







The Influence and Impact of AI-Powered Intelligent Assistance for Banking Services

D. Sheela Margaret^(✉) , N. Elangovan , Vedha Balaji , and M. Sriram 

School of Business Management, CHRIST (Deemed to Be University), Bengaluru, India
sheela.d@res.christuniversity.in

Abstract. Technology plays a major role in helping businesses or organizations achieve their goal of providing good services to their customers. One such strategy is the adoption of Artificial intelligence (AI). AI is transforming the global financial markets rapidly. Chatbots are virtual assistants of the bank that help customers find answers to their queries and aid to complete some of their banking-related tasks with ease. Many businesses, including e-commerce and retail, have started using the chatbot to provide a better service experience to customers in solving their queries and providing services to them 24/7. One such business which has adopted artificial intelligence on the verge of improving customer service is the banking sector. This paper aims to outline the influence and impact of AI, particularly chatbots in the banking sector.

Keywords: Artificial Intelligence (AI) · Chatbot · Banking · Financial Services · Customer Service

1 Introduction

1.1 Introduction to AI

The invention of computers has made humans work smarter. This journey continues with a lot of research and development to increase their operational speed, applications, and hardware. During the journey of expanding the application of computers, there were some schools of thought that whether machines can think like humans [1]. This thought gave birth to artificial intelligence (AI), creating intelligent machines like humans.

The word “artificial” stands for “human created” and “intelligence” stands for “thinking power”. It is also referred to as a “man-made object with thinking power”. Generally, AI is defined as machines that demonstrate intelligence. It is used to mimic human cognitive functions such as learning, understanding, reasoning, and problem-solving [2]. John McCarthy defines artificial intelligence as “the science and engineering of making intelligent machines, especially computer programs” [1].

In the era of decentralization, digitalization is shaping industries on a wider scale [3]. Connecting billions of customers through low-cost digital technologies, the present generation is adjusted to the digital environment and this has led customers to expect services and products with digital technology standards. Many businesses have invested

in digital technologies, and new businesses have risen according to PWC report. AI is part of this development creating intelligent machines and computer programs bringing a lot of changes in the business world and open new opportunities to businesses. As the saying “Necessity is the mother of Invention” Technology has impacted the lifestyle and mindsets of people changing to adopt the online network. AI’s capability of processing huge data patterns in a more effective way than human beings has attracted businesses leading to the demand for this technology.

According to researchers the impact of AI will be very significant on the economy. 0.5% of the world’s economy is generated by five developed countries (Accenture) and this will double by 2035. The global spending on AI applications has crossed \$5.1 billion. Globalization and development in technology have increased customer expectations to a higher scale [4].

1.2 Introduction to Chatbot

Chatbots are the virtual agents that are being used as help-desk agents to provide digitized and customized interactive experiences to customers. A chatbot is an AI-based computer program that stimulates conversations or interactions with real people through messaging applications and websites. Conversations between humans and chatbots can take place in the form of text-based interactions and spoken interactions without limitations in terms of time and space. From the customer’s perspective issues like waiting time, long queues, and lack of service personnel are avoided. Virtual agents like chatbots provide relevant information, and immediate responses to customers [4]. According to the forecast, the chatbot market size is projected to reach 102.29 billion USD by 2025 [5]. and the success rate of bot interactions (queries completed without the interference of a human operator) in the banking sector is expected to be over 90% by 2022 according to Juniper Research, 2020. Chatbots are also called conversational entities (ACE), chat robots, talk bots, IM bots, interactive agents, chatterbots, or chatterboxes.

