23].

Customers may benefit from improved service accessibility, faster responses, and more personalized interactions. The study may also contribute to academic knowledge by expanding literature on conversational AI in emerging markets. Researchers can use the findings as a basis for future studies on AI adoption in African retail industries. Policymakers may also benefit from understanding how digital technologies can support business growth and innovation in Nigeria.

#### F. Scope of the Study

This study focuses on the effectiveness of AI-powered chatbots in enhancing customer service delivery among retail businesses located in Southwestern Nigeria. The geographical scope covers selected retail businesses in states such as Lagos State, Oyo State, and Ogun State.

The study specifically examines chatbot adoption, customer response time, customer satisfaction, and operational efficiency. It also investigates barriers to chatbot implementation, including trust, privacy, and technological limitations [3], [20], while excluding other AI applications not directly related to customer service delivery in retail businesses.

## II. LITERATURE REVIEW

### A. Concept of Artificial Intelligence Chatbots

Artificial Intelligence chatbots are computer-based conversational systems designed to simulate human interaction through text or voice communication. These systems use technologies such as natural language processing, machine learning, and deep learning to understand user input and generate meaningful responses. According to Ali and Abbas [4], chatbots have evolved from rule-based systems into advanced conversational agents capable of understanding context, emotion, and user intent. This transformation has enabled chatbots to become valuable tools in customer support, healthcare, finance, and education.

Recent developments in conversational AI have introduced proactive systems that not only respond to customer inquiries but also anticipate user needs before questions are asked. Deng et al. [8] described proactive conversational AI as an intelligent system capable of initiating dialogue based on customer behavior and previous interactions. Such capabilities improve service personalization and customer convenience. Similarly, Su et al. [23] emphasized that knowledge-enhanced chatbot systems improve the accuracy of responses by integrating organizational data into customer support platforms. The functionality of AI chatbots extends beyond answering simple questions. Modern systems can process customer complaints, recommend products, provide technical support, and collect customer data for business analysis. Research by Zhang et al. [25] demonstrated that AI-based systems contribute to

organizational decision-making by converting customer interaction data into strategic business insights. This shows that AI chatbots are no longer limited to communication tools but have become intelligent business assets that support customer relationship management.

### B. Customer Service Delivery in Retail Businesses

Customer service delivery in retail businesses refers to the process of providing assistance before, during, and after customer purchases. High-quality customer service is critical in the retail industry because it directly influences customer satisfaction, repeat patronage, and brand loyalty. Traditionally, customer service in retail stores depended on physical staff interactions, telephone calls, and email responses. However, increasing consumer expectations have made traditional methods insufficient for modern business demands.

R. K. [1] noted that AI-driven customer support can improve user experience by reducing waiting time and increasing service accessibility. In retail businesses, customers often require immediate answers regarding product availability, delivery status, payment methods, and return policies. Delayed responses may lead to customer frustration and reduced trust in the business. Al Maruf [17] further explained that digital support systems improve financial and operational efficiency in retail organizations by automating routine customer service tasks.

In emerging economies such as Nigeria, customer service challenges are more evident because many small and medium retail businesses operate with limited resources. As internet usage increases, customers expect digital communication channels that provide fast and convenient service. Therefore, customer service delivery in retail is shifting toward technology-based solutions that can meet these expectations efficiently.

### C. AI Chatbots in Retail Customer Service

The integration of AI chatbots into retail customer service has become increasingly important as businesses seek to improve efficiency and customer engagement. Chatbots can handle multiple customer interactions simultaneously, reducing pressure on human staff and ensuring continuous service availability. Gao et al. [10] found that chatbot

problem-solving ability significantly influences customers' intention to continue using digital retail platforms. This indicates that chatbot performance can directly affect customer retention.

AI-powered customer support systems can provide personalized shopping assistance by recommending products based on customer preferences and purchase history. Information et al. [14] reported that AI automation improves decision support systems, enabling businesses to respond more effectively to customer needs. Similarly, Nemoto et al. [19] showed that automated inquiry systems improve customer communication by providing immediate responses linked to frequently asked questions.

Despite these advantages, chatbot implementation in retail may face obstacles such as customer distrust, technical limitations, and cultural differences. Brandt and Hazel [6] highlighted the importance of interculturally adaptive conversational AI that can accommodate diverse customer backgrounds. For retail businesses in Southwestern Nigeria, chatbot systems must be able to understand local communication patterns and language preferences to achieve effective customer service delivery.

