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Sectoral Adoption of Chatbots for Customer Service in India: A Consumer-Based Empirical Study

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Abstract

Customer service operations in India are undergoing a paradigm shift due to the rapid developments in the realm of advancement of artificial intelligence. Among the various applications of artificial intelligence, chatbots have emerged as an important tool for automating customer interactions and improving service efficiency. Despite their increasing adoption, the extent of chatbot usage varies considerably across industries due to differences in service characteristics and technological readiness. The present study examines the extent of chatbot usage across six major industrial sectors in India, namely banking & financial services, e-commerce, education, telecommunication, healthcare and lastly hospitality & tourism. The paper also examines the impact of demographic variables. These include gender, age, education, occupation, income and location of residence, on usage of chatbots in the different sectors. Primary data was gathered through a structured questionnaire administered to 657 respondents who had experience interacting with digital customer service systems. Cochran's Q test was used to examine differences in chatbot usage across sectors. The results reveal statistically significant variations in chatbot adoption across industries. E-commerce and banking & financial services sectors demonstrate the highest levels of chatbot interaction, while healthcare and hospitality and tourism sectors exhibit comparatively lower levels of usage. The findings highlight the role of industry characteristics such as digital transaction intensity and service complexity in shaping chatbot adoption. The study is an attempt to add to the growing body of research on AI-enabled service technologies. At the same time it seeks to provides managerial insights for organizations for effective implementation of chatbot systems in customer service operations.

Keywords: Artificial Intelligence (AI), Chatbot Adoption, Conversational Agents, Customer Service Systems, Service Automation, Digital Customer Interaction, Industry Sector Analysis, Technology Adoption, AI-enabled Services, Emerging Markets.

Introduction

Increasing sophistication of digital technologies has brought about a paradigm shift in the way organizations interact with customers. Over the past couple of decades, innovations such as mobile computing, cloud computing, and artificial intelligence have reshaped service delivery processes across industries. Digital technologies are being increasingly used by organizations to enhance service efficiency, reduce operational costs, and improve customer experiences. In this rapidly changing scenario of technological advancements, artificial intelligence (AI) has emerged as one of the most influential drivers of service innovation [1, 2].

Artificial intelligence can be defined as the ability of computer systems to perform cognitive tasks that normally require human intelligence, such as learning, reasoning, problem solving, and understanding language. The integration of artificial intelligence into service industries has enabled organizations to automate routine service interactions and provide faster, more efficient customer support [3]. Among the various AI-enabled technologies used in service environments, chatbots have emerged as one of the most widely adopted tools for automating customer service operations.

Chatbots refer to automated conversational systems that employ natural language processing and machine learning techniques to replicate human-like interactions. They enable communication between organizations and users through text or voice interfaces across digital environments such as websites, mobile applications, and messaging platforms [4]. By enabling automated communication between organizations and customers, chatbots allow firms to respond immediately in real time to customer inquiries, thereby improving service accessibility and responsiveness.

The growing adoption of chatbot technologies is driven by several factors. First, organizations increasingly face the challenge of handling large volumes of customer inquiries

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across multiple digital channels. Traditional customer service systems that rely exclusively on human service agents often struggle to manage such interaction volumes efficiently. Chatbots provide a scalable solution by enabling organizations to automate routine service interactions [5].

Second, contemporary consumers expect rapid and convenient service interactions. The rapidly increasing use of digital technologies has altered customer expectations, leading consumers to demand immediate responses and continuous service availability. Chatbots enable organizations to provide round-the-clock customer support without requiring large teams of human service agents [6].

Advancements in natural language processing and machine learning have considerably enhanced the functionality of chatbot systems. Contemporary chatbots are able to interpret complex customer queries, learn from past interactions, and provide responses that are relevant to the context of the conversation [7]. These technological developments have increased the effectiveness of chatbots, making them a valuable tool for organizations aiming to improve service efficiency and strengthen customer engagement. Consequently, the use of chatbot technologies has expanded across a variety of industries. Sectors such as banking & financial services, e-commerce, education, telecommunication, healthcare and hospitality & tourism have begun integrating chatbot systems into their customer service operations. Organizations in these industries use chatbots to handle a variety of service tasks, including answering customer queries, providing product information, assisting with transactions, and resolving service issues.

Despite the growing popularity of chatbot technologies, their adoption is not uniform across industries. Different industries have different levels of chatbot usage due to differences in service characteristics, technological infrastructure, and regulatory requirements [8]. Industries characterized by high digital transaction volumes and standardized service processes tend to adopt chatbot technologies more rapidly than industries involving complex and personalized service interactions.

For example, e-commerce platforms frequently use chatbots to assist customers with product searches, order tracking, and returns management. Similarly, banks increasingly deploy chatbots within their digital platforms to answer customers' account related queries, provide transaction updates, and financial assistance. In contrast, industries such as healthcare and hospitality & tourism involve complex service interactions that often require human expertise and personalized communication.

