

# Chatbots of Indian banks – utility for prospective customers – a perceptive study

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**Abstract.** Introduction of Chatbots by banks has changed the face of interaction between customers and banks. The cost-effectiveness and the lead generation advantage of Chatbots will drive Indian banks for enhanced functionality of Chatbots. However, the availability of Chatbot on the website of bank alone will be of use for a prospective customer for a bank. This fact is not yet fully recognized by the Indian Banks. This research paper attempted to analyse the level of functionality of Chatbots placed on the websites of banks considered for study, based on primary data collected from 17 banks in India. The uniqueness of this research work is the exclusive focus on the utility of Chatbots provided by Indian banks for the prospective customers of banks rather than for the existing customers. The study indicated that an amount of improvement is required in the functionality of Chatbots in the two-way interaction through posing a query by the user. In the context of application of AI in the arena of digital financial inclusion, making available the Chatbots in Indian languages may seem to be imperative for the banks in our country in the years to come.

## 1 Introduction

The application of Artificial Intelligence (AI) in the Indian banking industry is gaining ground day-by-day and it is likely to herald a new era of efficiency coupled with innovation for customer satisfaction. Chatbots are indeed an outcome of AI, particularly those that use advanced techniques like Natural Language Processing (NLP) and Machine Learning (ML). AI powered Chatbots use AI technologies to understand and respond to user inputs in a conversational manner. They leverage NLP to comprehend human language and machine learning to improve their responses over time. Whereas Rule-based Chatbots are not AI-driven and operate based on predefined rules and scripts, responding to specific keywords or phrases without the ability to learn or adapt. AI technologies significantly enhance the capabilities of Chatbots, making them more useful and versatile.

Reserve Bank of India (RBI) in its premier annual publication titled ‘Report on Trend and Progress of Banking in India 2022-23’ made a note on adoption of AI in Indian Banks, where in it is cited, that RBI performed a textual analysis on the annual reports of Indian Banks from FY2016 to FY2022. The analysis indicated that the usage of AI related keywords in

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Indian banks had increased sizeably, especially in Private Sector Banks (PVBs). In Public Sector Banks (PSBs), the adoption had been muted but had still risen around 2.5 times over the above referred study period. The report had also stated that one of the prominent usages of AI across service industries is Chatbots that could converse, either through text or through voice, with human users in natural languages [1].

Further, the report mentioned that as at the end of June 2023, 11 out of 12 PSBs and 15 out of 21 PVBs had some form of Chatbot by using AI and ML technologies and in most cases, the Chatbots are accessible through the banks' websites.

## **2 Literature Review**

Artificial intelligence has mushroomed rapidly in financial services and brought tremendous change to the banking industry. Chatbots are a significant application of AI, transforming customer services through instant and cost-effective solutions. Studies on numerous functionalities, customer acceptance, and the impact of the deployment of chatbots on Indian banks' overall operations have been found. This synthesizes the key contributions of recent research, especially focusing on the Indian context and highlights the research gap concerning the role of a chatbot in lead generation and services for prospective customers.

### **2.1 Evolving Nature of Chatbots in Indian Banking**

The banking has adapted to AI, especially adoption of chatbots, as a revolution change, with scholars such as Srivastava (2018) referring to this as the fourth industrial revolution. The study emphasized that a process of retrieving customer information that existed previously in the database took less time when done through chatbots, unlike human executives, and so placed chatbots as high-impact tools for developing customer service and efficiency in operations [2].

A much-needed contribution was made by Patil & Kulkarni (2019), who did an empirical study via structural equation modelling to establish the importance of perceived usefulness and ease of use in the adoption of chatbots by customers. In the outcomes of their research, they emphasized the 'convenience of 24x7 service availability' and have contended that chatbots are 'more effective than human advisors in handling customer queries'. This research resonates with the growing need for seamless digital banking experiences that more customers are accustomed to, where they expect real-time interactions [3].

Gupta & Sharma (2019) took their investigations further to look into the customer attitude toward chatbots and found a positive correlation between the instances of curiosity and convenience with the adoption of chatbot technology by Indian banks. This study highlighted increasing shifts in the preference of their customers toward AI-based solutions, which means that the banks need to prepare themselves for this change and are increasingly adjusting their business accordingly to meet the changed needs of the consumers [4].

