

Digitization to Accountability: India's Model Harnessing Data, Technology and Integrity for National Growth

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Abstract

India is rapidly transforming from paper money to digital means of finance supported by JAM (Jan-Dhan, Adhaar and Mobile) trinity, digital payments through Unified Payment Interface (UPI), GST e-invoicing and ongoing pilot Central Bank Digital Currency (CBDC). This move has improved transaction velocity, financial inclusion and welfare distribution. As velocity increased in digital transactions, various vulnerabilities like cyber enabled frauds, fake tax credit, and illicit cross border money flows have emerged. This study adopts mixed method approach combining secondary research from recent global literature, industry reports and regulatory publications with analysis of transaction trends and case studies. Findings indicate that digitization helps efficiency and scale but requires advanced forensic accounting, AI enabled anomaly detection and regulatory framework to mitigate risks. With 19.47 billion transactions amounting ₹25.08 lakh crore in July 2025, the paper argues for institution strengthening through technology enabled analytics and policy integration to support India's financial flow towards Viksit Bharat@2047, eventually improve GDP of the nation, reduce systematic leakages, corruption and support 'Sustainable Development Goal - 9 Industry, Innovation and Infrastructure'(NPCI, 2025) (PIB, 2024) (RBI, 2025) (Bain, 2025)

Key Words: Fraud, Inclusivity, Digitization, Forensic, UPI, SDG, India

1. Introduction

The Digital India program has helped India to be leader in digital payments with over 20 billion transactions in the month of August, 2025 for the first time. (DFS, 2025) India is determined to be a technology driven – solution oriented economy with massive investment in digital identity, payment interface, data driven solutions and enterprise transformation. Forensic accounting integrates accounting exercise with digital, investigative and legal competencies essential for improving integrity of the financial system. With rapid digitization of financial services, supply-chain management, welfare services; businesses migrate to digital platforms. The Government's move to Digital Payment Interface (DPI) and National Open Digital Ecosystem (NODE) require real time monitoring for risk of cyber fraud, financial manipulations and technical vulnerabilities. (MEITY, 2020) (NCEG, 2024) (DARPG)

India is moving his financial ecosystem to digital means of finance by UPI and GST e-invoicing have become backbone for real time money transactions and accurate monitoring of financial flows. JAM is foundation for inclusive and digital transformation of banking and financial institution of India. Ongoing implementation of e-₹ (CBDC) – frontier sovereign back currency is move for block chain enabled money trail system for maintaining financial integrity and combating illicit financing. This transformation improves economic efficiency, widens financial inclusion but requires forensic accounting augmented by digital forensic and AI for sustaining trust in Digital Bharat.

India's finance system is fastest growing and one of most fraud targeted ecosystem globally. This paper discusses verified datasets from RBI, NPCI, NCRB and global regulators.

2. Literature review

For constant growth of economy the innovation and ease of doing business is mandatory requirement. (Li, Sousa, He, & Hu) Governments and business organizations focus on sustainability and promote use of such goods as a reason of growing interest on sustainable development goals. For balance economic growth and sustainable development focus on circular economy is required by decision makers. (Kirchherr, N, Schulze-Spüntrup, Maarten, & Hartley, 2023) Digital transformation is essential for economy to adapt inclusive welfare mechanism. (Ertz, Sun, Boily, Kubiak, & Quenum, 2022) As the nation move to digitization, new risks emerge from technological adoption. Risks include resource constraint, technical expertise and financial resources. (Micheli, Cogno, Neri, & Cieri, 2021)

Emerging technical trends and large scale use of e-governance improves transparency and economic development. (Elbahnasawy, 2021) A study revealed that use of virtual social network beside traditional way of communication tool is increasingly used by citizens to pressure authorities for timely response to issues. This has shown there is indirect relation between e-governance and corruption. (Arayankalam, Khan, & Krishnan, 2021) The study on relation between ICT (Information and Communication Technology) and shadow economy has shown ICT use reduce shadow economy. E-participation has significant effect on reducing size of shadow economy. (Remeikien, Gaspar_ enien_, Bayar, Ginevicius, & e, 2022) Shadow economy has negative impact on economic growth. (Younas, Qureshi, & Al-Faryan, 2022)

Cyber crime is emerging trend in study of criminology due to complex structure and cross border network. Several studies have discussed effect of e- governance and technology in public service with cyber crime. Cyber offenders use ICT to harm individual or groups with criminal motive. Cyberspace is inevitable for businesses and government for inclusive welfare reach. Credit card data and personal data have higher value in dark market, and criminal use advanced tools to have access to them. (R, 2020) Use of strong data governance tool and specified responsibility modules are important for effective cyber secure environment. (Onwujekwe, Thomas, & Osei-Bryson, 2019) Big data governance is crucial for development of a nation. European Union protects personal data as a personality right, while United States protect personal data as privacy right. China advocates protection of data as personality right and for commercial use of the data plan to assign treatment as of a property. The study also propose utilization of Meta data and big data for law based government and construct governance concept that include private laws, public laws and self governance supported by robust technologically enabled safety tools and awareness activities. (Gao & Yu, 2020) (Yu, 2020) Machine learning can be used as a tool to reduce detection gap in fraud but for best result human oversight is must. (Hong, Zheng, & Zilberman, 2025) Block chain technology is useful in detecting and tracing illegal transactions but have privacy concern and cross border issues aligned to it. (Zarpala & Casino, 2021)

Digital public infrastructure and e- governance supports strong audit trails and governance validity but they need to adhere to emerging fraud dynamics and investigative techniques. Forensic accounting professionals must adopt digital environment where AI, Block chain and continuous monitoring supports ecosystem.

