

# ASSESSING THE ROLE OF AI-POWERED CHATBOTS IN IMPROVING CUSTOMER EXPERIENCE IN PHARMACEUTICAL E-COMMERCE BUSINESSES IN BEIJING

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## ABSTRACT

*Purpose* – The advent of new technologies like artificial intelligence in service industries has become a vital factor in creating a positive customer experience. The primary objective of organizations nowadays is developing excellent customer service that makes their customers satisfied, enhances their purchasing experience, and fosters engagement and loyalty. To achieve this, AI-enabled chatbots are widely used by businesses as they are more reliable, convenient, and accessible, provide quick resolutions as well as provide tailored recommendations for customers. This study examines the role of AI-powered chatbots in improving the customer experience in e-commerce pharmaceutical platforms in Beijing.

*Methodology* – This study will employ a qualitative secondary research method by examining existing information on online pharmacies using AI chatbots in Beijing.

*Results* – The findings reveal that there is huge potential for AI chatbots in online pharmacies because they can personalize customer interactions, streamline the healthcare journey of an individual, and cater to the growing demand for convenient and accessible healthcare services in an aging society like Beijing. In simple terms, healthcare treatment and diagnosis are time-consuming processes, however, with the incorporation of AI chatbots, customers gain access and convenience with personalized healthcare management, empowered self-service, 24\*7 support, cost saving, eliminated hospital visits, retrieval of drug information and making them aware with proper education on medication and related services. The study indicates significant advancement in customer support and service quality within e-commerce pharmacies in Beijing. Integration of AI chat bots have shown capacities in providing personalized healthcare solutions, Real time information and also the emotional support to customers. These results together with the research objectives of assessing the impact of AI on customer satisfaction and service efficiency, as written in hypothesis 1 and hypothesis 2.

*Implications* – The study has identified both opportunities and Threats associated with AI chatbots. Hence, the successful integration of AI chatbots in online pharmacies to improve customer experience requires proper integration between regulatory compliance, ethics, and innovation.

*Originality/Value* – This research contributes to existing research by shredding valuable insights on the transformative potential of using AI chatbots in online business models.

**Keywords:** AI-powered chatbots, Healthcare, E-commerce, Customer engagement, AI application

**Paper Type:** Research Article

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## **INTRODUCTION**

Digitalization in the healthcare sector provides the potential to revolutionize patient healthcare globally. Trenfield et al. (2022) stated that the advent of technologies like artificial intelligence, blockchain, augmented reality, and so forth are providing significant benefits in patient care and satisfaction in the pharmaceutical industry. Pharmaceutical inventions, design, and distribution are expanding into the digital sphere. Each stage in the lifecycle of medicine from hit detection to marketing and patient outcomes is seeing the adoption of next-generation digital technologies. The pharmaceutical industry has incorporated such technologies due to the widespread adoption rate in other industries and its substantial benefits in various facets of client satisfaction and engagement. For example, many pharmaceutical companies are implementing AI-guided drug discovery due to its speed, capability for resource-saving, and constant operations. Likewise, AI-powered chatbots are becoming gradually popular in the pharmaceutical industry as they can offer customers easy access to information and support them in making better decisions. They can deliver personalized instruction and recommendations on medications and treatments, as well as respond to commonly inquired inquiries.

The population of China is increasing at a faster rate. Chen et al. (2010) mentioned that the city of Beijing has become an aging society with a population of about 12.3 million, which has resulted in noteworthy social significance in Beijing. Aged patients account for more than 60% of emergency cases, 85% of long-term care, and 49% of hospital days. Amongst those aged over 75 years, two-thirds suffer from three or more chronic illnesses, approximately half have one or more functional disability, and 15% have drug-related opposing actions due to polypharmacy. There is no proper specialized healthcare system for such situations in Beijing and people have to visit hospitals even for mild diseases and infections. There is often delay in diagnosis and treatments due to complicated processes and repeated higher medical costs which increase patient's medical expenses. There is a lack of effective connections and improper information-sharing systems across various medical facilities. As a result, there is an evitable enormous waste of public health resources negatively impacting patient care.

Similarly, a news channel has reported a large jump in the number of hospitalizations due to COVID-19 in Beijing. According to Farge (2023), the number of hospitalizations has risen by 70% to 63,307 compared to the previous week in January 2023 and this is the highest figure China has reported since the pandemic emerged 3 years before. Similarly, hospitals in China are faced with a lack of proper supply of medicines, ventilators, and other equipment. Chinese healthcare professionals are urging people through the media to avoid overcrowding hospitals and seek alternative solutions (Singh, 2022). Compared to the growing demand, pharmacy reserves and stocks are running out at a faster rate where essential medicines have become scarce commodities and people are finding it difficult to acquire medicines due to the complicated registration process for offline pharmacies. In the middle of such intricacies, the attention turns to digitalization and innovation. E-commerce pharmacies along with artificial intelligence could assist customers in navigating shortages along with fulfilling other healthcare requirements. Hence, this report aims to examine the potential of AI chatbots within pharmaceutical e-commerce businesses to improve customer experience in Beijing.

### ***Research Objectives***

1. To study various types of AI chatbots used in the e-healthcare industry, examining their role, functionalities, and effectiveness in healthcare services.
2. To examine the role of AI-driven chatbots in enhancing customer experience within e-commerce pharmaceutical companies in Beijing.

### ***Benefits***

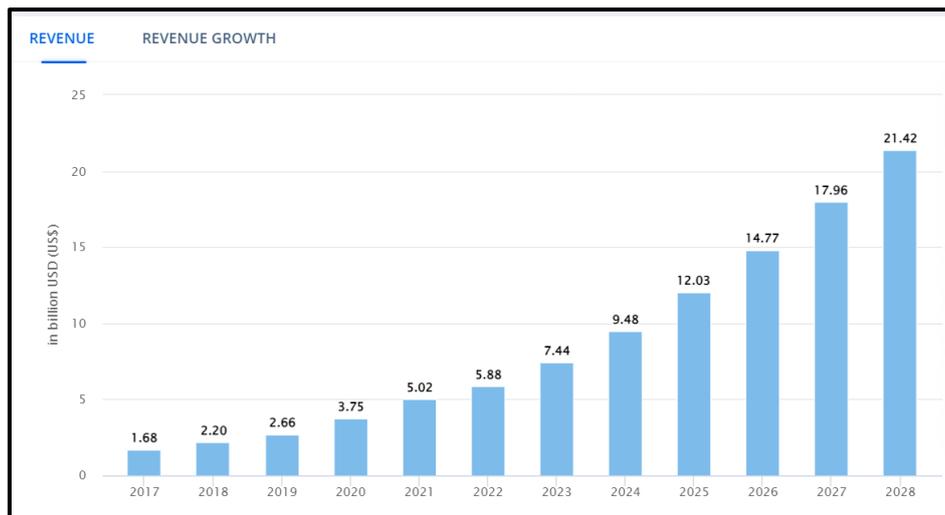
The researcher aims to identify the power of technology like artificial intelligence in enhancing the customer base by providing them with convenient and easy-to-access health services, thereby reducing the complexities of accessing medical support and facilities.