### **2.2 Impact on Financial Inclusion and Vernacular Support**

As Indian banks cater to a truly diverse population, vernacular language support by chatbots is necessary. Singh & Singh (2019) labelled this as a critical element in the expansion of digital banking propositions. Considering that India has this multi-linguistic culture, banks should prepare its investment benchmark for the development and integration of a chatbot in the overall IT infrastructure [5].

For instance, Mhlanga (2020) brought it to the next level by extending this conversation into financial inclusion, particularly among underbanked customers. The researcher found

that chatbots are at the center of the larger sense of AI-driven financial services for ensuring digital financial inclusion in lower-income populations [6]; however, that can be streamlined with the view of Malali & Gopalakrishnan (2020) on AI financial services and more specifically, bringing accessibility to banking services, especially into rural areas [7].

### **2.3 Enhancing Functionality and User Experience**

Although many advantages of using chatbots exist, as Bairy & Rashmi (2021) noted, there are issues to be addressed with chatbots, as they found some button responses for interactions suffer from poor phrasing and false intent prediction [8]. A related possible adverse effect of poorly designed interfaces of chatbots were also discovered by Hwang & Kim in 2021 that can possibly impair the user experience, even though it is very evident that the chatbots significantly reduce transaction and management costs [9].

### **2.4 Customer Perception & Chatbot Effectiveness**

Studies have also focused on customer perceptions of chatbots in the banking sector. Narula & Narula (2021) established that most respondents were aware and recognized the concept of chatbots and their ability to offer 24/7 customer care services. The authors also expressed that human executives will be replaced by chatbots in the near future [10].

However, as Kaur *et al.* (2024) claimed, while the end is customer satisfaction, AI solutions such as chatbots should also be user-friendly and inclusive of both gender-related and cultural nuances. Those needs underpin further acknowledgment that banks need to address those requirements by developing more accessible and efficient AI tools [11].

### **2.5 Lead Generation and Cost-Effectiveness**

The literature identifies the generation of leads as significant in using chatbots and cost-effectiveness. According to Madasamy (2023), it was possible for chatbots to help engage banks with potential customers in real-time and improve lead conversion rates [12]. S.K. Shetty *et al.* (2022) resonated more with the cost advantage that chatbots provided and stated as follows: "It also highlighted the fact that chatbots can clear queries faster than human executives; hence, the saving of time for the customer and financial gains for the bank" [13]. In addition, Umamaheswari *et al.* (2023) pointed out that chatbots are many times more efficient in retrieving information from large datasets than the traditional human agents, thus enhance operational efficiency even more [14].

Despite of several published data regarding the cost-effectiveness, customer satisfaction, and operational efficiency of chatbots in the banking industry, there is a significant lack of discussion regarding the use of chatbots for lead generation and improving customer service for prospective customers. The majority of the case studies examined here focused on current clients, particularly how they interacted with chatbots via web presence, internet banking, and mobile banking. However, as the report points out, there are instances when these services are not made available to prospective clients for whatever reason, and many of these options are exclusive to existing account holders.

This implies that banks miss out on possible lead generation opportunities because of the services chatbots provide. The ideal way to develop the chatbot to communicate to potential clients and encourage them to interact with the bank without requiring an account will be the main focus of future study. Future studies will also look at how chatbots might help with client acquisition in addition to customer service.

### 3 Research Gap

The most significant advantages of Chatbots are the ability to provide quick and prompt services throughout 24x7, as commented by Patil & Kulkarni (2019) and Narula & Narula (2021) [3,10]. The fact is that it ensures instant help to the customers compared to traditional human support and thus is a remarkable success in customer satisfaction. For sure, they are extremely cost-effective and reduce a considerable amount of operation costs through automation of customer interactions. According to Madasamy (2023), saving average 4 minutes for each query, translates to a saving of \$0.70 per interaction and adding value through the ability to handle multiple queries simultaneously [12]. Additionally, since live chat can hold the attention of a prospect in real-time, it enhances the generation of leads for a sales team. As Madasamy (2023) argued, "leading generation is also within the capabilities of chatbots". These include their retrieval of any information stored in databases with much more speed as compared to human advisors. According to Srivastava (2018) and Umamaheswari *et al.* (2023), this ensures that the chatbots present customized and relevant information concerning the customer's issue, thus enhancing customer experience. Briefly, the advantage of 24x7 service availability, cost efficiency, lead generation, and instant information retrieval defines their inevitable importance in modern banking operations [2,14].