Understanding sectoral differences in chatbot adoption is important for application in managerial decisions and also for academic research. From an academic perspective, examining chatbot usage across industries contributes to the growing body of literature on artificial intelligence in service systems[2]. From a managerial perspective, understanding how chatbot adoption is essential for designing more effective digital service strategies.

India is an exemplary case for examining chatbot adoption. Digital infrastructure has grown rapidly in the country together with increasing internet penetration, and widespread adoption of online service platforms. Organizations operating in India are increasingly investing in digital transformation initiatives aimed at improving operational efficiency and enhancing customer experiences.

However, empirical research examining chatbot usage across multiple industries in India remains relatively limited. Most existing studies focus on chatbot adoption within specific sectors rather than comparing usage patterns across industries. Consequently, there is very little empirical evidence to understand how chatbot adoption differs from industry to industry from the viewpoint of consumers.

This particular study addresses this gap by looking at the extent of chatbot usage across six major industrial sectors in India: banking & financial services, e-commerce, education, telecommunication, healthcare and hospitality & tourism.

The specific objective of this paper is to examine the chatbot usage among various industrial sectors in India and to look at the impact of demographic variables on chatbot usage in those sectors. By investigating sectoral variations in chatbot adoption, the study contributes to a better understanding of how industry characteristics influence the deployment of artificial intelligence in customer service environments.

Literature Review

The growing incorporation of artificial intelligence into service systems has received significant attention from both scholars and industry practitioners in recent years. AI technologies have the capacity to reshape service delivery by allowing organizations to automate repetitive activities, process and analyze large datasets, and provide more personalized experiences to customers.

Researchers have examined the significant impact of artificial intelligence on service industries. AI-enabled technologies allow organizations to improve service efficiency by automating repetitive tasks and reducing reliance on human labour. By analyzing large datasets, AI systems can also provide organizations a better understanding of customer needs and preferences.

The application of artificial intelligence in service systems has led to the emergence of intelligent service technologies capable of interacting directly with customers. These technologies include virtual assistants, recommendation systems, chatbots, and service robots. Among these technologies, chatbots have become one of the most widely adopted tools for automating customer service interactions.

An increasingly important component of digital service ecosystems is conversational artificial intelligence. Chatbots represent one of the most obvious applications of conversational AI in customer service environments. Chatbots are designed to simulate human conversation and provide automated responses to queries by users with the application of natural language processing technologies. The technical strides made by conversational agents has enabled organizations to automate routine customer service interactions and provide instant responses to customer inquiries.

The increasing use of chatbot technologies can be attributed to the growing importance of digital service channels. As organizations expand their presence on websites, mobile applications, and social media platforms, they must manage large volumes of customer interactions. Traditional customer service systems often depend heavily on human service representatives, which can cause long waiting times and increased operational costs. Chatbots provide an efficient solution by enabling organizations to automate routine interactions and handle multiple customer queries simultaneously.

Research has brought to light several advantages of the implementation of chatbot in service systems. One of the greatest advantages of chatbots is their ability instantly respond to customer inquiries. Rapid response times are an

important determinant of customer satisfaction in digital service environments. Chatbots enable organizations to immediately answer customer queries, thereby improving service accessibility and responsiveness.

Another important benefit of chatbot technologies is their ability to operate continuously without interruption. Unlike human service agents, chatbots can provide customer support twenty-four hours a day. This capability is particularly valuable for organizations operating in global markets where customers may require assistance at different times of the day.

Chatbots also allow organizations to manage large volumes of customer interactions efficiently. In many service industries, organizations receive thousands of customer inquiries each day. Chatbots can process these inquiries simultaneously, enabling organizations to reduce waiting times and improve service efficiency.

Despite these advantages, chatbot implementation also presents certain challenges. One of the primary challenges is ensuring that chatbot systems accurately interpret user queries. Misinterpretation of customer requests can result in incorrect responses and reduced customer satisfaction. Therefore, organizations must invest in advanced natural language processing technologies to improve chatbot accuracy.

One of the key challenges is maintaining an appropriate balance between automated systems and human interaction. Although chatbots are effective in managing routine customer inquiries, more complex service issues often require the expertise and judgment of human agents. Consequently, many organizations implement hybrid service models in which chatbot-based automation is complemented by human customer support.

The extent of use of chatbot technologies varies significantly across industries due to differences in service characteristics and technological requirements. Industries characterized by high levels of digital interaction and standardized service processes tend to adopt chatbot technologies more rapidly.

E-commerce represents one of the earliest adopters of chatbot technologies. Online retail platforms frequently deploy chatbots to assist customers with product searches, order tracking, payment issues, and returns management. Since many of these interactions involve standardized processes, they can be easily automated through chatbot systems. The high volume of customer inquiries in e-commerce environments makes chatbot automation particularly valuable.

The banking & financial services sector has also witnessed significant adoption of chatbot technologies in recent years. Financial institutions increasingly use chatbots to provide customers with real-time access to account information, transaction details, and financial services. Banking & financial services chatbots enable customers to perform routine tasks such as checking account balances, transferring funds, and obtaining financial advice.

