

Revolutionizing the Banking Sector: A Comprehensive Study on Modern Technology Services

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Abstract

The modern technology is unavoidable in the present global scenario. It does not lone posing challenges to the developing or under developing countries alone rather it too poses more challenged to the developed countries like UAS, UK, Russi, etc., Using of Technology is one challenge but at the same time protecting the data is becoming another challenge.

Among the different challenges in using Technologies, the countries are taking more efforts to protect the privacy of data of individuals, companies, Business etc... here in this study an effort is taken to chart out different technologies used all over the world and protection system adopted by the different countries for protecting them without interventions of the intruders.

The study is descriptive and analytical in nature, secondary source of data is used for analysing the latest data related to the Technologies used in Banking sector.

Keywords: Digital personal data protection, Top technologies, Banking process Automation and Block chain Technology

1.1 Introduction:

Banking sector in India is developing largely in the resent past and empowered itself according to the changing technologies. In the context of globalisation its services with in the country and outside the country is an indispensable one. In the world most of the developed countries are accepting the role of India is deciding the economy of other countries.

Technology is a king of 21st century's unique gift, where the business and financial transactions have become simple and process have been simplified and it is accepted at any part of the world and any category of people, literacy rate and other criteria like education, civilisation or language are not barriers for accepting the technologies in the new millennium.

The resent business is technology based where all the transactions are virtually happening, the cloud computing is becoming outdated and virtual technology is introduced, where wireless technology is used and complicated algorithms are used for protection of technology. Indirect accessing or breaking the fire walls or protection codes have become complicated.

Special laws for protection of privacy of Individuals

In the resent past the Indian government has made major changes in its **digital personal data protection act India (DPDP)**. Where amendments introduced in right to information Act 20025, to remove legal basis in

allowing government agencies to share personal information and warned the dilution of transparency law (*The Hindu Bureau, 2019*). the effort for protection of legal framework for privacy was made in the year 2010, the paper considered the need for privacy and data protection for ICT-based programs especially Indian digital identity cards Aadhar, voters ID, pass ports and other government linked digital cards. The experts committee chaired by Justice AP Shah was appointed and final report in the 2012 also recommended the creation of privacy legislation for India. The act recommended three version liked between 2011- 2014. But an ultimatum this is stopped never focussed on.

Again, in the year 2017 legal debate on privacy is continued the supreme court of India had been hearing a raft petition challenging the constitutionality of the Aadhaar system which infringement of privacy. The decision of Justice K.S. Puttaswamy V Union of India, the supreme court affirmed the privacy of protection is constitutionally accepted (*Malavika Raghavan, 2022*).

The digital persona data protection bill act of India (DPDP) is come to final state after sever years of discussion. The official gazette on Friday August 11,2023 the bill was passed in the lower and upper houses (*Raktima Roy, 2023*). of the parliament and received the acceptance of president.

India is a most populous country where more than 1.5 billion of people are living is a largest democracy and has 19th position in G20 members to pass this comprehensive data protection act.

Background of the study

The internal technology Is considered third wave of revolution after agricultural and industrial revolution, the usage of POS and cash deposit machine is not matching with the expectation of the government of India as compared with demonetization. (Prof. V. Narasimha Rao. 2018). Information technology is and e-banking are being more realistic form contributed for improving banking services in order to matching with the growing competitiveness. (Meri Boshkoska., Kosta Sotirovski. 2018). In service firms, technology investments and exporting decisions remains unexplored, instead of their prominent role for economic growth and prosperity. (Shubin Yang et al., 2020). Digital adaptation and reformation in banking sector are continuous process it affects both internal and external environment reduces the burden of internal process and complications in the existing methods. (S. Reoco Shalin, Mrs. K. Princy Hebshibha. 2022). The rapid development in information technology affects the day today life, and poses challenges to domestic banking in protecting its customers amid increasing complexity and dynamism. (Mitha Christina Ginting. Et Al., 2022). The present technology contributes for cashless society, has its serious impact on disseminations of financial services. (U. Midhunde. Et al., 2023). Application of fin-

