



(REVIEW ARTICLE)



A paradigm shifts in fintech and rural inclusion challenges in India

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Abstract

FinTech abbreviates as financial technology. India being a developing country having largest population in the world by surpassing the china recently in April 2023. Continuing with conventional method of transaction, most of the people of such a populous country are standing in queue waiting for their turn for financial services. Is it feasible to bear such a time and economical loss arises as opportunity cost due to standing in queue rather than doing some other activity? Therefore, it become need of the time to adopt the advance technological way of doing transactions. Since 2015, India has witnessing its most aggressive phase of financial inclusion initiative ever seen anywhere in the world which brings nearly 330 billion citizens into formal financial sector which still increases to make it a crucial topic for research. In this research, we analyses the rural FinTech literacy requirement with all available means and impact of FinTech facilities on E-commerce and banking sector along with intermediaries role by adopting case study approach. With huge potential for FinTech, India can be the global FinTech super power but challenge is acceptance of FinTech with pace of technological advancement as well as with challenges and security loophole protection.

Keywords: FinTech; Opportunity cost; Financial inclusion; Financial literacy; Security loopholes

1. Introduction

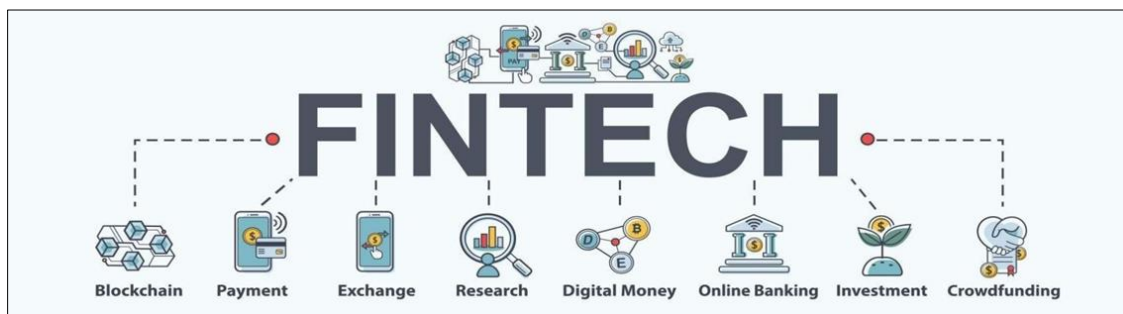
Prominently the existence of FinTech came during the financial crisis of 2007 - 2008, since than it revolutionized the financial sector. FinTech simplified life of so many stakeholders significantly like banking authorities and customers. Advanced FinTech such as AI, Big Data technology, Block Chain, Detecting fraud and its regulation technologically, Management of assets, Underwriting of loan, Paying digitally, InsureTech and RegTech like technology etc. have its implications in banking and financial services. India ranked third largest among different fastest growing countries in terms of strengthening FinTech developments. Fin-tech is the fast and innovative way of using Technology, delivering financial services. FinTech is an association of finance and technology. Schueffel (2016), defines FinTech as "A new financial industry that applies technology to improve financial technologies". According to a study by Fortune in (2021), majority of Americans around 90% used FinTech for the management of their finances and there are approx 10,000+ FinTech start up registered in US alone, and over 26000 around the globe. Still it has been a new field of study needed to be explored and introduced as a subject in the relevant streams.

Digitization of financial sectors made management of large sum of money very easy which was very risky before to carry in hand. By the introduction of cashless transaction with online mode or banking application software's, cashless transactions are replacing the tangible one. The major transformation came in case of E- Commerce Industry by digitization of financial transactions and gaining its popularity more in rural area in comparison to digital banking industry. For making the equality in terms of digitization of financial technology rural digital financial literacy should be promoted, as so many peoples in India still waits in queue for receiving financial services in financial institutions like

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banks and insurance companies. This research will also study the government initiatives for digital growth of Indian financial sector. As many as companies are approaching the digital platform financial inclusion is also increases apart from core financial institutions, digital presence of many companies promoting the way of digital payment and transaction with regard to their product and services. With so many benefits digitization involves, one of most important is fairness with respect to record of past transaction and reduction in tax evasion.

Investment technology and Neo banking services are two emerging areas of FinTech market. Neo-banking is expected to grow 16 million dollar by 2026, currently it operate through strategic partnership with traditional banks of India. For the better utilization and optimization of funds new technology of block chain has also been introduced it helps to know who should actually get subsidy and who should not yet. Other technology of FinTech adopted in the India for Payment, Exchange of commodity, Researching mechanism, Online banking purpose, Investment in mutual funds or various schemes etc shown in Figure 1. India have huge potential of digitization of financial transactions as still much of rural as well as some of urban population is not under umbrella of digital financial transactions.