Telecommunications companies have also adopted chatbot technologies to handle service requests related to billing inquiries, service activation, and technical support. Telecommunications providers often receive large volumes of customer queries, making chatbot automation an efficient solution for managing customer interactions.

In the education sector too, chatbots are primarily used for information services and troubleshooting tasks. AI systems are often used to provide quick responses to frequently asked questions and provide information regarding resources of educational institutes.

The travel and tourism industry has also begun adopting chatbot technologies to enhance customer service. Travel companies use chatbots to assist customers with booking inquiries, itinerary information, and travel updates. Chatbots allow travel companies to provide instant responses to customer queries and improve service efficiency.

In contrast, industries such as healthcare tend to adopt chatbot technologies more cautiously. Healthcare services involve sensitive medical information and require high levels of accuracy and reliability.

These differences suggest that the suitability of chatbot technologies varies depending on the nature of service interactions within each industry.

The adoption of chatbot technologies can also be interpreted in terms of technology adoption and service automation theories. Technology adoption models suggest that the perceived usefulness and ease of use of technological innovations influence their adoption across industries. In service environments, the suitability of automation technologies depends on the standardization of service processes and the complexity of customer interactions. Therefore, industries characterized by high digital interaction and standardized service procedures are more likely to adopt chatbot technologies extensively, whereas industries involving complex and personalized interactions may rely more heavily on human service agents.

Research Gap

Although previous research has examined the technological capabilities and benefits of chatbot systems, several gaps remain in the existing literature. First, many studies focus on chatbot implementation within individual industries, such as banking & financial services or e-commerce, rather than examining adoption patterns across multiple sectors. Hence, there is limited understanding of the varying usage of chatbots across industries with different service characteristics.

Second, existing research frequently examines chatbot adoption from the perspective of organizations or technology developers. However, understanding chatbot usage from the perspective of consumers is equally important, as consumer interaction patterns ultimately determine the effectiveness of chatbot-based service systems.

Third, much of the literature on chatbot adoption has been based on studies carried out in developed economies. Empirical research examining chatbot usage in emerging markets such as India remains relatively limited, despite the remarkable growth of digital technologies in these economies.

The present study addresses these gaps by examining chatbot usage across six major industrial sectors in India from the perspective of consumers.

Conceptual Framework

The adoption of emerging technologies within service industries is influenced by a plethora of organizational, technological, and industry-specific factors. In the context of chatbot adoption, industry characteristics play a particularly important role in determining the extent of the implementation of conversational technologies in organizations.

Industries differ significantly in terms of service delivery processes, customer interaction patterns, technological infrastructure, and regulatory requirements. These differences influence the suitability of chatbot technologies for automating customer service interactions.

One of the prime factors influencing chatbot adoption is digital transaction intensity. Industries characterized by high

levels of digital interaction between customers and organizations tend to adopt chatbot technologies more extensively. For example, e-commerce platforms operate almost entirely through digital channels and receive large volumes of customer inquiries related to product information, order tracking, payment processing, and returns management. In such environments, chatbot systems provide an efficient solution for handling routine customer inquiries.

Another important factor influencing chatbot adoption is service complexity. Some industries involve relatively simple and standardized service interactions that can be easily automated. In contrast, other industries involve complex decision-making processes and personalized customer interactions that require human expertise. For example, banking & financial services involve both standardized interactions such as balance inquiries and complex financial advisory services. As a result, chatbot adoption in the banking & financial services sector may focus primarily on automating routine service tasks. In industries such as healthcare, service interactions are often highly complex and require specialized knowledge. Healthcare services involve sensitive medical information and require professional judgment in diagnosis and treatment decisions. These factors limit the extent to which chatbot technologies can fully automate customer service interactions in such industries.

A third factor influencing chatbot adoption is customer interaction volume. Industries that receive large volumes of customer inquiries are more likely to implement chatbot systems to manage these interactions efficiently. Telecommunications companies, for example, frequently receive customer queries related to billing, service plans, and technical support. Chatbots enable these organizations to handle such inquiries quickly and reduce the workload on human service agents.

In addition to these factors, technological maturity and organizational readiness also influence chatbot implementation. Organizations operating in technologically advanced sectors may be more willing to experiment with AI-enabled service technologies.

Based on these considerations, the conceptual framework of this study proposes that industry sector influences the extent of chatbot usage through service characteristics such as digital transaction intensity, service complexity, and customer interaction volume. Industries characterized by high digital engagement and standardized service processes are expected to exhibit higher levels of chatbot usage, while industries involving complex and personalized interactions may demonstrate lower levels of chatbot adoption.

Conceptual Framework Diagram

Industry Sector

(Banking & financial services, e-commerce, education, telecommunication, healthcare and hospitality & tourism)

↓

Service Characteristics

- Digital transaction intensity
- Service complexity
- Customer interaction volume

↓

Extent of Chatbot Usage

(Customer interaction with chatbot systems)

The conceptual framework proposed in this study is based on the premise that the nature of service delivery within an industry determines the suitability of chatbot technologies for customer service operations. Industries differ considerably in terms of the volume of customer interactions, the complexity of service processes, and the degree to which service activities can be standardized. These differences influence the extent to which chatbot systems can effectively replace or complement human service agents.

