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BANKING ON ARTIFICIAL INTELLIGENCE: OPPORTUNITIES & CHALLENGES FOR BANKS IN INDIA

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ABSTRACT

Over the years, technology has revolutionized our world. It has changed our lives like never before. It has changed the way we think, the way we learn, the way we communicate or the way we bank. The technology itself is getting better and smarter day by day. It has also made our lives easier, faster, better... and more fun. To play our favourite Bollywood track or to switch on the TV Set or to get our bank account balance, we can just ask our "Siri" or "Alexa" and the work is done! Technology powered with intelligence (Artificial Intelligence, AI in short) has brought newer opportunities across all industries. Banks are exploring and implementing the technology in various ways - bringing smarter chat-bots for customer service, personalizing services for individuals, and even placing robots for self-service at their specialized Digital Banking Branches. AI in banks is bringing in more efficiency to their back-offices and even reducing fraud and security risks. Opportunities come along with new challenges as a package for the banks implementing AI. This study is an attempt to explore how Banks in India can capitalize on the opportunities, how banks face the challenges in adapting to the new AI culture and also to appreciate the global best practices.

KEYWORDS

Chatbots, artificial intelligence, robots, self-service banking.

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INTRODUCTION

What is artificial intelligence? Broadly, it refers to the development of machines or systems that can perform complex tasks normally considered to require 'intelligence' and thus thought to be the preserve of humans. In simple language, it can be defined as: a computer system that can sense, comprehend, act and also learn. In other words, a system that can perceive the world around it, analyse and understand the information it receives, take actions based on that understanding, and improve its own performance by learning from what happened. And by enabling machines to interact more naturally – with their environment, with people and with data – the technology can extend the capabilities of both humans and machines far beyond what each can do on their own.

Application of AI and ML (machine learning) to different functions within the banking industry has enabled them to offer a far more personalised and efficient customer service. By achieving that, banks have also been able to gain better insights into their customers' preference and expectations from the bank. Accordingly, automation of back-end workflows has shown better outcomes. Banks are reaping the benefits of banking on Artificial Intelligence through use of Chatbots, Robots in various areas of banking.

RESEARCH OBJECTIVES

1. To study the areas where the artificial intelligence is presently being used by the banks in India.
2. To study the challenges faced by the banks in India in adapting to new AI culture.
3. To appreciate the Global Best Practices in AI, particularly Chatbots, in Banks

RESEARCH METHODOLOGY

This research study is descriptive by nature with qualitative method of data collection and analysis. Data have been collected from various authentic and reliable secondary sources such as various reports published by RBI, IDRBT, NASCOM, Forbes, leading consulting companies, etc. and web sites of various leading banks in India. Inputs/Reports/Research papers from leading research institutes on Banking Technology/Artificial Intelligence have also been referred.

IMPORTANCE OF THIS STUDY

Some leading private sector and few public sector banks in India have started implementing AI in various applications – particularly Chatbots, while remaining banks are still on "wait and watch" mode. Some of the banks (of later category) may be very skeptical about the outcome of AI based initiatives by banks. Against this backdrop, we conduct this study to explore what exactly banks are doing with Artificial Intelligence now and what challenges they are facing. We have also attempted to study the global best practices in the area which can be used as opportunities for the banks in India.

LITERATURE REVIEW

Artificial Intelligence is not new to India. Research institutions and universities have been working with various AI technologies for decades, and especially in the area of social transformation. With enabling technologies becoming a lot more accessible and inexpensive, AI is now becoming mainstream, with large enterprises and start-ups looking at different opportunities. A research report of Accenture shows that the adoption of AI has the potential to add nearly \$1 trillion to the Indian economy by 2035.

The technology – which enables machines to simulate and augment human intelligence – has finally come of age. Artificial intelligence (AI) is creating the single biggest technology revolution the world has ever seen. Artificial Intelligence is being used, across all industries in general and banking sector in particular, to address a wide range of challenges, large and small, by making interactions with machines and systems simple and smart. It is like getting the best of both worlds – speed & accuracy of machines & intelligence of human beings. Artificial intelligence is expected to enable financial services companies such as banks, insurance companies etc. to completely redefine how they work, how they create innovative products and services, and how they transform customer experiences.

State Bank of India, the largest bank in India conducted "Code for Bank" hackathon to encourage developers to build solutions leveraging futuristic technologies such as AI and Blockchain into the banking sector. SBI is already using chatbot SIA (SBI Intelligent Assistant), while private banks like HDFC Bank and ICICI Bank have also introduced chat-bots (EVA & iPal respectively) for customers service. Some banks have even gone ahead with placing robots in branches for superior customer experience. Canara Bank installed Mitra and Candi robots at some of its offices in Bengaluru. HDFC Bank has deployed Robot IRA (Interactive Robotic Assistant) in some select branches.