## LITERATURE REVIEW

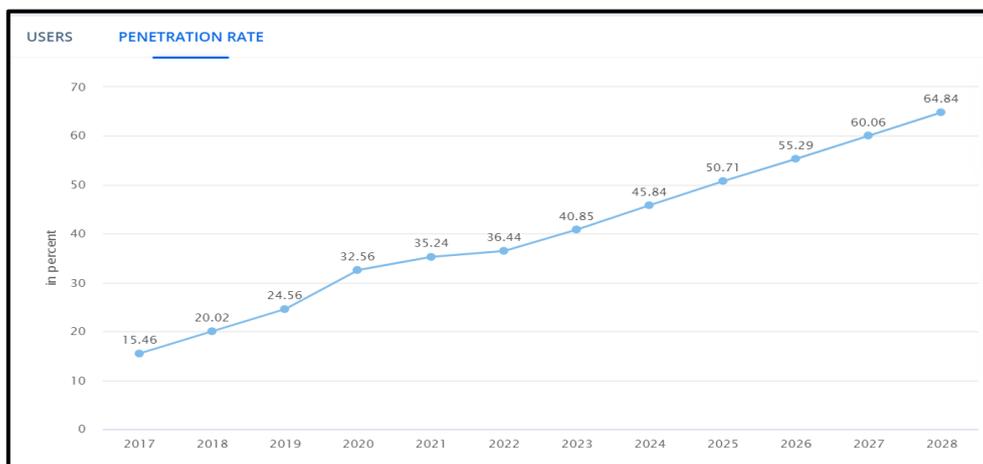
### *Overview of the pharmaceutical e-commerce landscape in Beijing*

There is a rise in consumer demand for convenience and accessibility in healthcare services due to which online pharmacy is expanding at a faster rate. The e-commerce pharmacy has been experiencing significant growth all over China (Statista, 2023). Figure 1 demonstrates current future revenue projections in this sector. It is observed that revenue in e-commerce pharmacy is \$7.44 billion in 2023, which is anticipated to grow at the rate of \$21.42 billion by 2028. Likewise, user penetration in this area is 40.85% in 2023 which is expected to hit 64.84% by 2028 (Figure 2). Customers are turning to e-commerce platforms for healthcare services because they save time and effort by enabling them to obtain prescribed drugs and medications from the comfort of their homes. Likewise, before making a purchase, they have the option to compare costs and read reviews online as well as speak to medical experts online, which provides them easy access to prescription drugs, guidance, and faster service. The expansion of services beyond pharmaceutical sales is one significant trend in the online pharmacy industry. An extensive variety of healthcare services counter drugs, vitamins, supplements, as well as personalized healthcare services are available from numerous internet pharmacies. This assists online pharmacies to draw a huge number of customers and boost sales. One prominent example of an e-commerce pharmacy in Beijing, China is JD Health, which is the largest online healthcare platform in China. The business was incorporated in 2018 and is headquartered in Beijing (Yahoo Finance, 2023). It offers pharmaceutical products like OTC drugs, health supplements, medical devices, and other medical supplies through direct selling and an online retail pharmacy network. It further offers online medical consultation, healthcare management services, referrals to doctors and hospitals, genetic testing, consumer healthcare, beauty care services, advertising, and intelligent healthcare services. In addition, it is involved in order management, customer management, and other traders' operational and maintenance support activities.

The growth of e-commerce pharmacies is prevalent in countries like China with high smartphone penetration rates. The number of mobile phone users across China as of 2023 is 1.68 billion and it is predicted that the mobile internet market will increase in big cities like Beijing (Seo China agency, 2023). Similarly, about 14% of the population of China is over 65 years and in the next 2 decades, it will add more over 65s population (Hawkins, 2023), which will increase the demand for faster healthcare services. The increase in internet penetration rates, increasing healthcare costs, and aging population add to the growing demand for online pharmacy services. As more persons gain admittance to the internet and search for cost-effective healthcare resolutions, the online pharmacy marketplace is predicted to continue growing. According to the report on China Pharmaceutical E-Commerce Industry Research 2021, as stated by Yang (2021), there are two major benefits of e-commerce pharmaceuticals in Beijing have been highlighted. Firstly, quick delivery and secondly, faster customer service have prompted Chinese citizens to buy medicines online. As per the online survey media and research platform VCBeat Research in association with JD Health, it was found that about 46.6% of people in Beijing would purchase medication and healthcare services online if they fell ill. Simultaneously, common family medications and prescription drugs account for 25.4% and 25.9% of users' online medication procurements, correspondingly. In compliance with the relaxation of regulations on online sales of prescription drugs by the Chinese government, pharmaceutical e-commerce has a significant potential to grow its market share and also offer a wide range of personalized services to its customers. Similarly, about 40% of people in a survey agreed that they would be willing to pay more to access personalized services through experienced healthcare providers online. The main reason behind this upsurge in demand of e-commerce in healthcare services can be attributed to COVID-19 which has revealed unstructured healthcare services in China and led to the growth of online pharmacies from RMB 100 billion yuan to 200 billion yuan over the past year. This offers huge prospects for pharmaceutical corporations to incorporate these online platforms along with their digital marketing resolutions and technological advancements as a significant network to reach end-users.



**Figure 1.** Revenue growth in e-commerce pharmacy  
Source: Statista (2023)



**Figure 2.** User penetration rate in e-commerce pharmacy  
Source: Statista (2023)

### ***Electronic business model and digital transformation in pharmaceutical e-commerce in Beijing***

The fast-paced growth of pharmaceutical e-commerce is evidence of how digital models in the business landscape are evolving and changing the healthcare industry. Panchal et al. (2023) stated that online retail pharmacies can disrupt the outdated brick-and-mortar pharmacy industry, as they offer better convenience and lower prices. The growth of the internet has revolutionized our lives in every aspect including communication, procurement, and so forth. As access to internet services has increased globally, people are making wider use of it to seek healthcare information and services. This has led to the emergence of new business models in pharmacy. E-commerce permits customers to retrieve every minute detail of their health and shop from home saving their amount of time energy and money. After this, there is a noteworthy enhanced growth in the e-commerce of pharmaceutical industries enabling progress in online pharmacies. This enormous upsurge of convenience and accessibility by the customer is filling the information gap between the customer and the supplier. There is no doubt that businesses are consuming the internet in a diversity of manners to advance commercial performance by offering appropriate information on products and services to the purchaser. This kind of retailing and exchanging goods and services on the internet is termed e-commerce.

