"A Study on Challenges and Opportunities of Emerging Technologies in the Indian Banking Sector"

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Abstract: In recent times, a multitude of technologies have surfaced and are currently being extensively employed within the banking and financial industries. Among the various technologies available are robotic process automation (RPA), machine learning (ML), artificial intelligence (AI), big data, block chain integration, cyber security, cloud computing, and cryptocurrency. These technological advancements ease human lives. On the other hand, some people are not aware of them in the public domain. This study aims to educate readers on the benefits of these technologies in financial services and how they can be used to their advantage. The data from this study will assist different stakeholders in developing plans for growing their businesses and acquiring new clients while gaining a competitive edge. Since the descriptive technique was most suited for this topic, it was used to perform the research. Information was gathered from a variety of sources, including websites for listed businesses, RBI, SEBI, and published reports. Credit evaluation, check payments, money transfers, merchant services, currency exchange, wealth management, stock market, portfolio management, and insurance are only a few of the processes that heavily rely on the chosen technologies. Therefore, this is beneficial to all parties involved in these companies. One significant outcome of this study is the rapid growth of digital accounting, which in the future may totally replace human labor.

Key words: Hyper automation, Artificial Intelligence, Digital literacy, Block Chain Technology, Robotic Process Automation, and Data Analytics

I. Introduction

The world is changing quickly thanks to cutting-edge technology, and it is achieving novel feats in a wide range of industries, including retail, education, financial services, supply chain and logistics, and transportation. Technology has permeated daily life and changed how people live, from getting out of bed in the morning to going to sleep at night. Technology brought about the shift, which is an   essential phenomena to endure on our cutthroat world. Technology is used in many ways, such as the sensor bell at the door of one's house or the first landing on Mars. All industries benefit from it, but there are also numerous, widespread issues that arise as a result of it. The human race still has a great deal to learn about the applications of technology, and there are still a great deal of issues that require thoughtful answers. Financial services are changing as a result of digital innovations. For instance, online banking is replacing traditional methods of conducting business by being accessible to customers around-the-clock; physically handled stock market transactions are being transferred to online platforms; big data assists in properly organizing data on electronic devices so that it can be used whenever necessary; data mining is used to acquire new clients and manage risk; the financial sectors have given rise to new terms like Regulatory Tech and Super Technology due to the growing power of artificial intelligence and machine learning; cloud computing is used to protect data and fault tolerance; and block chain are employed to transmit money from one end to the other end efficiently. For instance, Ripple Net's usage of block chain technology enables customers to transfer money in five seconds. Many Fintech companies have successfully entered the market with De Fi systems, which allow you to keep your money in a safe digital wallet rather than a bank, thanks to block chain technology. His ground breaking work will alter centralized finance. The drawbacks of service advancement include decreased security, an increase in fraud, problems with trust and loyalty, difficulty altering regularly scheduled operations, difficulty shifting mind sets, etc. The reader will gain a thorough understanding of developing technologies in this study effort, including their applications, benefits, and drawbacks. This knowledge will aid in the development of new tactics aimed at outpacing competitors and gaining a competitive edge. Additionally, readers will discover the topic's future potential and contribute to more research. Additionally, they will learn a few new phrases related to the banking and finance industry. They will discover the innovations made in this field by Fintech and how the latest Fintech are controlling banks and other financial institutions.

II. Literature Review

Gardiner, a. e. Finance (1978) reported that the first transfer of money via electronic medium was done in 1915- in the starting of 20th century by Federal Reserve bank. After this in 1918, American banks connected reserves' telephones, federal reserve board and the treasury by telegraph which results in a telecommunications system to process the funds transfers. In 1934, IBM 801 bank proof machine were invented and IBM 803 proof machines in 1949 to do many kinds of financial services. (WO. Technology and future of financial industry, 1985) In 1950, the first credit card company named Diners club international was developed which has introduced first independent credit card. (Wang j. y. Technology transfer in international business, 1994) In 1952, Artificial intelligence was earliest coined by Mc Cathy and was realize for the smart machine manufacture in science and engineering Sectors. In 1955, the term Machine Learning was introduced by Samuel A. (Simon, H.A. Artificial intelligence: An empirical science, 1995) In 1971, NASDAQ become the largest automated and electric stock exchange in U.S. In 1982, Big data was

