Implementation of robotics and its impact on sustainable banking: A futuristic study

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Abstract. Nowadays we are standing on the edge of technological rebellion which would vitally modify the way we live and work. This paper focuses on understanding the changing economic and financial situations with advent of modern technology. Banking sector was analyzed with the help of secondary data collected through several reports, journals, websites and past studies. The study helped me attain insight into probable impacts of implementation of robotics in banking sector and the way it would help to ease the bank’s transactions, maintain sustainability throughout and enhance profitability. While in the field of manufacturing, repetitive procedure have been subjected to automation involving robotics and other technologies, since industrial revolution, robotics has now opened doors to other sectors of the world like banking and finance. This study has been undertaken to understand the impact of RPA (Robotics process automation) technology on banks and its future in a developing nation like India. The research has emphasized on alterations made by changing technology specially robotics in the banking industry.

1. Introduction

Machines can do many tasks, better, cheaper and faster- Cliff Justice. Change is the only constant. Humans can never ignore the existence of change and mere thing they can do is to amend to the altering ecology renovate themselves. First and foremost industrial revolution used steam power and water to mechanize production. Second revolution utilized electric power to build mass production. Third one opted to use IT and electronics for automating production and the fourth is now building upon the third and connecting human minds with technology, calling it Artificial intelligence [1].

For the times of ancient civilization there has been existence of user configurable automated devices, used to entertain people. Robot’s origin lies back in early 19th century. Robots are machines, specially programmed as well as controlled by a computer. They are able to carry multifaceted functions automatically either through external control or along with a command entrenched inside them. Robotics has replaced humans in almost every field. It helps people to get replaced in undertaking dangerous as well as repetitive actions that humans are not capable to perform due to several limitations [2]. Implication of technology all over has permitted staffs to configure computer software or robots with an aim to capture as well as interpret existing applications for processing a transaction, triggering responses, manipulating data, mining information and communicating with digital systems. RPA helps in automation of rules-based procedure along with software which needs minimum or zero human interaction and implements it to firm’s workflows, databases, Enterprise resource planning systems (ERPs) and email systems. In case of banks Robotics have the capability to decrease the functional errors, work constantly 24*7, and reduce cost incurred due to handling several staffs and also multitasking. This leads towards enhancement of sustainability, increment and advancement in consumer services but quantitatively and qualitatively and
even helps to augment the kind and number of audits. Presently booking of a taxi, purchasing any product, booking flight tickets, making payment, and much more can be done remotely. This has helped dropping cost of transport and communication has become more effective. Economists have prophesied that with present revolution number of job creation would decrease [1], [2].

Soon there will be a phase when people will be rewarded for their innovations, thereby making it essential for humans to focus on impacts that robots have on banking and financial sector. Automated teller machine exists since 1967, yet they have been unable to replace traditional teller jobs. As complex transactions are undertaken, human interventions are compelled. Best example of such compulsion is “demonetization” that took place in India. Some parts of such payments are replaced by several mobile e-payment wallets like paytm and g-pay etc. There always exists risks like KYC, valuations, limits etc. [3], [4].

2. Background

Banks today are scrambling to build as well as integrate digital technology into their operations, with an aim to deliver better consumer experience and decrease operating cost. This has become a necessity- but is yet not enough. For banks to thrive and survive in this dynamic ecology, ignorance of their activities impacting the sustainability of the business cannot be afforded [5], [6], [7]. Every single operation within banks have an impact upon firms, environment and economy thereby affecting their sustainability on a whole. It is no more a secret that banks today have to change constantly to supply best experience to their customers and stay competitive in the inundated financial segment. Having vast counter competition from many virtual banking solutions, banks face immense pressure towards boosting their efficiency and optimizing their resources. Scarceness of skilled resources, an abrupt rise in personnel costs, as well as necessity of improvement in the procedure efficacy are yet other challenges that banks are facing today. This has actually led towards adoption of Robotics also known as Robotic Process Automation (RPA) in the banking sector [1], [3], [4], [5], [8]. This study explores the major impact of robotics and the role it plays as well as can play in the coming future in order to develop and maintain sustainability within banking institutions sustainability.