3. Research Methodology

The study follows exploratory mixed method approach using secondary data of government reports and documented fraud incidents.

3.1 Data Source

Secondary Data: Data sets from DICGC (Deposit Insurance and Credit Guarantee Corporation), RBI, NPCI and PIB for period 2016-2025

Global Literature: FATF, Academic and Industry Study and analysis reports on forensic accounting, documented fraud incidents available on public domain

3.2 Hypothesis

H₁: Financial inclusion in India has significantly increased transaction velocity in digitization of finance.

H₂: Higher digital transaction volumes are positively correlated with cyber-enabled financial frauds.

H₃: Advanced forensic accounting and AI-enabled analytics mitigate risks more effectively than traditional audit methods.

3.3 Analytical Methods

Trend analysis, Regression, Correlation and p - value test ($\alpha=0.05$)

4. Data Analytics

Table 1

| Financial Year | Total Number of Bank Accounts (Crore) (a) | Number of Total Digital Banking Transactions (Crore) (b) | No. of Cases Reported (1lakh and above)(c) | Total Amount of Loss due to Cybercrime (₹ lakh) (d) | *Fraud Rate (e) |
|----------------|---|--|--|---|-----------------|
| 2016 | 168.19 | 593 | 1,191 | 2690 | 2.01 |
| 2017 | 188.48 | 969 | 1,372 | 2778 | 1.42 |
| 2018 | 194.09 | 2071 | 2,058 | 7979 | 0.99 |
| 2019 | 217.4 | 3134 | 1,866 | 5174 | 0.60 |
| 2020 | 235 | 4572 | 2,677 | 4422 | 0.59 |
| 2021 | 252.63 | 5554 | 2,545 | 5010 | 0.46 |
| 2022 | 262.2 | 8840 | 3,596 | 8033 | 0.41 |
| 2023 | 300.1 | 13462 | 6,699 | 6968 | 0.50 |
| 2024 | 289.75 | 18592 | 29,082 | 17705 | 1.56 |
| 2025 | 293.66 | 23834 | 13,384 | 10721 | 0.57 |

(DICGC) (PIB) (Dataful) (digipay) (AngelOne, 2025)

*Fraud Rate = Number of Fraud Cases/ Amount of Digital Transactions (in Crore)

Table 2

| H ₁ | H ₂ | H ₂₁ (Removal of outlier 2024) | H ₃ |
|------------------------|------------------------|---|------------------------|
| r = 0.880 | r = 0.784 | r = 0.983 | r = -0.238 |
| r ² = 0.774 | r ² = 0.614 | r ² = 0.967 | r ² = 0.057 |
| p value = 0.012 | p value = 0.354 | p value = 0.039 | p value = 0.010 |