Source : <https://fintechmagazine.com/>

Figure 1 Diverse areas of FinTech

Indian government has also started so many schemes to push financial literacy and inclusion both in rural and urban India under their digital India program. One of the such program is Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) by Meity which aims to bridge digital divide in India by empowering rural Indian communities. It was launched in 2017 with the aim of making 6 crore rural households digitally literate. Another such scheme is Pradhan Mantri Jan Dhan Yojana (PMJDY) which is having a mission of national importance to push financial inclusion in the affordable manner by ensuring services like Remittances, Credit, Pension and Saving and Deposit accounts digital operation. So many other schemes are also available like Pradhan Mantri Jeevan Jyoti Yojana (PMJJBY), Atal Pension Yojana (APY), Pradhan Mantri Mudra Yojana (PMMY), Pradhan Mantri Vaya Vandana Yojana (PMVVY), India stack etc With exponential growth in financial inclusion and digitization of financial transaction risks associated with cyber security also enhanced. There are so many FinTech security concerns should be overcome for future prospects of FinTech like theft and breach of data still remains the top concern for FinTech industry. As the case with Pine labs which is a financial institution dealing in B2B business was under cyber attack during August 2021. The confidential information and employed data is cyber attacked by hacker group named Ransomware. One more concern is related with cloud computing which is playing as the role of back bone for financial service delivery by offering speed, accessibility. According to one of the recent report on cyber security around 49% of financial firms are infected by Cloud Malware.

Since 2015 India has witnessing its most aggressive phase of financial inclusion initiative ever seen anywhere in the world which brings nearly 330 billion citizens into formal financial sector which still increases to make it a crucial topic for research. This research is about the drivers behind major trends, key industries like E-commerce and banking and their role played in such a big financial inclusiveness and the next phase about financial inclusion with more efficient and effective way of secure and timely transaction. Digitization of financial services are only fruitful if financial technology provided by institutions or businesses have utility in urban India and in the similar fashion in rural India as well.

This research is significant for emerging economies like India, because it identifies problems and challenges with respect to the emergence of financial technologies in its initial stage in promoting financial inclusion in rural areas challenging institutional contexts. This paper also suggests potential research in the field of FinTech for future perspective particularly skills and training required by the managers to taught the rural population in their local language about confidentiality of financial information and security breach of intermediaries.

2. Review of literature

Venkatesh and Nandini, (2013)¹ concluded that the main reason behind digitization of India is to check black money or creation of parallel economy.

Banna et al. (2021)² after the analysis of data of 534 institution taken from 24 OIC nations, it has been examined that increase FinTech based financial inclusion (FFI) leads to increase the risks of banking industry. During the phase of post industrial revolution known as phase 4.0, the nexus has become more active.

Philippon (2017)³ FinTech act as a new player in already existing financial market have the capability to reduce financial contracting frictions and promotes to increase consumer welfare.

According to BIS 2021, Erik Feyen et. al. (2021)⁴ studied renowned banking organization as well as financial institution closing their digital gaps while doing their internal processes and customer services with the implementation of FinTech and Big Data. There are more evolving risks to data privacy and protection. The customized services, meeting emerging customers needs and interlinked financial services and products with other so many activities, increasing the risks of sacrificing customer privacy and data. Consumer security of data and risks arising from FinTech and digitization are discussed.

Manisha Jagtap (2016)⁵ concluded in her paper Technological Advancement in Digital Payment environment is changing life importantly and providing end users with speed, convenience, choice and save their time. The total payment of the cards accounted for largest part almost 50% of the total volume in 2017 - 18. Mr Narendra Modi initiated 'Digital India' campaign foretasted that 12,000 rural post office efforts being made to digitalize the payment gateway .

Puneet Prakash (April, 2023)⁶ recommended that the COVID-19 increased the rate of Digitization, acceptance of FinTech in relation to monetary transactions. The government's adoption of regulation perspectives became an additional necessary contribution fact for adopting banking services and mitigating risk of substandard financial inclusion having the influence of pandemic. Cellular banking became the crucial structure of change at COVID-19. The exterior rationality increases for FinTech, that African countries and different rising economies like to invest in FinTech, such investment made cushioning effect to increase the validity of FinTech in India.

Renu Singh and Garima Malik 7April, (2019)⁷ concluded that, basic objective of rural banking digitalisation includes to protect the customers protection while doing payment through digital platform,the customer should be protected and not be liable for any loss resulting from the risky transactions or due to system failure or malfunctioning.

S. Amudhana et. al. (2022)⁸ studied about rural banking system of India facing various problems, such as a lack of internet connectivity. Operating from conventional banking towards digital banking is only first step to approach digital upgradation. It's an important shift in the way of banks and FIs to acquire knowledge about client involvement. In general, 360 degree digitization of technology in every sphere of business. Hence, it has been concluded that preference of the clients and customers for the digitization of banking services is positive. As the digital world of banking industry or financial institutions progresses, it would be best interest to prepare acceptable system for entire financial system, and which can be applied easily to the financial market.

Thakor & Merton (2019)⁹, proposed a theory about banking and non banking financial institutions regarding borrowing of funds in which banks have some advantages in comparison to non banking when there is matters of building trust for making good loans.

Zack Jourdan et. al. (2023)¹⁰, analyzed in their study that the future scope of FinTech sphere across research analysis . Regardless of efforts of the various researchers, FinTech is having introductory stage of newly created technological surge.

Sharon Chen et. al. (March 2021)¹¹, surveyed divulge clear cut gap between between technologically mobile women and men especially with respect to digital technology. Women's concerning more about privacy when transacting with online companies, being reluctantly available to share their information's with digital platforms for better opportunities and offers and less adopted for advanced products including FinTech.