Technology and digital technology will increase customer retention and attract prospective customers. (Pendyala John Adinarayana., B.Kishore Babu. 2019). The new era of AI increased e-finance, Artificial intelligence-based approach improves decision-making and contributes for increasing banking functionality efficiency. (Rajani H. Pillai. 2019). The new 4.0 technology in banking sector help to increase the service providing capacity as well as opportunity for potential improvement. (Oshadhi Bandara. Et al., 2019). The services like email and fax into instant messaging or chat, virtual words, social networking sites, wikis, twitter, blogs in the workplace beneficial in transferring information. (Sulochana Shrestha. Et al., (2019). The Algerian financial institution announces that the adoption of modern technology not only based on feasibility, but also responses well according to the growing competition. (Mostéfaoui Sofiane. Et al., 2016). The comprehensive coverage of digital technology, involvement in financial services, and regulatory components are source for effective mechanism (Yulia Evdokimova., Elena Egorova., Olga Shinkareva 2021). Rapid Technogym in ATM, online, mobil, telephone banking suits for retail segment. (Dr. S. Bulomine Regi., Dr. C. Eugene Franco. 2017). The central bank is motivating the commercial banks to provided better technology bases services in order to retain and provided prompt services. (Gayathri. Et al., 2021.; C. Nandhini. Et al., 2021). Electronic banking, digital banking can improve productivity of financial companies in rightful way. And it brings impacts in governance and monitoring system. (Dr. T. Ravisankar. 2021; Arathi Sivaram., E. K. Satheesh. 2021; Diyan Lestari., Basuki Toto Rahmanto.2021; Tatjana Boshkov.2017).

1.2 Statement of the problem

In today's ever-evolving digital landscape, the compulsion to embrace cutting-edge technology is more prevalent than ever before. The adoption of advanced tools and platforms has become mandatory in order to stay ahead in a fiercely competitive market. As technology continues to rapidly evolve, businesses must keep up with the latest developments in order to remain relevant. Countries cannot abstain from technology. It needs to at least buy latest technology, because a country cannot invent all the technology on its own and inventing on own consumes more time and investment. The modern geopolitical tie-ups created opportunity to acquire the technical- know how, or copy rights or patents rights where the technology can be instantly used.

Under the bilateral business and technology agreements the countries are exchanging technologies for reconstructing its economy and also gives space to other developing countries or under developing countries to adopt latest technology. Though the technology transfer or interchange happens it is not happening in all the fields but restricted to few fields alone, but commonly happens in the field of finance and banking. So, it becomes compulsion to the banking industries to use modern technologies for its economic developments.

Thus, the researcher made an attempt to bring out the various technology aspects used in the banking industries for providing smooth and speedy solutions.

1.3 Objectives:

1. To examine the latest technologies used in banking industries for transitions
2. To evaluate the various e-based facilities based on virtual technology
3. To examine the protection walls or systems provided for transactions protections

1.4 Methodology

The validity of Any research depends upon the systematic method of collecting data and analyzing the same in a logical and sequential order. In the present study, an extensive use of secondary data has been made, making use of descriptive and analytical research.

The secondary data were also collected from different leading business journals and magazines. A number of standard text books were studied to obtain pertinent literature on the Technology used in the banking sectors. Web resources related to banks were also used to collect the latest information about the customers' opinion about technological services in the study area.

Statistical tools used only percentage analysis is used for identifying the priority of using technology and reasons for protecting against cyber securities and usages of artificial intelligences in the banking companies.

This study has its limitations due to time constraint only secondary data is collected, the data shown is taken from the web sources not generated from the primary source.

1.5 Findings and Discussions

The following table shows in details regarding modern banking technologies used in the banking sector all over the world.

Table no:1 Modern banking Technologies

S.NO	Modern banking Technology	Percentage
1.	Artificial intelligence	23
2.	Open Banking	19
3.	Hyper -personalized Banking	13

4.	Banking things	8
5.	Cybersecurity	8
6.	Blockchain	12
7.	Immersive Technology	7
8.	Neo Banking	3
9.	Banking process Automation	6
	Quantum computing	1
Total		100

Source: secondary data

From the above table it is inferred that 23 percent of respondents are using artificial intelligence for their banking transactions. 19 percent of the respondents are using open banking technology, 13 percent is using hyper-personalized Banking, 8 percent of the respondents are using banking things and cyber security technologies. It followed 12 percent of the respondents are using blockchain technology, 7 percent of the respondents are using immersive Technology, it followed 3 percent of the respondents are using neo-Banking Technology, and 6 percent of the respondents are using banking process Automation Technology.