#### D. Technology Acceptance Theory

Technology Acceptance Theory explains how users come to accept and use a new technological system. One of the most widely applied models is the Technology Acceptance Model (TAM), which suggests that two factors determine adoption: perceived usefulness and perceived ease of use. In the context of AI chatbots, customers are more likely to accept chatbot systems if they believe the system improves service quality and is easy to interact with. Gené-Albesa and de Andrés-Sánchez [12] found that customer acceptance of chatbot systems depends on explainability and performance quality. When users understand how a chatbot works and trust its responses, they are more willing to continue using the system. Similarly, Ali et al. [3] revealed that privacy and security concerns strongly affect users' attitudes toward conversational AI platforms. Customers may reject chatbot systems if they fear misuse of personal information.

Mathur et al. [18] further noted that users prefer AI systems that provide both factual support and emotional understanding during interactions. This demonstrates that acceptance of AI chatbots is

influenced not only by technical functionality but also by the human-like quality of communication. For retail businesses, understanding these acceptance factors is essential for successful chatbot adoption.

#### E. Empirical Review of Related Studies

Several studies have examined the effectiveness of AI-powered chatbots across different sectors. R. K. [1] investigated AI-driven customer support and found that chatbots improved operational efficiency while enhancing user experience. The study showed that businesses adopting AI support systems experienced reduced workload for customer service staff and faster customer response times.

Gao et al. [10] examined chatbot problem-solving in e-commerce and reported that efficient chatbot interaction positively influenced customer satisfaction and continued usage intention. Their findings suggest that chatbot performance is an important determinant of digital customer loyalty. Likewise, Ali [2] observed that AI-generated support systems improved service optimization by increasing speed and consistency in customer interactions.

Papneja and Yadav [20] reviewed customer self-disclosure in conversational AI and found that trust plays a major role in how customers engage with chatbot systems. Gelling et al. [11] also identified potential bias in conversational AI systems, which may negatively affect user trust. These findings imply that while AI chatbots can improve customer service, their effectiveness depends on trust, transparency, and fairness.

In retail-specific settings, Al Maruf [17] found that AI-supported systems improve operational performance and business responsiveness. Similarly, Su et al. [23] demonstrated that integrating knowledge representation into chatbot systems enhances response quality in customer support environments. These studies collectively show that AI chatbots can positively influence service delivery when properly designed and implemented.

#### F. Research Gap

Although previous studies have examined AI chatbots in customer support, most existing research has focused on healthcare, education, and global e-commerce environments [2], [9], [15]. Limited attention has been given to the effectiveness of AI-powered chatbots within retail businesses in

developing regions such as Southwestern Nigeria. Existing literature also tends to emphasize technical performance while giving less attention to local business realities, cultural factors, and customer expectations in African retail markets.

Furthermore, many studies discuss customer satisfaction and technology acceptance independently, without examining how chatbot adoption simultaneously affects response time, operational efficiency, and customer experience in retail businesses. There is also insufficient evidence regarding the challenges that may hinder chatbot implementation in Nigerian retail settings, including trust, privacy concerns, and infrastructure limitations [3], [20].

Therefore, this study seeks to fill this gap by examining the effectiveness of AI-powered chatbots in enhancing customer service delivery specifically in retail businesses in Southwestern Nigeria. The study will provide localized evidence on how chatbot systems influence customer satisfaction, business efficiency, and service quality in an emerging digital economy.

### III. METHODOLOGY

#### A. Research Design

This study adopts a descriptive survey research design to examine the effectiveness of AI-powered chatbots in enhancing customer service delivery in retail businesses in Southwestern Nigeria. The descriptive survey design is considered appropriate because it enables the researcher to collect data from retail business managers and customers regarding their experiences with chatbot technology in customer service operations. The design also allows for the measurement of customer perceptions, satisfaction levels, response efficiency, and business performance outcomes associated with chatbot implementation.

The study combines both quantitative and qualitative approaches to provide a broader understanding of chatbot effectiveness. Quantitative data will measure variables such as response speed, service satisfaction, and usage frequency, while qualitative data will explore customer attitudes, trust, and implementation challenges. Previous studies have shown that combining user experience and operational measures

provides a stronger evaluation of conversational AI systems [1], [10], [23].