3. Literature review

3.1. Robotics

Robotics has permitted machine learning and artificial intelligence to be a game changer in banking services. It decreased the cost as well as time which in return enhances the functional efficacy and productivity. As per a report by CBInsights, a technology insight platform, investing in robotics have enhanced to 587$ in 2015 from 155$ in 2011 [7]. In past few decades, virtual and also physical growth of banking through mobile, internet banking, biometric, tele banking, and solar automated teller machine (ATMs) have been replacing and have attained speed in past times. At the end of June 2008, total 2,36,199 ATMs were installed within India by several banks. Majority of ATMs were owned by private banks, followed by few offsite ones owned by SBI and its several subsidiaries [9].

3.2. Robotics in banking

Robotics in banking industry is defined as the usage of a powerful RPA software to- 

a) Install desktop
b) Install different end-user device—level software robots
c) Develop artificial intelligence workforce
d) Provide virtual assistance
Robotic technology has altered the face of modern day banking which has helped to satisfy millennials need of technology. RPA has also drastically streamlined a large variety of back office procedure which always used to consume time of bankers. By shifting such tedious, manual works from humans to machineries RPA helps banks to attain compliance and reduce risk. There exists great recording tasks in banking consumer’s life cycle, starting from withdrawals to deposits to loan documentations etc. [9], [10], [11]

RPA serves as the most efficient tool for banking sector, addressing all the technical demands of the industry and helping banks in maximizing their efficiency through minimizing cost, optimizing resource allocation and enhancing profitability. McKinsey forecasts second wave of artificial intelligence and automations in next two years, after which software and machine tasks would be implemented amongst 10-25 percent of bank operations, expanding overall capability and permitting the employees to emphasize upon tasks with greater values [12].

Before technological revolution it was undoubtedly very tedious task for consumers also to maintain the record. A major change that robotics bought is that it introduced a solution for entire banking sector for data management tasks. Exponential growth of robotics in banking sector could be estimated by the truth that the industry is assumed to be worth whopping $2.9 billion by the year 2022, as compared to mere $250 million in 2016 [13], [14].

With implementation of RPA bank staffs are capable of accessing information anytime and anywhere. Other areas where robotics has helped banking sector are:

a) Audit and compliance- instead of paying money to consultants, auditing can be undertaken easily with help of robotics. For instance, Bank of Tokyo- Mitsubishi brought a 58cm tall, 5.4kg robot named Nao which was well-equipped with microphone and camera and also had visual recognition as well as remote control system. It was able to identify 19 languages, and communicate with customers in different branches, and also answer their queries.

b) Processing tasks- banks can use robotics to undertake accounts payable, processing payroll, mortgage demonstration, as well as HR management functions. For instance, ICICI bank now uses RPA for performing over one million banking transactions within their backend functions every day, dropping their response timing by 60% as well as enhancing their rate of accuracy.

c) Retail banking- banks have used these robotics functions and have deployed these software RPA in more than 200 banking procedures across retail banking and agro-banking, treasury, forex and trade. Example: Barclays bank has implemented robotics all across a vast range of procedures like fraud detection, account receivables, risk monitoring and loan application processing. Also in India, HDFC bank has presented Eva (Electronic virtual assistance) which is India’s foremost Artificial intelligence based banking Chatbot (Chat robot). EVA has made easier for consumer to access any information regarding any banking product or services, their charges and branch’s IFSC codes. It handles over 50,000 queries and support everyday customer interactions to enhance bank’s capability in answering their enquiry. EVA never sleeps and her learning never stops!

d) Chatbot- Known as chat robots, currently they are used to conduct discussions with an original human. Progressive programs are being developed where two chatbots will be capable to communicate with one another. They are vastly used by e-commerce websites and also call centers aiming to solve consumer grievances. Growth of chatbots has also opened doors for consumer engagement and novel ways of carrying out businesses in the form of conversational commerce with the consumers [1], [2], [3], [4], [8], [15].
3.3. Robotics use-cases in banking

As robotics can be implemented to large count of business functions and automation projects, there are several well-defined use-cases in this space (Fig 1).

