

# Chatbot for Business Organization : Utility, Processes and Significance

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## ABSTRACT

Chatbots are the substitute for business automation. They have evolved in recent times in almost every aspect of business organizations including sales, service, operations, Customer Relationship Management(CRM), marketing, Human Resource Management etc. However, there are many questions organizations are puzzled with; How to use them? What are the pros and cons of chatbots? are they really useful? what are the technological implications? This article attempts to find out the answer to these questions.

**Keywords:** Chatbots, Artificial Intelligence, E-Commerce, Business Automation, Machine-Learning.

## I. INTRODUCTION

Nowadays there is a significant change in the market because E-commerce has taken the world of retail to new dimensions and has captured the imagination of entrepreneurs. E-commerce websites are trending in India. Traffic on the website is not controllable sometimes. So there is need of automation on the website so that user experience is rich and can handle most of the traffic at the same time. Chatbot helps to sort items from E-commerce websites categorically and can control traffic on the website. There are many big Brands which are already using their chatbots in marketing for example Aerie, Whole Foods, National Geographic's genius etc. The significance of the chatbots could be realized by the fact that 2016 is termed as a "Chatbot year".

E-commerce with chatbots can help businesses to grow rapidly. Apart from being awesome for solving queries of customers, they help in sales using AI (Artificial Intelligence). There are many ways by which chatbot can fit into a marketing strategy. Chatbots offer customers with personalized experience which means having interaction with someone who already knows them by their name which can change nature of the conversation. When a customer calls to care Centre for

a query, chatbots could answer them accurately and take the conversation further by offering personalized shopping advice based on their purchase history and preferences.

Chatbots have larger engagement capacity which is unique because they can engage customers by learning from interaction, allowing it to send relevant information regarding various brands, products, and services. A human being can engage customers by catching their attention by talk, expressions, and observation. However, it can only engage for some time. Chatbots can gather analyze customer's feedback and data. They gather all required information by introducing questions in conversation naturally. Additionally, with right machine learning tools, chatbots can give insights of what customer truly wants. From this, business organizations can remodel their marketing strategy to become more focused on customers' need. Customers don't want to be bombarded with emails, text, notification regarding services, products etc. Chatbots are able to capture and analyze data so it will help the customer to get what they exactly want.

Chatbots automatically make our proactive. Brands have a passive approach to customer's interactions. They only communicate with their customers if they

have approached them first. A chatbot sends a welcome notification when a person arrives on the website or social media profile. Ordinary people can't track all people visiting a website or social media profile. Retailer and technology firms are experimenting with chatbots powered by a combination of machine learning, natural language processing etc. to provide services to the customer. Chatbots can keep the social presence fresh. It is almost unrealistic to expect from the customer care team or support team to solve every asked query in support forum because it is time-consuming, expensive and requires more manpower. With chatbot, a business organization can make them available for 24\*7 hours as chatbots don't need sleep. By combining a chatbot into the marketing strategy, a business organization can learn about their audience (customers) and tailor their marketing efforts to reach new customers and monetize their social media profile.

## II. SCOPE AND HISTORY OF CHATBOT

A recent survey By Ubisend in the **UK reveals that consumers are ready to start spending money straight from a chatbot.** Even more interestingly, millennial (26-36-year-olds) are willing to spend more than their older brethren that is £481 for the former, £353 for the latter (“(REPORT) 2017 Chatbot Report”, 2017).

We live in the era where humans talking to machines is no longer science fiction. Not long ago, the simple thought of it might have sent one to a loony institute. There is a long history of the genesis of chatbots. Ada built the very first computer and the very first programming language to power it. Often attributed to her is the very first thought that humans could interact with a machine to extract everything we could ever need. From 1843 to Alan Turing in 1950 to Weizenbaum in 1966, the history of chatbots is long and fascinating.

Chatbots software programs that mimic human conversation, are one of the hottest trends in artificial intelligence and marketing right now. 1.4 billion People a year are now interacting with chatbots. A recent study by Oracle 80 percent of businesses reported that they already use or plan to use chatbots by 2020 (Oracle,2016).