This framework provides the basis for examining sectoral differences in chatbot usage across industries in the Indian context.

Hypothesis Development

Technology adoption within service industries is often influenced by the nature of service delivery processes and the characteristics of customer interactions. Industries that rely heavily on digital platforms and standardized service procedures are more likely to adopt automated service technologies.

Previous research has suggested that the suitability of chatbot technologies varies across industries. Sectors characterized by high levels of digital engagement and routine customer inquiries tend to implement chatbot systems more extensively. For example, e-commerce platforms frequently deploy chatbots to assist customers with product searches, order tracking, and customer support queries.

Similarly, financial institutions have increasingly adopted chatbot technologies to provide customers with real-time access to account information, transaction updates, and financial services. These interactions are often standardized and can be efficiently automated through conversational interfaces.

In contrast, industries such as healthcare and insurance often involve complex service interactions that require professional expertise and personalized communication. These industries may therefore rely more heavily on human service agents rather than automated chatbot systems.

Given these differences in service characteristics, it is reasonable to expect that chatbot adoption will vary significantly across industries.

Therefore, the following hypothesis is proposed:

H_1: There are significant differences in the extent of chatbot usage across industrial sectors.

Methodology

Research Design

The present study adopts a quantitative research design to examine the extent of chatbot usage across different industrial sectors in India. Quantitative research methods are particularly suitable for examining patterns and relationships within large datasets and allow researchers to test hypotheses using statistical techniques.

The study uses survey data collected from consumers who have interacted with chatbot enabled customer service systems. By analyzing consumer responses, the research seeks to identify differences in chatbot usage across sectors.

Data Collection

Primary data was collected through a structured questionnaire administered to consumers in India. The questionnaire was designed to capture respondents' experiences with chatbot-based customer service systems across different industries.

Respondents were asked whether they had interacted with chatbot systems while seeking customer service in the following six sectors:

- Banking & financial services
- E-commerce
- Telecommunications

- Education
- Hospitality & Tourism
- Healthcare

The questionnaire included binary response options indicating whether respondents had used chatbot services in each sector.

Sample

A total of 657 respondents participated in the survey out of whom 600 cases reported having used chatbot. Only these 600 responses were used in the final statistical analysis.

The respondents represented a diverse group of consumers who had experience interacting with digital service platforms across various industries.

Data Analysis

To examine differences in chatbot usage across industries, the study employed Cochran's Q test. Cochran's Q test is a non-parametric statistical test used to determine whether there are significant differences between three or more related proportions.

In this study, Cochran's Q test was used to determine whether the proportion of respondents who had interacted with chatbots differed significantly across the six sectors.

Results

Sector-wise Chatbot Usage

Table 1: Chatbot usage varies across industries.

Sector	Number of Users	Percentage
E-commerce	453	75.5%
Banking & financial services	291	48.5%
Education	240	40%
Telecommunication	210	35%
Healthcare	171	28.5%
Hospitality & tourism	132	22%

Since respondents could report usage in multiple sectors, these percentages represent relative penetration levels rather than mutually exclusive categories.

The results indicate that E-commerce demonstrates the highest level of chatbot usage, followed by Banking & Financial services. Education and Telecommunication and Healthcare services exhibit moderate levels of chatbot interaction, while Healthcare and Hospitality & Tourism sectors show comparatively lower levels of chatbot usage.

Table 2: Cochran's Q Test Results

Statistic	Value
N	600
Cochran's Q	495.436
df	5
p-value	< 0.001

The Cochran's Q test produced a statistically significant result ($p < 0.001$), indicating that there are significant differences in chatbot usage across the six industries examined in this study.

The significant result supports the research hypothesis that chatbot adoption varies across sectors. These sectoral differences are consistent with service automation literature, which suggests that AI systems are most effective in routine and standardized service environments [2, 15].

Discussion

This study provides important insights into the sectoral adoption of chatbot technologies in India. The results reveal significant variations in chatbot usage across industries, highlighting the influence of industry characteristics on the implementation of AI-enabled service technologies.

E-commerce emerged as the sector with the highest level of chatbot usage among respondents. This finding is supported by previous research indicating that industries having high digital transaction volumes are more likely to adopt automated service technologies[1]. E-commerce platforms typically handle large volumes of customer inquiries related to product information, order tracking, and returns management. E-commerce platforms widely use chatbots for order tracking, product information, and customer support. These services are typically routine, repetitive, and time-sensitive, making them highly suitable for automation. AI-based systems perform particularly well in standardized service tasks where responses can be rule-based and predictable [2, 15]. Chatbots are particularly well suited for handling such routine interactions because they can provide immediate responses and automate repetitive tasks.