**Figure 1. Robotics use-cases in banking**

- **Automatic report generation**
  Generating report for fraud transactions in form of suspicious actions reports or, which is regular need of banks. Traditionally, its a mandate for officers to go through these reports manually and fill the SARs details, making their task complex and time taking. RPA involving natural language generation capacity, is able to read through such lengthy and complex documents before extracting needed data and filling SARs form.

- **Consumer on boarding**
  Consumer on boarding is a lengthy, drawn-out procedure in banks, majorly because of many documents need manual verification. Robotics can ease the procedure by capturing data from KYC documents through optical character recognition technique.

- **Opening account**
  With robotics installed the otherwise cumbersome process of opening a new account becomes easier and straightforward as well as accurate. RPA eliminates data transcription error which existed amid core banking and account opening requests, thus enhancing quality of the data of overall system.

- **Mortgage lending**
  Robotics permits for easier automation of several tasks needed for the process of mortgage lending, involving document processing, loan initiation, quality control as well as financial comparisons, resulting in loans getting approved faster and enhancing consumer satisfaction.

- **Anti money laundering (AML) and KYC**
  Both AML and KYC are both data-centric procedure, making it most suitable for robotics. Whether manual process or capturing suspicious transactions in banking robots implementation has been proved beneficial in terms of saving time and cost against traditional banking format.

Source: [8], [16]
3.4. Robotics- enabling sustainability and building better future of banks

Since past decade, financial sector and banking firms have been reported to have spent above $321 billion on fines and compliance operations. Banks are now thought to disburse some $270 billion every year, merely on compliance operations, which is above 10% of a bank’s total operating cost. Rise in operating expenses, compounded by regulatory fines and regulatory needs, dawdles the process and also leads to poor customer experience, throwing more number of people into problems of finding better ways to manage compliance. RPA can help banks to decrease manual efforts, mitigate risks, offer better compliance and improve overall experience of customers and development of sustainability. However, no added infrastructure needed along with low-code approach makes robotics most suitable for banking sustainability on a whole [17], [18].

Main aim of RPA in banking sector is to succor in proceeding repetitive banking tasks. It supports banking in enhancing their productivity by involving customers in real-time as well as leveraging several benefits of robots. Robotics being an extensive procedure, requiring robust staff training, structured inputs as well as governance. Nevertheless, once arranged and implemented properly, such robot based banking takes entire control of the system like keyboard, mouse, emails, clicking and opening applications etc [19].

As mentioned earlier, core of robotics supported procedure automation does not includes physical robots, rather software that are capable to replace humans on personal computers. RPA enables building digital workforce which works alongside staffs to drive better efficiency. Software (smart robots) involving dynamic and powerful procedure flow, automates tasks which would otherwise require human resources [19]. The per hour cost of a robot is essentially the cost incurred if the energy is consumed, typically 0.3USD per hour, resulting to an yearly cost which is fifty times lesser than that incurred if manual labor is involved. Cognizant, an IT firm undertook a research regarding the impact of digital technology specially robotics in work ecology and found that 46% of banking respondents were of view that decrease in customer interaction and front office tasks contributed to 15% savings on cost yearly [18]. Also, the flow has become standardized and reduction in error rates were noted. Decreased dependency on different procedures for executing tasks and safety assurance for users is of prime importance when robotics is used for banking tasks. Keeping the convenience element aside, robotics has also offered competitive working ecology to banks, resulting in better promising future. Some years later, banks might serve lesser clients physically yet might carry deeper relation with them. Robots would later serve as a means to store information and might work alongside human beings helping them work efficiently with optimum utilization of resources, resulting to better sustainability of banks. Robot advisors have been predicted to be parts of banks helping consumers to take correct financial decisions and stop them from making illogical choices [12], [20].

