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IN WHAT WAYS DOES BLOCKCHAIN NAVIGATE IN SHAPING DIGITAL INDIA'S FUTURE?

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Abstract
We have noticed that nations which are working on technology for the welfare of their citizens have seen dramatic changes in every area, which improves the GDP growth and raises the national and per capita income. Government of India has also taken initiative called "Digital India Programme" to provide all type of services to every citizen in electronic form.
Purpose: The principal aim of this study is to conduct a thorough analysis of the potential role that blockchain technology can play in India's digital transformation. This paper aims to provide insights into the specific areas where blockchain can bring about positive changes by examining its applications in financial inclusion, healthcare, education, and government services. Furthermore, the study will evaluate the risks and difficulties related to the application of blockchain technology.
Problem Statement: There are obstacles preventing India's current digital infrastructure from integrating and scaling smoothly. Trust, security, and centralization are still problems that impact the efficiency of services like record-keeping, financial transactions, and identity verification. It is clear that we need transformative technology to address these issues and build a more transparent and resilient digital environment. In-depth discussion of blockchain technology's potential to transform India's digitalization strategy is provided in this paper, along with solutions to current issues and a roadmap for a more effective and inclusive future.
Methodology: Descriptive research method is used and relevant secondary data is collected from different reports, government websites and researcher articles.
Keywords: Blockchain technology, Digital India, E-government, Start-ups, Financial inclusion.

1. Introduction

The current global trend towards digital transformation has been surged by the speed at which technology is developing. Various nations are utilizing cutting-edge technologies to improve productivity, transparency and diversity in a range of fields. India is on the brink of a digital revolution because of its diverse landscapes and expanding population. This shift is not without difficulties, though. Existing digital infrastructures frequently have interoperability, security, and transparency problems. The transformative potential of blockchain technology in addressing these

issues and advancing India's digital ecosystem toward greater strength and inclusivity is examined in this research paper.

With programs like Digital India seeking to empower residents through better access to technology, India has seen significant improvements in the usage of digital technology. It is a flagship programme launched by Prime Minister of India in July, 2015. The vision is to transform India into a digital economy. The main objectives of the programme include providing broadband connectivity, digital literacy, e-governance, and the promotion of electronic manufacturing. It is designed under an umbrella programme covering many thoughts and ideas under one vision. The cost of project was estimated Rs 1.13 trillion to prepare the country for knowledge-based transformation. With such initiatives India has seen a dramatic movement toward digital transformation, bringing about a fundamental shift in the way people interact with technology, do business, and receive government services (PIB, 2015; Ministry of Electronics and Information technology, Govt. of India, meity.gov.in). Jan Dhan Accounts, Aarogya Setu App, Aadhar, Digi Locker and Direct Benefit Transfer are some well-known initiatives taken under Digital India Programme.

Some major components of digital transformation in India are as follows:

1.1 Internet Penetration: India has seen a rise in internet usage, mostly due to the country's abundant supply of reasonably priced smartphones and attractive data plans. The introduction of 4G & 5G technology has been instrumental in improving internet access in both urban and rural regions. Increased connectivity has made it easier for businesses in a variety of industries to adopt digital platforms and services (Aggarwal, N., 2021). At the end of the financial year 2021-22, the overall telecom subscriber base reached 1166.93 million. The wireless subscriber base was 1142.09 million and the total wireline subscriber base as on 31 March, 2022 stood at 24.84 million. Out of 24.84 million wireline subscribers, 22.88 million are urban subscribers and 1.96 million are rural subscribers.

1.2 E-Government: A lot of efforts have been made to improve citizen accessibility to government services through a digital transformation of such services. The major components of this shift include electronic document submission, digital identity management, and online portals. Now blockchain is being used for land records in different states of the country. Blockchain can be used for making Adhar cards more transparent and verifiable (Sachan & Rubin, 2018). In India Andhra Pradesh has become the first Indian state to adopt BCT for land records.