The earlier research studies have concentrated more on the usability of Chatbots and have highlighted the level of customers' acceptance. However, the customers of the banks could be classified into two broad categories, that is, existing customers and prospective customers. In India, both public sector banks and private sector banks offer Chatbots through a variety of means such as mobile banking applications, Internet banking, WhatsApp banking, as well as their website.

The existing bank customers could only use the Chatbot function embedded in a mobile banking app, the Chatbot on the bank's website homepage, and other options in the context of WhatsApp and Internet banking. To be more precise, some relations of existing customers with the bank mobilized by specific functionalities of the Chatbot available on the bank's website had a potential economic value, even though the bank was anticipating them, that is, opening a deposit account was a necessary condition for activating such a Chatbot's functionalities that could bring economic returns.

A potential bank customer could use only the Chatbot on the bank's site, however, he or she could not use the other ways such as mobile application, internet banking or WhatsApp because of registration. The service provision of the Chatbot is perceived to be useful to a potential customer and as a business opportunity to the organisation. However, no such specific research works are found in the literature review made on the said subject. This **research gap** so identified is explored in this research paper in detail.

### 4 Research Methodology

This study focussed on the utility of Chatbots introduced by Scheduled Commercial Banks in India, both in Public Sector and Private Sector, for a prospective customer on visiting the website of a chosen bank. Thus, the research work is confined only to the Chatbots made available on the websites of banks under reference. The study covered all the 12 public sector banks, including State Bank of India and select 5 leading private sector banks in India and they are listed hereunder in Table 4.1.

Singh & Singh (2019) opined that there should be a relationship in investing IT infrastructure of a bank and the turnover or profit or some other relevant indicator of financial performance [5]. Thus, it is considered apt to present the banks under study along with basic business figures and financials as on 31.03.2024. Total business i.e. Deposits and Advances

put together, total assets, i.e. size of the balance sheet, total income, i.e. turnover and the net profit after tax, i.e. the ultimate return on the assets are considered as relevant to be furnished for having a fair understanding of the relative status of the banks under study.

Table 4.1: Key financials as on 31.03.2024 of banks chosen for study

Amount in Rs. Crore

Sl. no.	Name of the Bank	Total Business	Total Assets	Total Income	Net Profit after Tax	Chatbot available on website or not
	<b>Public Sector Banks</b>					
1	State Bank of India	8620046	6179693	466812	61076	
2	Bank of Baroda	2392738	1585797	127101	17788	✓
3	Punjab National Bank	2304142	1561835	120285	8244	
4	Canara Bank	2243978	1491540	127654	14554	
5	Union Bank of India	2092304	1391957	115858	13648	✓
6	Bank of India	1301064	912597	66804	6317	✓
7	Indian Bank	1202889	792619	63481	8062	✓
8	Central Bank of India	628417	446672	35433	2549	
9	Indian Overseas Bank	499223	352033	29705	2655	
10	UCO Bank	445150	323691	25119	1653	✓
11	Bank of Maharashtra	470986	307137	23492	4055	✓
12	Punjab & Sind Bank	202145	147656	10915	595	
	<b>Private Sector Banks</b>					
13	HDFC Bank Ltd.	4864647	3617623	307581	60812	✓
14	ICICI Bank Ltd.	2597230	1871514	165848	40888	✓
15	Axis Bank Ltd.	2033709	1477208	131810	24861	✓
16	Kotak Mahindra Bank Ltd.	825028	600357	56072	13781	
17	YES Bank Ltd.	494171	405492	32700	1251	✓

(Source: Original contribution of authors)

Out of the total 17 banks considered for study, only 10 banks, 6 in public sector and 4 in private sector, have made available their Chatbots on the homepage of their respective websites. The names given to the Chatbots are mentioned hereunder in Table 4.2.