Payment companies are using AI to offer personalised payment experience to consumers. By applying AI and analyzing past payment patterns, payment systems can prompt the preferred payment instrument which best suits a purchase at the time of checkout. Say a consumer avails EMI option frequently for his big-ticket

purchases, then the best EMI option is made available to the consumer at the time of checkout. Such personalised consumer experiences drive up consumer spending and creates stickiness to the product consumers are using.

As per a recent media (Economic Times, 04.06.2019) report, Axis Bank used robotic video assessment to hire customer service operators and assistant vice presidents. Algorithm based video interviews – along with aptitude tests were used to hire around 2,000 customer service officers from a pool of 40,000 applicants. Algorithms are analyzing people's emotional states nervousness and happiness based on eye movements, expressions and tone of voice.

AREAS IN BANKING WHERE AI IS USED IN INDIA

(What Banks in India exactly do with Artificial Intelligence)

CHATBOTS AND PERSONALIZED CUSTOMER SERVICE

Simply put, a chat assistant (colloquially called a chatbot) is an AI or computer programme that conducts conversations meant to replicate human conversation via auditory or textual means. Chat assistants have come a long way from their humble origins, with advancements in machine learning and natural language processing allowing them to "learn" from their interactions and hold conversations in a human-like manner, thereby becoming more "human".

With increasing automation, there is a fear of reduced loyalty due to less personal contact. However, increased AI usage does not necessarily mean less personalized experience, in fact, banks are using AI to increase client satisfaction, improve efficiency and maintain customer loyalty in many ways. Here is an indicative list of Chatbots being used by various banks in India.

TABLE 1: LEADING BANKS WITH CHATBOTS IN INDIA

Sl. No.	Bank	Chatbot Name	Year of Introduction
1	State Bank of India	SBI Intelligent Assistant (SIA)	2017
2	HDFC Bank	Electronic Virtual Assistant (EVA)	2017
3	ICICI Bank	iPal	2017
4	Kotak Mahindra Bank	Keya	2018
5	Axis Bank	Axis Aha	2018
6	Yes Bank	Yes Robot	2017

SBI Chatbot SIA helps customers with everyday tasks like a bank representative. SIA has been set up to handle 10000 enquiries per second or 864 million a day!

Customer Support and Helpdesk: Chatbot interfaces are used in banks to increase efficiency and reduce cost for customer interactions.

Digitization and automation in back-office processing: Capturing documents data using OCR and then using machine learning/AI to generate insights from the text data helps in cutting down back-office processing times.

Wealth management for masses: Personalized portfolios are managed by Bot Advisors for clients by taking into account lifestyle, appetite for risk, expected returns on investment, etc.

Risk Management: Tailored products are offered to clients by looking at historical data, doing risk analysis, and eliminating human errors from hand-crafted models.

Security: Suspicious behaviour, logs analysis, and spurious emails are tracked down to prevent and possibly predict security breaches.

ATMs: Image/face recognition using real-time camera images and advanced AI techniques such as deep learning are being used at ATMs to detect and prevent frauds/crimes.

ROBOTS

TABLE 2: LEADING BANKS WITH ROBOTS IN INDIA

Sl. No.	Bank	Robot/Solution Name	Year of Introduction
1	Canara Bank	Mitra & Candi	2017
2	HDFC Bank	Interactive Robotic Assistant (IRA)	2017
3	ICICI Bank	Software Robots	2016
4	City Union Bank	Lakshmi	2016

ICICI Bank has deployed more than 750 software robots (March 2018) to handle more than 20 lakh transactions daily. These robots are being used across different operations and LoBs including retail, wholesale banking, forex, treasury, agro and international operations. Most of the robots deployed have been developed in-house.

COMPLIANCE, FRAUD DETECTION AND ANTI-MONEY-LAUNDERING

Avoiding fraud and money laundering is a challenge for many banks. Artificial intelligence has the potential to help the banks become more efficient in the process of detecting fraud and money laundering. To quickly identify potential fraud, AI scientists have developed tools and systems that automatically conduct and compress data that normally requires many hours of labor in just a matter of minutes.

CHALLENGES FOR THE BANKS IN INDIA

Every opportunity comes bundled with a challenge. Artificial Intelligence in banks is no exception. For implementing AI in Banks, there are many challenges. From the lack of a credible and quality data to India's diverse language set, to scarcity of skilled data scientists/engineers and many more, experts believe a number of challenges exist for the Indian banking sector using AI.