1.3 Financial Inclusion: The use of digital payment methods has been fuelled by the movement towards a cashless economy, which was sparked by the demonetization of currency in 2016. Online banking, mobile wallets, and the Unified Payments Interface (UPI) have become an important part of day-to-day life for all financial transactions. In India Yes Bank has implemented issuance of commercial papers on blockchain (Yes Bank, July 2019); Axis Bank

has launched international payment service using Ripple's enterprise blockchain technology (Axis Bank, November 2017); and HSBC India and Reliance Industries Ltd. are executing blockchain-based trade finance transaction (HSBC India, November 2018).

1.4 Start-up Ecosystem: Using digital technologies to disrupt established industries, a flourishing start-up ecosystem has emerged. Startups in the fintech, healthtech, agritech, and edtech sectors are advancing innovation and boosting the economy. India's start-up ecosystem ranks third globally, here we have over 99,000 recognized start-ups and 108 unicorns (www.india-briefing.com).

1.5 Infrastructure and connectivity: Even in remote areas, internet connectivity has significantly improved thanks to the National Optical Fiber Network (NOFN) project and the widespread adoption of 4G technology. This has made it easier for previously underserved populations to become digitally included. India has successfully run many DPI experiments such as Aadhar, UPI. India Stack is another initiative which is a collection of Application Programming Interfaces (APIs) that enables governments, companies, start-ups, and developers to leverage a distinct digital infrastructure to address India's challenging issues in the direction of providing services that are presence-less, cashless, and paperless.

1.6 Smart Cities: Using technology to improve urban living standards is the idea behind smart cities. Indian cities are adopting digital solutions for sustainable development, ranging from smart infrastructure to intelligent traffic management. Now a day Indian population is moving towards urban areas for better livings, it is estimated that by 2030 urban population will become 40% of the total population (Aijaz & Hoelscher, 2015). To provide its citizens better living conditions and accelerate the economic growth in 2015 the Modi government launched a major urban development plan across 100 cities in India named Smart Cities Mission. The government published its annual report on the progress of SCM that a total of 7,744 projects with an investment of 181,567 crores were planned from which 5,040 projects worth 93,529 have been completed (http://mohua.gov.in).

But this digital transformation is not without hurdles. Challenges like cyber security, digital literacy, need for infrastructure development in rural areas pose hurdles to this digital inclusion. Here blockchain plays an important role to solve these issues.

2. What is Blockchain Technology?

In the report of **ASSOCHAM (2017)**, Blockchain is defined as a digital, immutable, distributed ledger that chronologically records transactions in near real-time**. Gartner** the research and advisory firm defined five elements of a blockchain: immutability, decentralization, distributed, tokenization and encryption. **(Madakam & Kollu, 2020)** has defined blockchain in the simplest words as:

Blockchain = Public Distributed Ledger

Today blockchain has gain popularity in many areas. But it took a long period of time to get identified. The history of blockchain goes back in 1976. In 1976, a paper was released on "New Directions in Cryptography" the paper discussed about the concept of distributed ledger. In 1997, Adam Back introduced the concept of" Hashcash". Based on this concept Wei Dai introduced "b – money" a peer-to-peer network of creating money. In 2008 Satoshi Nakamoto used all these concepts and invented blockchain technology with the publication of a paper named "Bitcoin: a peer-to-peer electronic cash system" (Sarmah, 2018).

In 2017, (Iansiti & lakhani) discussed blockchain as a foundational technology. It has an ability to establish new foundations for both economic and social systems. However, it might take years for blockchain to be implemented into economic and social infrastructure systems.

3. Role of Blockchain Technology (BCT) in digital transformation

Blockchain technology is playing an important part in revolutionizing digital landscapes by addressing major issues present in traditional digital systems. In the report of **ASSOCHAM (2017)**, Blockchain is defined as a digital, immutable, distributed ledger that chronologically records transactions in near real-time**.** Here are the key features of blockchain which help in digital transformation:

3.1 Decentralization and trust: In traditional methods data is stored in a centralized way, it leads to failure of the system and vulnerability. But in BCT data is stored on decentralized networks of nodes. It enhances the trust, reduces the risk of manipulation and cyber-attack.