Chatbots have grown into a platform for user interaction. Let's have a look at the wide scope of chatbots sailing through the below statistics.

- ✓ In 2016, the chatbot market was valued at \$703 million. (“Chatbots Market worth 3,172.0 Million USD by 2021”, 2017)
- ✓ Between 2016 and 2021, we expect the chatbot marketing to grow at a compound rate of 35.2%. (ibid)
- ✓ By 2020, over 80% of businesses are expected to have some sort of chatbot automation implemented (Business Insider, 2016)
- ✓ \$4.5 Billion is expected to be invested in enterprise intelligent assistants by 2021. (“Nuance Receives #1 Combined Rating among Enterprise Intelligent Assistant Vendors in Newly-Published Opus Research Report”,2017).
- ✓ In 2015, mobile messaging app usage has surpassed social media usage. (Ballve, 2015)
- ✓ 96% of businesses believe chatbots are here to stay (“Chatbot Market Survey- 2017“, 2017).
- ✓ By 2022, banks could automate up to 90% of their interactions with chatbots. (“Those Annoying Chatbots Will Save Business Billions, Researcher Says”, 2017).

## III. HOW IT WORKS

Chatbot is a software program for simulating intelligent conversation with human using rules or artificial intelligence. Users interact with the chatbot via conversational interface through written or spoken text. In everyday life while we converse, communicate with someone or peers become aware of context of the subject in discussion. Contextual con is emerging as the standard of interaction and chatbots are making their mark by conversing contextually. When the interface connecting man and machine becomes intelligent and conversation, it becomes simple for the consumer to converse with the machine with ready human terms. According to Gartner, 30% of browsing done by users will turn in screen less in 2020 (Levy, 2017). Chatbots have brought a turn in the business for their target market.

Chatbots live inside the app, website, website modules, SMS and email. Chatbots can be used in a conversational way or it can be for a message back and forth with consumers to carry out any number of tasks,

from ordering to suggesting items and it can also be used for finding products.

The use of Artificial intelligence and ability to converse in natural language can make chatbots seem as if we are experiencing the future right now. However, for building chatbots, there is no need of being Silicon Valley giant with great developers. In fact, any business organization can build it from their home with less complex programming skills because various platforms are available for the sake. It is easy for even small industries to make their own chatbots. There are various chatbots building platforms available for developers as discussed below. A business organization can use any of them according to applications in their firm.

**1) Messaging platforms:**

- ✓ B2C messaging: Facebook Messenger, Wechat, Kik, Telegram, Allo, Line, Viber.
- ✓ B2B messaging: Slack, Atlassian, Stride, Microsoft Teams, Facebook Workplace.
- ✓ Native Chatbot: Website or App
- ✓ Smart Speakers: Amazon Echo, Google Home, Apple Homepod or MS Cortana

**2) NLP/AI platform:**

- ✓ Wit.ai
- ✓ IBM Watson
- ✓ Language Understanding Intelligent Services
- ✓ Dialog flow

These are various platforms used for creating chatbots. There are two concepts that need to be explicitly understood here; chatbots development platform and chatbots publishing platform. The prior is an environment where chatbot is experienced. It is a tool/application through which one can create chatbots. Chatbot platform helps in the adding more functionality to Chatbot by creating a flow, machine learning capabilities, API integration etc. These chatbots platforms are easy to understand to make a bot, by implementing simple drag and drop approach. With this, anyone who does not have technical knowledge can make a bot. So if any organization planning to have chatbots with fewer expenses and less human power then must go for below platforms: Chatfield, Botsify, Flow Xo, Beep Beep, Bottr, Motion.ai, Chatty people, QnA maker, Recast.ai, Botkin, ChatterOn.io,

Collect.chat, Gupshup. Whereas later is the medium through which chatbots can be accessed and used by users. It is more like Facebook, Instagram, Snapchat through which you can publish thoughts which would be visible to Friends and everyone else. A business organization with chatbots developer who have skills like AIML( artificial intelligence markup language)engine written in MySQL in PHP, Java, NodeJS, C#, NLP(natural language programming), API(Application program Interface), GUI is needed to create one's own chatbots. These platforms are as follows: Slack, Facebook, Skype, Oracle, Telegram, Kik, Wechat.