AVAILABILITY OF CORRECT DATA

A key challenge is the availability of the right data. Data is the lifeblood of AI, and any vulnerability arising from unverified information is a serious concern for businesses. Imagine for example, the risks that could arise from KYC compliance AI systems if the data sources are incorrect. Or consider the efficacy of a fraud detection AI system without the right kind of data. Structured mechanisms for collecting, validating, standardizing, correlating, archiving and distributing AI relevant data is crucial.

MANY LANGUAGES

India has more than 100 languages with sizable spoken population. Applications which use speech to text or text to speech rely on natural language processing (NLP) libraries and techniques. Banks can use the existing technologies to start with to support some major Indian languages, but in order to effectively reach out to wider population in India, much more progress is required on NLP front.

DATA PRIVACY

Data access and data privacy is a central aspect of any AI work banks do. These aspects will be of paramount importance with introduction of regulations in Europe such as GDPR (General Data Protection Regulation). GDPR regulation is currently applicable to European citizens, but India and other countries have their own data privacy regulations. Banks in India will have to build AI systems with GDPR and similar privacy regulations in mind.

SKILLED MANPOWER

Experts also have also stressed the need for more skilled data scientists/engineers to drive the segment. "The biggest challenge is the scarcity of trained human resources; the existing workforce is not familiar with latest tools and applications.

One of the important challenges that is faced by Industry and not just banks in India is unavailability of people with right data science skills. With only small number of good data scientists available to do AI work, the industry needs to work with universities in India to develop skilled data scientists as well as develop in-house training programs to train employees on data science skills. Also identification of right use cases for AI implementation with the help of domain experts and data scientists can also help banks in successful implementation of AI technologies for banking functions.

FEAR OF UN-EMPLOYMENT

The AI technology is considered a big threat to make employees redundant in the banking sector. Banking Sector in India is one of the top employers in the organized sector in India. The mass adoption of AI may cause a grave unemployment problem in the sector.

UNWILLINGNESS OF BANK EMPLOYEES

Senior employees in banks, particularly those in the public sector banks, may not show much interest to learn new technology/applications related to Artificial Intelligence. This may lead to unnecessary delay in implementation of AI related projects. Some employees may be in their comfort zone not to learn new technologies.

GLOBAL BEST PRACTICES & OPPORTUNITIES FOR BANKS IN INDIA

Bank of America has already developed a chatbot, Erica, an AI-enabled tool that provides financial guidance for the bank's clients through voice and text messages. The service is accessible 24/7, and it can perform day-to-day transactions. This allows clients to have access to services at any time without costing more money hiring customer service personnel. Chatbots help ensure that, over time, less-typical queries have ready-made responses versus the current status quo where advisors often have to consult experts for immediate advice.

More and more banking organizations across the globe are leveraging artificial intelligence to launch chatbot solutions, reducing costs and serving increasingly tech-savvy consumers. In many instances, chatbots are developed to facilitate two-way communication, replacing channels such as phone, email or text. The objective is to provide quick service and transactional support.

TABLE 3: BANK CHATBOTS AROUND THE WORLD (OTHER THAN INDIA)

Sl. No	Bank Name	Bank Headquarters	Chatbot Name	Year of Introduction
1	Bank of America	North Carolina, USA	Erica	2018
2	American Express	New York, USA	Amex Bot	2016
3	HSBC Bank	London, UK	Amy	2018
4	Commonwealth Bank	Sydney, Australia	Ceba	2018
5	SEB (Sweden)	Stockholm, Sweden	Aida	2017
6	Deutsche Bank	Frankfurt, Germany	Debbie	2018
8	OCBC Bank	Singapore	Emma	2017
9	ING of the Netherlands	Amsterdam, Netherlands	Inga	2018
10	RBS	Edinburgh, UK	Luvo	2016

Let us discuss in detail some of these Chatbots and their features and capabilities.

Needless to say, the outlook for Conversational AI in banking looks very promising indeed. Banks are increasingly investing in AI-powered chatbots as a smarter way to acquire, engage and serve customers.

To get a better understanding of how Conversational AI has been beneficial to the banking sector, let us first take a look at some examples of successful implementations, from across the globe.

1) Erica from Bank of America

Erica has following features

- sending notifications to customers
- providing balance information
- sharing money-saving tips
- providing credit report updates
- facilitating bill payments
- helping customers with simple transactions

As of early 2019, Erica has surpassed 6 million users and has serviced over 35 million customer service requests.