Sebastian Doerr et. al. (2023)¹² concluded that the prospects of Big Tech develops around the globe depending on a particular country economic characteristics, such as Per Capita Income, GDP, Market power of banking industry, Rule

and Regulation for control, Ease of doing business and Investor protection of personal data. In case of some economies, Big Techs already have importance to play in the financial system.

Avi Goldfarb and Catherine Tucker (2019)¹³ suggested that dynamics to economic behavior that is the outcome of difference in the costs related to the digital adoption of technology are relatively less in comparison to traditional model of business. On the other hand, so many other types of costs may show downwards movement as digital technology innovates.

S.A. Amudhan, Dr. Satyantami Banerjee, Dr. J. Poornimsa (2022)¹⁴ in a journal mentioned that banks have placed a great emphasis on information technology in order to improve customer services. During lockdown digital banking became very popular. Digitization of banking industry grown many folds. In rural India, Educational level, Awareness about digital banking, Skill required, Gender disparities are one among such factors that could create disparity in digital banking services.

Bülent Balkan (2021)¹⁵ studies changes introduced by digitization and advancement of technology is Creative, Innovative, Workable financial blends offered by modern companies called FinTech. Such blends appeal to introduce to advance and cope up with changing banking technology and also industry.

Jon Frost (2020)¹⁶ analyses FinTech utility is directed by domain of demand and supply characteristics. unfulfilled demand of financial inclusion is acting as a strong operator for unreserved market segments. The high cost of financial industries, are also playing an important factor. Regulatory factors need to accomplish their regulatory compliance, regulations do not play as a primary influencer of Fintech acceptance, at least at consolidate or an aggregate level.

Silky Sharma and Dr. Shalini Srivastav (2022)¹⁷ suggested the fact that India is an emerging economy with high cost of infrastructure in banking sector, in fact of bearing large costs, many part of the population lacked banking facility. With the entry of FinTech delivery of financial products becomes possible at affordable rates to increase financial inclusion, Increasing internet penetration, Increasing consumer demand in favour of digitization and online E-commerce, Mobile SIMs biometric authentication, and a supportive regulatory framework by the government of India. In India, there are very few developed and elevate FinTech industries operational, mostly in banking services and insurance industries. The Indian financial regulatory environment is strong and strict, with legal and statutory foundations such as the, Payment Service Providers (PSPs), State Bank of India's Payment System Operators (PSOs) and Branchless Banking Regulations acts like are pushing the growth of FinTech.

Pat Kinsel (2020)¹⁸ former Forbes Councils Member of Forbes Technology Council advised that When Covid-19 hit in, it becomes impossible for transactions to be held in person. Within overnight, businesses and economic systems were forcefully need to redesign both their functionality to upgrade at online mode, main challenges arises here to earn customers trust to adopt digital technology. Confirming face-to-face presence and identities is not very a necessary for doing a transaction, as new technology of verifying identity make it possible to prevent fraud has taken the place of traditional technology.

According to IMF publication 27 June, (2019)¹⁹, This paper found that in fact there are so many important regional, sub-regional and national diversities, yet countries were predominantly grabbing the chances of FinTech to enhance economical growth and inclusion or participation in FinTech, while stabilizing the risks to balance stability and wholeness.

Acar, & Citak, Y.E. (2019)²⁰, FinTech take the advantage of susceptibility in the different sectors and increases market inclusion by assuming technological answers to many problems. The modernization in some sector downturn at one point by unseen technical forces. By Surpassing these challenges, collaboration between different FinTechs with FIs shown as answers for both allies.

Cătălin Mihail Barbu et. al. (2021)²¹ concluded that Managers with the use of FinTech must continuously or consistently try to lower costs and offers products at relatively low prices which will meet the customers expectations of low prices.

Mohammad Asif et. al. (2023)²² contributed to the research that give out the factors contributed to the use of FinTech for the purpose of financial inclusion especially for economically lacked or poor people of remote India. This model dealt with the empowering the rural citizens in the financial decision-making process acts as the very crucial finding of this empirical research.

Rajesh Shettigara (2023)²³ study analyzed the main pilot of FinTech development and the link between its acceptability with respect to different the economy and how other potential players or entrants of the financial sector perceive. However, there were different views on the upcoming dangers of the FinTech potential, and working with different competitors is not an intelligent course.

Poonam Garg et. al. (21 February, 2023)²⁴ study put light on optimistic relationship among BCC, OP and CA. The conclusions are premium for banks going through various hindrance in their way to adopt block- chain technology being not appropriately understanding the futuristic advantage with respect of execution accelerate and remove complexities of different cross-border payment system, improving online specification management, felicitating trade financing, and also helps in loyalty and incentives.

Rajas Saroyet. al. (1 April 2023)²⁵ in this paper identifies by employing a dynamic panel of data analysis approach on cost of bank-level and gaining technical level efficiency estimates for the duration of 2011 –2018, to capture the influence of adopting payment technology on banking sector effectiveness and efficiency. By intensified usage of digital platform technologies (viz NEFT, ATMs, cards etc) makes good business opportunities for the banks and financial sector, by improving both cost and operation efficiency.

According to Rizka Ramayanti et. al. (March 2024)²⁶, future research can decipher the influence of demographic factors such as Age and Experience while also considering Gender with the perception of the burgeoning of more influential training and development schemes by corporate. For illustration, specific part of category with an important effect upon willingness and realistic exercise of digital payment system such as FinTech needs very comprehensive training.