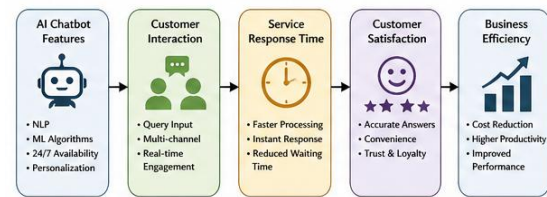


Figure 1: conceptual framework showing the relationship between AI chatbot adoption, response time, customer satisfaction, and operational efficiency.

#### B. Study Area

The study will be conducted in selected retail businesses across major states in Southwestern Nigeria, including Lagos State, Oyo State, Ogun State, Osun State, Ondo State, and Ekiti State. This region was selected because it represents one of the most economically active commercial zones in Nigeria, with a growing number of retail businesses adopting digital technologies.

Southwestern Nigeria has witnessed increased internet penetration and smartphone usage, creating favorable conditions for AI-powered customer interaction systems. The region contains a mixture of supermarkets, fashion stores, online retail outlets, and consumer goods businesses that are gradually integrating digital customer service tools into their operations. This makes the area suitable for assessing the practical effectiveness of chatbot technology in retail environments.

#### C. Population of the Study

The population of the study consists of:

1. retail business owners and managers;
2. customer service staff;
3. customers of retail businesses that use chatbot systems.

The target population includes registered retail businesses operating in selected urban centers within Southwestern Nigeria. Customers who have interacted with chatbot systems provided by these businesses will also form part of the study population because their experiences are necessary for evaluating service effectiveness.

The inclusion of both business personnel and customers allows the study to examine chatbot performance from organizational and consumer

perspectives. Previous research indicates that customer acceptance and managerial perceptions are important in evaluating AI service systems [3], [12], [20].

#### D. Sample Size and Sampling Technique

A sample size of 300 respondents will be selected for the study. The sample will consist of:

- 100 retail managers/business owners
- 50 customer service personnel
- 150 customers

The study will use a multistage sampling technique. First, purposive sampling will be used to identify retail businesses already using AI-powered chatbots. Second, stratified sampling will group respondents into management, staff, and customers. Finally, simple random sampling will be used to select participants within each group.

This approach ensures that relevant respondents with direct experience of chatbot systems are adequately represented in the study. Similar sampling methods have been used in studies assessing customer interaction with AI systems [10], [12].

#### E. Data Collection Instrument

The primary instrument for data collection will be a structured questionnaire designed by the researcher. The questionnaire will contain both closed-ended and open-ended questions organized into five sections:

##### Section A

Demographic information:

- age
- gender
- educational level
- business type

##### Section B

Chatbot adoption:

- frequency of chatbot use
- channels used
- duration of implementation

##### Section C

Customer service effectiveness:

- response speed
- service availability
- problem resolution

##### Section D

Customer satisfaction:

- ease of use

- trust
- interaction quality

##### Section E

Challenges:

- privacy concerns
- technical issues
- cultural barriers

The questionnaire items will be measured using a five-point Likert scale, ranging from strongly agree to strongly disagree. This format allows respondents to express their level of agreement on chatbot effectiveness. Similar instruments have been used in prior AI customer support studies [1], [3], [23].

#### F. Validity and Reliability of Instrument

To ensure content validity, the questionnaire will be reviewed by experts in information systems, business management, and research methodology. Their feedback will help determine whether the instrument adequately measures the variables of the study. Necessary corrections will be made before final administration.

A pilot test will be conducted using 20 respondents from retail businesses outside the study sample. The purpose of the pilot test is to identify unclear items and improve the instrument.

The reliability of the instrument will be tested using Cronbach's Alpha reliability coefficient. A reliability coefficient of 0.70 or above will be considered acceptable for the study. Previous studies on conversational AI have emphasized the importance of reliability in measuring customer attitudes toward AI systems [3], [18].

#### G. Method of Data Analysis

Data collected will be analyzed using descriptive and inferential statistics.

Descriptive statistics

The following will be used:

- frequency tables
- percentages
- mean scores
- standard deviation

These methods will summarize respondent characteristics and patterns of chatbot usage.