2) Amex bot from American Express

American Express deployed the 'Amex bot' on Facebook Messenger. Once Amex card users link their cards with their Messenger accounts, they will receive messages and push notifications in the Messenger, related to purchases they make using their card. The Amex bot will make contextual recommendations based on the user's purchases, provide real-time sale notifications, and provide information regarding credit card benefits and loyalty program features – in addition to responding to any other customer support query.

3) EVA from HDFC Bank

- Eve provides better and faster service to customers
- Accessing information regarding branch addresses, IFSC codes, loan and interest rates etc.
- understands user queries and fetches the requested information from thousands of possible sources, in a matter of milliseconds
- The bot has been deployed across a number of platforms, including Google Assistant and Alexa

EVA has answered over 5 million queries with over 85% accuracy – holding over 20,000 conversations daily with customers across the globe.

4) Amy from HSBC Bank

- Amy provides real-time 24x7 responses to customer support queries.
- Amy has enabled customers to seamlessly access information regarding a wide range of HSBC's products and services.
- It easily handles routine queries and FAQs, and gradually learns to respond to more complex and broader queries over time by processing and analyzing customer feedback.

5) Ceba from Commonwealth Bank Australia

- Provides real-time customer support.
- Over 200 banking tasks such as activating their card, checking account balance, making payments
- Quickly analyze over 500,000 ways customers ask for 500 different banking activities, making it a highly powerful and effective tool for the Commonwealth Bank.

Banks realize a measurable lift in business results from their personalization campaigns. But, powerful as it is, personalization is only part of the story. To give customers what they want, organizations must be able to listen to them. That is where AI-powered social listening and recommendations systems come in.

A 2017 report by Juniper Research claims that for every query that a chatbot handles, banks save 4 minutes of an agent's time translating to a cost saving of 0.70 USD per query. More recently, it has been estimated that the operational cost savings from the use of Conversational AI in the banking sector will reach 7.3 billion USD by 2023. This represents a total time saved for banks in 2023 of 862 million hours – equivalent to nearly half a million working years!

MAJOR FINDINGS

There are primarily three use cases for which Conversational AI solutions have proved to be effective in the banking sector.

LEAD GENERATION

E-mail campaigns and cold calls are steadily losing their effectiveness. A conversational interface, like a chatbot, adds a novelty factor to the process of lead generation that appeals to prospective customers. These lead generation bots are embedded on the bank's websites or mobile apps and initiate conversations with users to find out if they wish to purchase products and gauge their interest. Later, these captured 'leads' can be sent to the bank's sales team for additional follow up until the sale is completed.

CUSTOMER FEEDBACK

As banks endeavor to continuously improve their customer service, collection of feedback from customers becomes crucial. The conversational survey format of feedback using bots makes it a far more compelling alternative to the use of long, static feedback forms – thus boosting feedback collection. Conversational AI, in particular, has seen a lot of interest in recent years, with a number of banks implementing AI-powered conversational solutions. Bots, be it chatbots or voice bots, can conduct smart and compelling conversations on behalf of the bank with millions of consumers, at a fraction of the cost of using human customer service staff. The interactive nature of Conversational AI, and its speed and efficiency go a long way towards enhancing the customer experience.

CUSTOMER SUPPORT

With the advancements in the field of computing and natural language processing (NLP, ML), chatbots have now become capable of having smarter and more compelling conversations, which means they can handle a wide variety of customer support queries which are redundant in nature. These bots can be plugged into most customer touch points, such as social media profiles (Facebook Messenger, Twitter), website (like Internet Banking), apps like mobile banking or Internet Banking, and other platforms. They ask users to specify their problems and either give them direct solutions or redirect them to the right person.

Here are some other interesting developments from the world of Conversational AI that are of tremendous value to the banking sector:

1) Voice Bots on IVR

Talking to customer care executives of a bank to get your work done may not be good experience. You might have been put on hold for an average of 10 to 15 minutes during working hours, making it seemingly impossible to reach an agent in case of emergency. A voice-based IVR (Interactive Voice Response) system helps battle this problem by providing customers with instant access to service through a voice-based conversational interface. In 2018, Kotak Mahindra Bank launched a voice bot called Keya aimed at helping users navigate swiftly and smoothly through the IVR systems. Further developments in the area of voice bots and IVR are sure to be immensely beneficial to banks.

2) Siri, Alexa and Google Home Assistants

Smart speakers and voice assistants such as Amazon's Alexa and Google Home Assistant are becoming increasingly more commonplace in homes across the globe, India being no exception. Just command your Siri, Alexa or Google Assistant for a bank account balance or a fund transfer & it will be done instantaneously. A number of banks and other financial service providers have already started adopting such solutions to be available across Alexa, Siri and Google Assistant.