In China, the first online pharmacy opened in 2005 and ever since then, its expansion has been significantly increasing at a faster pace. Chen (2018) pointed out that, according to the official website data of the China Food and Drug Administration (CFDA), there are an overall of 693 online pharmacies in China, among which 52% of China's total number of online pharmacies are confined within five jurisdictions and cities including Zhejiang, Shandong, Guangdong, Jiangsu, and Beijing. In this context, due to the high potential of this business model, traditional brick-and-mortar pharmacies have experienced digital change giving way to innovative digital platforms that completely transform the way medicines are accessed and purchased. For example, leading online retailers including Tmall and JD Health are leading this transformation in the industry by offering extensive choices of prescription drugs, medical supplies, and related services through their online storefronts. These businesses have embraced digital adoption in their business models to meet the changing needs of customers and fulfill the gap in the traditional healthcare sector as exposed by the pandemic in 2019.

Various key forces have shaped the digital ecosystem in the pharmaceutical industry. Bu et al. (2021) argued that health tech is among the major forces in Overall China including major cities like Beijing to transform from cutting-edge contact tracing and immunization arrangement systems to the explosion of online clinician consultations and service bookings, to groundbreaking associations among digital pharma businesses and doctors, China's HealthTech sector is exploding, with far-reaching influences. COVID-19 also accelerated the implementation of AI applications and robotics systems to assist healthcare staff, comprising cleaning robots, food delivery chatbots, temperature-screening systems, and health AI chatbots. AI-equipped diagnostic assistants have drastically enhanced the effectiveness of healthcare services. In contrast, Navarro (2021) argued that the presence of computer-generated assistants or chatbots, nanotechnology, and the practice of 5G infrastructure in remote surgical operations with AI applications and, predominantly, machine learning, in the healthcare field, could serve, as a tool that advises/counsels, examine descriptions, allocates resources, or acts as a second judgement for diagnosis and treatment of illnesses, however, the control remains with the health professional. Hence, proper coordination of humans and AI is necessary for the successful integration of AI-enabled tools like chatbots to assist customers online.

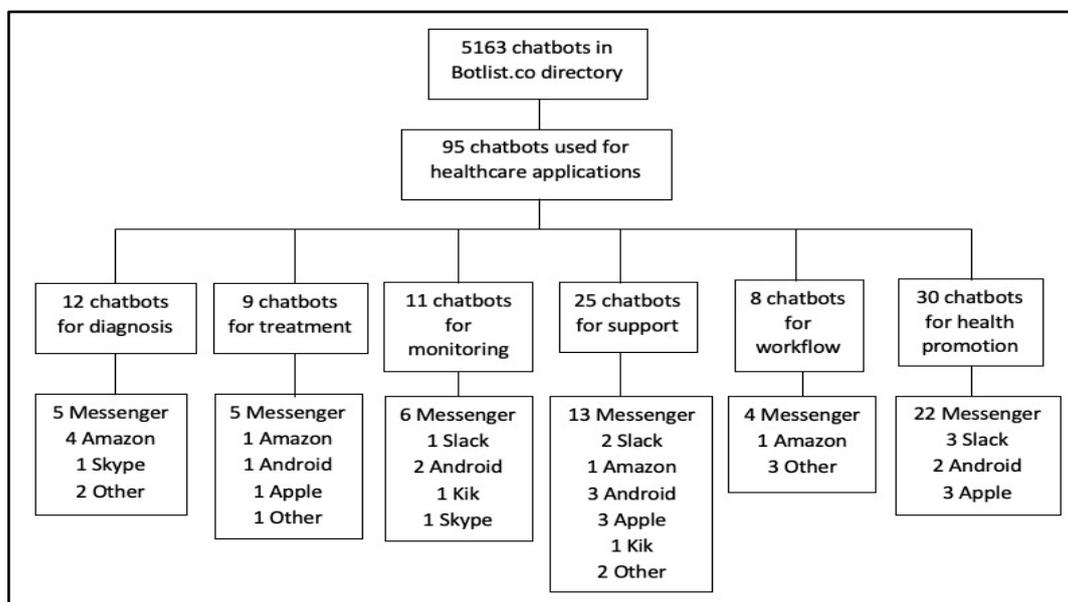
In July 2023, the Chinese Government issued its new and finalized guidelines for generative artificial intelligence. As mentioned by Ferguson et al. (2023), the Interim Measures for the management of Generative AI services (Interim GAI Measures) were accepted by seven foremost Chinese government agencies. The main objective of the Interim GAI Measures is to regulate content generated by AI and involves several local and application-based laws. The AI regulations of Beijing may have a big impact on the adoption of AI in several sectors. For example, Beijing's 13th five-year plan (2016-2020) specified that AI has the potential to enhance economic growth, and its current 14th Five-year plan (2021-2025) signaled constant state investment in AI. However, Broersma (2023) reported that the Beijing Municipal Health Commission has banned medical prescriptions that are generated by AI chatbots. This presents difficulties and growing concerns related to the incorporation of artificial intelligence in the healthcare industry. This is mainly to regulate potential threats related to internet-based medications, thereby, mandating strict regulations like having three experiences by doctors by businesses who offer AI-based treatments. Henceforth, striking a balance between regulations and the commercial landscape is vital to survive in the digital era.

### ***Role of AI-powered Chatbots in Improving Customer Experience and Business Value in e-commerce pharmaceutical platform***

#### ***History of chatbots***

Artificial intelligence (AI) is at the frontage of changing several facets of our lives by changing the way we explore information and refining decision-making through problem-solving, intellectual, and knowledge. Xu et al. (2021) asserted that Machine learning (ML) is a subgroup of AI that enhances its performance based on the data offered to a general algorithm from experience rather than outlining instructions in outdated methods. The handling of complex data, accuracy, speed, cost-effectiveness, and decision-making have benefited from advancements in machine learning.

A prime instance of an AI system that has evolved from machine learning is a chatbot, often discussed as a smart bot, chatter robot, digital assistant, conversational agent, and intellectual agent. A chatbot is well-defined as a computer program that can hold a discussion with an individual mainly through the Internet. The concept of chatbots was first familiarised in 1950 by Alan Turing when he put forward the question “Can machines think?”. The initial versions of chatbots were developed to test the Turing test and mimic human language as closely as possible. The very first known chatbot that was designed to mimic humans and perform as a psychotherapist in the healthcare field was “ELIZA” in 1966. It utilized pattern matching and template-based answers for engaging users in question-based communication online in the healthcare field. Similarly, later various improvements were made to develop chatbots with more human-like appearance and PARRY was evolved which was developed by Kenneth Colby and stimulated paranoid patients. Among the most well-known chatbots that was developed by Richard Wallace in 1995 was ALICE which made use of a pattern-matching technique for retrieving sample sentences from outcome patterns to avoid unsuitable answers. Later major advancements in chatbots were made and the emergence of Alexa, Google Assistant, and Microsoft Cortana took place. Figure 3 indicates the most popular development of chatbots for healthcare resolutions including diagnosis, patient support, counseling, and healthcare promotion.