Robots might replace entire human banking platform in coming future. As mentioned in the study “Robotics in banking, 2015”, procedure of robotics does not depends on physical bodies but has immense impact on banks when it comes to monotonous procedures which are recurrent as well as rule-based. Banks in future can entertain queries 24*7 using robots which would be more economically efficient as compared to staff remuneration. Banks under continuous pressure of innovation and rise in competition from different sources, have to be adaptable enough to undertake robotics and gain sustainability throughout [5], [18].

Several studies [2], [7], [17] have said that robotics is shaping banking’s future and developing ways of sustainability. Robotics in banking is currently undertaking several tasks of data collection, dealing
consumer query, transactions and many more. Even banks are using robots to enhance their consumer experiences through combining touch speech, web, artificial intelligence, 5G technology and many more. Majority of banks today are using robots since years to undertake functions that were earlier undertaken by humans. AN ATM is a solid example of such replacement of humans by robots [17]. Another instance of robotics in banking can be Chabot which provides financial guidance using predictive analytics and cognitive messaging. Robots act as a virtual assistant and help customers to reset their passwords. Know your customer (KYC) is yet another mandatory procedure which has replace manual tasks with robots, to implement essential checks on consumers. Bearing in mind the manual procedure, banks have initiated using RPA to confirm consumer data. With enhanced accuracy, banks no more have to worry regarding frauds, risks, faults and procedure could be completed with minimum staffs and errors [1], [19], [21].

Robots reduce banking costs, enlarge skills as well as advances the experiences of the consumers, thereby enabling banks towards future sustainability. As per Brown et al. (2015), major drivers for automation beyond cost savings include: decreased rates of error (21%), lesser redundant tasks (21%), enhanced standards of workflow process (19%), decreased dependency on multiple screens and systems (14%), and reduced friction rate (11%). Also this study has proved that use of robotics helps in sustainability attainment and cost reduction by 55% in banking sector [6], [7], [17], [19].

As per Divekar (2015), industrial revolution taking place will definitely give rise to smarter banks effectively serving new generation raised on technology and smart phones [5]. Robots later will even be used in back office functions for automating manual procedures through rules on the basis of processing and decision making. This would help in error elimination and would enable smart as well as intelligent operation in back office tasks. Virtualization, automation and cloud computing if becomes key themes of banking would definitely promote sustainability in all banking tasks [7], [16], [17].

In approaching times, cloud computing would also be used by banking firms in form of cloud robotics. As per Dasgupta (2014), cloud robotics can be referred as application of cloud computing technology into robots, through which the self-directed behavior of robots are shifted towards the cloud this remote computer can ultimately interact with the robots through internet [2]. This literature also indicates that bank would be capable of using the technology of cloud robotics through leveraging the cloud computing technique which would also ensure bank’s automation in their back office functions along with front office tasks [11], [20].

A robot being multi-component device requires multidisciplinary knowledge like actuation, sensing and intelligence control. Novel designs can use only few amongst these components currently. For instance, if there is an issue of electricity consumption through actuation, electric vehicles can be replaced by windup clockwork motors or a biogas engine. This would ensure preservation of qualitative benefits of robotics, like accuracy, while diminishing its dependency upon higher power electricity supply. Such solution would demand substantial study in mechanical engineering, electrical energy conservation on smaller scales and also intelligent control. Thus robotics can enable sustainability through developing a mix of classical as well as sustainable technology and building novel applications. This totally depends on creative engineers as well as entrepreneurs fluent in the local ecology and carrying best knowledge of principles of traditional robotics and its mix with sustainable technology. With use of local resources and development of novel talents successful designs can be built through application of sustainable robotics resulting into better future of banks [11], [14].
3.4.1. Robotics and security. Robotics, that finds its backbone in artificial intelligence has revolutionized people’s lives. RPA has changed and it continuing to alter the way banking sector functions. Robotics supports both backend operations as well as front desk consumer experiences. Robots help in operational cost cutting for banks noticeably through decreased employees, enhanced efficiency and reduced requirement of physical locations. RPA even removes the risk of human error and also ensures compliance with regulators flawlessly, reducing the resources and time used to fix mistakes. RPA helps to easily backup information and effortlessly access data from off-site locations as well, to keep the bank and its transactions secure. Robotics is even ideal for stopping unlawful users from opening or even manipulating private data [5], [16].