1.3 The Need for AI Based Intelligent Assistance in Banks

The financial industry and banking industries are seeing AI as a process gain [6]. A report published by PWC in 2017 a lot of interest is shown in banking. The banking sector is undergoing tremendous changes at present [7]. There are various reasons for the banks and financial industry to incorporate AI [8]

- Due to the raise in competition and many players in the Financial sectors.
- Need for customized solutions for the queries of the customers.
- Need for process-driven services.
- Requiring customized bank services.
- To increase profitability
- To secure and maintain the privacy of customer’s data.
- To enhance employee efficiency
- To maintain and deal with huge amounts of data

AI in banks is rendering the best services to customers and increasing their profitability [9]. The banking sector is said to benefit from this technology boosting the banking foundation [10]. Four out of five bankers suggest that AI is going to revolutionize banks. AI is expected to assist humans with various jobs and daily lives [11]. One of the tasks of AI is to reduce errors and properly align information from the database and draw conclusions helping both the customers and the businesses [12]. Banks have included all channel strategy that includes the internet, web, or physical branches [13]. Banks offer a wide variety of digital service products, including online banking, mobile banking, telebanking, neo-banking, and self-service technology to name a few [14]. Banks are exploring implementing AI in their operational and customer support process.

India is a tech hub in outsourcing and is also the home of a large core banking market. Companies like Infosys and TCS are very active in the fintech arena. Companies like ICICI, Axis, and HDFC Banks are conducting hackathons and content to have the best innovations. AI involvement in the banking sector has brought a lot of improvements, it's seen in customer support, recruiting, in communication to name a few. Banks are coming up with different approaches to improve like automated personalized services that provide financial advisors, and planners. These automated services analyze the market based on the customer portfolio, and financial goals and provide recommendations. Big companies like Google, Apple, and PayPal are venturing and developing their payment gateways creating a cashless environment known as digital wallets or smart wallets. AI technologies are also assisting customers with their queries through voice commands and touch screens known as Voice-Assisted Banking. Drive-through banking allows the customer to do banking transactions without getting out of the car. Voice AI systems are being developed to replace humans in drive-thru banking. Bank stations are value-based self-service terminals that deliver a wide range of e-services to consumers like bill payments, government e-services, etc. A passbook printing kiosk is an automatic kiosk that enables customers to print their passbooks.

2 Literature Review

2.1 Artificial Intelligence in Banks

In 1956 the evolution of AI came into existence commonly known as artificial intelligence [15]. John McCarthy 1956 was the first to put forward Artificial Intelligence. Warren McCulloch and Walter Pitts came up with a model named artificial neural with regard to AI in 1943. Further development in technology led to the first neural computer in 1950 [16–18]. Technological advancement was seen in the '80s and '90s when machines were made to think and work like humans [16, 18].

AI can be defined as “The theory and development of computer systems able to perform tasks that traditionally require human intelligence [19]. AI is where a computer or software thinks intelligently like humans [20]. Artificial intelligence is smart machines built to work more smartly. They think like humans and their decision making are very accurate based on the data fed to them. AI is the latest trend in today's market because it saves money and time. Many businesses have started adopting this technology. AI is used in various businesses like finance, advertising, travel, agriculture, aerospace, etc. Every business has felt the need for AI it may be the production companies or the service

sectors all have adopted AI [21]. The production companies introduced this technology very early to avoid human errors and since it was cost-effective. AI opened the gates of job opportunities in health care, financial services, education, and customer care [22, 23].

The financial sector is considered the backbone of the country has also adopted AI technology and the banking sector has implemented various applications of AI in its operations [22, 10]. Financial services are coming up with a lot of innovative changes with the help of AI technology. The potential transformation of the financial service industry with innovative business models and new technology is termed financial technologies and fintech [24].