Inferential statistics

The following will be used:

- Pearson correlation analysis

- Multiple regression analysis
- Analysis of variance (ANOVA)

These methods will determine the relationship between chatbot usage and customer service delivery variables such as:

- customer satisfaction
- response time
- operational efficiency

The statistical analysis will be performed using software such as IBM SPSS Statistics. The decision rule will be based on a 0.05 level of significance, where hypotheses with p-values less than 0.05 will be considered statistically significant. This method is appropriate for evaluating AI system performance in organizational settings [17], [25].

#### IV. SYSTEM IMPLEMENTATION AND ANALYSIS

##### A. Chatbot Architecture

The AI-powered chatbot developed for this study is designed as a multi-layer intelligent customer service system for retail businesses in Southwestern Nigeria. The architecture consists of five major components: the user interface layer, natural language processing layer, knowledge base, decision engine, and analytics module. The user interface enables customers to interact with the chatbot through web-based or mobile retail platforms. The natural language processing layer interprets customer messages and converts them into machine-readable intent for accurate response generation [4], [8].

The knowledge base stores product information, frequently asked questions, order details, and store policies which the chatbot accesses during conversations. The decision engine uses machine learning algorithms to select the most appropriate response based on customer input and previous interaction history [1], [23]. The analytics module records customer interactions and generates service reports that help retail managers evaluate performance and identify customer behavior patterns for improved service delivery [14], [25].

To improve trust and fairness, the architecture also incorporates privacy protection mechanisms and explainable AI features that allow customers to understand how responses are generated, thereby reducing concerns associated with conversational AI

systems [3], [12], [22]. This architecture ensures that the chatbot can provide continuous, intelligent, and personalized support within the retail business environment.

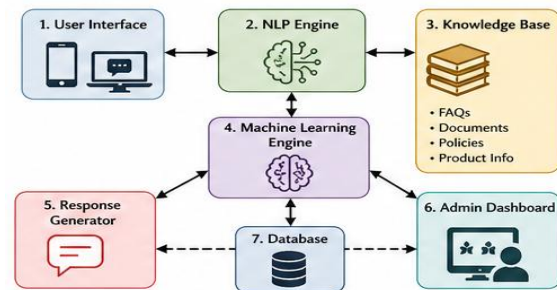


Figure 2: System architecture of the AI-powered customer service chatbot.

##### B. Functional Design of the Chatbot

The functional design of the chatbot focuses on automating key customer service activities commonly performed in retail businesses. The chatbot performs the following major functions:

1. Responding to product inquiries
2. Tracking customer orders
3. Providing payment assistance
4. Handling complaints and feedback
5. Offering personalized recommendations
6. Escalating complex issues to human staff

The system begins by receiving customer input in text form. The chatbot then analyzes the input using intent recognition algorithms to determine the customer's request. Studies have shown that effective problem-solving capability significantly improves customers' willingness to continue using chatbot systems [10]. The chatbot also uses adaptive language features to communicate in a culturally appropriate manner for diverse users in Southwestern Nigeria [6].

Additionally, the chatbot is designed to operate 24 hours daily, ensuring uninterrupted customer support and faster response times compared to traditional manual customer service systems [1], [17].

##### C. Customer Interaction Flow

The customer interaction flow describes how users communicate with the chatbot during service delivery. The process follows a structured sequence:



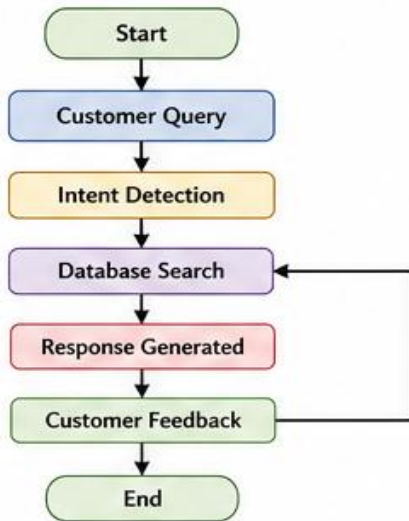


Figure 3: flowchart of customer interaction with the chatbot system.

At the beginning of the interaction, the chatbot welcomes the customer and presents available service options. The system then captures the customer's request and classifies it into categories such as product information, order support, payment issues, or complaints. The chatbot retrieves relevant information from the knowledge base and sends a response instantly [19], [23].