Robots prevent attacks. They:

- Allow people having login credentials to have access to the sensitive data within the system
- Develop RPA ecology personalized through active directory integration for enhancing business efficiency.
- Adds encryption as a source towards secured usage of data. For example, if role-oriented access reduces interior risks, encryption then supports protection of the organization from any outer malicious action.
- Develop RPA center of excellence (CoE) team that collaborates for monitoring tasks that are scheduled, ensuring the protection against any kind of malware and implementing policies that decreases risks of business [18].

3.4.2. Robotics and its opportunities in banking sector. Banks have forever been known for their vast, manual procedures impacting overall customer satisfaction and productivity stages adversely. Robotics implementation within banking activities would give several excellent opportunities in order to automate few really critical banking tasks as mentioned below [12].

3.4.2.1. Customer services. Number of client enquiries daily in the banks (starting from query regarding balance to general data of accounts) is huge, creating difficulty for employees to respond and decrease the turnaround time. Robotics would permit banks to mechanize such ordinary, rule based procedures to effectually respond to enquiries in real-time, thus decreasing the turnaround timing substantively [16].

3.4.2.2. Credit card processing. Another time consuming procedure at banks is the application and approval of credit cards. It generally demands several verification thereby increasing the processing time and involving higher manual tasks. RPA can help banks in taking quick decisions in order to approve or reject the application with its rule-based approach [18].

3.4.2.3. Process of account closure. Banks receive several requests for account closure and have to deal with them on daily basis. A major reason is non-compliance on part of clients in the submission of mandatory documents. There are many advantages of robotics in banking industry [18]. Few of prominent ones are:

a) Scalability- the truth that RPA is greatly scalable, permits the banks to manage greater volumes at the time of business peaks by adding more number of robots and responding to any circumstance. Additionally, RPA implementation permits banks to emphasize upon innovative strategies to grow their business by releasing staffs from doing routine tasks.

b) Enhanced operational efficiency- Once set up properly, banks can fasten up their procedures, productivity and efficiency.
c) **Cost-effectiveness**- Same as any other industry, cost-saving is major for banking sector as well. Banks can look at saving around 25-50 percent of processing cost and time.

d) **Risks and compliance reporting**- Robotics in banking sector helps in generating entire audit trials for every procedure, to decrease the risks of business and maintain higher process compliance.

e) **Availability**- whether banks want to decrease manual errors or attain higher accuracy at lower cost, robotics 24x7 work enables completion of tasks assigned to them. Thereby, echoing the ever-existing availability.

f) **No infrastructure cost**- A major advantage of robotics in banking industry is that it does not demands any vital changes in the infrastructure because of its UI automation capabilities. Hardware and maintenance cost decreases in the case of cloud-based robotics.

g) **Quicker implementation**- RPA provides drag and drop technology in order to automate baking procedures, it is effortless to implement as well as maintain automation workflows without any coding needs.

h) **Growth of banks with legacy**- With implementation of robotics, banks are using legacy and novel data to bridge the gap amid process. Such type of initiation as well as availability of essential data in one system permits banks to build better and faster reports for growth of business [17], [19].

### 3.4.2.4. Robotics and ATM theft

Best thing that has ever happened to banks was ATM. Best instance of bank-oriented robots so far is Sanbot, already working in Banks within China. It helps to push forward limits of intelligent banking solutions. This helps bank to stay more competitive and provides them better rates for their customers, without destroying profit margins. Robots are great for providing security. While interacting with users, robots have touch interface which makes users sign in before it answers account-specific queries. With help of its 360 degree cameras, robots can ensure only authorized people are listening the conversation. In case of emergency, like robbery, robots can help keep the bank safe. Robot could detect emergency situations (even before it learns enough) and contact local authorities, robot does this faster than the bank’s staff and without risk to human life [9], [10].