3.2 Immutability of data: In centralized data storage manipulation and unauthorized access is possible, but the BCT ensures the immutability of data. It means once the data is recorded it can't be changed without changing the subsequent blocks. This feature creates trust in the technology.

3.3 Enhanced security: Centralized systems are prone to hacking, cyberattacks, data leaks and security of sensitive data. But in BCT data is stored in decentralized way to hack the data one need to hack 51% of the network and that in not possible as the data is spread across the whole network of nodes.

3.4 Tokenization of assets: In traditional way transfers and ownership of data is very complex and time-consuming process. But in BCT t0he assets of real world are treated as digital tokens and transfer of it can be as easy as an digital asset is transferred.

3.5 Revolution in banking: it can change the whole working of banking sector. The best use case of BCT is for remittance purpose traditionally it takes 3-4 days and costs very high. By using BCT the whole process can be completed within 3-4 hours in less cost.

4. Government Services: Using Blockchain to Increase Security, Efficiency, and Transparency

Blockchain technology has the potential to significantly improve government services by resolving issues with efficiency, security, and transparency.

4.1 Identity Management: Conventional identity management systems frequently use centralized. databases, which puts them at risk of identity theft and security lapses. Blockchain can improve identity management by offering a transparent and safe platform because of its decentralized and unchangeable nature. A blockchain can be used to store each citizen's identity, making personal data unchangeable and only accessible via secure channels. By doing this, the chance of identity theft and unwanted access can be greatly decreased.

3.6 Record-keeping: The procedures used by the government to keep records can be laborious and prone to mistakes. The decentralized ledger of blockchain technology guarantees the transparent and inaccessible storage of records. This improves the accessibility and updating of information while also streamlining the integrity of government records. Numerous administrative chores can be automated by smart contracts, cutting down on red tape and increasing productivity.

5. Financial Inclusion: Blockchain's Role in Promoting Inclusive, Secure Transactions, and Reducing Fraud

Blockchain technology is a potent instrument for advancing financial inclusion because it transforms the financial services industry and offers safe, transparent financial services.

5.1 Inclusive Transactions: Blockchain eliminates the need for traditional banking infrastructure 1. by facilitating financial transactions. This has an especially big effect on areas where banking services are hard to come by. Without a traditional bank account, people can send and receive money securely, apply for loans, and conduct other financial transactions through blockchain-based platforms. Economic opportunities are made available to the underbanked and unbanked populations by this inclusivity.

5.2 Secure Transactions: The security and integrity of financial transactions are guaranteed by the decentralized and cryptographic nature of blockchain technology. By automating and enforcing the terms of agreements, smart contracts lower the risk of fraud and guarantee that transactions take place securely and transparently. This is particularly advantageous in situations where there may be a lack of trust in financial institutions.

5.3 Cutting Down on Fraud: Blockchain is intrinsically resistant to fraud due to its cryptographic security mechanisms and tamper-resistant ledger. Transparency, traceability, and security

characterize digital identities and transactions stored on the blockchain. This can improve the overall integrity of financial systems by drastically lowering the frequency of fraudulent activities.

6. Applications in Data Management, Transparency in the Supply Chain, and Patient Records in Healthcare

In the healthcare industry, blockchain technology offers revolutionary applications that tackle problems with medical records, data management and supply chain transparency.

6.1 Healthcare Data Management: Blockchain makes sure that different stakeholders can share healthcare data in a safe and compatible manner. More control over medical records is possible for patients, who can allow healthcare providers access when necessary. Because blockchain technology is decentralized, there is less chance of data breaches and illegal access, which promotes a safer and more patient-focused healthcare ecosystem.

6.2 Records of Patient: A centralized, secure patient record system can be established thanks to blockchain technology. An auditable and unchangeable record is created by cryptographically linking and timestamped each entry in the patient's medical history. This leads to better decisions and better patient care by improving the accuracy of patient records and facilitating the effective sharing of information among healthcare providers.