Jon Frost, Leonardo Gambacorta, Yi Huang, Hyun Song Shin and Pablo Zbinden (2019)²⁷ proved Empirical evidences related to the promoters of the growing utility of Big Tech in finance, and addresses its implications. Big Tech companies in some areas have recently expanded their activities into Insurance, Lending, Savings, Investment either directly or with partnership with financial institution. Understanding the competitive advantage of Big Tech in financial intermediaries is a essentially a first step for towards gaining the opportunities to adopt these technological developments which on the other hand, enhancing financial intermediaries with their part played for the real economical growth.

Selim Elekdag, Drilona Emrullahu, Sami Ben Naceur, January, (2024)²⁸ studied the evolution of FinTech provides both challenges and opportunities for the financial services industries. Innovative Technology drives the promise of diverging approach to products and services of financial nature . Its also increases the diversity of product offered in the market and enhance convenient services to customers in reduced costs.

Zack Jourdan, J. Ken. Corley, Randall Valentine & Arthur M. Tran (03 April, 2023)²⁹ reviewed literature related to the term FinTech was first given by Citicorp during 1993.

Objectives

- To Study the loopholes in Financial Transactions, Online Financial Inclusion and prospects of FinTech in Rural or remote areas of India.
- To Study the impact of digitization and level of adaptability in Banking Technology.
- To study steps for enhancing the digitization of financial activities along with E commerce.
- To study the impact of intermediaries in Cyber security in Rural India.

3. Research methodology

In this paper, we approached secondary data study of various sources like, Government websites and other scholarly studies done on FinTech. Data is taken from Research Agencies report as well as from Government websites. It has been observed that urban Indian customers are less prone to cybercrime than rural in fact around 4.6% of rural Indian population not having banking facility. FinTech boost direct access to finances by simple yet cutting edge technology.

3.1. Different existing loopholes in financial transaction

With tremendous increase in the population using internet we should adopt a strong infrastructure for cyber security. There are so many modern challenges arises in Indian financial systems as cyber-attacks which paralysis the economic policies of government and also disrupt monetary policy due to which financial institution suffers huge losses. Cyber-attack discourages the foreign investors to invest in India for long duration investments by transferring economic power

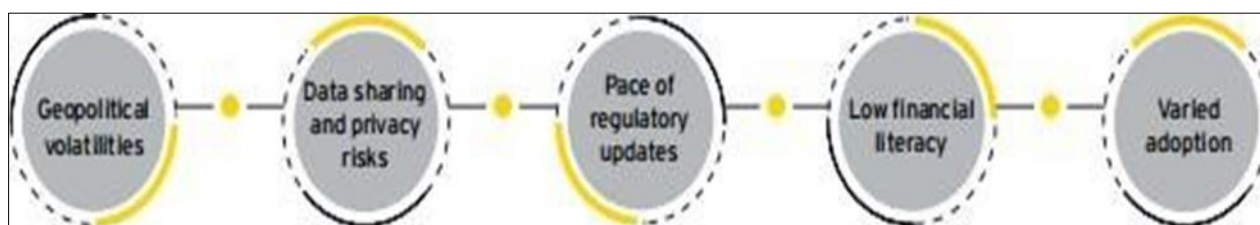
in the hands of criminals who creates parallel economy. On the other aspects, such activities like money laundering promotes the criminal mind sets in the society results declining of moral and social responsibilities such activities created overall policy paralysis on the parts of government. One of the main reason of existence of fraud in Indian financial system is coexistence of various regulatory agencies like RBI and SEBI and overlapping of their functionalities like Serious Fraud Investigation Committee (SFIO) and Infrastructure Protection Centre (NCPIIC) dealing with cyber security of India.

In October 2023²⁹, an US company Re-security informed about availability of Indian personnel data on black web which includes about 55% of Indian population. In October 2019, we all knows the cyber-attack on the confidential information of kundankulam nuclear plant. There was an attack which was a cyber espionage. In 2020, (operation side copy) uncovered which targeted by the use of a malware for Indian military and diplomatic personnel's by using fishing mails. City union banks SWIFT system causes the big loss of USD 2 Million dollar. There is major issue of security sacrifice while doing online transactions.

Certified Risk Management staff level 1 PCI DSS (Payment Card Industry Data Security Standards) processor can detect the fraudulent activities before it actually takes place in the payment network. It can be possible that password and PIN code can be guessed but physical presence required by finger print make the data more secure.

3.2. Online Financial Inclusion

Around 2 billion peoples in the world not having formal financial services. According to Internet and Mobile Association of India (IAMAI) report (April, 2022)* report India ranked second after china with respect to peoples using internet. By the year 2025, among new internet users in India 56% belongs to rural India. If we look at the gender profile of internet users in India, till the year 2022, 56% new active internet users are females. First time non active users of internet decreases and becomes only 714 Mn or 48% all around India. Inclusion of rural areas of India increases to 36% in digital payment users. One more surprising fact is rural India have more social media users than urban India. India is also going to be 3rd largest economy of the world from its fifth position by 2019. India have potential to become FinTech hub having the potential of\$1.3 trillion by 2025.