2.2 Chatbot or Intelligent Assistant in Banks

With more and more advancement of AI technology like chatbots, face recognition, data analytics, predictive analysis, and voice recognition to name a few the services by the banks to the customers have made life easy for the customers where the expectation of customers are increasing and the pressure on the service providers are becoming more to provide good quality service leading to customer satisfaction [25]. Chatbots and voice-enabled tools are that provide a contactless solution to their queries. Virtual assistants learn from their past dealings and browsing habits to provide customized services to their customers SBI provides answers to customer queries and addresses the needs of the customers with everyday banking tasks [26]. iPal a virtual assistant by ICICI bank has addressed more than 6 million queries and it is seen the accuracy level was estimated to be about 90% communicated with 3.1 million subscribers [27]. Eva electronic virtual assistant has answered 2.7 million queries answering more than 530,000 users. [28, 29]. Axis banks the third largest private sector has introduced AI and NLP (Natural Language Processing) and has launched an innovation lab called Think Factory [30].

3 Research Objectives

Through the review of the literature, the following research gaps are incorporated as research objectives for this paper.

1. To study the influence of Artificial Intelligence in Banks.
2. To study the impact where Artificial Intelligence is presently being used by banks.
3. Customer expectations from the banks through the adaptation of AI.

4 Research Methodology

The methodology followed in this paper is descriptive in nature. A systematic review of the literature was carried out. The source of data collection is secondary in nature. The information was extracted from authenticated websites, books, journals, articles, and business magazines from Google Scholar, Research Gate, Academia, ProQuest, and Jstor. This paper focuses on the effectiveness and the upgradation of various technological strategies in particular with AI technology which is recently being used by banks and financial institutions in present days. The various applications of AI in banks have been analyzed in this paper.

5 Importance of the Study

Most of the banks in India started realizing the importance and the benefits of AI in specific chatbots, which can positively influence the operations and services of the banks. The banks are slowly releasing the benefits and have started to implement this technology. Since chatbots are still in the nascent stage in India, some banks are still hesitant to implement them, they are skeptical about their use and the result. This study concentrates on exploring how banks are utilizing this technology and knowing the drawbacks they have to address.

6 Influence and Impact of AI

This section deals with how AI is influencing and impacting the Banking sector.

6.1 Effects of AI on Banks

This has resulted in a change in the business model from bank centered to customer-centered. This has made the banks think about giving more user-friendly applications rendering to customer satisfaction. Technology is playing a very vital role in helping banks to bring changes and also to understand customer behavior [31]. Based on the Accenture report technology will allow banks to have a 25% cost cut in operations [32]. AI has improved customer relations with service providers [10, 33, 34]. Now the service providers are able to contact the customers directly to know their grievances. AI has opened the doors for a lot of improvements in their services. In today's environment where customers want to get things instantly by spending less time, avoiding standing in long queues, and getting their queries answered immediately all these things have pushed the bank to have their presence in virtual mode [33].

The fraudulent activities which are always causing a threat to customers and banks are to a larger extent reduced by AI. AI is used in the front office used for conversational banking, middle office like the managers, administrators, and supervisors for anti-fraud, and back office for credit underwriting [24, 34]. The use of AI has made customers rely on the banks thus gaining trust. This trust will avoid attrition of the customers. The implementation of AI in banks has helped the banks to work in a more efficient and effective manner. AI is used in report generation, and analytics, the use of AI has reduced cost and increased revenue generation, and saved time and money effective manner. By adopting new technology in analytics, bots, RPA, and report generation, banks can reduce their cost and can allay risk, and moreover can increase their revenue generation. By implementing artificial intelligence various benefits can be enjoyed by the banking sector as it helps in increasing revenue, helps in mitigating risk, bringing customer satisfaction, and many more.

6.2 Ways AI Could be Implemented in Banks

Based on the applications, Artificial Intelligence can be categorized into three broad categories [35].

Artificial Narrow Intelligence (ANI). It is also known as Machine learning, weak AI, or Narrow AI. It is used to solve one particular problem in a specific area, like recommending a product or weather prediction. Most of the applications today are ANI. Some examples are speech recognition like Alexa, Siri, and Google Assistant, weather forecasting, fraud detection, and face recognition are narrow AI.