Chatbot publishing platforms is a platform where a business organization with chatbots developer can create chatbots. Here is some open source publishing platforms that are recommended are given below:

**Facebook Messenger:** Chatbot, a term popularized by Mark Zuckerberg when he launched the Facebook messenger platform. Though the concept of chatbots has been around for 60 years, it was Zuckerman who claimed that chatbots is new UI and declared the death of mobile apps. Facebook Messenger is widely used the platform. On this platforms number of chatbots has been created which are given in below table:

Sr no.	Chatbot Name	Chatbot Application
1	Skol	Created Video campaign for both Facebook and Instagram and became one of the first brands in Brazil to create messenger bot to promote nearby attraction, events, and bars to its users.
2	SnapTravel	AI-powered bot in Messenger helps the customer to find and book a hotel. The travel company has driven over \$1 million in hotel booking over messenger since launch less than one year.
3	Sephora	Stores location and services which is wanted by people, also one can book an appointment.
4	Globe	This bot provides customer service, the telecom company successfully increased employee productivity by 3.5x and reduced calls by 50%. (“Building customer relationships with

		Messenger”,n.d.).
5	Fandango	This chatbot finds local theaters and sees what is trending this week. Simply enter zip code or city, chatbots will show what is playing nearby and sends page where tickets can be booked.
6	Whole Foods	It can search emoji to get recipes in groceries for shopping with filtered recipes and special dietary needs.
7	Spotify	Enables users to easily search, listen and share music with this bot. This bot gives playlist recommendations based on users’ mood.
8	The wall Street Journal	This chatbot makes it easy to stay on top of big news and stock quotes and customize alerts. Simply the users have to type some commands for company information and key financial metrics, compare companies and get live stock quotes.

#### IV. HOW TO BUILD A CHATBOT?

The first step is chatbot development. Building a chatbot can be challenging, but with a keen eye for details, you can build a chatbot that offers great value. The plan to build a chatbot must also ascertain the purpose of building the bot, knowing what problem the bot is going to solve. Chatbots can be built in two ways – rule-based approach resulting in hard coding or machine learning that necessitates streaming data for the system to learn on its own. There are the basic chatbots and then there are chatbots with AI brains. With customers wanting to converse with chatbots that understand natural language, enthusiasts are making every attempt to create a bot that is rich in AI – Enthusiasts can now take advantage of sources like Api.ai to build chatbots with AI brains. The choice of the platform also matters when it comes to hosting the chatbot; a range of platforms are available including Facebook Messenger, Telegram, Slack, Discord and Kik. After choosing the platform, settle on the services that can be leveraged to build the chatbot.

Services that can be leveraged to build a bot include:

- Microsoft bot frameworks, Wit.ai, Api.ai, IBM’s Watson

Bot building enthusiasts without programming skills are not left behind as they can use services that encourage them to build a chatbot. Some of the development platforms include:

- Chatfield, Collect.chat , Textit.in, Octane AI, Motion.ai etc.

Architecture & Design

- **Speech-to-Text Conversion:**

- 1) Large Vocabulary Speech Recognition: Neurological research indicates that speech activates more of the brain than any other processing function. By incorporating speech processing, chatbots will be able to interface with phones and radios. Speech-to-text conversion begins with a process called automatic speech recognition (ASR). The goal of ASR is to achieve speaker-independent large vocabulary speech recognition (LVCSR).
  - 2) ASR Process Model: The first step in ASR is pre-processing. Speech is recorded into a microphone. The second-step is speech/non-speech segmentation. The ASR system must distinguish between the phonemes (the basic unit of speech) that should be recorded for translation vs. the background noise. The third step is feature extraction. Acoustic observations are “extracted over time frames of uniform length,” typically 25 milliseconds. The fourth step is decoding, in which the acoustic feature vectors are mapped to the most likely corresponding words.
  - 3) Restricted Boltzmann Machine (RBM) Implementation: Deep learning and the use of Restricted Boltzmann Machines (RBMs) have led to the development of even more effective methods for decoding sounds into phonemes. RBMs are neural networks with one layer of stochastic visible units and N layers of stochastic hidden units; there are no connections with each layer, but there typically connections between each unit in the visible layer and every unit in the hidden layer.
- **Natural Language Processing:** The goal of natural language processing (NLP) is to take the unstructured output of the ASR and produce a structured representation of the text