Source: The wind of change, Trends setting India's FinTech sector(2022)

Figure 2 Major FinTech challenges

Major confrontation of FinTech adoption is dealing with Indian geopolitical disparities, data sharing carelessness, weak regulatory update, less literacy rate especially in rural areas as per the report of SEBI only 27% of Indians are financially literate, FinTech if adopted courageously with government support can even able to create financial literacy and also able to increase confidence in Indian financial system varied rate of adoption of technology as traditionally peoples are use to with conventional banking and payment system Figure 2. Fintech surges India very rapidly with overall market size of more than \$ 584 Bn to more than \$ 2.1 Bn which includes different types of technology lending tech expected to have largest market size of 60% InsurTech 14 %, Payments 12%, Neo Banking 9%, Investment Tech 3%, Fintech SaaS 1.5% till 2030 by Table 1.

Table 1 Fintech Surge in India

Sectors	Market size (2022)	Market size (2030)	CAGR (2022-2030)	Percentage share (2030)
Overall FinTech market	\$584Bn+	\$2.1Bn+	18%	-
Lending Tech	\$270Bn+	\$1.3Bn+	22%	60%
InsurTech	\$87Bn+	\$307Bn+	17%	14%

Payments	\$165Bn+	\$253Bn+	5%	12%
Neo Banking	\$48Bn+	\$183Bn+	18%	9%
Investment Tech	\$9.2Bn+	\$74Bn+	30%	3%
Fintech SaaS	\$4.6Bn+	\$31Bn+	27%	1.5%

Source : Secondary source, Inc 42

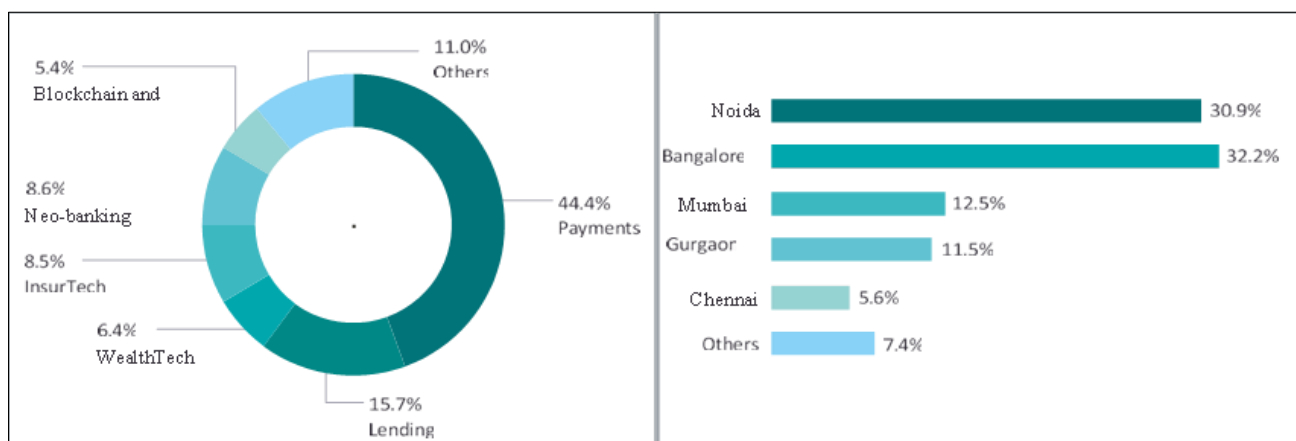
According to recent RBI report, out of 462.5 million PMJDY accounts almost 81% are operational in 2023, which was 76% in 2017. It has been said by PM Narendra Modi that FinTech have availability to form the basis of financial revolution in any country. According to Internet and Mobile Association of India (IAMAI) research, titled "Internet in India" about 346 million Indians practice online transactions including digital payment and E-commerce. India outlined the US in terms of population practicing digital transactions at 331 million. As per report, pandemic resulted to increase 51% digital transactions. As per IAMAI³⁰ numbers of internet users of India is expecting to boost rapidly more than 931 million by 2025 Table 2 and indulgence of rural population as internet user increases three folds in comparison to urban population. The penetration of internet in rural area increased in 2021 up to 67.6% which was 36.5% in 2018. but such penetration of internet is also promoting financial inclusion of rural population. Now days most of the rural areas, new generation prefers online transactions as 65% of rural population of India is below 35 years. Indians shopping through online medium increases to 51% in one year. Internet penetration is less with urban India in comparison with larger villages which accounts for 82%.

Table 2 Different types of Internet Users and their Growth

	2022	2025	% Growth
Smart phone users	931 Mn+	11 Bn+	22%
Internet users	759 Mn+	900 Mn+	19%
Urban internet users	360Mn+	396 Mn+	10%
Rural internet users	399Mn+	504Mn+	26%

Source : IAMAI, Inc 42

According to Blinc report³¹, India has been emerged as home to third largest FinTech ecosystem in the world. Overall size of Indian financial service sector in 2021 is 31 billion dollar which can reach up to 150 billion dollar till 2025 at the compound growth of 22%. Overall growth potential of financial services is 8.5% in next 5 year which is \$ 500 billion.