Artificial General Intelligence (AGI). It is also referred to as strong AI, a general AI, used to solve general problems. AI thinks, acts, solves, and responds like a human. AGI can perform human-level tasks like -driverless cars by uber, and Autopilot by Tesla. It is the future where AI overtakes human intelligence.

Artificial Super Intelligence (ASI). The future is unpredictable with a super AI. ASI system that completely surpasses human intelligence. Machines can do things more than men by themselves.

7 Effects of chatbots in the Banking sector

These chatbots can handle a huge number of customer requirements, and services are available 24/7 reducing the operating cost for the firm. Through chatbots banks globally can save 7.3 billion USD by 2023, an estimated 3 times higher than in 2019 [36]. Reducing the operating cost, The chatbot services are going to benefit the firm immensely, it is estimated at USD 430.9 million in 2020, and is expected to reach USD 2.486 million in 2028 based on Grand View Research 2021.

7.1 Ways Chatbots Could be Deployed in Banks

- a. **Goal-based:** It is designed to accomplish the given objective or task. Its goal is to provide a quick conversation and accomplish its task. Banks use chatbots on their websites to give customers a good service experience [37].
- b. **Knowledge-based:** It is the collection or repository of information the chatbot is educated on. The information may be on the product or the services provided by the money to the customers or the company details. Knowledge-based chatbots are classified into the open domain and closed domain. In the open domain, it responds to general topics. The closed domain focuses on particular knowledge and they don't respond to other queries [38].
- c. **Service-based:** It is based on the service provided to the user. It is categorized as commercial or personal [39].
- d. **Response Generated-based:** In this category, the chatbot responds based on response generation [39].

7.2 Services Provided by Chatbots in Banks

Some of the services rendered by chatbots in banks are:

1. **Availability of customer service 24/7:** Customers can avail of chatbot service facilities throughout the year, do their bank transactions or enquire about bank details anytime from anywhere.

2. **User friendly:** Chatbot services are made to make the banking process easier for customer benefit. These chatbots initiate the conversations trying to understand the needs of the customer. The navigation in the process is user-friendly.
3. **Increased productivity of bank personnel:** Chatbots can very well handle minor issues which will help the bank employees to enhance their productivity in attending to other urgent problems. This improves the efficiency of customer support and helps the company to focus on important issues that cannot be solved by AI.
4. **Convenient mode of communication:** In the fast-moving phase people want instant solutions to their problems without spending much time and effort. Since chatbots can combine various functionalities that will make it convenient for customers of different age groups. This is more convenient for the younger generation.
5. **Personalized experience:** Personalization is an important aspect of customer service where having the details of the customer before the conversation starts. Chatbots have access to the full information on the existing client even before they start the conversion process this will help in building a good customer relationship. The chatbot recognizes and verifies the client automatically based on the phone number, login/password, authorization token, or other means of secure and reliable identification. This way, they may greet a client by name, communicate in their preferred language, suggest customized offers and promotions, etc.

7.3 Chatbot Services Offered by Banks in India

Chatbot services are still at the nascent stage in India and only limited services like general queries, transactions, and some banking processes also are provided by the banks. Services provided by each bank are stated in Table 1.

7.4 Description of Chatbot Services/Virtual Assistants in Different Banks in India

State bank of India: SBI chatbot is an AI-powered software and multilingual bot introduced in SBI. It can respond in 14 languages, 864 queries in a day, it can handle up to 10,000 inquiries per second. This will bring a significant reduction in the expenditure for the bank [39]. It responds to standard queries like ATM locations, products, and services, IFSC codes [40].

ICICI Bank: iPal from ICICI bank is an AI-powered chatbot with 6 million responses, interacted with 3.1 million customers in 8 months Bank website handled about 1 million queries through the website and mobile apps [27].

Yes bank: An AI-powered chatbot called YES ROBOT was launched by the bank. The bot is a combination of natural language processing and artificial intelligence to have a good customer experience. It can offer 25 banking services and can handle half a million queries every month. Through the support of Microsoft, this bot has a vital feature of booking FDs and RDs by just having OTP-based authentication [40].