involved in the finance to make the life of employee easy. In 1993, Citicorp launched the financials services with the help of technology. With the help off all the established technology the Wells Fargo become the first company to offer the online checking service. (Sahut, J.M. the adoption and diffusion of the electronic wallets, world academy of science, 2008). In 1997, use of mobile payment was done on buying of the soft drink by vending machine. PayPal was founded in 1998 in the name of continuity, which started security software for portable gadgets. In 2000 online banking was developed by the Elon Musk. (Armstrong L. Bank of America secures the internet network, 1994) (Lescourret L. cold file, investor risk and information sharing during the pre-1997, 2017).

In 2008, block chain was developed by the pseudonym Satoshi Nakamoto. Similarly in 2009, the first transaction of block chain with the use of bitcoin was initiated. Here bitcoin was declared as cash which can used for the bank transfer or for cash transaction on various things. (Chen M.A. How valuable is Fin Tech Innovation, 2019) (Rella L. block chain Technology and remittance from financial inclusion to correspondent banking, 2019). Stepping down on the way of innovation, in 2011, google pay was introduced as peer-to-peer payment services which is connected to the sender and recipient's bank that allow the transaction between two person or merchants at zero cost. In 2012, Coin base was invented as a cryptocurrency trading web which give customer to storage and exchange services. (Al,2004) (Do, 2014) Advanced Block chain was introduced in 2014 which has increased the scope of the financial firms and Transactions. Smart contracts and Decentralised applications were developed with the help of the advanced technology in 2015. After invention of so many technologies in finance and banking sector, U.S came with the term Green financial technology to avoid the unnecessary pollution and move towards creating healthy environment. For an example the use of the papers was reduced and almost all the data is started storing in the machines. (Do, 2014). The use of tech in finance become the trendiest thing in modern era. The buzzing word called FINTECH become popular in the market. Due to which university started providing bachelor' degree in Fin Tech. (Guo. Bouwman. J, an analytical framework for m-payment, 2016). In 2018, the first investment was made in FinTech be the google ventures. Slowly and gradually many big players started playing in the Fin Tech firms. (Anastasiei. B, Dospinescu. N, Dospinescu. O, 2019). The high-level of conference started conducting to approach sustainable finance on international level to connect the financial technologies with the sustainability. (high-level conference: - a global approach to sustainable finance by European commission, 2020)

Gond (2017). stated that banking sector is a fast growing sector in India. Researcher examined that in order to attract customers, retained them, find new opportunities, to maximize revenue and minimize their own losses banks are using latest technologies like big data analytics. He stated this by giving examples like HDFC bank uses big data analytics for getting complete picture of their customer. ICICI bank uses Business Intelligence and Analytics for reducing their Credit losses. SBI uses Analytics for determining ATM location and amount of cash it should carry. He analyzed that.

Nancy Syan(2018). Stated that because of digitization new value added and customized products were introduced by Indian banks which makes banking as innovative or creative banking. The researcher examined that digitization has given rise to new techniques which helps banks to create more customer centric products. But use of networking and internet had also created new challenges in front of banks related to privacy, security and confidentiality to transaction.

Research Gap of the Study

This study aims to highlight the current state of Internet banking in India and discuss its ramifications for the country's banking sector. Numerous articles discuss the significance of Internet banking in India as well as its future potential for the country's banking sector. These studies, however, show no actual connection between Internet banking and bank profitability. The goal of the current study is to determine the variables influencing adult customers' approval as well as the degree of security concern.

Objective of the Study

    1) To exhibit the technical advancements in the Indian banking sector.

    2) To look at recent trends and advances in the banking industry

    3) To research new trends in banking technology.