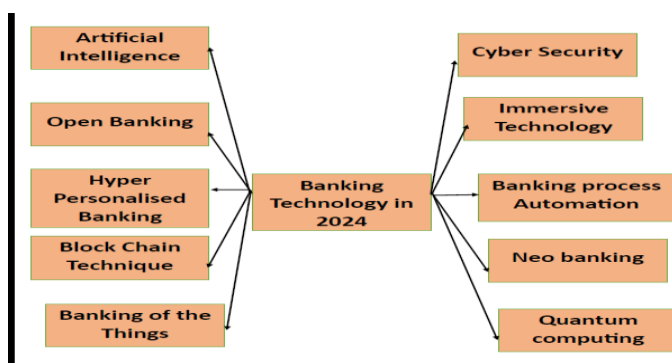


Fig:1 Modern banking Technologies

1.6 Artificial intelligence

The market for artificial intelligence, which was estimated to be worth \$136.55 billion in 2022, is anticipated to expand rapidly in the years to come, driven by rising investments in AI technologies, digital disruption, and the need for a competitive edge in a world economy that is rapidly expanding. Let's look at some astounding statistics:

Table no :2

Artificial intelligence - The most used regions in the world and effects on GDP

S.no	The regions in the world	Trillion (\$)	Effect on GDP in percentage
1.	North America	3.7	14.5
2.	Northern Europe	1.8	9.9
3.	South Europe	0.7	11.5
4.	China	7.0	26.1
5.	Latin America	0.5	5.4
6.	Developed Asia	0.9	10.4
7.	Rest of the World	1.2	5.6

Source: secondary data

From 2023 to 2030, the size of the global artificial intelligence market is expected to rise at a 37.3% CAGR. By 2030, it is estimated to reach \$1,811.8 billion.

All category of AI tools utility is slowly raising in India and leads for fast digitalisation in all major areas such as banking and financial, services, healthcare, automobile, telecommunication.

The artificial intelligence market in India had a size of \$680 million in 2022 and is expected to grow to \$3,935.5 million by 2028, at a compound annual growth rate (CAGR) of 33.28% from 2023 to 2028. In India, expenditure on artificial intelligence (AI) increased by 109.6%, or \$ 665 million, in 2018, and is projected to increase at a CAGR of 39%, or \$ 11,781 million, by 2025.6 By 2025, AI has the potential to increase the country's gross domestic product by about \$500 billion.

1.7 Open banking

Through the customer's authorization, open banking is a secure approach to give access to their financial information. ² Open Banking asks for the democratization of client data to non-bank third parties, consumers, etc., driven by regulatory, technological, and competitive forces.

Table No:3 open banking Technology

86%	8 out of 10	94 %	\$ 9.9 Billion
of financial institutions recognize the value of Open Banking data	financial institutions are adopting or plan to adopt Open Banking	of FinTech companies have considered how Open Banking can enhance current services	estimated total Open Banking sector revenues by 2022

Source: secondary data - The Databricks Lakehouse Platform

Hyper-personalization in banking

The method of tailoring banking services and products to each customer's specific needs is referred to as hyper personalized experiences. It involves understanding the particular needs and preferences of the consumer and then designing products and services accordingly.

1.8 The Customer Perspective on personalized banking

Based on a different survey, the majority of consumers between the ages of 18 and 34 are open to sharing their data with other companies or services in exchange for better packaged banking services.