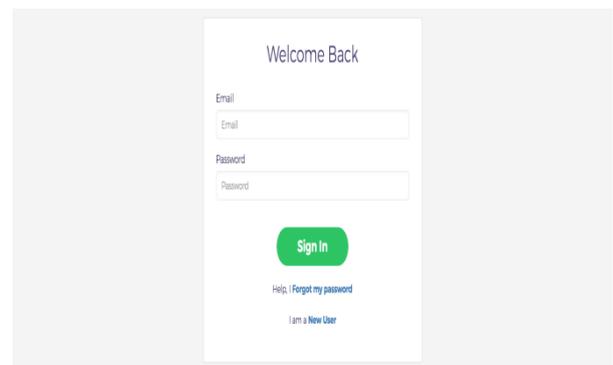
that contains spoken language understanding (SLU) or, in the case of text input, natural language understanding (NLU).

- 1) **Dialogue Act (DA) Recognition:** One way to extract meaning from natural language is to determine the function of the text/sentence (e.g. is this a question, suggestion, offer, or command); this is called dialogue act recognition.
  - 2) **Bayesian Approaches to DA Models:** The idea behind using a Bayesian approach to DA models is to find the probability of every possible sequence of dialogue.
  - 3) **Non-Bayesian Approaches to DA Models:** DA-classification is a classic machine learning problem. A number of non-NB approaches have been used, including neural networks, multi-layer perceptrons, and decision trees.
  - 4) **Intent Identification:** Domain-specific dialogue acts are called intents. Intent identifying has been most prominently used by call center bots, which ask the user “how can I help you?” and subsequently use intent identification to re-direct the user to one of N pre-defined re-direction options. Many of the same machine learning algorithms used for DA classification are used for intent identification.
  - 5) **Information Extraction:** The primary responsibility of the SLU is not just to understand phrase function, but to understand the meaning of the text itself.
- **Response Generation:** Response generation is arguably the most central component of the chatbot architecture. As input, the Response Generator (RG) receives a structured representation of the spoken text. This conveys information about who is speaking, the dialogue history, and the context. As output, the RG generates a response to deliver to the user, which it will deliver to the Dialogue Manager (DM).
  - **Knowledge Base Creation:** Chatbots are only as intelligent as the knowledge they have access to. Collecting training data used to train machine learning classifiers used in generative bot models or building corpuses of data used by information retrieval bots is critical to achieving human-like interactions. Advancing the corpora of data used by bots is a

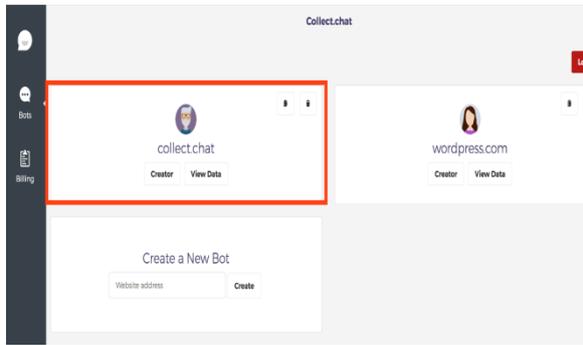
complement to algorithm development in improving bot accuracy.

- **Dialogue Management:** Once the chatbot has selected a response, the Dialogue Manager (DM) must choose a number of communication strategies, use language tricks to make it seem human, and deliver the message.
- **Text to Speech Text-to-Speech (TTS):** is the final step of the process, and converts the response generated to speech, which is returned back to the user. The first step of TTS is text analysis, in which text is converted into phonemes with pitch and duration. The second step is waveform synthesis, in which segments of recorded speech corresponding to each phoneme are concatenated to form speech.