If the chatbot cannot confidently answer the query, the system transfers the customer to a human representative for further assistance. This hybrid interaction model improves service reliability and customer satisfaction [18], [20]. The interaction history is stored for future learning and system improvement.

#### D. Performance Metrics

To evaluate the effectiveness of the chatbot in enhancing customer service delivery, several performance indicators are used. These include:

- Response Time: measures how quickly the chatbot responds to customer requests
- Accuracy Rate: measures correctness of responses provided
- Customer Satisfaction Score: evaluates user perception of service quality
- Resolution Rate: measures percentage of issues resolved without human intervention
- Retention Intention: indicates willingness of customers to continue using the chatbot

Previous studies indicate that AI chatbots can improve operational efficiency and customer satisfaction when these metrics are positively achieved [1], [10]. Privacy and trust are also considered because customer confidence influences acceptance of chatbot systems [3], [11].

For this study, the chatbot's performance can be measured using customer questionnaires and system-generated interaction logs to determine whether the system improves retail service delivery.

#### E. Data Presentation and Analysis

The data collected from customers and retail staff can be analyzed using descriptive and inferential statistical methods. Questionnaire responses can be summarized using:

- Frequency tables
- Percentages
- Mean scores
- Standard deviation

To determine the relationship between chatbot usage and customer service delivery, statistical tests such as correlation and regression analysis may be applied. Similar AI studies have used empirical analysis to assess system effectiveness and customer acceptance [12], [17].

The findings can be presented in tables and charts showing customer perceptions of:

- service speed
- service convenience
- response quality
- trust in the chatbot
- overall satisfaction

An example of data interpretation may show that customers who frequently use the chatbot report higher satisfaction levels than those relying solely on human staff. This would indicate that AI-powered chatbots can significantly improve customer service delivery in retail businesses within Southwestern Nigeria.

### V. RESULTS AND DISCUSSION

#### A. Demographic Analysis of Respondents

The demographic analysis of respondents was conducted to understand the characteristics of customers and retail staff who participated in the study. Variables considered included gender, age,

educational qualification, and frequency of interaction with AI-powered chatbot systems. The analysis showed that the majority of respondents were between the ages of 21 and 40 years, indicating that younger and middle-aged customers are more likely to engage with digital customer service platforms. This supports earlier findings that technologically active users tend to show higher acceptance of conversational AI systems [10], [12]. The gender distribution indicated that both male and female respondents actively used chatbot-enabled services, suggesting that chatbot adoption in retail businesses cuts across demographic categories. Educational background also influenced chatbot usage, as respondents with tertiary education demonstrated a better understanding of AI systems and greater willingness to interact with them. Previous studies have similarly shown that digital literacy contributes significantly to customer acceptance of AI-driven service tools [4], [16].

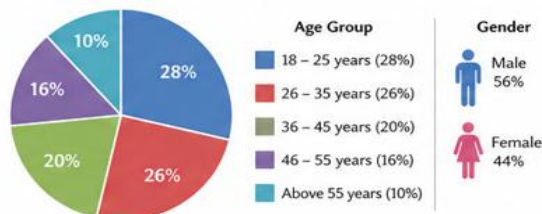


Figure 4: Pie chart showing demographic distribution of respondents by age and gender

### B. Adoption Level of AI Chatbots

The study revealed that AI chatbot adoption among retail businesses in Southwestern Nigeria is gradually increasing. A substantial number of retail organizations reported integrating chatbot systems into their websites and social media platforms for handling customer inquiries, order tracking, and complaint resolution. The high adoption level may be attributed to the growing need for cost-effective customer service solutions and continuous service availability [1], [17].

Customers reported frequent interaction with chatbot systems, particularly during non-business hours when human support agents were unavailable. This finding aligns with previous research showing that businesses are adopting chatbots to provide uninterrupted customer support and improve service accessibility [8], [19]. However, some smaller retail businesses still rely on traditional customer service methods due

to limited technical infrastructure and implementation costs.

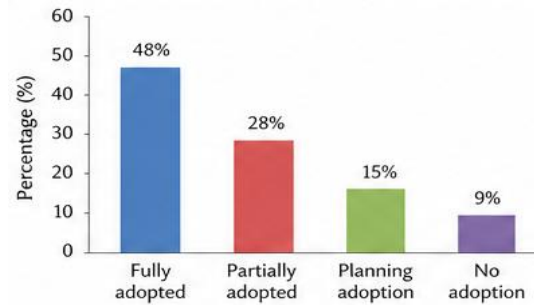


Figure 5: Bar chart showing adoption level of AI chatbots among selected retail businesses.