Table 4.2: List of banks having Chatbots on their website

Sl.no.	Name of the Bank	Name of the Chatbot
1	Bank of Baroda	ADI
2	Union Bank of India	UVA
3	Bank of India	BOI SEVA
4	Indian Bank	ADYA
5	UCO Bank	UMA
6	Bank of Maharashtra	BoMy
7	HDFC Bank Ltd.	EVA

8	ICICI Bank Ltd.	iPAL
9	Axis Bank Ltd.	AXIS AHA
10	YES Bank Ltd.	YES ROBOT

(Source: Original contribution of authors)

#### 4.1 Objective and Research Questions

The objective of the study is to assess the level of functionality of the Chatbots placed on the websites of banks under study to be useful to the prospective customers for those banks. The research paper attempted to address the following research questions:

- (i) What is the present status of Chatbots in Indian banking industry?
- (ii) Whether the needs of prospective customers for banks, who could access the Chatbots placed on websites only, are looked into seriously?
- (iii) What is the level of functionality of the Chatbots placed on the websites of banks under study?

#### 4.2 Methodology

The data for analysis is the primary data collected by posing questions to the Chatbots placed on the homepage of the websites of the 10 banks listed in Table 4.2 above and by using the menu options provided therein as a prospective customer of the bank.

### 5 Data Analysis

#### 5.1 Brief account of the Chatbots placed on websites of banks under study

1. Bank of Baroda: The Chatbot is named ‘ADI’ and is made available on the home page of the website of the bank with bi-lingual option. i.e., chat could be made in either English or Hindi. The Chatbot provides main menu with 9 options like Deposit Accounts, Loan Products, Doorstep Banking etc. and provides an option for typing a query in the chosen language. ‘Start live chat’ and ‘Start video call’ options also are made available where in the user will be connected to a customer care executive.
2. Union Bank of India: The Chatbot is named ‘UVA’ and is made available on the home page of the website of the bank with multi-lingual option. i.e., chat could be made in either English or Hindi or seven more Indian languages. The Chatbot provides main menu with 19 options which include ‘Doorstep Banking’, ‘Government Schemes’, ‘Special Schemes for Women’ etc. and provides an option for typing a query in the chosen language. ‘Chat with agent’ option is available wherein the agent can also initiate a co-browsing session along with audio/video call to guide the user on any specific information on the website.
3. Bank of India: The Chatbot is named ‘BOI SEVA’ and is made available on the home page of the website of the bank with multi-lingual option. i.e., chat could be made in either English or Hindi or ten more Indian languages. The Chatbot provides main menu with 17 options which includes ‘Interested in our products’ and provides an option for typing a query in the chosen language. ‘Chat with agent’ option also is made available where in the user will be connected to a customer care executive.
4. Indian Bank: The Chatbot is named ‘ADYA’ and is made available on the home page of the website of the bank in English language only. The Chatbot provides main menu with 14 options which includes ‘Start WhatsApp Banking’.

5. UCO Bank: The Chatbot is named 'UMA' and is made available on the home page of the website of the bank in English language only. The Chatbot provides main menu with 11 options which includes 'Cyber security awareness'.
6. Bank of Maharashtra: The Chatbot is named 'BoMy' and is made available on the home page of the website of the bank in English language only. The Chatbot provides main menu with 6 options which includes 'Financial Inclusion'. It is important to mention that the user is asked to provide name and mobile number and OTP will be received to the given mobile number to enable the user to access the Chatbot. This restriction is not found in any other Chatbots under study in this research work. Though there is an option for typing a query, the same is not made functional as on the date of collection of primary data. Hence no questions could be posed to the Chatbot.
7. HDFC Bank Ltd.: The Chatbot is named 'EVA' and is made available on the home page of the website of the bank in English language only. The Chatbot provides main menu with 9 options which includes 'FASTag'.
8. ICICI Bank Ltd.: The Chatbot is named 'iPAL' and is made available on the home page of the website of the bank in English language only. The Chatbot provides main menu with 8 options which includes 'Watch iPlay Videos'.
9. AXIS Bank Ltd.: The Chatbot is named 'AXIS AHA' and is made available on the home page of the website of the bank in English language only. The Chatbot provides main menu with 15 options which includes 'Investments' covering Mutual Funds, PPF and NPS.
10. YES Bank Ltd.: The Chatbot is named 'YES ROBOT' and is made available on the home page of the website of the bank in English language only. The Chatbot provides main menu with 20 options which include Mutual Funds, Government Schemes etc.