**Figure 3.** Healthcare AI chatbots

Source: Xu et al. (2021)

Chatbot offers programmed replies that are then produced by examining user input, on the transcript or verbal ground, and retrieving appropriate information. Difficulties arise while dealing with more multifaceted circumstances in dynamic environments and handling social conversational practices according to particular settings and exclusive communication approaches (Dahiya, 2017). Chatbots have evolved for two eras and combined themselves into several fields including education, entertainment, travel, security, and others. Chatbots have proven to be mainly pertinent in various healthcare components that frequently include face-to-face connections. With their capability for compound discussion management and communication flexibility, the incorporation of chatbot expertise into medical practice might decrease costs, improve workflow competencies, and expand patient outcomes. Healthcare chatbots are beneficial for the self-management of personal health better psychological and physical and behavioral outcomes.

*Types of AI-powered Chatbots in e-Healthcare*

Various types of AI-enabled chatbots are widely used in e-commerce pharmaceutical platforms. Some of them include:

**Knowledge domain chatbots:** This includes open and closed domain chatbots. In the open domain, chatbots respond to broader and general topics and concerns which can be easily searched within the databases, and specialize in repetitive symptom screening, connecting customers to service providers, and involving health promotion applications (Xu et al., 2021). In the closed domain, the chatbots involve more complex and specific healthcare concerns raised by users which necessitates in-depth research. Such chatbot is mainly preferred for treatment planning and suggestions.

**Service provider:** Service provider chatbots are categorized into three different types. Firstly, interpersonal chatbots are mainly used to transmit information without any intimate connections with users, mainly preferred for imaging diagnosis or heredity assessments wherein the main responsibility is to transmit factual information to users (Xu et al., 2021). Secondly, intrapersonal is tailored for support and offers services like counseling, health promotion, and emotional support which necessitate a human touch. One such example of a chatbot in Beijing, China is “The Xiaotian app”, which is an AI chatbot that provides mental health support to users (Huaxia, 2022). It can stimulate the human brain and has combined skills applied by professional counselors who deal with realistic cases. Lastly, the interagent model is used to communicate with other computer systems of chatbots specifically to transfer information about patients between locations.

**Rule-based chatbots:** The chatbot is intended to respond to regularly queried medication-related interrogations like drug communications and their side effects. The chatbot follows predefined instructions and decision trees to control its relations with users, offering them precise and reliable medication-related information (Ramadhani, 2023). However, the chatbot is imperfect in its capability to comprehend and retort to compound inquiries, as it is constructed on a fixed set of guidelines and cannot acquire and adapt over time.

**Machine learning-based chatbots:** These chatbots use complex algorithms and voice-text-voice features to solve user queries related to medications, side effects, dosages, and interactions with other medicines. This further assists with information about healthcare providers and scheduling appointments (Ramadhani, 2023). One such example of this type of chatbot is the “Ada Health chatbot”. This makes it a influential tool for patients who seek customized healthcare services and advice.

#### *Architecture of AI-chatbots*

Chatbots can be developed using a multitude of methods, however, the overall structure is quite simple. As stated by Ketakee and Champaneria (2017) the main idea is similar for every type of computer application that uses machine learning to stimulate human actions and includes four stages, namely, input process, input understanding, response generation, and response selection. A simple AI chatbot is illustrated by Xu et al. (2021) in Figure 4 which receives queries from users either in speech or text form and interprets them, processing them to provide meaningful information to the customer or user.

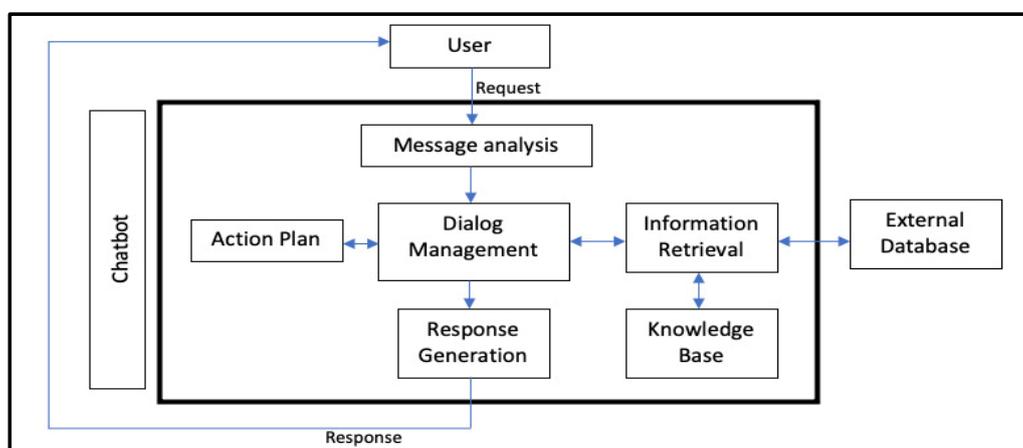


Figure 4. Chatbot Design/ architecture  
Source: Xu et al. (2021)

*AI-chatbots in improving customer experience in e-commerce pharmaceutical platform*

Artificial intelligence is drastically altering marketing strategies particularly in the field of enhancing customer experience because contemporary marketing has turned out to be more data-driven, and automated. El Bakkouri et al. (2022) stated that the advent of intelligent technological agents has enabled smooth interaction between humans and machines. For example, AI-enabled chatbots can capture customer input and offer customized solutions instantly. Currently, companies in almost every sector are progressively developing chatbots in their direct communications with customers to offer a customized service despite one-sided buying. Jenneboer et al. (2022) opined that in the era of technological advancements, where customers spend more time online, companies are seeking innovative ways to keep in touch with them. To improve customer experience, service quality is critical for every organization. An excellent customer experience is likely to increase trust, satisfaction, and commitment among customers which results in loyalty and increased intention to purchase among the customers. Response duration, accessibility, readiness, dependability, and flexibility are the five factors that together make up the system quality dimension, that is used to evaluate the chatbot's technological performance. The length of time chatbots take to receive a response is termed as Response duration, the simplicity in usage is readiness, to be able to use it from anywhere is accessibility, and at any time is dependability. Similarly, the capability to adjust to the changing needs of customers is flexibility. With chatbots in pharmacies, customers' questions and complaints could be responded in real-time making businesses less expected to lose sight of their customers. AI-enabled chatbots offer a new level of assistance comprising resolving complaints for the aspect of service quality and as a result of digitalization, personalized services are available to customers anywhere and anytime. However, customers are concerned about their data getting revealed on an online platform. Meanwhile, when e-commerce businesses offer specialized discounts or packages to customers, their concerns fade away. The quality of quick service, data availability, and user-friendly and factual information that customers can receive on their health and well-being, assist the companies in pharmaceutical platforms gain customer satisfaction which in turn gets concerted into customer loyalty.