### 3.4.2.5. Robotics and cybercrime

Cybercrime is defined as crime in which a computer is the object of crime or is utilized as a tool for committing the offence. It can be committed with minimum resources and from any location. Same system which has made it easier for people to undertake e-commerce and online transactions are now being exploited. Detection of criminals is tough and it’s a relatively lower risk action for greater rewards. Presently cybersecurity functions, generally, need a human being to spend their time going through alerts of potentially malicious action, a repetitive as well as time-consuming procedure. Banking people process more than 200,000 security cases daily on an average and more than 2000 hours every year are wasted because of false alarm. Robotics and computing is 40% faster as compared to traditional rule-oriented system and results in lesser false alarms as it learns and doesn’t repeat same mistake. More it analyses, more robotic understands fraudulent action and the patterns, which is something that helps cybersecurity professionals fight against hackers [7], [12].

### 4. Conclusion

This study titled “Robotics implementation and its impact on sustainable banking: A futuristic study” was undertaken to understand the impact of RPA technology on banks and its future in a developing nation like India. Time is money. People value time more than money. The advent of robotics in banking sector would guarantee better service quality with consumption of nominal time and optimum use of resources. Probably RPA’s use will be an uptrend and public will try and implement several aspects of financial sector.
With passing years there is going to be huge developments in technology in every single sector and banking is no exception. Due to major potential advantages there is probably no turn back and an enhancement in use of robots in future banking has been assumed to be a mandate. Nevertheless, the robots would bring in several security, business, and privacy issues, to be addressed for attainment of success in marketplace. With enhancing cybercrimes, hacking and data loss due to web based mall practices people feel uncomfortable to share their financial data, thereby making trust development an important task for banks. Though RPA would decrease the daily load of banks and ensure a more convenient and effective procedure, yet there will be a requirement to have human touch, always.

As per this research, it can be concluded that despite of several risks and uncertainties of RPA, people will still opt for robotics and banks will still implement RPA technology in coming future. Also public believes that there will be presence of robotics in banking sector in coming future and robots will be predicting facts and figures more accurately, but there will always be a need of human interface, especially in developing nations like India. Last but not the least, future of robotics in banking sector seems to be highly promising. Few years later, banking firms will be serving lesser clients manually and will have deeper relations with them. Robots in future would serve as a means to store data and can work together with humans which would help them work more competently.

Within the sustainable economic model, energy and resources are limited, the RPA can play a major role in the development of sustainable resilience across the country. Sustainable production management, in fact, does not preclude the use of robots. First of all, robots with the same ability as power, precision, and hearing are often superior to humans. Second, robots can be rearranged to use stable energy and material. Third, as already noted, new types of robotic control systems can be considered when the human robots cooperate to form a production unit, utilizing the power of both partners. Fourth, new applications for robots could emerge, supporting a sustainable economic model. One can think of application areas such as power generation and equipment, food chain, and renewals.

4.1 Future scope
This study can further be augmented by taking into consideration the views of banking staffs, on how and what they perceive about role of robotics in coming future of banking sector. Also study can be undertaken involving large sample for quantitative research, thereby bringing out more appropriate result. Main aim of technology is to minimize human requirement for undertaking tasks. Complete RPA implementation depicts no human association, no thoughts and no personnel activity. As, major banking firms are just worried about borrowing and lending practices, heading towards installation of RPA on a larger scale seems difficult because every single step in the procedure demands replacement of humans with robots. There are several people who are of view that RPA implementation into banking would lead to enhanced rate of unemployment and there are other who think that there will be a shift in human respond as RPA installation would create new opportunities. Future researches can be conducted to study the shift of employment trends, caused by RPA implementation.
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