Chapter 3
A Study of Robotics in Banking and Financial Services

Sudhir Kumar Pant
Uttarakhand Open University, India

Manjari Agarwal
Uttarakhand Open University, India

ABSTRACT

Banking and financial services are essential services for all organizations including government, public, private, academic, and not-for-profit organizations. The need for all government and non-government businesses to be digital businesses is on the increase, especially due to the situation arising during the COVID-19 pandemic. Organizations were forced to provide online service, even though the complete ecsystem like internet connectivity, smartphones, technology to deliver, or workforce readiness was not completely available. Robotics is a multi-disciplinary branch that designs machines that can emulate and replicate human actions, saving time and cost and improving the quality of service. The RPAs in banking and financial services can reduce costs, strengthen compliances, streamline operations, reduce operational risks, and can improve customer services. This study describes in general the emergence of robotics and studies robotics in banking and financial services.

INTRODUCTION

Banking and financial services are essential services for all government, public, private, academic and not-for-profit organisations. Every organisation has to keep a record of financial transactions and maintain an account with a bank. This bank

DOI: 10.4018/978-1-6684-7193-7.ch003

can be a government bank, public sector bank, private sector bank or cooperative or regional bank. The need for all government and non-government businesses to be digital businesses is on the increase and growing faster than ever before, especially during and after the Covid19 pandemic. This was forced even though a complete echo system like internet connectivity at both ends, smartphones, and technology to go online, the readiness of stakeholders like employees, customers, suppliers, government, supply chain etc was not completely available. However, most of the institutions quickly adopted the new mode of hybrid online delivery. This was true for all sectors like entertainment, eCommerce, medical consultation, banking, financial services, government services, etc. Banks were early adopters of technology, with the use of simple note-counting machines, use of calculators for day-to-day work, the use of the telegraph system in 1838, the laying of trans-Atlantic cable in 1866, to use of FedWire fund services in 1918, the introduction of diners credit card in 1950, Telexed network interlinking USA, Canada, Great Britain, Germany & France in 1966, followed with the installation of first ATM from Barclay's in 1967 (Kalra, 2019).

The word 'digital business' is a wider term, and may have different interpretations. One of the definitions is the delivery of products and services using any technology, connecting customers, with an organisation, and using a machine, to full fill their needs. A simple example can be a customer making an online bill payment by scanning a QR code or using a mobile wallet. Most of the digital transformation journey leads to larger and more complex transformation programs, focussing on consolidation, standardisation, and automation impacting people and process. Automation peace generally focuses on leveraging technology to automate repetitive tasks carried out by human beings.

Robotics is a multi-disciplinary branch, that designs machines, which can emulate & replicate human actions, saving time and cost and improving the quality of service. Robots can be virtual robots or referred to as bots, which are software-based and executed like an instance of a robot user hosted on a computer system, or can be hardware robots, which can perform human tasks, say on a factory production floor. In 1920, artificial automata were attributed to the term 'Robot' by a Czech writer. The term 'Robot' was pronounced differently between 1930 and 1960, and the current pronunciation came into practice in the '70s. The first digital robot came into existence in 1954, and this was the beginning of a new era for robotics. General Motors installed the first commercial robot in a manufacturing plant in 1961, for lifting hot pieces of metal and stacking them (History of Robots, n.d.).

Robotic Process Automation or RPA is a software-based robot application, where using drag and drop rule-based configuration and scripting, the repetitive tasks can be performed by a software-based robot running on a computer. Using RPA applications, one can configure robots like a human beings and assign them user

names, passwords and access to necessary applications, as is given to a real human being. The software-based robot, would invoke itself, at the scheduled time, pick up the tasks assigned to it, and perform them as per the business process configured in the application, similar to the human being. Chatbots and natural language processing bots are a few other types of robots to automate repetitive human tasks. These robots are also known as digital workers. As per Gartner 2022, the magic quadrant report for RPA, UiPath, Automation Anywhere, SS&C Blue Prism, Microsoft and NICE are leaders in RPA offerings. The banking and financial systems are known for processing a large volume of transactions, repetitive in nature, with timeliness, accuracy, and meeting regulatory compliances as the essence of the business. The RPAs in banking and financial services can reduce costs, strengthen compliances, streamline operations, reduce operational risks, and can improve customer services.

Fintech or financial technology firms use niche technologies to deliver innovative solutions for banking and financial services. Fintech offerings have disrupted financial markets and continue to grow faster than other sectors. Implementation of robotics for financial sector use cases is increasing rapidly. Fintech firms have come up with innovative solutions for investment, lending and borrowing, etc. using a combination of robotics and artificial intelligence (Pant, 2020).