In the realm of customer experience inside the pharmaceutical e-commerce landscape, the effective handling of customer complaints is pivotal. In this context, Guillot et al. (2023) argued that chatbots provide easy access to medical information for which a patient has to follow a tedious process offline from making appointments with doctors to seeking their advice after the receipt of medical check-up reports. This generally takes 1-2 days. However, the virtual agents incorporated in e-commerce pharmaceutical platforms assist customers by not only advising them about medications but also educating users about their use, benefits, limitations, and well as side-effects of using different medications and equipment. This also lessens manual tasks and workloads for customer support agents in pharmaceutical companies as technologies like chatbots can help complete these tasks with ease. Moreover, the most vital part of using chatbots in pharmacy and for effective customer service and experience is maintaining contact touch with the patients to track their progress and assist them 24\*7 whenever in need. For example, chatbots are effective tools that provide constant reminders, notifications, and alerts to customers instructing them about their treatments, the schedule of their ongoing medications, and additional questions that a patient always has related to their progress in treatments, any substitutes, prescription, and disease.

Placing orders for medicine had been easier than before. According to Rane et al. (2019), online pharmacies make use of mobile applications to facilitate the online purchase of medicines through verification of the prescription uploaded by the user and confirming the order. This system comprises mobile application interfaces, a pharmacologist interface, a database, and a web service provider for intermediary procedures to offer service through Android mobile phones with chatbots to assist them. Whenever a customer wants to purchase or raise any healthcare query with the help of a mobile application, he is asked to upload the details of the prescription by the doctor or specific details related to the personal health of the customer. The data is then stored in the database where the user precedes the process by providing details of medications in the mobile application chatbot interface. When the medicine or queried services

are available at the pharmacy, the customer is permissible to add the service to the cart, and if the medication is not accessible, the chatbot will offer suggestions by offering an equivalent brand of medicine and hold the process to assist the customer in the best possible manner. Later the service added in the cart list is compared with the prescription or details uploaded by the customer and will be approved by the pharmacist before the order is placed. The technique that is used in the entire process to speed up the searching procedure by the customer is the “n-gram technique”. Divya et al. (2018) argued that leading a good and healthy life is very significant, however, it is sometimes very difficult to obtain a consultation with a doctor in case of health problems. Hence, the other alternate form of this is medical chatbot using artificial intelligence which is capable of diagnosing disease as well as offering basic details about the best possible medications and suggestions available before consulting a doctor and simplifying the search process of the customers to ease their treatment journey. Similarly, it has the capability of reducing medical costs and expanding accessibility to medical knowledge. For instance, several chatbots act as medical reference books for customers, which assist the customers/patients in accessing more information about their disease and health conditions and help to recover their health. However, the user can attain the actual benefit of a chatbot only when it can detect all categories of sickness and deliver compulsory information. In this situation, a text-to-text chatbot is likely to engage customers in communication regarding their medical concerns and offer them personalized resolutions based on their symptoms. Henceforth, when people have the right idea about their health and can access the right information at the accurate time, their overall experience is enhanced which further positively impacts their satisfaction and trust level with the business.

Chatbots have been increasingly used in the e-commerce pharmacy field for assisting patients and healthcare professionals in disease education, medication management, and retrieval of medication information. Ramadhani (2023) mentioned that with the emergence of the COVID-19 pandemic, AI-enabled chatbots have been increasingly adopted by online pharmacies for teleconsultation services, health information, and education and assessment of symptoms. Researchers conducted an analysis on patients who had type 2 diabetes and learnt that AI-enabled chatbots were used by such patients regularly as a source of medication reminders which increased adherence among patients by 80%. Similarly, Chen and Liu (2023) reported that the healthcare system in China is faced with unprecedented challenges due to the re-occurrence of COVID-19, most of the top 100 hospitals in northern China are located in Beijing, where few hospitals help patients in applying for fake hospitalization procedures to deceive medical insurance funds. Similarly, some doctors produce fake medical records, charge excess fees, and falsify healthcare services to obtain benefits from medical insurance funds. This erodes the trust of customers in healthcare services and medical professionals. However, Ramadhani (2023) noted that in such situations, the adoption of AI chatbots by online pharmacies in Beijing stands as a pivotal tool to restore confidence and trust among customers by providing them with transparent and accurate information, answering common queries of customers, availability of medicines, and so forth. By empowering customers with real-time data, facilitating reporting mechanisms has enabled chatbots to increase customer satisfaction and engagement by improving their medical knowledge, and providing them accessibility and convenience from their homes, 24\*7, where chatbots provide personalized information in the face of adverse calamity, that made the customers feel valued and involved in their care.

### ***Theoretical Underpinnings***

The “Technology Acceptance Model (TAM)” is the foundational theory that explains the acceptance and adoption of technology by users. Opoku and Francis (2019) stated that technology use behaviour, denoted as the behaviour tendency towards tolerant technology, can be measured through a user’s outlook towards using technology. There are two main behavioral or outlooks towards technology usage that have been proposed. Firstly, perceived usefulness fosters a belief in an individual that the use of technology can promote the performance of their tasks. Secondly, perceived ease of use gives the perception to an individual that technology use is free from any kind of effort. In the context of AI-enabled chatbots in e-commerce pharmaceutical businesses, TAM sheds light on how chatbots are perceived by customers. For example, perceived usefulness

makes customers believe that AI chatbots in pharmacies would assist them in finding the right information about medications, receiving real-time health advice based on their medical condition, easing customer decision-making, and simplifying the purchasing journey. If customers find that the chatbots used by online pharmacies are beneficial in terms of tailored suggestions, and answering questions about medications, they are likely to adopt and use them at a faster rate, thereby increasing customer engagement and satisfaction. Similarly, perceived ease of use is vital if the chatbots are user-friendly and provide easy navigation to other healthcare websites for effective healthcare management, and makes the customers inclined to engage with the technology in their daily lives.

In literature review, the Technology Acceptance Model (TAM), discusses the theory relevant in the research. TAM explains how users accept and adopt technology, focusing on the usefulness and perceived ease of use. The theory is relevant to the research because it sheds light on how consumer perceives a chatbot in commerce pharmacies, impacting their adaptation and the behavior in the usage system. The usefulness and the ease use influence customers' acceptance and engagement with AI chatbots which affecting the overall experience.

### Hypothesis Development

The literature review discusses studies by Ramadhani (2023), Fan et al. (2021), and Guillot et al. (2023), which highlight the role of AI-enabled chatbots in improving customer service, providing real-time information, and offering personalized services to customers. Therefore, this research considered set hypothesis 1 as below.

H1: The integration of AI chatbots in online pharmacies has the potential to enhance customer satisfaction and experience.

The literature review discusses studies by Ramadhani (2023) and Chen and Liu (2023), which emphasize the use of AI-enabled chatbots in teleconsultation services, health information dissemination, and medication management, particularly in the context of challenges like the COVID-19 pandemic. Therefore, this research considered set hypothesis 2 as below.

H2: The application of AI chatbots has the potential to increase efficiency of healthcare services and boost patient safety.