III. Research Methodology

The present research study uses the most recent available published secondary data. To achieve the above stated objectives, the secondary data was used. The secondary data that are mainly used are published in annual reports of various banks and survey reports of leading business magazines. The secondary data was also used from various reference books related to E-Banking, Banking Service Quality, E-Commerce, M-Commerce, Information Technology, Marketing, Banking, Finance, Commerce, Management etc. For the said research study the secondary data is also collected from the various National and International Research Journals which are related to Commerce, Management, Marketing and Finance. For the said research study the data pertaining to the above objectives was collected and reviewed the literature on the topic concerned. The literature was thus collected by visiting various libraries. The Secondary data is also collected from various website.

Prospects for new technology in the banking industry:

The banking industry is undergoing a significant transformation driven by advancement in technology, Digitalization, automation, and data – driven insights have become key focus areas for banks looking to enhance customer experience, streamlines operation and gain a competitive edge. Here's an overview if the current state of technology in the banking industry.

❖ **Digital Banking:**

The way that consumers interact with their banks has evolved with the development of digital banking. Self-service solutions, internet portals, and mobile banking apps are now commonplace and offer clients instantaneous and convenient access to their accounts. Credit card and virtual currency wallets like as Render, E thereum, and Bitcoin are becoming more and more common. A survey published in the Economic Times projects that by 2023, digital banking transactions would total $1 trillion.

❖ **Hyper automation:**

Robotic process automation (RPA) and AI/ML skills are used in hyper automation to automate complicated business processes from start to finish. Banks can use hyper-automation to automate rule-based and repetitive processes including document processing, customer onboarding, and data entry. Banks can lower errors, increase operational effectiveness, and free up staff to work on higher-value tasks by automating certain procedures.

❖ **Low-Code Development:**

Banks can create applications with little to no coding knowledge thanks to platforms like Kissflow, which speeds up development and lessens the need for conventional coding techniques. These platforms enable both technical and non-technical stakeholders to engage in application development through visual interfaces, pre-built templates, and drag-and-drop functions. Banks may swiftly develop unique applications, optimize internal procedures, and provide cutting-edge client experiences by utilizing low-code development.

❖ **Artificial Intelligence (AI) and Machine Learning (ML)**:

Banks are using these technologies more and more to improve consumer experiences, detect fraud, and increase operational efficiency. Chat bots and virtual assistants driven by AI are being utilized to offer individualized help and support. Simultaneously, machine learning algorithms examine extensive datasets to extract significant insights for risk evaluation and consumer classification.

❖ **Robotic Process Automation (RRA) :**

The banking sector has seen a rise in the use of robotic process automation (RPA), which automates tedious manual operations and boosts operational effectiveness. Banks can increase efficiency and decrease errors in repetitive tasks like data entry, compliance checks, and customer onboarding by implementing software robots.

❖ **Computing:**

Cloud To reduce infrastructure costs, increase scalability, and facilitate quicker application deployment, banks are adopting cloud computing. Cloud-based solutions allow banks to innovate and swiftly launch new services since they provide improved data security measures, agility, and system integration capabilities.

❖ **Block Chain Technology**:

Block chain has become a disruptive force in the banking sector, revolutionizing processes including identity verification, cryptocurrency trading in futures markets, and cross-border payments. Its decentralized and secure design has the ability to save expenses, simplify procedures, and improve transaction transparency.

❖ **Data Analytics and Big Data:**

Banks leverage data analytics and big data technologies to derive actionable insights from vast customer data. By harnessing data analytics, banks can better understand customer behavior, personalize offerings, and make data-driven decisions to mitigate risks and optimize operations.

❖ **Cyber security and Fraud Prevention:**

With the increasing digitization of banking services, cybersecurity, and fraud prevention have become critical priorities. Banks are investing in advanced cybersecurity technologies, including threat intelligence, SOAR solutions, encryption, and biometric authentication, to safeguard customer data and protect against evolving threats.

❖ **Internet of Things (IoT):**

IoT technologies allow physical objects and devices to be connected to one another so they can exchange and gather data. The banking sector can benefit from IoT in a number of ways, including real-time fraud detection, individualized customer experiences, and remote asset monitoring. Banks can utilize IoT devices, for instance, to keep an eye on ATM performance, manage inventory levels, and send out tailored offers depending on client location and preferences.