Source: Tracxn, Media reports as of June (2022)

Figure 3 Sector-wise and State-wise distribution of FinTech

Indian FinTech startups are the second most funded startups sector in India as it accounts for 14% share of global funding. Its estimated to grow USD 2.1 Trillion by 2030. Fin tech startups in India raised USD 5.56 billion in 2022 and the number of institutional investors in India doubled between 2021 and 2022, raising from 535 to 1019 respectively. Volume of UPI transaction are also increases 200 folds from January 2017 to January 2023 and value

increased 600 folds during the same period. UPI having the largest volume of transaction in April 2023 where per day transaction can reach up to 1 billion by 2025. digital payment are also increases by 76% in transaction and 91% in value in 2022. Tracxn, Media reports as of June (2022) According to technology highest users of fintech is in payment sector followed by lending which emerged as most lucrative sector with respect to India. Blockchain and Cryptoc contributed to 5.4%, Neo-banking 8.6% Insurtech 8.5%, wealth-tech 6.4% and 11% is contributed by others while with respect to cities adoption Bangalore be the city with highest adoption rate followed by Noida and then Mumbai with 12.5% and Gurgaon with 11.5% figure 3.

3.3. Prospects of FinTech in Rural India

Aadhaar becomes the worlds largest biometric identification system. Mobile connectivity also improved. Jan Dhan Yojana become the worlds largest financial inclusion done by any government, Jan Dhan Yojana has supported to open bank accounts of 480 million beneficiary. GIFT city in Gandhinagar, Gujarat is also making the foundation for the vision of making India global FinTech hub. RBI has made a payment vision 2025, according to which RBI planning to achieve 3 folds increase in number of digital payments, increasing the customer for registered mobile related payments increased 50% CAGR, and PPI transactions increased 150%. RBI also created reserve bank innovation hub to promote various innovations across financial sector, financial technology, and industry along with educational institutions.

According report of BFSI Network report of Transforming rural India³² perspective in “Transforming rural India: Fintech startups bridging the financial divide” Fintech startups helping to bridge the gap of financial divide between rural and urban India. Five FinTech startup’s filling the gap of financial inclusion in rural India are-

- Aye Finance- Build with the motive of solving the funding problems of MSME and enable them to involve into the mainstream of economy.
- Bankshakti - Seeks to provide its users easy and seamless solution to their financial problems with the use of technology and empowering rural customers who were before unable to use digital financial services.
- BharatPe - BharatPe helps small companies and merchants with digital payment options including credit and debit card and UPI payments. It facilitates quick disbursement of loans with little documentation within 24 hours.
- KhataBook - It’s an application function as digital ledger which assists small businesses to track their transaction records. It helps to provide information in variety of languages. It will also help to create invoice and remind clients for their payment due date.
- Propelld - It’s a Bangalore based FinTech specialized in educational lending. Its main purpose is to make the education accessible and promote gross enrollment ratio by removing financial hurdles with the help of customized financial products. It focuses on future potential of students.

FinTech revolutionize the rural Indian financial system. Some of the key innovations are as follows: Digital Payments and Wallets like phonepe, paytm, googlepay etc

- Digital Banking: fostering financial inclusion through Unstructured Supplementary Service Data, agency banking, and Aadhaar Enabled Payment System etc.
- Microfinance: provides small loans to rural entrepreneurs with flexible eligibility criteria to set up their own business who was previously excluded from formal financial system.
- Financial Literacy Apps: many financial institutions have developed their mobile app with helps in providing financial literacy to the rural population of India such as spice money app, Shaksham an app developed by NABARD.
- InsurTech Solutions: by introducing digital insurance solutions, FinTech also permeates the insurance sector by providing tailored made customized insurance products according to the need of rural population.
- Aadhaar Integration: one of the most important and crucial enabler of FinTech is Aadhaar biometric identification which allowed even remote Indian citizens to pen their bank accounts and pushed the onboard process for financial inclusion.
- Government initiatives: like introduction of Jan Dhan Yojana, Micro ATM’s and Aadhaar Enabled Payment system and partnership of FinTech and conventional FIs becoming key to overcome the challenge of rural financial inclusion. According to KPMG, untapped market of financial lending started to reduce with expected growth of Rs1.2 Trillion in 2021 to Rs2.5 Trillion by 2025 in which significant growth comes from rural India.