The banking & financial services sector also demonstrates a high level of chatbot adoption. Banks increasingly use chatbots for customer queries and transactional assistance. Although financial services involve higher perceived risk, adoption among respondents remains substantial. Research on technology-mediated financial services suggests that trust and perceived security play critical roles in determining adoption behaviour [13, 6]. Financial institutions have increasingly embraced digital transformation initiatives aimed at improving service accessibility and operational efficiency. Banking & financial services chatbots enable customers to access account information, perform financial transactions, and obtain assistance with banking & financial services services without the need for human service agents. These findings are consistent with prior studies suggesting that AI-enabled service technologies are widely adopted in financial services due to the high volume of routine customer interactions [8].

Education and Telecommunications services demonstrate moderate levels of chatbot adoption. In these industries, chatbots are commonly used to handle routine service inquiries such as institute information, billing information, service plans, and booking assistance. However, more complex service issues may still require human intervention, which explains the moderate level of chatbot usage observed in these sectors. Prior studies indicate that consumers readily accept AI interfaces for functional and informational service tasks, while complex or emotionally sensitive interactions may still require human agents [14, 15].

Healthcare and Hospitality & Tourism sectors exhibit comparatively lower levels of chatbot adoption. These industries involve complex service interactions that require specialized expertise and personalized communication. In healthcare services, for example, medical diagnosis and treatment recommendations require professional judgment and cannot be easily automated through chatbot systems[10]. Healthcare chatbot usage might probably be low due to algorithm aversion, where consumers may be hesitant to rely on AI for sensitive medical decisions [11].

Overall, the observations show the importance of aligning chatbot deployment strategies with the specific characteristics of each industry.

Table 3: Sector Comparison of Chatbot Adoption

Sector	Digital Transaction Intensity	Service Complexity	Customer Interaction Volume	Level of Chatbot Adoption
E-commerce	Very High	Low	Very High	Very High
Banking & financial services	High	Moderate	High	High
Education	Moderate	Moderate	Moderate	Moderate
Telecommunications	High	Moderate	High	Moderate
Healthcare	Moderate	Very high	Moderate	Low
Hospitality & tourism	Moderate	High	Moderate	Low

Interpretation

The sector comparison highlights the association between service characteristics and chatbot adoption. Industries characterized by high digital transaction intensity and standardized service processes, such as e-commerce and banking & financial services, exhibit higher levels of chatbot adoption. Conversely, sectors involving complex service interactions, such as healthcare and insurance, demonstrate lower levels of chatbot usage. These findings support the argument that chatbot implementation is strongly influenced by the nature of service delivery within an industry.

Sector-Specific Demographic Differences

Additional chi-square analyses between usage of chatbot in that sector (yes or no) and demographic variables were conducted separately for each sector.

The demographic variables are as follows:

- **Gender:** (male/female/other)
- **Age (in years):** (18 to 24; 25 to 34; 35 & above)
- **Education:** (graduate or below; postgraduate or higher)
- **Occupation:** (student; working; currently not working)
- **Annual Income:** (less than 40,000/-; 40,000/- to 1,00,000/-; above 1,00,000/-)
- **Current Location:** (city; town; village)

In the table below, only the significant p-values (< 0.05) and the corresponding chi-square values are given.

Table 4: Chi square results

Variable		Gender	Age	Education	Occupation	Income	Location
Banking	χ^2	6.709	6.957	11.23	-	6.286	24.15
	p	0.01	0.031	0.001	-	0.043	0
E-commerce	χ^2	-	-	-	-	-	14.974
	p	-	-	-	-	-	0.001
Healthcare	χ^2	-	-	9.267	7.624	8.922	-
	p	-	-	.002	.022	.012	-
Education	χ^2	4.092	15.723	7.626	-	-	-
	p	.043	.000	.006	-	-	-
Tele-communication	χ^2	-	26.660	12.305	12.305	-	-
	p	-	.000	.005	.002	-	-
Hospitality & tourism	χ^2	-	7.048	27.179	-	-	-
	p	-	.029	.000	-	-	-

Banking Sector

Significant associations were observed with gender, age, education, income and location of residence.

Gender: Male respondents show higher banking chatbot usage than female respondents.

Age: Usage increases with age, with older respondents demonstrating relatively higher adoption.

Education: Respondents with postgraduate education show higher banking chatbot usage.

Income: Higher income groups demonstrate relatively higher adoption.

Location: Town residents show the highest usage, followed by city residents, while village usage is minimal.

Occupation was not significant.

E-Commerce Sector

Location: Chatbot usage was highest among city residents, followed by town residents, and lowest among village respondents, reflecting the influence of digital infrastructure availability [12].

The other demographic variables were not significantly associated with chatbot usage.

Healthcare Sector

Education: Higher educated respondents show greater adoption.

Occupation: Students show relatively higher adoption.

Income: Middle-income respondents show comparatively higher usage.

Gender, age and location are not significant

Education Sector

Gender: Male respondents show slightly higher chatbot usage.

Age: Highest usage among respondents aged 18–24 years.

Education: Higher education levels correspond to higher chatbot adoption.

Occupation, income, and location were not significant.