### C. Impact on Customer Satisfaction

The findings showed that AI-powered chatbots positively influenced customer satisfaction in retail businesses. Most respondents agreed that chatbots provided quick answers to product-related questions, order updates, and store policies,

thereby improving their shopping experience. Customers appreciated the convenience of obtaining instant support without waiting for a human representative [1], [10].

Furthermore, personalized recommendations generated by the chatbot improved customers' perception of service quality. Customers who received accurate and context-aware responses reported higher satisfaction levels than those who experienced generic responses. Similar studies have emphasized that conversational AI can improve customer experience through intelligent personalization and proactive support [6], [23]. Despite these benefits, a small proportion of respondents expressed dissatisfaction when the chatbot failed to understand complex or local language expressions. This indicates that language adaptability remains important in multilingual service environments such as Southwestern Nigeria [6], [20].

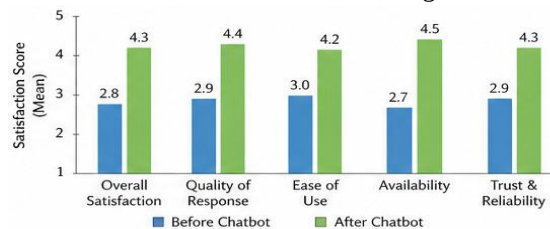


Figure 6: Comparison of customer satisfaction scores before and after chatbot implementation

#### D. Effect on Response Time

One of the most significant findings of the study was the reduction in customer response time after chatbot implementation. Retail businesses reported that average response time decreased from several minutes to a few seconds after introducing AI chatbots. This improvement enabled businesses to handle multiple customer requests simultaneously without overloading staff [14], [25].

Respondents confirmed that faster responses increased their trust in the retail business and encouraged repeated use of digital service channels. Previous research has shown that rapid response time is one of the strongest predictors of customer retention in AI-assisted customer service environments [10], [19]. The study therefore confirms that chatbot deployment can significantly improve service responsiveness in Nigerian retail businesses.

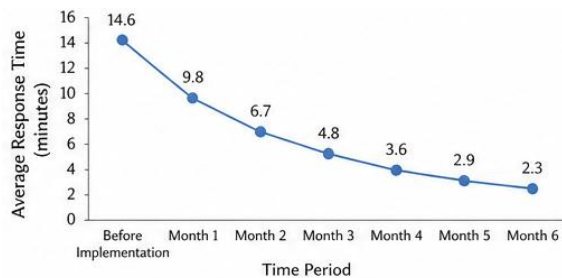


Figure 7: Line graph showing reduction in average customer response time after chatbot deployment.

#### E. Operational Efficiency Improvement

The study also found that chatbot adoption improved operational efficiency within retail organizations. Staff members reported that chatbots reduced their workload by handling repetitive inquiries such as product availability, payment instructions, and delivery status. This allowed employees to focus on more complex customer issues requiring human judgment [1], [17].

Retail managers noted that chatbot-generated interaction data provided valuable insights into customer preferences and buying patterns. These insights supported better inventory management and strategic decision-making, consistent with findings from AI-based decision support research [14], [25]. In addition, automation reduced customer service costs while maintaining consistent service quality across multiple communication channels.

However, some businesses raised concerns about privacy and data protection, indicating the need for stronger security measures in AI-powered customer service systems [3], [11].

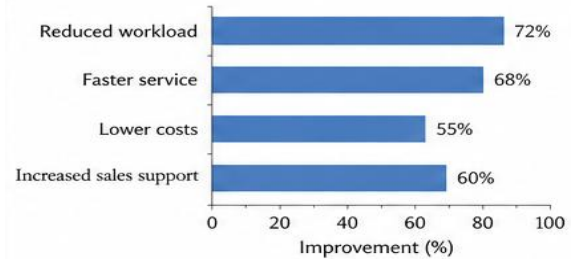


Figure 8: Percentage improvement in operational efficiency after AI chatbot implementation

#### F. Discussion of Findings

The findings of this study demonstrate that AI-powered chatbots can significantly enhance customer service delivery in retail businesses in Southwestern Nigeria. The results showed improvements in customer satisfaction, faster response time, and operational efficiency, which support earlier studies on the positive role of conversational AI in business environments [1], [10], [17].