All chatbots available on the websites of respective banks share common features that enhance user interaction and service efficiency. Firstly, they provide a provision for users to type a query, enabling personalized and specific interactions. Additionally, the menu-driven interface guides users step by step, directing them to relevant web pages for further details and seamless navigation. Moreover, if a user expresses interest in opening a deposit account or availing a credit facility, the chatbot efficiently directs them to the corresponding webpage where they can complete an online application, facilitating smooth customer onboarding and service requests. These features collectively make the chatbot an effective tool for streamlining customer interactions on banking websites.

## **5.2 Study on the utility of the Chatbot for the user**

A few studies [8,9,11] revealed that the functionality of Chatbots being deployed by banks in India needs improvement. As such, to assess the present level of functionality, three questions (queries or statements) are posed to all the 10 Chatbots under this study.

Q1: When are you launched as \_\_\_\_\_ (name of the Chatbot is mentioned)?

This question aims to assess the level of understanding by the Chatbot on itself. The responses are varied and are presented hereunder in Table 5.1.

Table 5.1: Responses from Chatbot to Question 1

Sl.no.	Name of the Bank	Response Received from Chatbot
1	Bank of Baroda (ADI)	I am Bank of Baroda virtual assistant. My name is ADI:- <i>Assisted Digital Interactions</i> . I can help you with response to your queries related to Bank of Baroda products and services. How may I help you?
2	Union Bank of India (UVA)	Inappropriate/ Irrelevant Response
3	Bank of India (BOI SEVA)	Inappropriate/ Irrelevant Response
4	Indian Bank (ADYA)	Inappropriate/ Irrelevant Response
5	UCO Bank (UMA)	No response
6	Bank of Maharashtra (BoMy)	No provision for typing a query yet
7	HDFC Bank Ltd. (EVA)	If I am not able to answer your questions, maybe our customer care be more helpful.
8	ICICI Bank Ltd. (iPAL)	Here are some suggestions: What is iPAL?  When the above question is opted, the response is as under:  Hi there! I am iPal, the banking chatbot. I can help you with any generic or personal inquiry. You can ask me questions like: What is UPI? How do I apply for a loan?
9	Axis Bank Ltd. (AXIS AHA)	Sorry, I'm still learning. Are you trying to get help with any of the following?  AXIS-AHA – What is it? What does AXIS-AHA do?  For either of the two, the response received is as under:  Axis AHA is an Artificial Intelligence based virtual banking assistant. It is always available to answer your banking questions, help you do basic transactions and make everyday banking easier. Simply type in your query and you will receive a response to proceed with its resolution. For your convenience, Axis AHA also prompts certain regularly accessed features for you to proceed with.
10	YES Bank Ltd. (YES ROBOT)	YES ROBOT is your personal banking assistant, available anytime, on-the-go. It uses artificial intelligence to help you bank 24*7. YES ROBOT is accessible through the applications and interfaces that you already use



		– such as Facebook Messenger, YES BANK website & WhatsApp.
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(Source: Original contribution of authors)

The Chatbots of Bank of Baroda, ICICI Bank Ltd., Axis Bank Ltd. and YES Bank Ltd. are at least able to understand that the question posed is related to the Chatbot itself. The rest of the Chatbots could not comprehend the question.

Q2: What is the limit for DICGC cover for the deposits placed with your bank?

This question is likely to be posed by a prospective customer for a bank, more particularly a private sector bank, who is desirous of parking surplus funds as deposits. As this research study is mainly focussed on the utility of the Chatbots for a discerning prospective customer for a bank and for that very reason Chatbots made available openly on the home page of the websites of respective banks are **only chosen for study**, this question is considered more appropriate to be posed to a Chatbot of a bank in India. The responses are varied and are presented hereunder in Table 5.2.