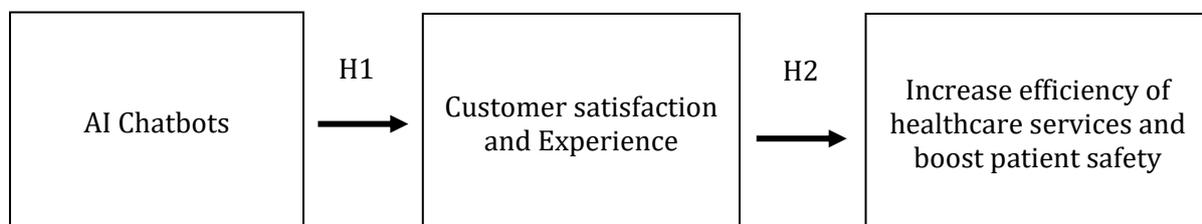


Figure 5. Theoretical Framework

## METHODOLOGY

### *Research Design*

This study will employ a qualitative secondary research method by examining existing information on online pharmacies using AI chatbots in Beijing.

### *Population and Sample size*

The sample size of the reports will be between 35-40, and the keywords used in the research process include AI-powered chatbots, healthcare, e-commerce, customer engagement, customer service, and AI application.

### *Sampling Methods*

Purposive sampling will be used to select information and sources based on specific purpose and criteria.

### **Research Tools**

The research tools include Market research reports, Google Scholar, websites, government publications, case studies and other reliable sources.

### **Data collection Method**

The data will be collected from peer-reviewed articles, journals, books, government publications, public records, newspapers, industrial reports, and company websites. Case studies will be used to examine the implementation of AI chatbots in e-commerce pharmacies in Beijing.

### **Data Analysis Techniques**

Thematic Analysis will be used to justify, analysis and report patterns in the data collected.

Data collection: the data for the analysis was collected from various sources like peer reviewed articles, journals, government publications, books, public records, newspapers, industrial reports, and the website of the company.

Data preparation: once the data was collected, it was organized and the analysis was done. This process has involved transcribing interviews, extracting relevant excerpts from documents and ensuring that the data was in the format so as to make it easy for analysis. To transcribe interviews will include listening to it multiple times and drafting the transcript by adding time stamps and speaker labels. Proof-read it and then format the final transcript.

Coding the search began with reading the data to be familiar with its content and validity. The codes were assigned to segments of the data that represent the features, ideas or patterns.

Identifying Themes: once the coding of the data was done, the work was to identify broader patterns or themes that emerged from the data segment. Themes are recurring patterns of meaning or topic that capture something important about the data patterns.

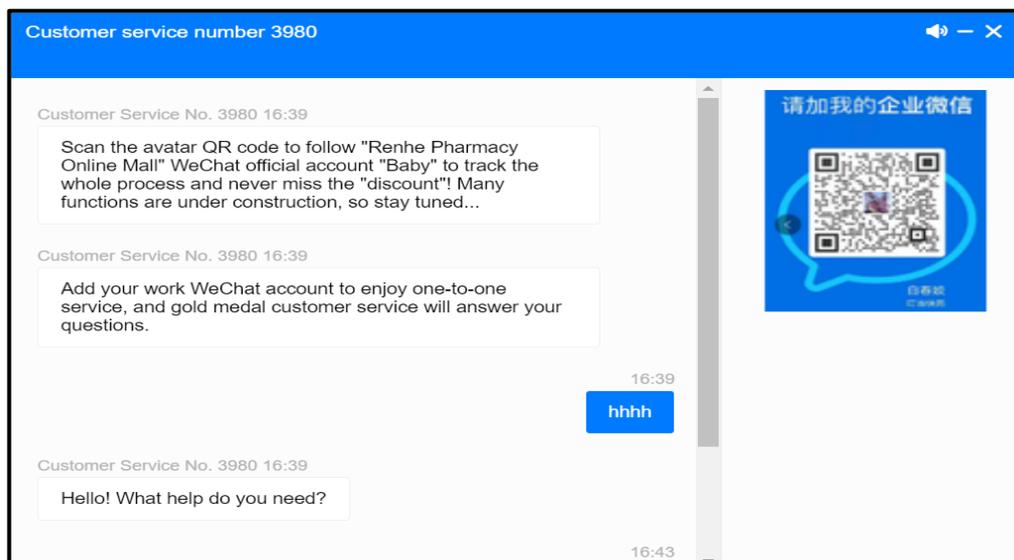
Defining Themes: After refining the themes they were defined and the names were given to them which are descriptive in nature.

Analysis: The findings of the thematic analysis into a coherent narrative that addressed the questions are the objectives of the study.

## **RESULTS**

Within the e-commerce pharmaceutical platform, various companies are embracing artificial intelligence in the form of chatbots to enhance the customer experience in several manners. One such example is JD Health. It is the digital healthcare subsidiary of JD.com and is headquartered in Beijing (Yahoo Finance, 2023). It is an e-commerce platform for retaining pharmaceutical products. JD.com has introduced an AI-enabled chatbot named "Chat Rhino" to assist industries like retail, healthcare, finance, and municipal services (Wang, 2023). This chatbot makes use of 79% generalized data in combination with 30% native intelligent supply chain data to provide personalized solutions to resolve issues and concerns. For instance, JD's smart customer service chatbot has made a paradigm shift in enhancing customer experience. Combined with AI, it can detect subtle human emotions which modernizes interactions and ensures proactive and sensitive support to the users (Cao, 2021). Emotion is a vital part of providing excellent customer service and the implementation of human robots has helped in interacting with customers more naturally while maintaining patient and caring mood 24\*7. For example, in 2020, a customer asked JD's robotic customer service chatbot "How many sleeping pills a human consumer to take one's life". The chatbot with its unique AI feature of detecting human emotions and sensitivity, understood the abnormality of the inquiry and immediately redirected it to the suicide hotline team called "Life Channel" of JD Health. Later the customer was served by the trained front-line staff of the Life Channel by providing psychological counseling to calm the customer during communication and take suitable measures to ensure the customer's safety. Such proactive intervention in the form of AI chatbots which detect human emotions used by JD Health not only showcases technological advancement and commitment to the well-being of its customers but exemplifies how technology can be significant for the overall societal good. Similarly, by making this chatbot feature available to several other cities in China through the resident service hotline (12345 in China), it has improved and resolved about 97.9% of cases (Cao, 2021). Hence, this signifies a pioneering step towards using AI chatbots to enhance customer satisfaction and experience.

Similarly, Yaofang.com is an e-commerce pharmacy in Beijing that sells pharmaceutical products (Yaofang, 2023). It operates Renhe Pharmacy Network in Beijing which is an online pharmacy service and assists customers 24\*7 by providing smooth healthcare services (Yaofang, n.d) (Figure 6). It assists customers in major areas like assisting in chronic diseases, family medications, traditional Chinese herbal treatments, nutrition and weight management, new and specific drugs, health services like doctors' appointments, and so forth. Similarly, this lets the customers get personalized and one-on-one assistance by adding their "WeChat" account by scanning it through a QR code where a highly skilled customer representative will be available to address the inquiries of the customer. This not only enhances customer service but also signifies a proactive approach towards providing elevating customer satisfaction and experience in gaining access to effective healthcare services. Hence, the utilization of QR codes for personalized services and AI Chatbots reflects the commitment of the e-commerce pharmacy in embracing digital means for streamlining customer service and interaction.