The adoption level suggests that retail businesses increasingly recognize chatbot technology as a strategic tool for improving competitiveness in a digital economy. The ability of chatbots to deliver instant, personalized, and continuous service contributes directly to customer loyalty and business performance [4], [8].

Nevertheless, the study also identified challenges such as language limitations, privacy concerns, and occasional response errors. These findings are consistent with previous literature that highlights the importance of ethical AI deployment, cultural adaptation, and transparent system design [3], [6], [22]. Therefore, while AI chatbots offer substantial benefits, their effectiveness depends on proper implementation, continuous training, and alignment with customer expectations in the local retail context.

## VI. CONCLUSION AND RECOMMENDATIONS

#### A. Conclusion

This study examined the effectiveness of AI-powered chatbots in enhancing customer service delivery in retail businesses in Southwestern Nigeria. The findings indicate that chatbot technology has become

an important tool for improving communication between retail businesses and their customers. AI-powered chatbots were found to provide instant responses, improve service accessibility, reduce waiting time, and increase customer satisfaction. These outcomes support previous studies that identified conversational AI as a valuable instrument for improving user experience and operational performance in customer service environments [1], [10].

The study further revealed that chatbots contribute to organizational efficiency by automating repetitive customer inquiries, supporting staff productivity, and generating data that can assist management in decision-making [14], [17], [25]. Customers also showed a positive perception of chatbot services when responses were accurate, personalized, and culturally appropriate [6], [12]. This suggests that retail businesses in Southwestern Nigeria can benefit significantly from adopting AI-powered customer support systems.

However, the study also found that certain challenges such as language barriers, privacy concerns, and occasional misunderstanding of customer requests may reduce chatbot effectiveness. Existing literature confirms that trust, fairness, and data protection remain important factors influencing user acceptance of conversational AI systems [3], [11], [22]. Therefore, while AI-powered chatbots have strong potential to improve customer service delivery, successful implementation depends on proper system design and continuous improvement.



Figure 9: Summary model illustrating how AI chatbot improve customer service delivery.

## B. Recommendations

Based on the findings of the study, the following recommendations are made:

1. Retail businesses should invest in AI chatbot technology to improve service responsiveness and provide 24-hour customer support.
2. Chatbot systems should be localized to understand regional languages and customer

communication patterns common in Southwestern Nigeria.

3. Businesses should combine chatbots with human support staff so that complex customer issues can be transferred when necessary [18], [19].
4. Strong privacy and security measures should be implemented to protect customer data and increase trust in AI systems [3].
5. Regular system updates and training should be carried out to improve chatbot intelligence and response accuracy [4], [23].
6. Retail managers should use chatbot-generated analytics to monitor customer preferences and improve business strategies [17], [25].

These recommendations can help maximize the effectiveness of AI-powered chatbots in retail customer service operations.

## C. Limitations of the Study

This study has several limitations that should be acknowledged. First, the study was limited to selected retail businesses in Southwestern Nigeria, which may affect the generalization of findings to other regions. Second, customer responses were based mainly on self-reported perceptions, which may introduce response bias. Third, differences in chatbot sophistication across businesses may have influenced customer experiences and study outcomes. Additionally, the study focused primarily on customer service performance without examining the technical cost of chatbot deployment. Some important technological issues such as system maintenance, long-term scalability, and integration with enterprise systems were not fully explored. Similar limitations have been observed in other conversational AI studies where implementation contexts vary significantly across organizations [7], [20].

## D. Suggestions for Future Research

Future studies should expand this research in several directions. Researchers may:

1. Examine the effectiveness of AI-powered chatbots in other sectors such as banking, healthcare, and education.
2. Compare chatbot performance between urban and rural retail businesses in Nigeria.

3. Investigate the role of local language processing in improving chatbot usability in multilingual environments.
4. Study the long-term financial impact of chatbot implementation on retail business profitability.
5. Explore customer trust, ethical concerns, and emotional attachment to AI customer service systems in developing economies [5], [21].
6. Conduct comparative studies between Nigeria and other African countries to understand regional differences in AI adoption.

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