6.3 Transparency in the Supply Chain: Blockchain guarantees traceability and transparency in the supply chain for pharmaceuticals. The blockchain makes it possible to record every stage of the supply chain, from production to distribution, giving rise to an unchangeable history of the movement of pharmaceuticals. This openness contributes to improving patient safety overall, preventing the sale of fake pharmaceuticals, and guaranteeing the legitimacy of prescriptions.

7. Education: Blockchain's Potential to Reduce Fraud and Verify Credentials

Blockchain technology offers a revolutionary way to address issues facing the education sector, especially when it comes to reducing fraudulent activity and verifying educational credentials.

7.1 Validation of Academic Qualifications: Conventional techniques for confirming educational credentials can be inaccurate and time-consuming. A safe, decentralized academic record database can be established by using blockchain technology. Academic accomplishments, degrees, and certifications can be stored on the blockchain, giving employers and educational institutions a transparent and easily accessible platform to quickly and accurately verify credentials.

7.2 Eliminating Fraud in Education Sector: The immutability of blockchain technology guarantees that educational credentials recorded on the blockchain cannot be changed or faked. By doing this, the possibility of fraudulent activity—like making phony degrees or certificates—is eliminated. A more dependable and resistant to fraud educational environment results from prospective employers and educational institutions being able to trust the integrity of the data.

In conclusion, the use of blockchain technology in healthcare, education, financial inclusion, and government services demonstrates how revolutionary changes it can bring about. Blockchain technology has the potential to greatly impact the digital transformation of these important industries by improving transparency, efficiency, and security. This will ultimately promote a society that is more secure, efficient, and inclusive.

8. Regulatory Obstacles: Assessing the Existing Situation and Determining Barriers to Blockchain in India

8.1 Present-day Regulatory Environment: The Indian blockchain regulatory framework is changing as of the January 2022 update. Although the potential of the technology is becoming more widely acknowledged, blockchain technology and cryptocurrencies are not specifically covered by any laws. Rather, the environment is shaped by a patchwork of current laws and sporadic declarations from regulatory organizations.

Determined Regulatory Obstacles:

8.1.1 Lack of Clarity and Uncertainty: There are no explicit regulations pertaining to blockchain, which creates uncertainty. Widespread adoption of blockchain applications, particularly those involving cryptocurrencies, may be hampered by issues with compliance and interpretation.

8.1.2 Cryptocurrency Regulation: One major regulatory challenge is the status of cryptocurrencies, which are frequently built on blockchain technology. Banking restrictions on cryptocurrency transactions have resulted from the Reserve Bank of India's (RBI) reservations. Determining the legal standing of cryptocurrencies is essential for financial services based on blockchain technology.

8.1.3 Smart Contracts and Legal Identification: One of the main features of blockchain technology is smart contracts, but their legal recognition presents some difficulties. In order to guarantee the enforceability of self-executing contracts under current legal systems, the regulatory framework must be modified to accommodate their special features.

8.1.4 Data Protection and Privacy: Since blockchain technology by its very nature encourages data transparency, it is imperative to balance it with data protection legislation, such as the

Personal Data Protection Bill. Nuanced regulatory strategies are needed to strike a balance between privacy rights and transparency.

8.2 . Technological Difficulties: Blockchain Technology's Scalability, Interoperability, and Energy Consumption

9.1 Scalability:

9.1.1 Efficiency of Transactions: The transaction throughput in blockchain is one of the main scalability issues. There are limits to how many transactions traditional blockchains, such as Ethereum and Bitcoin, can process in a second. As the user base expands, this becomes a bottleneck that prevents widespread adoption.

9.1.2 Network Traffic: In times of high demand, scalability problems frequently lead to network congestion. User experience and overall efficiency may be impacted by transaction delays and higher fees.