Table NO: 4 Customer perspective on Hyper personalization in Banking

S.NO	Trend of utility	Percentage
1.	Customers expect companies to always personalize offers	52
2.	Customers expect companies to understand their unique needs and expectations	66

Source: * Salesforce – Trends in FS 2020

Table NO :3 Bank accounts preference for personalised accounts

S, NO	Podsolised Accounts in different fields	Percentage
1.	Ride Hailing services	10
2.	Air Travel services	13
3.	Travel Insurance	19
4.	Utility services	24

5.	Smart phone services	28
6.	Netflix	40

source: secondary data

Three out of ten consumers believe they would open an Amazon checking account if it came with extra services (such as cell phone damage protection, ID theft protection, and roadside assistance), according to data by Cornerstone Advisors. Even \$5 to \$10 a month for the packaged product is acceptable to them. Customers would change banks for a checking account that came with services that allowed them to save money, make their lives more convenient, and provide protection for an extra \$5 to \$10 a month. The poll also inquired about the extras that might persuade customers to switch banks. Media services like Netflix received the greatest answer (40%) followed by smartphone insurance (28%), utility services (24%), travel insurance (19%), air travel miles (13%) and ride

1.9 Block chain Technique

Blockchain is a decentralized, immutable database that makes it easier to track assets and record transactions in a corporate network. An asset might be physical (a house, car, money, or piece of land) or intangible (patents, copyrights, branding, and intellectual property). On a blockchain network, practically anything of value may be recorded and traded, lowering risk and increasing efficiency for all parties.

Tabel No: 4 Barriers in investment in blockchain technology

S.NO	Barries for investment's	Percentage
1.	Regulatory issues	39
2.	Implementation – replacing or adapting to legacy system	37
3.	Potential security threats	35
4.	Uncertain ROI	33
5.	Lake of in-house skill, understanding	28
6.	Not a current business priority	22
7.	Lack of compelling application of the technology	22
8.	Technology is unproven	20
9.	Concerns over sensitivity of competitive information	20
10.	No barriers	6
11.	Others	2

Source: Deloitte's 2018 global blockchain survey

The above table shows in details of barriers for investments in the blockchain technology. 39 percent of respondents hesitate to invest due to regulatory issue. 37 percent of respondents hesitate to invest due to implementation and replacing or adopting to legacy system, 35 percent of the respondents fail to invest due to potential security threats, 33 percent of respondents fail to invest due to uncertain ROI, it followed by 28 percent of the respondents fail to invest due to lake of in-house skill, and understanding, 22 percent of the respondents hesitate to invest due to not a current business priority, it followed by 22 percent of the respondents fail to invest due to lack of compelling application of the technology, it followed by 20 percent of respondents fail to invest due to technology is unproven and concerns over sensitivity of competitive information. it Followed by 6 percent and 2 percent of respondents fail to invest due to no barriers and for other reasons.

Tabel NO: 5 Countries Best Prepared Against Cyber Attacks

S.no	Country	GCI Score	Legal	Technical	Organi sational	Capacity building	Co-operation
1.	Singapore	0.92	0.95	0.96	0.88	0.97	0.87
2.	United states	0.91	1	0.96	0.92	1	0.73
3.	Malaysia	0.89	0.87	0.96	0.77	1	0.87

4.	Oman	0.87	0.98	0.82	0.85	0.95	0.75
5.	Estonia	0.84	0.99	0.82	0.85	0.95	0.75
6.	Mauritius	0.82	0.85	0.96	0.74	0.91	0.70
7.	Australia	0.82	0.94	0.96	0.86	0.94	0.44
8.	Georgia	0.81	0.91	0.77	0.82	0.90	0.70
9.	France	0.81	0.94	0.96	0.60	1	0.61
10.	Canada	0.81	0.94	0.93	0.71	0.82	0.70

(Source: Norse.com)

The above table shows in details the top ten countries best prepared against cyberattacks. It is analysed based on global cybersecurity index (CGI). created by the international telecommunication union (ITU). The cyber security is measured based on the five pillars described by the international telecommunication union (ITU) such as legal, Technical, organisational, capacity building and cooperation.

USA most affected country for cyber-attacks due to that nearly 58 percent of securities companies are located in USA. Israel is the second largest country for cyber-attacks. Russia is accused of cyber espionage and attacks by their political opponents. But they know how to protect themselves against the cyber-attacks.