The paper describes in general the emergence of robotics and studies robotics in banking & financial services.

OBJECTIVE

Banks are the backbone of the economy, keeping a record of financial transactions for government and non-government organisations. The traditional business of the bank was to accept deposits and lend to borrowers. Banks have evolved and grown to many newer areas like investment advisory, foreign exchange, etc along with an enormous increase in the number of customers and banking transactions. Technology has been the backbone of the banking system and the emergence of financial technology (fintech) has disrupted banking and financial institutions. Fintech start-ups are one of the fastest-growing sectors in the USA, China and India, followed by many other countries (Global fintech adoption, 2019).

The use of robotics by fintech start-ups is increasing with innovative offerings. The main purpose is to study the implementation and adaption of robotics in the banking and financial sector.

LITERATURE REVIEW

Banks

In the early days, there were no banks, and temples were considered safe places to deposit personal possessions or take loans. The priests were always at the temple, were considered to be trusted individuals and were early financial institutions. This is from ancient records of some countries like Greece, Egypt and Rome (Gajdhane, 2012). These personal possessions were later on converted into coins and notes, which was the first analogue money (Davies, 2010). The person who used to collect coins for deposit was known as a banker, as he used to sit on a bench and operate. As the business was expanding, so was the need for transformation of these banks from individuals to groups of individuals to companies. The first currency notes were issued by a bank in Sweden in July'1661. The primary function of banks is to accept deposits, keep deposits safe and lend money to borrowers at interest (Croxford et al., 2005). The banking sector is challenged by new fintech firms, who are not banks but are delivering services like a bank. In the long term, either bank would transform and offer services like fintech firms, or banks would continue to provide backend banking connectivity, and fintech firms may become front-end banks, or banks and fintech can co-exist supplementing and complimenting each other (Adrian et al., 2019).

Fintech

Fintech or financial technology has several definitions, however at the core of most of the definitions, fintech uses new and emerging technologies for delivering innovative banking and financial products and services, with ease of use and at a lower cost. Some of the technologies used by fintech are cloud, blockchain, artificial intelligence, the internet of things and robotic process automation (Vijai, 2019). Fintech leverages technology to improve and automate banking and financial services. This includes mobile banking apps, digital payments, and online platforms for lending, investment and insurance.

Niche Technologies

Web technology, cloud computing, virtualisation, artificial intelligence, machine learning, data analytics, the internet of things, blockchain, and robotics, are being used in most of the financial offerings by fintech (Hendershott et al., 2021). Fintech is synonymous with blockchain, machine learning, smart contracts and artificial intelligence (Mention, 2019). Fintech firms use web and mobile app technologies

for online applications, cloud computing technologies for storing and processing large amounts of financial data, data analytics and visualization tools for analyzing and understanding customer behaviour, and financial markets Artificial intelligence and machine learning for creating personalized financial advice, fraud detection, and risk management, blockchain and distributed ledger technology for secure and transparent financial transactions, biometric technologies such as fingerprint and facial recognition for secure user authentication, payment technologies such as NFC, QR codes, and digital wallets for facilitating digital transactions.

Robotics and Robotic Process Automation

The software-based robots are increasingly being deployed in the financial services sector. These robots can automate human interactions and functions and can intelligently deliver services using artificial intelligence. The fintech robots are deployed for digital advisory solutions, which automates decisions for investment or lending advisory, without any human intervention. The financial advisory function has multiple use cases in peer-to-peer lending, crowdfunding, and investment advisory. Some of the studies observe that customers still expect human interaction, along with robot-advisory. However, it was observed that with human intervention, the overall investment performance decreases, as compared to the performance of Robo-advisory without any human intervention (Ge et al., 2021). The robots enhance the customer experience in financial services, especially in the investment sector, for customers who have little or no knowledge of investments (Barbu et al., 2021). The robot advisors do not discriminate against customers as compared to the human advisors. The robot advisory improves ease of use for the customer in taking investment decisions (Jung et al., 2018).