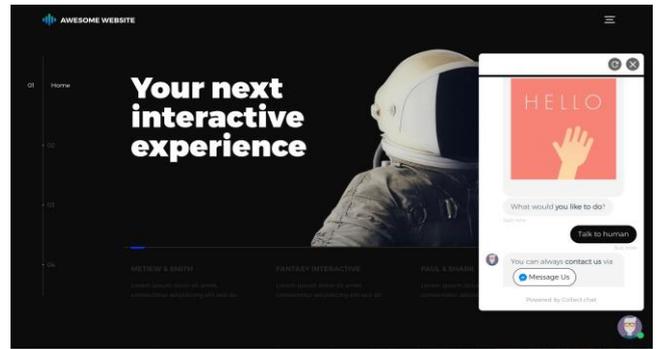
Chatbots can be created using above process but it required good programming skills and understanding. According to survey, it might be frustrating for a beginner. So beginner should go for the development platform. Development platform takes care of this layer and provides drag and drop GUI approach. Amongst the platforms, Collect.Chat is the chatbot platform which is very easy in WordPress is found. Following pictures show the method of creating it for any business organization’s website.



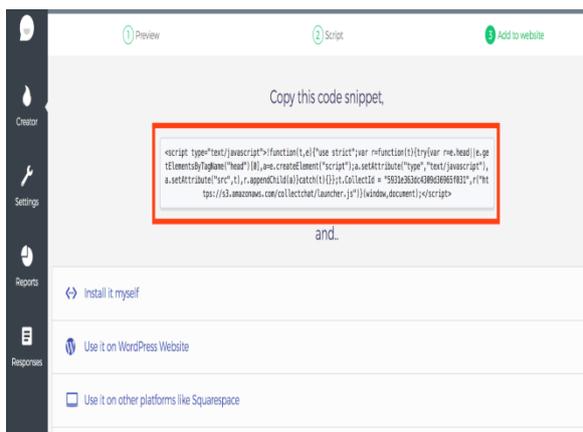
**Figure 1.** Login to Collect.chat



**Figure 2.** Select the chatbot

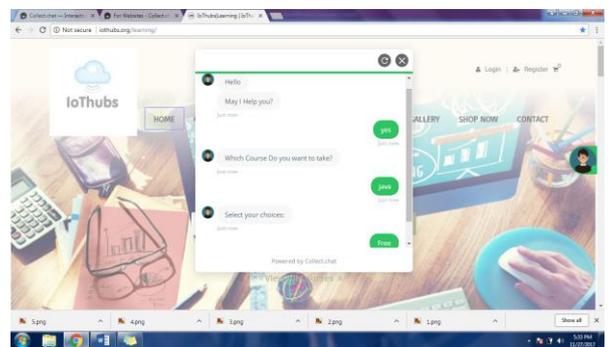


**Figure 5.**Preview on website

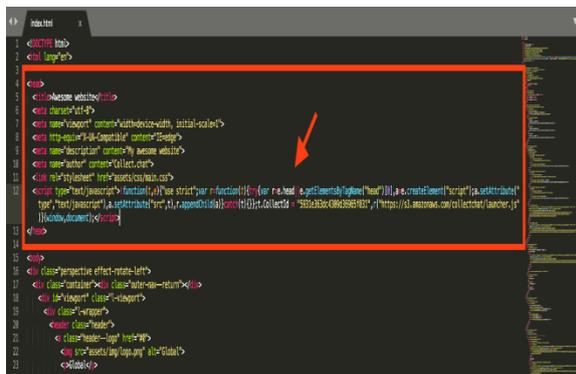


**Figure 3.** Copy the code snippet

A chatbot is created for IOTHUBS using collect.chat chatbot and result of this is following:



## V. CUSTOMERS' PREFERENCES AND ATTITUDE TOWARDS CHATBOTS



**Figure 4.** Paste the code snippet

A Survey reveals that 57% of UK consumers know what a chatbot is. (“(REPORT) 2017 Chatbot Report”, 2017) while 27% of the users worldwide are very interested in artificial intelligence based tools. (An, 2017). Further, 48% of consumers would rather connect with a company via live chat than any other mean of contact (ibid). Another survey by Ubisend states that 35% of consumers want to see more companies using chatbots. (“(REPORT) 2017 Chatbot Report”, 2017) and 57% of consumers are interested in chatbots for their instantaneity (An, 2017). However, HubSpot reveals that 40% of consumers do not care whether a chatbot or a real human help them, as long as they are getting the help they need (ibid). It further says that 55% of consumers are interested in interacting with a business using messaging apps to solve a problem. (ibid). 21% of consumers see chatbots as the easiest way to contact a business. (“(REPORT) 2017 Chatbot Report”, 2017). 95% of them further believe that 'customer service' is going to be the major beneficiary of chatbots (Mindbrowser, 2017). HubSpot further

reports that 47% of consumers would buy items from a chatbot. (An, 2017). To even more surprise HubSpot finds that 37% of consumers would buy items via a company's Facebook page than their website. (ibid). In addition, Foye's survey reports that Chatbots are expected to save banks between \$0.50 and \$0.70 per interaction ("Those Annoying Chatbots Will Save Business Billions, Researcher Says", 2017).

It further finds that Chatbots could save businesses up to £6 billion per year cross industries (ibid). Even, 45.8% of consumers would rather communicate with a business through a messaging app than email ("(REPORT) 2017 Chatbot Report", 2017).

## VI. SUCCESSFUL CASES OF SOME RENOWNED ORGANIZATIONS

A Number of companies use chatbots for their companies. Here are some success stories of the giant companies.

- 1) Domino's: Domino's is well known for pizzas. It makes ordering pizzas easy. Domino's chatbot is integrated with Alexa Echo so that one can now place your orders straight from Alexa Echo! ("Order Your Domino's for Pickup or Delivery Using The Amazon Echo", 2017)
- 2) Micromax: AISHA is the name of chatbot of Micromax. This voice assistant by Micromax is the Indian version of Siri. It can perform tasks like initiating a google search, giving movie reviews, make calls, read the news, view stalk market details and much more. Artificial Intelligence Speech Handset Assistant is all about AI in its backend that makes ("Chatbots: The Popular Humanoids of the Future!", 2016).
- 3) Titan Company Limited: It has partnered with a messenger named Gupshup to offer a chatbot on their e-commerce store. Currently active in Titan's e-commerce store and Facebook Messenger, the chatbot can hold intelligent automated conversations with customers and offer them a personalized shopping experience. Through the bot, customers can explore Titan's range of products, get recommendations and raise queries about order tracking, shipment (Ayyar, 2017).
- 4) Allstate: In 2016, Allstate upgraded its commercial insurance line for small businesses. After the launch, agents jammed the internal

call center inquiring about the policies and how to set sales quotes, but expanding the call center was out of the question for Allstate. Soon after, the company developed an AI virtual assistant called Allstate Business Insurance Expert, which now handles questions from 12,000 agents and eventually answers inquires directly from customers. By the end of the first year, ABle had paid itself off, according to Allstate. It is Insurance chatbot (Earley, 2016).

- 5) Marriott's International Hotels: chatbot is available through Facebook Messenger, Slack, and, soon, WeChat and Google Assistant. It allows Marriott Rewards members to research and book travel in more than 4,700 hotels. Customers can also plan for upcoming trips with suggestions linked from Marriot's digital magazine Marriott Traveler, all while chatting directly with the Customer Engagement Center. Members using Facebook Messenger, 44 percent successfully received assistance related to their stay or reservation, and 53 percent received help with their Rewards account Marriott believes that the integration on chatbots will improve hospitality and increase their customer satisfaction ("Marriott International's AI-powered Chatbots on Facebook Messenger and Slack, and Aloft's ChatBotlr, Simplify Travel for Guests Throughout Their Journey", 2017)
- 6) Ixigo: Ixibaba is chatbot that can answer all travel queries, brought to you by Ixigo is the perfect example of how companies are improving on interacting with customers and enhancing customer experience. This AI bot can provide quick and quirky answers to all travel related queries much faster and instantaneously than a human could. Travellers can talk about flights, hotels, cabs, vacation destination etc. It also provides real-time information about weather, travel routes, flight timings etc. (Karwa, 2016).
- 7) Payjo Inc.: This is an Artificial Intelligence Banking Platform developed to virtually assist customers in all transactions. The highly intelligent Bot employs ML and NLU. Payjo is India's first messenger bot that lets you recharge your phone, sets a reminder for recharge and shows suitable plans for your