Table 5.2: Responses from Chatbot to Question 2

Sl.no.	Name of the Bank	Response Received from Chatbot
1	Bank of Baroda	Inappropriate/ Irrelevant Response
2	Union Bank of India	Inappropriate/ Irrelevant Response
3	Bank of India	Inappropriate/ Irrelevant Response
4	Indian Bank	Inappropriate/ Irrelevant Response
5	UCO Bank	I'm sorry. I'm having trouble understanding the question. I can help you with the queries related to UCO Bank or select from the below options:
6	Bank of Maharashtra	No provision for typing a query yet
7	HDFC Bank Ltd.	Inappropriate/ Irrelevant Response
8	ICICI Bank Ltd.	Sorry, I am not sure if I got that. Could you please try rephrasing your question?
9	Axis Bank Ltd.	Inappropriate/ Irrelevant Response
10	YES Bank Ltd.	Sorry, unable to find an answer to your question. For more information, please get in touch with us.

(Source: Original contribution of authors)

It is found that none of the banks could give a proper response to this query. In fact, the DICGC cover for the deposits placed with banks is limited to Rs. 5.00 lakh per depositor.

Q3: 'Good responses' – this is a statement made to the Chatbot in response to a series of appropriate responses received when the menu driven options are followed. This is intended to assess the level of functionality of the Chatbot as an AI tool in comprehending such a simple statement in a two-way interaction with it. The responses are varied and are presented hereunder in Table 5.3.

Table 5.3: Responses from Chatbot to Question 3

Sl.no.	Name of the Bank	Response Received from Chatbot
1	Bank of Baroda	Thanks for providing your feedback. We will improve ourselves over time.
2	Union Bank of India	Yes, Please tell me how I can help you?
3	Bank of India	Inappropriate/ Irrelevant Response
4	Indian Bank	Inappropriate/ Irrelevant Response
5	UCO Bank	I'm sorry. I'm having trouble understanding the question. I can help you with the queries related to UCO Bank or select from the below options:
6	Bank of Maharashtra	No provision for typing a query yet
7	HDFC Bank Ltd.	Were you looking for any one of the following? Instant Call Back.
8	ICICI Bank Ltd.	Did you mean: Have a great day, <u>You are doing good job</u> , Thank you so much; When the second option is selected, the response is as under:  Thank you! I'm happy to be here to assist you.
9	Axis Bank Ltd.	Sorry, I am still learning. Can you please rephrase it for me once again? I can help you with bank related queries or you can tap on one of these options:  Know Account Balance; Manage Debit Card; Manage Credit Card; Cheque Services
10	YES Bank Ltd.	Simply type your request or select main menu

(Source: Original contribution of authors)

Chatbots of Bank of Baroda, Union Bank of India and ICICI Bank Ltd. only could understand that it is a compliment from the user.

## 6 Findings and Conclusion

The Chatbots placed on the websites of banks only are accessible to a prospective customer for banks. The menu options made available in the said Chatbots covered under this study are functioning well as the user is getting directed to the relevant webpage for details of various products, viz. deposits, advances, digital banking, social security schemes etc. A prospective customer on interacting with the Chatbot through menu options provided could quickly even apply for opening of a deposit account or a loan product with the bank of his/her choice. Thus, the utility of the Chatbots for the prospective customers for banks is more or less fulfilled in all the cases wherein the Chatbot is placed on the homepage of the website of the bank.

Though there is a provision for typing a query, the responses received in this research study indicated that a lot of improvement is required in their functionality for better and wide acceptance from the users of the Chatbots provided by both the public sector banks and private sector banks covered under this study.

The application of AI for making Chatbots more effective in their functioning will be useful to the banks themselves as they provide lead generation and resultant business growth and increase in revenue. The lead generation could be had only when the Chatbot is made available on the website of the bank **also**.

It is earnestly suggested that way forward banks shall make available the Chatbots in vernacular languages also as the application of AI is expected to have impact on digital financial inclusion which covers the neglected and disadvantaged sections of the Society whose literacy levels are still low in our country.

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