1.10 Findings and suggestions

- From the above analysis is found more than 23 percent of the countries are adoption artificial intelligence technology in the field of modern banking. Still the developing and under developing countries are not getting opportunity to use latest technology. Hence when countries such as UAS, Israel and Japan and other developed countries can help the countries who are less using the technologies.
- From the analysis it is found that majority 7.0 trillion worth of transaction are made by adoption of artificial intelligences by China which contributes nearly 26.1 percent towards the GDP. The contribution of other countries needs to be changed hence other countries need to come forward to use the AI based technologies in all the fields and also see the netty gritty to save the people from unemployment problems.
- 86 percent of the financial institutions are recognising and interest in accessing their financial transactions with the help of open banking data. And 94 percent of the respondents belongs to fin tech companies are showing interest in accessing open banking technologies. More concentration needs to be shown on the other side of users, in common life AI need to be introduced where all common people will get opportunity to use the technology.
- Most of the customers 52 % are expecting that banking companies need to provide personalized offers for utilising Technology in banking companies. Still more awareness needs to be built among the customers and assurance for safe transactions need to be ensured with more protection system.
- Majority 40 percent of the respondents are using Netflix technology for personalised accounts. The customers are provided sufficient awareness to use other technologies such as Block chain Technology, Neo banking, and immersive Technologies.
- Majority 39 percent of the respondents has hesitation to invest in the blockchain technology due regulatory issues. proper assurance and guarantee need to be assured from the financial institution to remove hesitation among the customers for using the technologies.
- Singapore Is the top most country uses cyber security technology to protect itself from cyber attacks. Slowly other countries are also increasing their protection walls on AI.

1.11 Conclusion

Personal Data protection acts are ensuring the protection of personal information of the individuals. In India justice K.S. Puttaswamy v Union of India is the breaking case where the supreme court affirmed the privacy in protecting informational privacy is constitutional rights the nine -Jude constitutional bench has settled the question of Indian law.

Among India all the G20 countries have introduced digital personal data protection Act and providing security for maintaining individual data. Hence in the coming days more protection will be provided for maintaining personalised data of individuals.

Reference:

1. Prof. V.Narasimha Rao. (2018). Customer Perception towards Banking Services – Post Demonetization. IOSR Journal of Business and Management (IOSR-JBM) e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume. 20, Issue 4. PP 79-86.
2. Meri Boshkoska., Kosta Sotiroski. (2018). An empirical study of customer usage and satisfaction with e-banking services in the Republic of Macedonia. Croatian Review of Economic, Business and Social Statistics (CREBSS), Vol. 4, No. 1, 2018, pp. 1-13
3. Shubin Yang et al., (2020). Access to Finance, Technology Investments and Exporting Decisions of Indian Services Firms. Open Economies Review, Volume. 31: PP.1009–1036.
4. S. Reoco Shalin, Mrs. K. Princy Hebshibha. (2022). A Study on Customer Preference and Satisfaction on Digital Banking. International Journal of Advanced Research in Science, Communication and Technology (IJARSCT), Volume 2, Issue 4, pp.147-158.
5. Mitha Christina Ginting. Et Al., (2022). Pengaruh *Electronic Banking* Terhadap Kinerja Perusahaan Perbankan Yang Terdaftar di Bursa Efek Indonesia Periode 2019-2021. Vol. 7 No. 2 (Desember 2022) 118-127
6. U. Midhunde. Et al., (2023). An Empirical Investigation of Innovation and Technology in Banking. Recent trends in Management and Commerce, volume. 4, issu.2, pp.121-128.
7. Pendyala John Adinarayana., B.Kishore Babu. (2019). Modern Techniques of Promoting the Banking Financial Services and Insurance (Bsfi). International Journal of Innovative Technology and Exploring Engineering (IJITEE), Volume.8, Issue.10, pp.1715-1718.
8. Md. Mazharul Islam Bhuiyan. (2022). Digital Competitiveness in The Banking Sector of Bangladesh. Business and Management IJBMF VOL. 8, NO. 1, pp.19-23.
9. Reza Farishy. (2023). The Use of Artificial Intelligence in Banking Industry. international journal of social science, Vol. 03, No. 07, pp. 1724- 1731.
10. Rajani H. Pillai. (2019). Footprints of Human Resource in Banking Sector. Journal of Human Resource and Sustainability Studies, Volum.7, pp.388-396.
11. Oshadhi Bandara. Et al., (2019). A Model for Assessing Maturity of Industry 4.0 in the Banking Sector, Proceedings of the International Conference on Industrial Engineering and Operations Management Bangkok, Thailand, (pp.1141- 1150)
12. Sulochana Shrestha. Et al., (2019). Communication in Banking Sector: A Systematic Review Quest. Journal of Management and Social Sciences, Volume. 1, Issue. 2, pp. 272-284.
13. Mostéfaoui Sofiane. Et al., (2016). Contribution of the Information Technology Audit in Achieving the Quality of the Electronic Accounting System: Evidence from the Algerian Banking Sector. International Journal of Economics, Finance and Management Sciences, 4(2): 46-51.
14. Yulia Evdokimova., Elena Egorova., Olga Shinkareva (2021). Modern Digital Technologies and Banking Tools. In Proceedings of the International Scientific-Practical Conference "Ensuring the Stability and Security of Socio-Economic Systems: Overcoming the Threats of the Crisis Space" (SES 2021), pp.259-263.
15. **Dr. S. Bulomine Regi., Dr. C. Eugene Franco. (2017).** Information Technology in Indian Banking Sector – Challenges and Opportunities. *International Journal of Multidisciplinary Research and Modern Education (IJMRME)* Volume 3, Issue 1, pp.78-82.
16. Gayathri. Et al., (2021). A Study on Customer Satisfaction Towards Mobile Banking Services with Special Reference to Coimbatore City. International journal of creative research thoughts, (IJCRT), Vol.9, issue5, pp. i175-i743.
17. C. Nandhini. Et al., (2021). Study on Factors Affecting Digital Banking Services in Western Tamil Nadu. Asian Journal of Agriculture Extension, Economics and Sociology, Vol.39, Issue.10, pp.358-368.