Robotic Process Automation (RPA) is the use of computer programs to automate repetitive and routine tasks. In the banking industry, RPA can be used to automate a wide range of processes, such as chatbots, complaints, service requests, data entry, data upload, account reconciliation, monthly closings, and compliance checking. For example, RPA can be used to automatically extract data from documents, such as cheques, invoices and drafts, and enter it into the bank's systems. This can reduce the time and effort along with a reduction in errors. RPA can also be used to automate the monitoring of compliance with regulations such as Anti-Money Laundering and Know Your Customer. By using RPA, banks can improve their operational efficiency, reduce costs, and improve the customer experience. RPA are virtual, efficient workforce for banking and financial institutions, and can potentially reduce costs by 80% and time to perform the rule-based task by 90% (Kalra, 2019). One of the studies concludes that banks are leading in RPA implementation as compared to other sectors (Pramod, 2021). The customer experience is expected to

improve with the deployment of RPAs, as they bring in reliability and availability of information, on-demand to customers. There has been a lot of hype for the adoption of RPA by Banks, but in reality, there is a lack of adoption of RPA in the banking mainstream. There is a lack of academic research on robotics and RPAs for banking and financial institutions. Information security remains a challenge for customers to accept and adoption of newer technologies. The other challenge is to deliver human-like interactions of RPA with customers (Kumar et al., 2018). There has been opposition to RPA implementation by banking staff, due to fear of losing jobs, and growth opportunities. Banks need cultural change to adapt to newer technologies, which can reduce costs, and improve the time to deliver service, with a better customer experience (Pokharkar, 2019). The selection of the right process for the implementation of RPA is critical for initial adoption and success within a bank. The initial process should not be very complex. Within the scope of RPA implementation, banks should consider training programs for stakeholders, change management, perception management, and communication management (Camo et al., 2021). One of the studies concludes that RPA is an emerging technology, beneficial for the banking sector (Vijai et al., 2020). In 2017, in an interview with McKinsey, Prof. Leslie Willcocks, London School of Economics' Department of Management, based on 16 case studies, estimated benefit in terms of return on investment varying between 30% to 200% in the first year itself. Prof. Leslie recommends to plan for medium to long term return on investment, instead of short-term benefit. The major benefit can come from processes, which are repetitive and uses lot of manpower resource like customer inquiries, wherein manpower can be freed and redeployed. The exact savings are generally not available; however, several reports quote millions of US dollars savings by deploying RPA robots, who work round the clock, throughout the year.

Future Trends in RPA

The future of RPA would leverage intelligent artificial intelligence, machine learning, blockchain and a new model of RPA as a service will be available. This will reduce costs on one side and reduce time to deploy robots for new processes. The Forbes (2021) report estimates number of service providers for RPA as a service to grow between 200-300% in next three years. Further, the business growth of RPA implementation is expected to overtake growth of RPA software market growth. The adoption of RPA in SME segment is expected to grow by 70%+. This growth will be triggered by using subscription-based RPAs with popularity of RPA as a service.

METHODOLOGY

This study was conducted using the descriptive methodology. The review of the literature was carried out using a search on google scholar for keywords banks, financial institutions, fintech, fintech technologies, robotics, robotic process automation, RPA, robot-advisor, etc.

FINDINGS

The study examines the definition of fintech, technologies in fintech, and status of robotics implementation in banks and financial institutions. The key findings are summarised as follows:

5.1. Banks and financial institutions are known for the early adoption of technology. Newer technology adoption is important for banks to survive, as it reduces the cost of operation, and improves the time to deliver service, along with scalability and consistency.

5.2. Fintech firms are disrupting banking and financial institutions with innovative products and services. Fintech firms are providers of new technology, as well as a challenger to the banking and financial sector.

5.3. Some of the emerging technologies used by fintech are cloud computing, artificial intelligence, data analytics, blockchain, drone, the internet of things and robotics.

5.4. The early implementation of robots was in the investment and P2P lending sector, and are known as robot-advisors. The overall performance of investment from robot advisors is better and more consistent than human advisory.

5.5. The adoption of RPA will be accelerated with subscription model, RPA as a service. The SME segment comprises of more than 90% of Industry and service model will be help in adoption for this sector.

5.6. The banking sector is known for the early adoption of RPA, as compared to other sectors like healthcare and retail. The implementation of RPA in the banking sector can reduce the cost of the transaction by 80% and the time to deliver service by 90%.

5.7. One of the studies concludes 30% to 200% return on investment in the first year itself, based on 16 cases. However, the business case for RPA implementation should be prepared for medium to long term.

5.8. There is limited or no statistical data available on business case for RPA deployment, and there is a need to further study on this.

5.9. There are challenges to the implementation and acceptance of RPA. On one side, the banking employees have the perception that they would lose their jobs, on the other side customers have fear of data security, expectation of human-like interaction with RPA and an interaction with banking and financial analyst for while making a financial decision.