Telecommunication Sector

Age: Older respondents show relatively higher usage.

Education: Higher educational attainment is associated with greater usage.

Occupation: Students and working professionals show higher adoption compared to non-working respondents.

Gender, income and location are non-significant variables.

Hospitality Sector

Age: Younger respondents (18–24 years) demonstrate higher usage.

Education: Respondents with postgraduate education show

substantially higher adoption.
Gender, occupation, income and location are non-significant variables.
Cross-Sector Demographic Patterns

The comparative analysis reveals that demographic influences vary across sectors.
Gender shows minimal influence. Gender is significant only in the education sector, where males show slightly higher usage. Across most industries, chatbot adoption appears largely gender-neutral, indicating widespread acceptance of AI-based service interfaces. Gender is the least influential factor. Gender differences are minimal, indicating largely gender-neutral chatbot adoption, consistent with findings in conversational AI adoption research [16].
Education emerges as the most consistent demographic determinant, influencing chatbot usage in five of the six sectors (banking, healthcare, education, telecommunication, and hospitality). Higher educational attainment is seen to lead to greater adoption of chatbot technologies, reflecting the role of digital literacy and cognitive familiarity with AI-based systems. This aligns with digital literacy research suggesting that education enhances technological adaptability and AI readiness [12, 3].
Age is a moderately influential factor. Younger users dominate in education and hospitality sectors while older users show stronger usage in banking and telecommunication. This indicates that the role of age depends on service relevance and sector characteristics.
Occupation significantly affects chatbot usage in healthcare and telecommunication sectors, where students demonstrate higher adoption. This may reflect higher information-seeking behaviour and greater digital familiarity among students.
Income differences reveal that higher income groups show stronger adoption in banking, while middle income groups show stronger healthcare adoption. Income significantly influences chatbot usage in banking and healthcare sectors only. This suggests that economic factors matter particularly in financial and health-related service contexts.
Location shows that Urban respondents (city/town) show higher usage in banking and e-commerce sectors, reflecting digital infrastructure effects, This finding highlights the influence of digital infrastructure availability and internet penetration, supporting the Digital Divide Theory [12].

Conclusion

The findings indicate that:

i). Chatbot usage in India has achieved high overall penetration (91.3%).
ii). Adoption varies significantly across sectors (Cochran's Q = 495.436, $p < .001$).
iii). E-commerce shows the highest adoption, reflecting suitability for routine digital transactions.
iv). Healthcare and hospitality show the lowest adoption, likely due to higher trust and personalization requirements.
v). Structural factors such as location and income influence adoption more strongly than basic demographic characteristics.
vi). Sectoral characteristics moderate demographic effects, indicating that chatbot adoption patterns vary across industries.

Overall, chatbot diffusion in India is widespread but uneven, shaped by sectoral service characteristics, perceived risk, digital infrastructure, and socio-economic exposure to digital technologies.

Table 5: Demographic Influence Matrix for Chatbot Usage across Sectors

Demographic Variable	Banking	E-commerce	Healthcare	Education	Telecommunication	Hospitality
Gender	Significant → Higher usage among males	Not significant	Not significant	Significant → Higher usage among males	Not significant	Not significant
Age	Significant → Usage increases with age	Not significant	Not significant	Significant → Highest usage among 18–24 yrs	Significant → Higher usage among older respondents	Significant → Higher usage among younger respondents
Education	Significant → Higher usage among postgraduates	Not significant	Significant → Higher usage among postgraduates	Significant → Higher usage among higher education levels	Significant → Higher usage among postgraduates	Significant → Higher usage among postgraduates
Occupation	Not significant	Not significant	Significant → Higher usage among students	Not significant	Significant → Higher usage among students and working professionals	Not significant
Income	Significant → Higher usage among higher income groups	Not significant	Significant → Higher usage among middle-income groups	Not significant	Not significant	Not significant
Location	Significant → Highest usage among town residents; lowest in villages	Significant → Higher usage among city residents	Not significant	Not significant	Not significant	Not significant

The demographic influence matrix demonstrates that chatbot adoption patterns vary significantly across industries, rather than following a uniform demographic pattern. Education emerges as the most consistent determinant of adoption, while other demographic variables exert sector-specific effects.

These findings indicate that chatbot adoption in India is shaped by a combination of digital literacy, service relevance, socio-economic factors, and infrastructure access, highlighting the sector-contingent nature of AI-based customer service diffusion.

Theoretical Implications

This study provides several important theoretical contributions to the literature on artificial intelligence, service technology, and digital customer service systems. As organizations increasingly adopt conversational technologies such as chatbots, it is critical to understand the factors that influence chatbot adoption in different industries and hence this has become an important area of academic inquiry.

First, this study contributes to the growing body of literature on artificial intelligence in service systems by providing empirical evidence regarding the sectoral adoption of chatbot technologies. While previous research has studied at length the technological capabilities of chatbots how they impact customer satisfaction and service quality, there is an absence of extensive work on how chatbot usage varies across industries. By examining chatbot usage across six major sectors in India, the present study provides insights into how industry characteristics influence the adoption of conversational technologies.