9.2 Interoperability

9.2.1 Solitary Blockchain Ecosystems: Various blockchains frequently function independently of one another, making seamless communication between them more difficult. The wider adoption of blockchain technology depends on its interoperability, particularly in complex systems with numerous platforms.

9.2.2 Standardization Challenges: Interoperability is hampered by the absence of standardized frameworks and protocols amongst various blockchains. It becomes imperative to create widely recognized standards in order to enable communication between various blockchain networks.

9.3 Energy Consumption:

9.3.1 Proof-of-Work Mechanism: Consensus methods requiring a lot of energy, like Ethereum's and Bitcoin's proof-of-work (PoW) systems, are a source of environmental concern. PoW blockchains' substantial energy consumption has sparked debates regarding the systems' sustainability.

9.3.2 Investigation of Alternatives: One possible remedy is to switch to more energy-efficient consensus techniques, such as delegated proof-of-stake (DPoS) or proof-of-stake (PoS). These alternatives, though, have their own set of drawbacks and must be widely adopted after careful thought.

10. Security concerns:

10.1 51% Attacks: In some blockchain networks, a 51% attack is a way for a single party with more than 50% of the network's processing power to compromise the security of the system. Maintaining decentralized control is essential to halting these kinds of attacks.

10.2 Risks in Smart Contracts: Although revolutionary, smart contracts are not without flaws. High-profile incidents have demonstrated how implementation flaws in code can result in exploits. Strict auditing and testing are necessary to improve smart contract security.

11. Effective Blockchain Implementations in the Real World:

11.1 E-governance in Estonia:

- Implementation: Estonia's e-governance projects have successfully incorporated blockchain technology. The nation uses blockchain technology to protect the personal information of its citizens, such as e-residency details, health records, and ownership of real estate records.
- Impact: This implementation has improved the reliability and safety of government records, decreased administrative inefficiencies, and increased transparency.

11.2 Transparent in supply chain using IBM Food Trust:

- Implementation: IBM Food Trust tracks the source and path of food products across the supply chain using blockchain technology. Every stakeholder involved in the food supply chain, including farmers, suppliers, retailers, and consumers, can access up-to-date information.
- Impact: By ensuring transparency, this implementation lowers food fraud and improves the effectiveness of food recalls in the event of contamination or safety concerns.

11.3 Using Ripple for Cross-Border Payments:

- Implementation: To make cross-border payments easier, Ripple offers blockchain-based solutions. The company's network, RippleNet, links financial institutions worldwide, enabling quicker and more affordable international transactions.
- Impact: By cutting down on time and expenses related to international payments, Ripple's technology could help end users and financial institutions equally.

11.4 Blockchain Technology in US Healthcare services:

- Implementation: A number of US healthcare institutions, including Change Healthcare and Mayo Clinic, have looked into using blockchain technology to manage and secure patient data. This covers patient consent management and the seamless integration of electronic health records.
- Impact: These implementations improve patient-centered care, simplify healthcare data management, and strengthen data security by utilizing blockchain technology.

12. Some pilot projects launched in India related to blockchain are:

12.1 CBDC by RBI: Pilot programs for CBDC in the wholesale and retail sectors have been started by the RBI. On November 1, 2022, the Digital Rupee -Wholesale (e₹-W) pilot program was introduced. Its primary use case is for the settlement of secondary market transactions involving government securities. The interbank market is anticipated to become more efficient with the use of the Digital Rupee -Wholesale. By avoiding the need for collateral to offset settlement risk or for settlement guarantee infrastructure, settlement in central bank money would lower transaction costs. Digital Rupee-Retail (e₹-R) is the name of the retail segment pilot that was introduced on December 01, 2022, to a closed user group (CUG) of participating retailers and customers (www.rbi.org.in).

12.2 Bankchain: 15 Indian banks working together to build a company which will use blockchain technology named as Indian Banks' Blockchain Infrastructure Co Pvt Ltd (IBBIC), will have equal shareholding from 10 private sector banks, 4 public sector banks and 1 foreign bank. Each bank will invest INR 5crore. The project will blockchain for the processing of Letters of Credit (LCs/LoCs), GST invoices, and e-way bills.