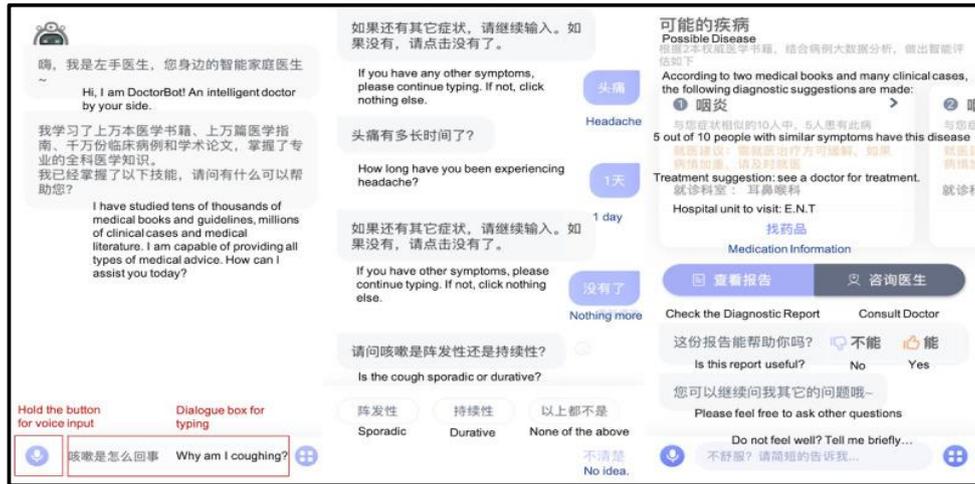


**Figure 6.** AI-chatbots at Yaofang.com  
Source: Yaofang (n.d.)

Hypothesis 1: The finding demonstrated that the integration of AI chat bots in online pharmacies added to customer satisfaction and experiences. This was evidence by the improved customer service, recommendations and real time assistance.

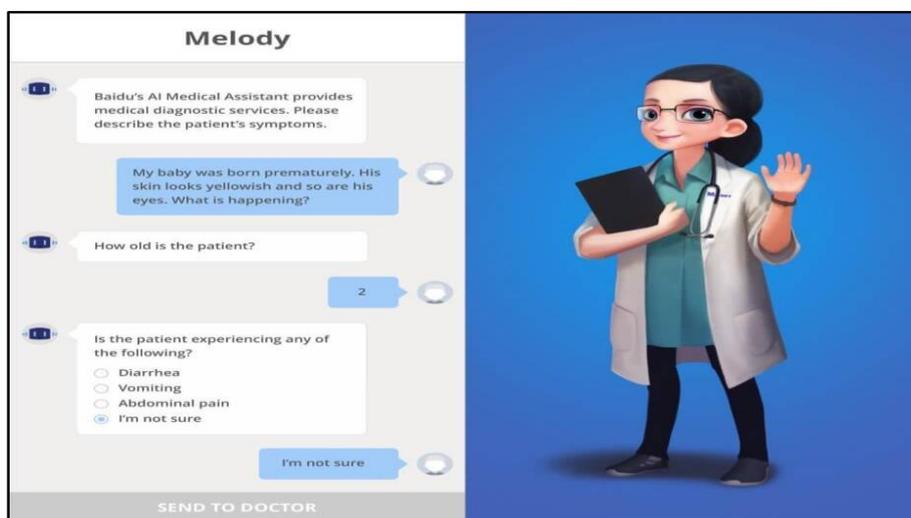
Hypothesis 2: The study of hypothesis to reveal that the application of AI chat bots increase the efficiency of the healthcare services and contributes to the patient safety.

Doctor Bot is an AI-driven chatbot in Beijing that represents a groundbreaking use of technology in the e-commerce pharmaceutical landscape of China. Fan et al. (2021) opined that it leverages extensive medical datasets as well as cutting-edge AI techniques like deep learning for delivering tailored services to customers seeking medical advice. E-commerce pharmacies incorporate this chatbot to empower users with a huge range of services like self-diagnosis, dietary recommendations, drug usage, and so forth. Figure 7 illustrates an overview of the chatbot which uses both English and Chinese language for the ease of users and starts by prompting for the user to describe their main complaint or symptoms. After being prompted, like "Why I am coughing?", triggers the chatbot to ask a series of queries related to the symptoms of the user. The user is then asked to provide a medical history of hospital visits, any ongoing or past medication or allergies, and so forth. Lastly, based on the symptoms and medical data provided by the customer, the chatbot provides details treatment suggestions whether to see a doctor or medication recommendations. Hence, this empowers users to get a detailed overview of their health conditions with real and factual data that deliberately enhances their overall experience as a patient or consumer.



**Figure 7.** Overview of Doctor Bot  
Source: Fan et al. (2021)

Online pharmacies work in collaboration with doctors and physicians before recommending medications to the customers. Waszyk-Nowaczyk et al. (2021) stated that for patients, effective collaboration among healthcare teams and pharmacies can lead to better coordination and more effective treatment, by improving patient outcomes, thereby enhancing customer trust in online pharmacies. In this context, Baidu is a Chinese multinational technology company that has launched an artificial intelligence-powered chatbot named “Melody” to link patients and doctors for effective treatment and improve the overall healthcare scenario of China (Taylor, 2016) (Figure 8). Baidu has used advanced deep learning and natural language processing technologies to influence Melody. It is specifically designed to be able to assist a person feeling sick at home, where a customer can pose a query in the chatbot and get real-time input. As per the data of WHO, it is predicted that there will be a worldwide deficit of almost 13 million health-care professionals in 2 decades. In this scenario, this chatbot can assist online pharmacies in taking the leverage of assisting customers by getting a quick grasp of their medical condition and assisting them as early as possible. Melody has been designed to use health data from several sources, textbooks, and websites that assist the chatbot in handling medical queries and asking the right questions from the customers/users, and collecting the right information that doctors can use to treat their condition. Hence, this presents scope for wider acceptance of this AI-chatbot by both offline and online pharmacies in improving customer experience at large.