Bank of Baroda: Assisted Digital Interaction bot powered by IBM was launched by the bank [41].

Table 1 Indian banks providing chatbot and virtual assistance

S. No	Bank using chatbot	Chatbot services offered	Source
1	HDFC Bank	Provides answers to all general questions except about payments	https://www.hdfcbank.com/
2	ICICI Bank	Provides answers to all general questions like bill payments, transfer of funds, recharge, voice banking	https://www.icicibank.com/
3	Yes Bank	Provides services like Balance checks, recent transaction history, money transfers, recharge of phone, bill payments, eligibility on loans, details on FD & RD, and availability of credit and debit card details	https://www.yesbank.in/
4	IndusInd Bank	Provides information on general questions, the Account balance can transfer funds, credit card bills can be paid	https://www.indusind.com/in/en/personal.html
5	Kotak Mahindra Bank	Provides information on transfer of funds, information on fixed deposits, general information	https://www.kotak.com/en/home.html
6	Axis Bank	Answers general queries, can request cheques books, manage card limits, can request for cheque book, block cards, payment of bills, recharge, and transfer funds	https://www.axisbank.com/
7	City Union Bank	Provides information for all the services	https://www.cityunionbank.com/
8	State Bank of India	Provides general information	https://www.onlinesbi.sbi/
10	Bank of Baroda	Provides general information	https://www.bankofbaroda.in/
11	Union Bank of India	Provides general information	https://www.unionbankofindia.co.in
12	Canara Bank	A virtual bank employee, doing the work of a bank employee	https://canarabank.com/

7.5 Statistics of Usage of Chatbots

Banks use chatbots in marketing, sales, and customer relationship management to provide fast, cost-effective, and personalized services to customers [41]. It is seen that only 19% of consumers are currently using the service of chatbots, remaining 95% are predicted to use it in the future. The survey conducted by Statista 2019, showed that 13% of responders worldwide consider that customer service of chatbots is not effective 54% say they are somewhat effective and 33% find that customer service is very effective.

8 Findings

Artificial Intelligence is the future of financial markets. It is learned that chatbots in banking are bringing a revolution in the operational and service sectors. Banks can combat fraudulent transactions and improve compliance through AI. Privacy and security can also be dealt with very well. It has brought more secure transactions, non-centralized, changing the world into a cashless environment. In this study, we examine how AI technologies can contribute to the Indian Banking Sector. It is found that AI applications are leading the Banking Sector and also helping customers to have a pleasant and smooth experience with the service providers. This study also reveals that AI-based chatbots offer cost-saving opportunities. The bank's profit margin will be boosted if a proper follow-up is done and rectifying the flaws. Chatbots are more spontaneous than traditional methods.

But the other side says that users are experiencing unsatisfactory encounters with the chatbots and this may result in resistance and pessimism leading to a lack of trust in the technology. Technological progress is bringing about change in consumer habits and the expectation of the consumers will increase bringing a lot of unprecedented challenges in gaining the trust of the customers, their experience should be a smooth journey. So, the quality of service should be good.

Customers are keen on a few things from the bank that is better service, faster service and simple procedures to be followed so that not much time is wasted. They want the services and products which they can decide on at their convenience time and place. They basically need a customized service for different types of customers.

9 Conclusion

To conclude most banks have adopted this technology to communicate with their clients and to provide a personalized experience. One of the reasons for choosing chatbots is speed, security, simplicity, privacy, fast, and less time. Data protection and assurance by the banks will increase the usage of customers. When a customer is getting a smooth and memorable experience with the chatbot customers will persuade the service on a long-term basis. Chatbots are still in the nascent stage, still, there is a lot of room for research in this area. This is the initial step towards understanding AI chatbots and improving user compliance.

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