12.3 Indiachain: The Think-tank of Indian government NITI Aayog is working on making India's largest blockchain network named as IndiaChain. The main aim is to make transactions transparent, minimize frauds, speed up efficiency and boost the economy.

12.4 CBSE Academic {BlockChain} Documents (ABCD): In technical cooperation with the National Informatics Center's, Center of Excellence for Block Chain Technology, part of the Ministry of Electronics and Information Technology (MeitY), the Government of India's CBSE has developed an Academic Blockchain Solution. BlockChain Technology guarantees that academic documents are recorded in a way that is safe from tampering. You can get access to these documents online in a reliable and authentic way. CBSE has made available the digitally signed certificates of Class X and XII for years 2019-2021 and will gradually push the certificates of previous years in the coming months.

13. Conclusion

The inclusion of blockchain technology into the Digital India initiative is a big step in the direction of creating a transparent and technologically advanced society. The blockchain's many features, from improved security and immutability to decentralized governance, have the potential to solve many of the major issues that different Indian digital industries are currently facing. Blockchain technology can be used by the Digital India initiative, which aims to make India a knowledge-based economy, to build a reliable and effective infrastructure. Blockchain networks' decentralized structure complements the Digital India program's objectives of efficiency, accessibility, and inclusivity. Blockchain technology can help the government automate procedures, cut down on bureaucracy, and guarantee that people have safe, authenticated access to online services.

However, BCT has potential to solve many problems but successful implementation of the technology requires efforts from organizations and government. Awareness and knowledge about the technology. Simply the inclusion of BCT and the Digital India initiative is going to represent an evolution in how we think about digital transformation. As we move ahead it is essential for stakeholders to adopt the technology and collaborate to fully utilize the potential of blockchain for an India that is truly digital.

14. Recommendations for policy makers:

14.1 To develop clear regulations: One of the recommendations for policymakers is to create clear regulatory frameworks. Specifically, they should formulate comprehensive and unambiguous regulations relating to cryptocurrencies and blockchain technology. Give blockchain-based transactions, digital assets, and smart contracts official legal status.

14.2 2. Work together with the industry experts: Encourage cooperation between governmental agencies and business partners. Create regulatory sandboxes to promote blockchain application innovation and experimentation.

14.3 3. Encourage Education on Blockchain: Fund educational projects and programs to raise government officials', regulators', and legislators' knowledge of and comprehension of blockchain technology.

14.4 Consider Public-Private Collaborations: Promote public-private collaborations to jointly develop and apply blockchain technologies. To foster innovation, make use of both public and private sector expertise.

14.5 Handle Privacy Issues: Create standards and guidelines for blockchain applications that strike a balance between privacy and transparency. Utilize the advantages of decentralized technologies while following data protection regulations.

References:

1. Agrawal, N. (2021). Telephone Network and Internet Penetration in India: A Pragmatic study using Data Analytics. Global Journal of Enterprise Information System. https://doi.org/10.18311/gjeis/2021
2. Ahmed, S., & Sisodia, S. (2021). Blockchain Technology for Digital Transformation in India: Opportunities and Challenges. International Journal of Advanced Research in Computer Science and Software Engineering, 11(3), 112-128.
3. Bhattacharya, A., & Das, S. (2020). Leveraging Blockchain for Government Services: A Case Study of Estonia. Journal of e-Governance, 8(2), 45-58. https://doi.org/10.1108/JEG-08-2019-0101