**Figure 8.** Overview of AI-chatbot “Melody”  
Source: Robles (2016)

### Summary of Research Result

| E-healthcare industry | Type of AI Chatbot used | Role   | Functionalities  | Effectiveness   | customer satisfaction  |
|-----------------------|-------------------------|--|--|---|--|
| Online Pharmacy       | Chat Rino               | Provide personalized solutions to resolve issues and concerns  | Maintaining a patient and caring mood 24*7, detecting human emotions and sensitivity, psychological counseling, calm the customer during communication | Improved and resolved about 97.9% of healthcare cases   | Enhanced customer satisfaction and experience  |
| Online Pharmacy       | QR code-based chatbots  | Customers get personalized and one-on-one assistance by adding their "WeChat" account  | Assists customers 24*7, assisting in chronic diseases, family medications, traditional Chinese herbal treatments, nutrition, and weight management.    | Helped in gaining easy access to effective healthcare services  | Streamlining customer service and interaction  |
| Online Pharmacy       | Doctor Bot              | Leverages extensive medical datasets as well as cutting-edge AI techniques like deep learning for delivering tailored services | empower users with a huge range of services like self-diagnosis, dietary recommendations, drug usage, and so forth.                                    | Assists in reducing hospital visits, and empowers patients to get a detailed overview of their health.              | Real and factual data that deliberately enhances customers' overall experience as a patient or consumer. |
| Online Pharmacy       | Melody                  | Link patients and doctors for effective treatment and improve the overall healthcare scenario of China                         | Specifically designed to be able to assist a person feeling sick at home, where a customer can pose a query in the chatbot and get real-time input     | Assist online pharmacies get a quick grasp of customer's medical conditions and assisting them as early as possible | Improved customer experience and satisfaction.   |

## DISCUSSION AND IMPLICATIONS

### *Objective 1: Assessing AI chatbots in e-commerce pharmacy*

An analysis of AI chatbots in the pharmaceutical e-commerce industry demonstrated notable improvements in support for customers. Platforms such as JD Health and Yaofang.com have demonstrated their capacity to customize consumer interactions through the use of AI-driven chatbots, which offer prompt and all-inclusive healthcare solutions. With their cutting-edge features, these chatbots effectively attended to the requirements of their users by providing emotional support, medical guidance, and individualized healthcare services. This aligns with the findings of Panchal et al. (2023) who demonstrated that e-commerce pharmacies have disrupted traditional brick-and-mortar business models with the acceptance internet and revolutionary technologies in their business models. For example, Wang (2023) came to similar conclusions by stating that online pharmacies use 70% of generalized data in combination with 30% intelligent supply data with the power of AI chatbots to provide tailored solutions to customers. Hence, Customers' access to healthcare services has been revolutionized by the deployment of cutting-edge chatbot technology, which has improved customer satisfaction and loyalty. If the intention restore confirm that the hypothesis through research, the focus should be on designing the study to test the specific hypothesis. This involves defining the variables, selecting research methods, and collecting data that directly addresses the hypothesis.

***Objective 2: Evaluating the role of AI chatbots by online pharmacies in improving customer experience.***

AI-enabled chatbots discussed above including “Chat Rhino”, “Melody”, and “Doctor Bot” proved to be pivotal in enhancing customer service. They were capable of providing real-time information and personalized services to the customers. This finding aligns with the view of El Bakkouri et al. (2022) who revealed that AI-enabled chatbots can capture customer input and offer customized solutions instantly. Similarly, Guillot et al. (2023) argued that in effective customer service, it is very vital to effectively handle the complaints of their customers to gain their loyalty and trust. However, with the effective implementation of artificial intelligence by online pharmacies, customers are getting easy access to every sort of medical information for which a patient has to follow a tedious procedure from making appointments with doctors to seeking their advice after the receipt of medical check-up reports. For example, as discussed in the results section, the chatbot used by JD Health improved and resolved about 97.9% of cases. This signifies technological advancement and commitment to the well-being of its customers. Hence, the literature review and analysis indicate that there is a growing trend of AI-chatbots in online pharmacies, as they are capable of enhancing customer experience by offering real-time and instant resolution of their queries. The findings revealed that all of the chatbot's reliability, service quality, interactivity, and usability have a significant positive impact on the customer experience.

***Practical or theoretical implications of the research***

The growth of AI-enabled chatbots in online pharmacies has several potentials to improve customer/patient care and engagement in Beijing's e-commerce pharmaceutical platforms. It was found that the integration of artificial intelligence in the form of chatbots has the potential to provide customized and real-time medications and recommendations. Additionally, many online pharmacies discussed above have expanded language capabilities by accommodating English as well as a non-English language like Chinese to increase accessibility and engage a maximum number of customers. Furthermore, chatbots can not only utilized for providing suggestions on medications, but, it is impactful in knowledge transfer by making customers aware of their health conditions, and adhering to monitoring and patient education, which has the potential to reduce hospital hospitalizations and improve the overall healthcare sector in Beijing. Likewise, the voice-text-voice feature presents a significant opportunity for the future growth of online pharmacies. As discussed, the population of Beijing is aging at a faster pace and as time passes, AI will continue to improve. This advancement will enable the elderly to seek quick resolutions regarding their health conditions, get more personalized options, and allow customers to get tailored recommendations on treatments and medications. Similarly, these chatbots would also prove effective marketing tactics in the future for online pharmaceutical companies, as they are capable of collecting huge amounts of customer data, feedback, and insights, which could be further used by the companies to improve their products and services. Hence, proper adherence to regulations by e-commerce pharmacies and the adaptive nature of businesses to accept technological change in the online pharmaceutical industry look promising in terms of engaging more customers and improving their experience, as AI will continue to improve and evolve at a faster rate..

**LIMITATIONS AND FUTURE RESEARCH POSSIBILITIES**

The major limitations of this study are limited time and use of secondary methods because many sources do not have open access and restricted the use of data and information. The future study should focus on exploring the use of artificial intelligence on diverse customer segments like people with disabilities and the elderly, mainly disadvantaged or marginalized groups who do have a helping hand to assist them in their treatment process. Research of this nature can assist in identifying any potential biases or restrictions in the application of AI and in formulating solutions. Similarly, future research can look into the long-term consequences of AI on consumer engagement, including how it affects customer retention and loyalty.

## CONCLUSION

To conclude, the research examined the role of AI chatbots in enhancing customer experience in e-commerce pharmacies in Beijing. The findings reveal that due to technological advancement there is significant potential growth and potential of using AI in business models as it can positively influence customer journeys. However, challenges like legal compliances, data security, and privacy should be adhered to and will result in successful implementation of AI in enhancing customer service and satisfaction. Despite the challenges, there is growing interest in chatbots can be observed in healthcare mainly because of the accessibility, affordance, and portability. In this world of technological advancements, where every industry is leveraging digitalization to enhance their business process and improve customer satisfaction. Thereby, there is no doubt that there is lot of room for improvement as early medical detection will be possible, attract more customers to access online service which in turn boost revenue. Similarly, the analysis revealed that the population of Beijing is increasing at a faster pace which will further give rise to healthcare concerns mainly among the aged population. In this context, chatbots are a boon for online healthcare because this has the potential to not just increase customer satisfaction with enhanced patient safety and easy accessibility of medications and other healthcare services, but also, further improve the overall economy by saving on medical costs.

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## CONFLICTS OF INTEREST

The author declares that there are no conflicts of interest found in this research.

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