Second, the study contributes to service technology adoption literature by highlighting the importance of industry-specific service characteristics in shaping technology implementation. Much of the existing research on technology adoption focuses on organizational factors such as technological readiness, management support, and innovation orientation. However, the findings of this study suggest that the nature of service interactions within an industry also plays a critical role in determining the extent of technology adoption. Industries characterized by standardized service interactions and high digital transaction volumes are more likely to adopt chatbot technologies extensively.

Third, the study extends existing theoretical perspectives on service automation by demonstrating that automation technologies like chatbots cannot be uniformly applied across industries. The findings suggest that the effectiveness of chatbot technologies depends on the compatibility between service characteristics and technological capabilities. In industries where service interactions are highly standardized, chatbot technologies can effectively automate customer service operations. However, in industries involving complex service processes and personalized interactions, the role of chatbots may be limited to complementing human agents rather than replacing them.

Fourth, the study adds to the literature on digital transformation in emerging markets. Much of the current research on artificial intelligence adoption has focused on developed economies with advanced technological infrastructures. By examining chatbot adoption in the Indian scenario, this study leads to insights on how conversational technologies are being implemented in rapidly developing digital economies.

The findings imply that organizations in emerging markets are increasingly adopting chatbot technologies as part of broader digital transformation initiatives. However, the extent of adoption varies across industries depending on factors such as technological infrastructure, service complexity, and customer interaction patterns.

Fifth, the study contributes to the literature on human–technology interaction in service environments. As organizations increasingly rely on automated service technologies, it becomes even more important to understand how customers interact with chatbot systems. The findings of this study indicate that customer exposure to chatbot technologies varies across industries, which may influence customer expectations regarding automated service interactions.

Industries with high levels of chatbot adoption may gradually shape customer expectations regarding the availability of automated service support. Conversely, industries with lower levels of chatbot usage may continue to rely more heavily on human service agents.

Sixth, the study studies the impact of demographic variables on chatbot usage and highlights how different demographic variables differ in their impact across different industrial sectors.

Finally, the study contributes to the emerging literature on AI-enabled customer engagement by demonstrating that chatbot usage is influenced by the structural characteristics of service industries. The findings suggest that industry structure plays a critical role in shaping the ways in which organizations deploy conversational technologies to engage with customers.

Overall, the study advances theoretical understanding of chatbot adoption by emphasizing the importance of industry characteristics in determining the extent of technology implementation in customer service environments.

Managerial Implications

The findings of this study provide several important implications for managers seeking to implement chatbot technologies in customer service operations.

First, organizations operating in industries characterized by high digital transaction volumes should consider expanding their use of chatbot technologies to improve service efficiency. Chatbots enable organizations to automate routine customer interactions, reduce service response times, and handle large volumes of customer inquiries.

Second, organizations should adopt a strategic approach to chatbot implementation. Rather than viewing chatbots as a complete replacement for human service agents, firms should integrate chatbot technologies into broader customer service systems that combine automation with human support.

Third, organizations should invest in improving the accuracy and usability of chatbot systems. Advances in natural language processing and machine learning technologies have significantly enhanced chatbot capabilities. However, organizations must continuously update chatbot systems to ensure that they can understand user queries accurately and provide relevant responses.

Fourth, firms should integrate chatbot systems with customer relationship management platforms to enable personalized service interactions. By analyzing customer data, chatbot systems can deliver customized recommendations and improve customer engagement.

Fifth, companies should adopt sector specific strategies to target different market segments based on demographic segmentation.

Finally, organizations should focus on building customer trust in chatbot technologies. Transparency regarding the capabilities and limitations of chatbot systems can help improve user acceptance and satisfaction.

Limitations and Future Research

Despite its contributions, the present study has several limitations.

First, the study focuses on six industries and may not capture chatbot adoption patterns across all sectors. Future research may examine chatbot usage in additional industries.

Second, the study focuses on consumers in India. Future research could conduct cross-country comparisons to examine how chatbot adoption varies across different cultural and

technological contexts.

Third, the study examines chatbot usage rather than customer satisfaction or service quality outcomes. Future studies may explore the impact of chatbot usage on customer engagement, satisfaction, and loyalty.

Conclusion

The rapid advancement of artificial intelligence technologies has significantly transformed the landscape of customer service across industries. Chatbots have emerged as one of the most prominent applications of artificial intelligence in service environments, enabling organizations to automate routine customer interactions and provide continuous service support. As organizations increasingly adopt chatbot technologies as part of their digital transformation initiatives, understanding the factors that influence chatbot adoption has become an important area of research.

The present study examined the extent of chatbot usage across six major industrial sectors in India: banking & financial services, e-commerce, telecommunications, travel services, insurance, and healthcare. By analyzing survey data collected from 657 respondents, the study sought to identify sectoral differences in chatbot adoption from the perspective of consumers.