5.10. There is limited academic research available on robots and robotic process automation, and there is a need for further detailed research work spanning various functions of banks and financial institutions. There are few courses and programs available on robotics, however considering the potential of these technologies for the banking and financial sector, there is a need to offer more and more courses and programs by academic institutions for both students as well as professionals from the banking and financial sector.

CONCLUSION

The banks and financial institutions have evolved from deposit and lending to investments, treasury, insurance, cross-border currency, and many more functions. Robotic process automation is in existence for more than a decade now, and there are use cases where banks have successfully implemented RPA. However, there is a good potential for further implementation and adoption of RPA by banks and financial institutions. There is a need to address the fear and perception of the employees and at the same time, the customers need to be educated for awareness and adoption of RPA.

REFERENCES

Adrian, M. T., & Griffoli, M. T. M. (2019). *The rise of digital money*. International Monetary Fund.

Barbu, C. M., Florea, D. L., Dabija, D. C., & Barbu, M. C. R. (2021). Customer experience in fintech. *Journal of Theoretical and Applied Electronic Commerce Research*, *16*(5), 1415–1433. doi:10.3390/jtaer16050080

Camo, H., Harnesk, S., & Grufman, N. (2021). *Implementation of Robotic Process Automation: A case study of issues, challenges and success factors for RPA implementation in banking and financial services*. Academic Press.

Croxford, H., Abramson, F., & Jablonowski, A. (2005). *The art of better retail banking: supportable predictions on the future of retail banking*. John Wiley & Sons.

Davies, G. (2010). *History of money*. University of Wales Press.

Five Key Trends To Look Out For In The RPA Industry. (2021). https://www.forbes.com/sites/forbesbusinesscouncil/2021/08/18/five-key-trends-to-look-out-for-in-the-rpa-industry/?sh=6b78838750ab

Gajdhane, A. (2012). The evolution of banking in India. *Avishkar–Solapur University Research Journal*, *2*, 67–75.

Ge, R., Zheng, Z., Tian, X., & Liao, L. (2021). Human–robot interaction: When investors adjust the usage of robo-advisors in peer-to-peer lending. *Information Systems Research*, *32*(3), 774–785. doi:10.1287/isre.2021.1009

Hendershott, T., Zhang, X., Zhao, J. L., & Zheng, Z. (2021). FinTech as a game changer: Overview of research frontiers. *Information Systems Research*, *32*(1), 1–17. doi:10.1287/isre.2021.0997

History of Robots. (n.d.). https://en.wikipedia.org/wiki/History_of_robots

Jung, D., Dorner, V., Glaser, F., & Morana, S. (2018). Robo-advisory. *Business & Information Systems Engineering*, *60*(1), 81–86. doi:10.100712599-018-0521-9

Kalra, D. (2019, November). Overriding fintech. In *2019 International Conference on Digitization (ICD)* (pp. 254-259). IEEE. 10.1109/ICD47981.2019.9105915

Kumar, K. N., & Balaramachandran, P. R. (2018). Robotic process automation-a study of the impact on customer experience in retail banking industry. *Journal of Internet Banking and Commerce*, *23*(3), 1–27.

Magic Quadrant for Robotic Process Automation. (2022). https://www.gartner.com/doc/reprints?id=1-2AOVKCXF&ct=220728&st=sb

Mention, A. L. (2019). The future of fintech. *Research Technology Management*, *62*(4), 59–63. doi:10.1080/08956308.2019.1613123

Pant, S. K. (2020). Fintech: Emerging Trends. *Telecom Business Review, 13*(1).

Pokharkar, A. P. (2019). Robotic Process Automation: Concept, Benefits, Challenges in Banking Industry. *IIBM'S Journal of Management Research*, 17-25.

Pramod, D. (2021). Robotic process automation for industry: Adoption status, benefits, challenges and research agenda. *Benchmarking*.

The value of robotic process automation. (2017). https://www.mckinsey.com/industries/financial-services/our-insights/the-value-of-robotic-process-automation

Vijai, C. (2019). *FinTech in India–opportunities and challenges. SAARJ Journal on Banking & Insurance Research*, 8.

Vijai, C., Suriyalakshmi, S. M., & Elayaraja, M. (2020). The future of robotic process automation (RPA) in the banking sector for better customer experience. *Journal of Commerce*, *8*(2), 61–65. doi:10.34293/commerce.v8i2.1709