3.4. Impact of Digitization and Level of Adaptability in Banking Technology

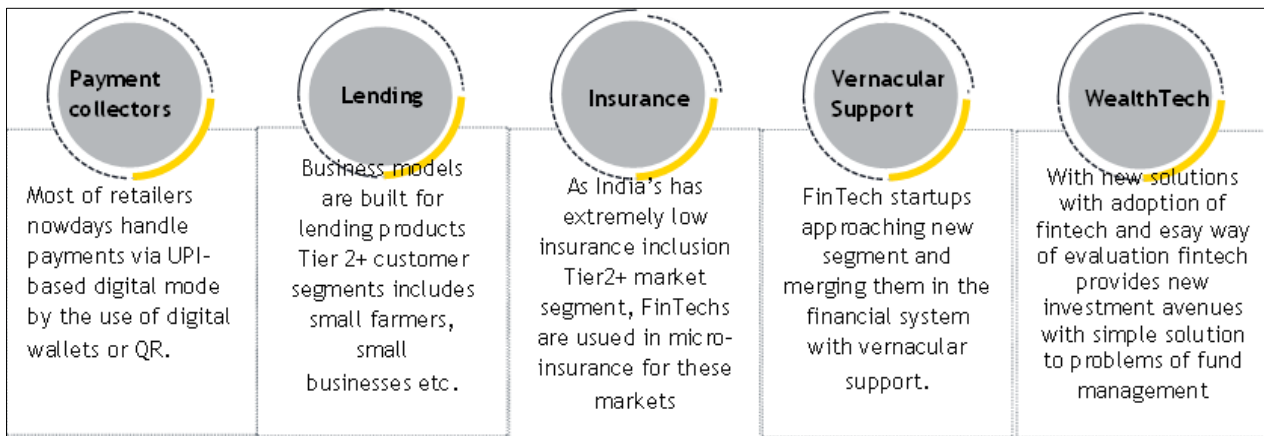
Digitization is the mother of FinTech and played a crucial part of its role in reshaping banking industry of India taking care of customer preference of digital services and rapid advancement of technology. From 2018- 2022, there was a gradual shift towards consumer-oriented services. Digitization of banking system totally changed the consumer behavior. Banks are working more effectively and efficiently than ever before. Digitization of banking system promotes higher customer involvement with respect to digital payment system, and E commerce and makes the users more independent. Digitization enables banks to leverage the power of artificial intelligence and data analytics to take better decisions. Now, bank is able to analyze the large amount of customers data by collecting them and having insight of customer preferences. It will improve customer satisfaction and helps the banks to customize their services according to specific needs.

Recently following technology have impacting the digitization of an economy.

- Integrated and broader Digital transformation at every area.
- Mobile technology and Cross channel communications.
- Visualization technologies.
- Chat bot and Voice assistance etc.

According to Times of India article “How digitization is shaping the future of banking” by HP Singh (2023)³³ Use of block-chain technology revolutionize the banking industry many folds providing safe and secure way of storing and transferring the information by comply with KYC/AML. Internet of things improve the operational efficiency, enable innovative services ultimately increases customer satisfaction. Integration of block-chain technology with hyper automation ensure robust data protection and discourages cyber-attacks.

According to the report of Wind of change trend shaping India's FinTech sector (2022)³⁴ there are different FinTech solutions according to the need of a particular sector Figure 4 customers like payment aggregators are retailers to handle payment by using UPI-based transactions and QR codes scanning and helps tier 2+ segments which includes small farmers and small businesses. WealthTech for providing trading solution, Insurance services like Micro Insurance, Vernacular support to reach new segment of market and include them to the mainstream.



Source: The winds of change Trends shaping India's FinTech Sector : EditionII

Figure 4 Innovative solutions by FinTech

The digitization of financial technologies has been spurred by the innovations evolved as the term FinTech. Make it simple, FinTech is the collection various types of technologies whose application are optimistic for financial services. This includes artificial intelligence, big data, biometric, and distributed ledger technologies such as Block-chains.

3.5. Steps for enhancing the digitization of financial activities along with E commerce

As has been discussed earlier, By 2025, new user of internet up to 56% included from rural areas, and 65% of new internet users will going to be female. According to Tao Zhang (8 May, 2018), spur of digitization pave the way of innovation of new technology called FinTech. He discussed two points as follows:

- Financial services may transform the future with introduction of FinTech.

- How central bank and mitigating agency going to control the risk arises with new technology.

Digitizations spur the growth of E commerce industry by following ways

- Advanced payment services- Due to tedious task of bill payment and limitation of timing 69% of carts are left by the peoples without payment. For making the economy cashless digitization paving the way towards effective and efficient transactions.
- Personalization Through AI- Provides customers better shopping experience which is major goal of every E-commerce company.
- Effective Marketing- With Social Media like twitter, Facebook, YouTube etc. 24/7 Sales and Market Presence- as the use of tablet, laptops and smartphones are increasing helps the e commerce to have 24X7 hours presence in the online market.
- Digital Supply Chain and Data Management- Managing the large amount of data and tracing the choice of specific customers becomes very easy with the digitization.
- Forecasting Based on Demands- Demand forecast by tracing the choice and frequency of purchase as well as the polarity of product analysis becomes very easy.
- Grabbing Customer Attention- To grab customers attention several retailers send notifications to the customers for discounts and sale pop up at their mobile screen to attract them.

3.6. Impact of Intermediaries in Cyber Security in Rural India

Intermediaries are the any person or organization that provides internet platform or infrastructure. These are the mediator of information which who transfers the information to the original destination. If Intermediaries are strictly rules and regulation bounded its works towards strengthening cyber security. As digitization permeates all aspects of our life the role of Intermediaries becomes much more important. Intermediaries brings together the two parties involves in transactions and provide platform for citizen participation, speech and social activities. There are increasing pressure of cyber-crime related to breach of Intermediaries like copyright infringement, pornography, and security of confidential or personal data. Now days internet Intermediaries hosting undesirable content, illegal ways, infringement are wide spread.