The findings of the study reveal significant variations in chatbot usage across industries. E-commerce emerged as the sector with the highest level of chatbot interaction among respondents. This finding reflects the digital nature of e-commerce platforms, which rely heavily on online transactions and customer interactions. Chatbots provide an efficient mechanism for handling routine customer inquiries in such environments.

The banking & financial services sector also demonstrated a relatively high level of chatbot adoption. Financial institutions have increasingly embraced digital technologies to improve service accessibility and operational efficiency. Banking & financial services chatbots enable customers to access account information, perform transactions, and obtain assistance without the need for human service agents.

Education and Telecommunication sectors demonstrated moderate levels of chatbot usage. In these industries, chatbots are commonly used to handle routine inquiries such as general information, billing information, service plan details, and booking assistance. However, more complex service issues may still require human intervention.

Healthcare and Hospitality & tourism sectors exhibited comparatively lower levels of chatbot adoption. These industries involve complex service interactions that often require professional expertise and personalized communication. As a result, the role of chatbots in these sectors may be limited to supporting rather than replacing human service providers.

Overall, the findings of the study highlight the importance of industry characteristics in shaping the adoption of chatbot technologies. Industries characterized by high digital transaction volumes and standardized service processes are more likely to implement chatbot systems extensively. In contrast, industries involving complex and personalized service interactions may adopt chatbot technologies more cautiously.

The study contributes to the growing literature on artificial intelligence in service systems by providing empirical evidence regarding sectoral differences in chatbot adoption. By examining chatbot usage across multiple industries, the research offers valuable insights into how service characteristics influence the implementation of conversational technologies.

From a managerial perspective, the findings suggest that organizations should align chatbot deployment strategies with the specific characteristics of their industry. Firms operating in digitally intensive industries can benefit from extensive chatbot deployment to improve service efficiency and reduce operational costs. In contrast, organizations operating in industries involving complex service interactions may adopt hybrid service models that combine chatbot automation with human service support.

As artificial intelligence technologies continue to evolve, chatbot systems are likely to become increasingly sophisticated and capable of handling more complex service interactions. Future research may explore how advancements in artificial intelligence influence the role of chatbots in service environments and how customer perceptions of chatbot interactions evolve over time.

In conclusion, chatbot technologies represent an important component of modern digital service systems. Understanding how these technologies are adopted across industries can help organizations design more effective customer service strategies and improve the overall quality of digital service experiences.

References

1. Davenport TH, Guha A, Grewal D, Bressgott T. How artificial intelligence will change the future of marketing. *J Acad Mark Sci.* 2020;48(1):24–42.
2. Huang MH, Rust RT. Artificial intelligence in service. *J Serv Res.* 2018;21(2):155–172.
3. Dwivedi YK, Hughes L, Ismagilova E, *et al*. Artificial intelligence (AI): Multidisciplinary perspectives on emerging challenges and opportunities. *Int J Inf Manage.* 2021;57:101994.
4. Araujo T. Living up to the chatbot hype: The influence of anthropomorphic design cues and communicative agency framing on conversational agent and company perceptions. *Comput Human Behav.* 2018;85:183–189.
5. Adam M, Wessel M, Benlian A. AI-based chatbots in customer service and their effects on user compliance. *Electron Mark.* 2021;31(2):427–445.
6. McLean G, Osei-Frimpong K. Chat now… Examining the variables influencing the use of online live chat. *Comput Human Behav.* 2019;96:55–67.
7. Sheehan B, Jin HS, Gottlieb U. Customer service chatbots: Anthropomorphism and adoption. *J Bus Res.* 2020;115:14–24.
8. Belanche D, Casaló LV, Flavián C. Artificial intelligence in fintech: Understanding robo-advisors adoption among customers. *Ind Manage Data Syst.* 2020;120(3):427–447.
9. Huang MH, Rust RT. Engaged to a robot? The role of AI in service. *J Serv Res.* 2021;24(1):30–41.
10. Abd-Alrazaq A, Alajlani M, Alalwan AA, Bewick BM, Gardner P, Househ M. An overview of the features of chatbots in mental health: A scoping review. *Int J Med Inform.* 2020;132:103978.
11. Longoni C, Bonezzi A, Morewedge CK. Resistance to medical artificial intelligence. *J Consum Res.* 2019;46(4):629–650.
12. Van Dijk J. *The digital divide.* Cambridge: Polity Press; 2020.
13. Gefen D, Karahanna E, Straub DW. Trust and TAM in online shopping: An integrated model. *MIS Q.* 2003;27(1):51–90.

14. Van Doorn J, Mende M, Noble SM, Hulland J, Ostrom AL, Grewal D, *et al*. Domo arigato Mr. Roboto: Emergence of automated social presence in organizational frontlines and customers' service experiences. *J Serv Res.* 2017;20(1):43–58.
15. Wirtz J, Patterson P, Kunz W, *et al*. Brave new world: Service robots in the frontline. *J Serv Manage.* 2018;29(5):907–931.
16. Gnewuch U, Morana S, Maedche A. Towards designing cooperative and social conversational agents for customer service. *Proceedings of the International Conference on Information Systems.* 2017.