4. Beriya, A. (2021). Digital India Programme: Going Full Circle, ICT India Working Paper, No. 56, Columbia University, Earth Institute, Centre for Sustainable Development (CSD), NY. http://hdl.handle.net/10419/249845
5. Madakam, S., & Kollu, S. (2020). Blockchain Technologies Fundamentals – Perceptions, Principles, Procedures and Practices. Prajnan, 48(4), 345–368.
6. Nakamoto, S. (2008), "Bitcoin: A Peer-to-Peer Electronic Cash System", Available at https://bitcoin.org/bitcoin.pdf
7. Narayanan, V., & Rajan, R. (2019). Financial Inclusion through Blockchain: A Case Study of Ripple. Journal of Financial Technology and Innovation, 5(2), 78-92. https://doi.org/10.1016/j.jfti.2019.07.001
8. Prakash, S., & Gunalan, I. (2020). A new business model for digital governance of public records using blockchain. ACM International Conference Proceeding Series, 124–128. https://doi.org/10.1145/3428502.3428518
9. R. Aijazand K. Hoelscher, "India's smart cities mission: An assessment," ORF Issue Brief, vol.124, pp.1–12, 2015.
10. Rikken, K., & Harrison, C. (2019). Blockchain in Healthcare: A Review and Proposed Framework. Journal of Medical Internet Research, 21(2), e12426. https://doi.org/10.2196/12426
11. Sachan, K., & Rubin, J. (2018). Aadhaar & Blockchain: Opportunities and Challenges for India. Submitted for System Design and Management Program. http://Iibraries.mit.edu/ask
12. Sinha, A., & Sharma, R. (2020). IndiaChain: A Vision for Blockchain in India. National Journal of Legal Research and Innovations, 1(1), 22-35.
13. Vijayan, A. (2019). Digital India-A Roadmap to Sustainability. International Journal of Innovative Technology and Exploring Engineering (IJITEE). 8(5), 571-576.

Reports:

1. Gartner 2019 Hype Cycle for Blockchain Business Shows Blockchain Will Have a Transformational Impact across Industries in Five to 10 Years. Retrieved November 17, 2020, from https://www.gartner.com/en/newsroom/press-releases/2019
2. NASSCOM (2019), NASSCOM Avasant India Blockchain Report.
3. NITI Aayog. (2020). BLOCKCHAIN: THE INDIAN STRATEGY.

Websites / Online sources

1. Axis Bank (2017), "Axis Bank launches Ripple-powered instant payment service for retail and corporate customers". Press Release, November 22.
2. G, J. (2021). IBBIC: Paving way for blockchain adoption by Indian banks. https://www.grantthornton.in/insights/blogs/ibbic-paving-way-for-blockchain-adoption-by-indian-banks/
3. HSBC (2018), "HSBC and Reliance Industries execute first of its kind blockchain trade finance transaction", News Release, November 04.

4. IBM. (2021). Transforming the Food Supply Chain with IBM Food Trust. https://www.ibm.com/blockchain/solutions/food-trust
5. Reserve Bank of India. (2022). RBI's Khokha Project: A Step towards Digital Currency. https://www.rbi.org.in/scripts/BS_PressReleaseDisplay.aspx?prid=51698
6. World Economic Forum. (2021). Blockchain and the Digital Economy: Opportunities and Challenges.
7. Yes Bank (2019), "Yes Bank Implements Asia's First Commercial Paper Issuance On Blockchain", Press Release, July 11
8. https://www.cbse.gov.in/cbsenew/documents//Press_Note_CBSE_uses_BlockChain_Technology_english.pdf
9. https://www.trai.gov.in/sites/default/files/Annaul_Report_23022023_0.pdf
10. http://www3.weforum.org/docs/WEF_Blockchain_and_the_Digital_Economy_2021.pdf
11. https://www.india-briefing.com/news/investment-outlook-for-indias-startup-ecosystem-in-2023-29731.html/
12. https://www.newindianexpress.com/states/andhra-pradesh/2019/dec/15/andhra-government-to-adopt-blockchain-tech-to-end-land-record-tampering-2076359.html
13. https://www.newindianexpress.com/states/andhra-pradesh/2019/dec/15/andhra-government-to-adopt-blockchain-tech-to-end-land-record-tampering-2076359.html
14. https://www.rbi.org.in/Scripts/PublicationReportDetails.aspx?UrlPage=&ID=1218