❖ **Automation and Develops:**

To facilitate continuous integration, continuous delivery, and quicker application deployment, Develops approaches integrate software development with IT operation. Banks can shorten the time it takes to launch new services, increase communication between the development and operations teams, and raise the general caliber and reliability of their applications by implementing DevOps techniques. Automation technologies help banks attain greater operational efficiency by quickening the development and implementation processes.

Challenges

1) Automation and AI may lead to unemployment:

AI and automation are the major breakthroughs of today's innovation era. Although the benefits are promising, technology revolution poses a great threat to many of the jobs which will be completely automated and opportunities for job seekers will shrink. Banking is no exception to this fact.

2) Voice Revolution will take over online banking:

As voice recognition and voice authentication mature, web traffic to banking sites and mobile applications may drop by 50% in next few years. Customers will simply TALK to an internet connected device and perform most common banking tasks within few seconds. Drop in web traffic due to voice recognition systems could pose a serious threat to banking industry. The customers who currently visit the websites for banking tasks, also go through the marketing promotions on the site. The banks may lose the opportunity to cross sell current customers with drop in web traffic.

3) Issues related to Biometrics:

Operational issues – A minor could change the voice quality and may pose problems in speech authentication. People who work in labour intensive jobs may have damaged fingerprints. Even the senior citizens may have problem in fingerprint authentication. © 2020 JETIR December 2020, Volume 7, Issue 12 www.jetir.org (ISSN-2349-5162) JETIR2012274 Journal of Emerging Technologies and Innovative Research (JETIR) www.jetir.org 566

4) Security issues:

In its note on 'Digital Payments - Analyzing the cyber landscape', KPMG mentioned, cybersecurity is one of the most critical challenges faced by stakeholders of the digital payment ecosystem. With more and more users preferring digital payments, the chances of getting exposed to cybersecurity risks like online fraud, information theft, and malware or virus attacks are also increasing. Lack of awareness and poor digital payment ecosystem are some of the primary reasons that have led to increase in these attacks.

5) Digital literacy in rural areas:

There has been considerable growth in the users of smartphone in rural India in last few years. But not many are aware and confident about online banking through smartphones. The primary usage of smartphone is restricted to entertainment and communication only. As the urban tech savvy customers adopt the changing landscape of ICT innovation in banking, Indian rural population yet needs to be educated about the concepts of AI, Biometrics, Blockchain, Big Data etc.

Findings of the Study

1. Over the past five years, banks have launched a number of cutting-edge solutions that have aided in back office operations as well as customer acquisition and retention.

2. Recently, the bank deployed robotics-based, AI-powered, and extremely advanced technology-driven services.

3. Because they find mobile banking capabilities to be so user-friendly, bank customers tend to enjoy exploring them.

4. An analysis revealed that many customers are not yet aware of newly offered products, which prevents them from testing them.

5. Consumers who are aware of new services but would rather not use them.

6. Social media and the bank's website are the main sources of information for customers.

Suggestions

1. The bank should take the initiative to adequately publicize its products and should use social media platforms or websites to create awareness, as it was found that clients were not aware of the bank's offerings.

2. Given that many customers prefer social media platforms, banks should also concentrate on raising knowledge of social banking tools like pockets, I Wish, and icici bank pay, which are available on Facebook and Twitter.

IV. Conclusion

The growing reliance on smartphones and the internet has made the digitalization of the banking industry unavoidable in order to meet global standards. The daily routine banking transactions become less dependent on humans as a result of digitalization. It improves convenience, enabling firms to operate independently of one another's schedules. Using the many features offered by digital banking, it is possible to automate the payment of insurance policies and utility bills. Using digital banking has made it easier to pay for Uber and Ola with ease and recharge mobile devices. The method for booking train tickets has also been changed by digital payment systems. Digital banking makes it easy to bank whenever and anywhere you choose. The different possibilities offered by digital banking make consumers' lives easier. However, as with everything worthwhile, there is a price. Currently, the average person is not well-versed in the security elements of digital banking, which encourages fraudsters to con people out of their hard-earned money. For digital banking to succeed, mobile and internet access are essential components. There is a risk to bank employees' employment in the banking industry as a result of the rapid development in digital banking usage.

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