Rural Indian population is not very literate and when any society reforms towards digitization number of threats to users arises, here main weapon of cyber attackers is little or no knowledge about cyber security. FinTech payment platform should be transparent enough with real time solutions with AI assistance to handle large volume of data. Post monetization the surge of online payment with the use of PayTM, RuPay, and BHIM increases their reach towards rural parts of country. Increased number of internet users impose the risk of fraud and and cyber-crime also. With more and more increase in online transactions the shops or business taking online payment must meet the requirement or standards given by Payment Card Industry of Data Security Standards.

Cyber-crime activities are done with the help different types of malware's. There are various kinds of intermediaries in financial markets some among them are-

Gateway intermediaries Market place intermediaries

- Certificate authority
- Platform intermediaries
- Domain name controller
- Hardware controller
- Cloud service provider
- Internet assess and service provider.
- Host (data processing and web host provider)

According to Ajoy P.B. (March, 2022)³⁵, Internet intermediaries acts as gateway of any information whether its personal information, transaction details of conversation between two peoples. They are having obligation to strictly comply with licence requirement, content regulation and removing any illegal content etc. Growth of internet in every aspect of life led to growth of intermediaries also. Its becoming more and more difficult to classify them and define them, in India IT Act 2000, imposed liability but some conditional immunity is provided to them in the amendment in 2008. however still immunity and laws were violated by intermediaries. Government of India notified intermediaries guidelines rules in April 2011, which provides detail information about online content and regulation of intermediaries. Intermediaries is a person on whose behalf any other person receives or transfers recorded information. According to Ease of Doing

Business report 2021, While so many intermediaries are in the field 85% of them are negatively having negative impact on security being new to IT Rules.

Managerial Implications : FinTech is very lucrative technology and also very complex sometimes for the developing country like India which have different literacy rate. One side in India, cyber-crimes and frauds are increasing in numbers rumoring the disadvantage of FinTech impacting negatively overlooking the advantage which needs a proper regulation on the parts of government. Government promoting the FinTech and also taking steps towards the security but it's an ongoing process.

In India we need skilled peoples or managers to implement the technology with its full capacity to generate maximum return. We lack good trainers in the field of FinTech as it's still very newly adopted technology to provide good training to the further proceeds the development of FinTech in Indian perspective. For taking the advantage of surge of FinTech development we need to make managers more updated with latest updates to train them and make them ready to train others as well.

Future scope of the study: FinTech witness limitless opportunities in rural India. As much as people adopt the FinTech and becomes comfortable with it, increase the publicity of FinTech in rural areas which on the other hand, make it to include even more in remotest areas. It is expected that nation will unlock the potential of FinTech 2.0 in the coming years. 2024 is going to be the exciting year with growth prospects of Fintech in rural as well as urban areas. There may comes the time when the scope started to reduce in rural areas as well with time as decreasing with urban areas. Future will provide great opportunity for the growth of FinTech but one of the challenge is still lies with adoption of FinTech technology and skill based advance development in the field of FinTech.

4. Conclusion

Maintaining highest level of security in today's fast moving economy towards digitization is a challenge in itself for such a populated country like India. For coping up the challenges imposed by cyber security loopholes India need to strengthen its cyber resilience to introduce a centralized cyber control system especially for sensitive information of its citizens. Product specific regulatory approach is needed. Collaboration of traditional financial institution and FinTech companies is the biggest step towards rural inclusion. Ensuring financial challenges and securities regulatory bodies built trust of rural peoples to make approach of FinTech to extra miles.

With huge potential in terms of digitization of financial transactions, FinTech innovation and industry 4.0 is futuristic goal of India. Financial inclusion becomes the necessity of the time to reduce poverty, balanced economic growth and for economic stability. India being having the highest FinTech adoption rate of 87% globally where global rate is only 63%. there are lots of challenges included with respect to security of transactions, personal information. The ambit of Indian financial services increases with digital revolution brought more rural citizens under its coverage. Indian transaction market of 3 trillion dollar is expected to grow 10 trillion dollar in 2026. UPI transactions itself approached the growth of 650% in semi urban and rural stores in India. It has been estimated that digital transactions will contribute around 65% of total transactions in 2026. India has 23 FinTech firms which gained unicorn status. India is gaining benefit of demographic dividends also as 68% of population is young and around 55% is in the age group of 20 -59 which is working population in 2020 is estimated to be reached at 56% in 2025.

Due to sudden spread of COVID 19 pandemics many businesses need to change the functionality from conventional methodology to digital payment system. Revealing face to face identity is no longer the fact for selling a product, a new and innovative layer identity verification of fraud detection has replacing the conventional system of face to face interaction. As fast as any the technology evolve its loopholes are also taking shape during first four month of 2021 attempt of digital frauds increases to 25% if compared with last four months of 2020. but there a lots of different solutions come forward to mitigate risk and adds more layers of security to digital platforms. There is benefit for businesses to operate digitally with high levels of bank grade encryption security of internet which on the other hand reduces lots of manual and paper work as well. Going paperless have lots of benefits consumer will get large accessibility, security ans speedy service. Security architecture should be revised to meet present digital needs. Security of private information of customer data plays a vital role gaining customer confidence and catalyses to believe in FinTech. So from this research, it has been concluded as much as the financial inclusion is important so is the financial security. At some limit financial security results from financial literacy but still as fast as the online technology expanding it needs more advanced approach towards security concern. intermediaries should respect the rights of citizens in order to increase the security for sensitive information.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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