18. Dr. T. Ravisankar. (2021). Computerized Methodology to Analysis Customer's Satisfaction Towards Digital Banking Services with Special Reference to Salem District in Tamil Nadu. *International Journal of Management and Development studies*, Vol.10, issu.08, pp.1-7.
19. Arathi Sivaram., E. K. Satheesh. (2021) Customers' Perceived Risk and Attitude towards Adoption of the Digital Banking Services. *South Asian Journal of Social Studies and Economics*, Volum.12, issue.4, Pp.21-28.
20. Diyan Lestari., Basuki Toto Rahmanto.(2021). Fintech and Its Challenge for Banking Sector. *The Management Journal of BINANIAGA*, Vol. 06, No. 01, Pp.55-70.
21. Tatjana Boshkov. (2017). An Empirical Research on the Correlation between Human Capital and Career Success: Serbian and Macedonian Banking Sector. *Mediterranean Journal of Social Sciences. Volume.8. Issue .1, pp.279-284.*

Website Reference:

1. "Data Protection Bill poses severe restrictions to RTI Act, advocacy group NCPRI cautions government"
THE HINDU BUREAU, July 14, 2023 10:14 pm | Updated August 08, 2023 04:35 pm IST - NEW DELHI
<https://www.thehindu.com/news/national/government-severely-restricting-rti-act-through-data-bill-ncpri/article67080300.ece>
2. MALAVIKA RAGHAVAN Senior Fellow, "ARE WE THERE YET? THE LONG ROAD TO NOWHERE: THE DEMISE OF INDIA'S DRAFT DATA PROTECTION BILL" **OCTOBER 11, 2022, TUTTER THE FUTURE OF PRIVACY FORUM**
<https://fpf.org/blog/are-we-there-yet-the-long-road-to-nowhere-the-demise-of-indias-draft-data-protection-bill/>
3. Raktima Roy, Gabriela Zanfira-Fortuna "THE DIGITAL PERSONAL DATA PROTECTION ACT OF INDIA, EXPLAINED" **AUGUST 15, 2023 TUTTER POST, FUTURE OF PRIVACY FORUM**
<https://fpf.org/blog/the-digital-personal-data-protection-act-of-india->
4. Breaking blockchain open Deloitte's 2018 global blockchain survey- <file:///C:/Users/Dell/Downloads/cz-2018-deloitte-global-blockchain-survey.pdf>
5. Elias Chachak, "Top 10 Countries Best Prepared Against Cyber Attacks" <https://www.cyberdb.co/top-10-countries-best-prepared-cyber-attacks/>