3) Handling more unique and complex queries

Chatbots today are programmed to handle rather simple and redundant queries, which make up the majority of the volume of customer support queries. In addition to this, some replies which can be pulled from a knowledge base can be accessed by the bot using an API. However, certain complex user queries and requirements still reveal the limits of automation. The efforts of AI and NLP developers over the years has already significantly enhanced the ability of Conversational AI to self-learn to respond to such complex queries, and this capability will only continue to evolve with time.

HDFC's Humanoid Intelligent Robotic Assistant (or IRA) is a robot that visitors to certain HDFC branches can physically interact with. The assistive humanoid robot would respond to simple customer queries and guide them to the relevant staff or service counter. IRA was highly successful when it came to relieving the bank's staff from the need to respond to simple and routine queries – servicing an average of 60 customers daily. It's newest iteration, IRA 2.0, leverages the AI and machine-learning backend engine of HDFC's virtual assistant EVA to offer customers an even more personalized, voice-based conversational experience.

While assistive humanoids are a solution not very likely to see widespread adoption in the banking sector, HDFC's successful experiment in this regard stands testament to the innovativeness of Conversational AI in banking!

AI applications within banking sector include the following:

Fraud detection: AI has the ability to identify fraudulent activity in the real time behavior i.e. while it is happening, as well as identify what the next pattern of suspicious behavior will be by using location services.

Compliance with regulatory guidelines: Technology can be used to ensure that regulatory requirements are met and that data is kept with monitoring done on a real-time basis. This can ensure that the regulations are followed in the spirit.

Improving the customer experience: AI provides the opportunity for improved and faster decision making by deriving deep and actionable insights (e.g. customer behavior patterns). Some of these interactions will be with new voice or chatbot technology while other applications will be behind the scenes, supporting marketing communication.

Reducing cost of operations & increasing revenue: AI can offer the biggest opportunity by automating the frontline, by engaging with customers in a more automated and intelligent way offers significant cost savings, with the risk being spread over millions of customer interactions.

Enhancing customer engagement: Artificial intelligence will assist in the creation of customized and intelligent products and services, with new features, more intuitive.

Type of customer engagement can enhance customer loyalty without costly manual intervention. Going a step further, banks can leverage innovative technologies to integrate chatbots into more advanced uses.

The banking industry has only begun to scratch the surface with regard to the potential of AI, machine learning, chatbots and advanced technology. At the foundation of all of these advances is the ability to collect insights and apply advanced analytics to benefit the customers. Banking is a sector that has been ahead of the curve when it comes to adopting Conversational AI solutions. AI-powered chatbots and voice bots have significantly helped banks engage with customers at every stage of the customer life cycle.

AI systems can ingest and evaluate vast amounts of virtually any kind of customer-related information at lightning speed. From automation and analytics to disaster management and digital assistants, AI systems are delivering the business intelligence that boosts the bottom line in every part of today's smart banks.

CONCLUSIONS

The traditional banking has evolved and more and more banks are adopting new technologies like AI, Cloud, blockchain to cut down their operating expenses, to provide superior customer service and improve overall efficiency in the banks. Improvement and development in the AI industry will, no doubt, increase productivity at a reduced cost in banks. The recent push towards digitalization is rapidly influencing the traditional banking models. However, it has also exposed the banks to increasing cyber security threats and vulnerabilities. Banks must keep their employees updated with new technologies & processes that may be in place with use of AI in various areas of banking.

There are many ways AI can be explored in the banks. Leaders should broaden their vision and have long term plan for putting necessary infrastructure in place to collect and merge data sets across the bank. Without leadership, a clear plan and proper infrastructure to bring together data living across functions, departments and databases, it will be very tough to make the most out of AI systems.

Integrating artificial intelligence in the dynamic industry of banking has several benefits. Some of these include accuracy, reduction in human error, cost cuts, scalability, etc. Another important activity that will become easy to perform with AI is data analytics. Machine Learning can effortlessly process a large amount of data swiftly. Patterns can be observed and customer service can be enhanced accordingly. The right customer can be contacted at the right time with the right product, leading to rapid business growth. Jobs will have to be enriched in reply to emerging technology being used as an aid to human intelligence. In spite of all challenges, banks in India will get smarter and more intelligent to implement Artificial Intelligence in all possible areas so that it can provide better customer service, reduce bank's risks and cost of operations and also bring efficiency. Further banks in India will have a very exciting time ahead with many opportunities with AI to make their customers and employees happy.

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