number. In short, Recharge Bot supports intelligent balance reminders for prepaid phones. The biggest advantage of this chatbot is its availability languages other than English. It currently supports Hindi, Tamil, Telegu, and Kannada. (“YES BANK partners with Payjo to launch Artificial Intelligence led Digital Initiatives”,2017).

- 8) Skedool IT Private Limited: It aims at automating repetitive everyday tasks for business executives, sales, and recruiting professionals. A blend of artificial and human intelligence, it handles your B2B scheduling and calendar management. It has raised a substantial amount of funding from prominent Silicon Valley and Indian technology investors including Kludein LLC, Narayan Ramachandran, and Pranav Pai, investing on behalf of Mohandas Pai among others. The AI assistant is named as Alex and uses natural language processing and machine learning supervised by humans to enable customers to communicate with the service via email just as they would with a human executive assistant(Mishra, 2016).
- 9) Niki: Niki is an artificial intelligence company headquartered in Bangalore, Karnataka. Whether a pre-paid, post-paid or DTH recharge, paying electricity bills, booking a cab, getting a laundry or ordering a burger from burger king, this chatbot assists you in all of it. Celebrating its inception in the year 2015, Niki has attracted funding from the likes of Tata and Ronnie Screwvala. This fully automated chatbot works upon the concept of artificial intelligence with no human intervention(Srivastav, 2017).
- 10) State Bank of India: State Bank of India’s SIA chatbot is aimed to handle customer queries and guide customers through retail products and services(“SIA is State Bank of India's intelligent chatbot to assist customers with banking related queries”,2017).
- 11) HDFC Bank: HDFC Bank’s EVA was launched to provide conversational experience to customers across digital platforms. Customers can access product details, fees, application processes, branch IFSC codes, and other such information. HDFC Bank’s Eva claims to have interacted with over 500,000 unique users, with more 1 million unique conversations and more than 2.5 million queries addressed.(IANS,2017).
- 12) ICICI Bank: ICICI Bank’s iPal offers help on FAQs, paying bills, fund transfers, recharges and new feature discovery. It’s integrated with the search feature on the website and queries are routed to human operators, if needed(Maru, 2017).
- 13) Bajaj Allianz’s Boing: Bajaj Allianz’s Boing helps customers register claims, get a soft copy of their policy, check the policy status, locate insurance branches and networked hospitals(Chitra,2017).
- 14) Birla Sun Life: Birla Sun Life’s bot is expected to promote awareness, instantly generate a quote, register a claim, and help customers understand their policies better(ETCIO,2017).
- 15) PNB MetLife: PNB MetLife’s bot Dr. Jeevan is expected to educate customers on critical illnesses cancer and heart failure with interactive videos and personalized quotation. It’s available on Facebook messenger(“PNB MetLife introduces Dr. Jeevan, an AI Powered Chatbot for customer engagement”, 2017).
- 16) Lenskart: Lenskart uses its bot for order tracking, query logging and for assisted product discovery(“Lenskart chatbot”, n.d.).
- 17) Yatra’s: Yatra’s bot helps customer’s search and book flights directly through FB Messenger(“Yatra Cutting Edge Technology”,2016).
- 18) MeruCab :Meru Cabs’ messenger bot responds in real time with the cab details and the chauffeur’s mobile number once the customers verify their booking needs(Singh, 2016).

## VII. CONCLUSION

Chatbots really have useful applications, they can open up a new channel to communicate with customers, and in long-term, they can save hugely on human capital. If you’re not paying someone to sit at a computer and respond to customer service inquiries by phone, email, or chat, it stands to reason that chatbots would be a smart investment. So any business organization can have chatbots for their business without any hesitation as discussed. It has been proved that chatbots do not have cons rather they are indispensable in the present business scenarios for their success.

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