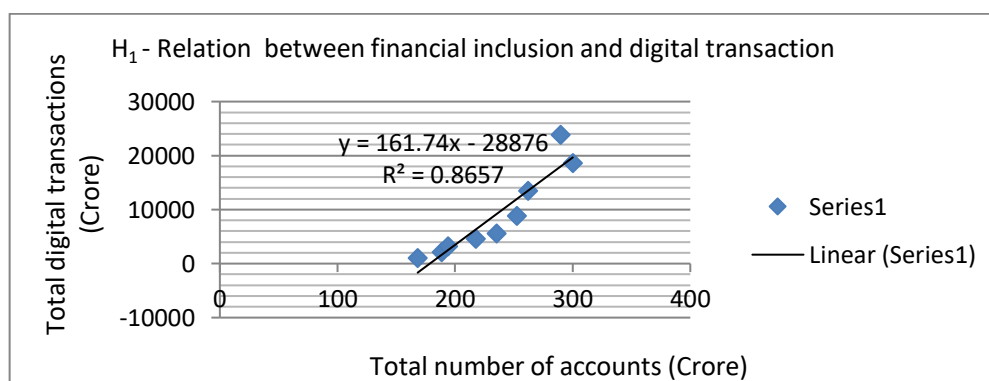


Figure 1

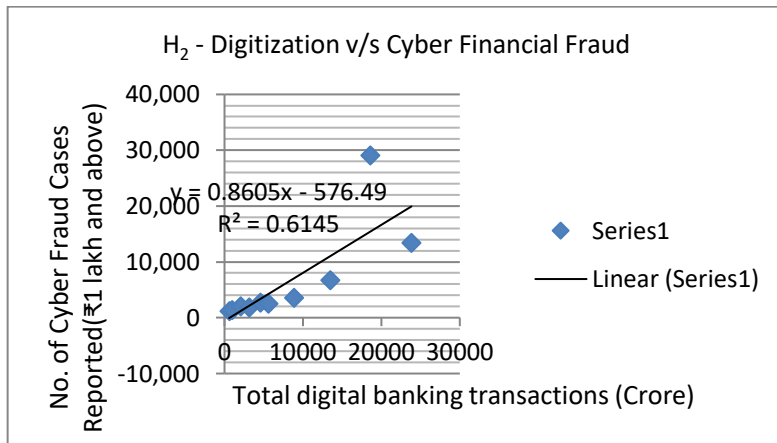


Figure 2

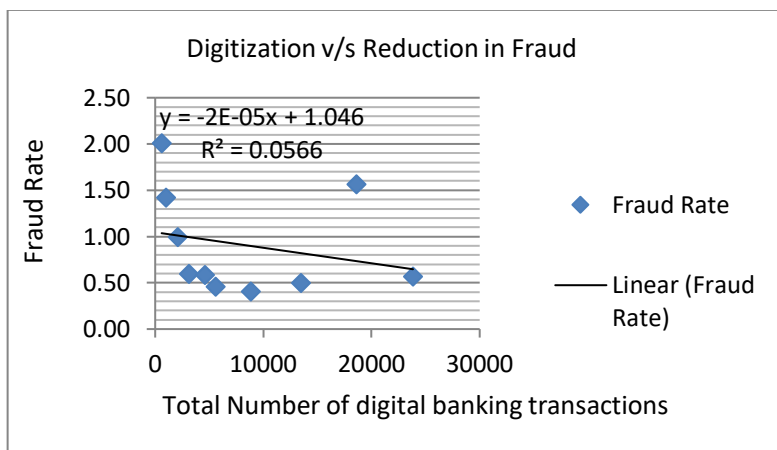


Figure 3

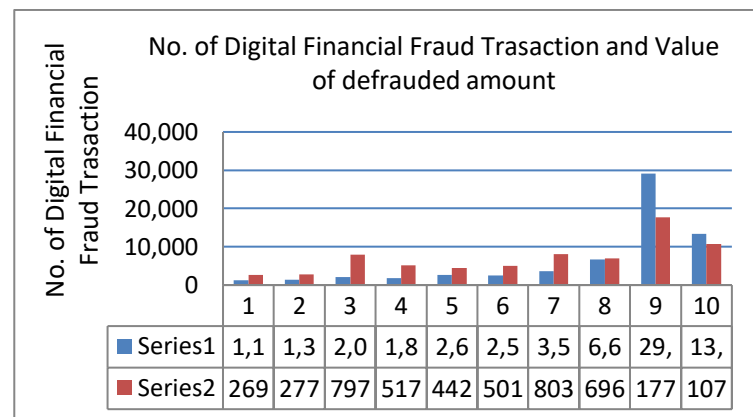


Figure 4

4.1 Analysis and Discussion:

On the basis of above data analysis performed on data sets available from DICGC, RBI, NPCI, and published industry reports for period of 2016-2025, details of the observations derived are as here.

Number of bank accounts opened since 2016 has significantly increased in 2019 from 168.19 crore to 217 crore due to government initiative of Jan Dhan Accounts opening and low cost life and health insurance scheme for lower strata of the society. Digital transactions volume has increased from 593 crore transactions in 2016 to 3134 crores transactions in

2019 largely due to effect of demonetisation in November, 2018 and implementation of UPI for mobile banking transaction. The series for digital transactions shows exponential growth of double digits for remaining years.

The findings for H_1 demonstrate a strong positive association between financial inclusion (a) and number of digital transactions (b) with $r = 8.880$ suggest a substantial linear relation. p value is below conventional threshold 0.05, we reject the null hypothesis of no relation between financial inclusion (a) and number of digital transactions (b).

Upon analysis of H_2 , the analysis has positively high relation between total number of digital banking transactions (b) and total number of cyber financial cases reported (c) with $r = 0.784$ and $r^2=0.614$ but the association was not statistically significant.

To address exceptionally high rise in financial fraud cases in July, 2024, the RBI has implemented followings rules –

- Early Warning System (EWS) to detect suspicious transactions.
- Strict monitoring of Non-KYC accounts, high risk transactions and accounts.
- Incorporating Market Intelligence Unit (MIU) to analyse fraud trends (RBI, 2024)
- RBI introduced MuleHunter.ai – to detect and manage mule accounts. (rbihub.in, 2025)

Upon identifying the FY 2024 as an outlier, revised result was produced eliminating data for FY 2024. The result demonstrated much stronger positive correlation with 96.7% variance explained by r^2 with statistically significant relationship p value = 0.039. Hence we reject the null hypothesis of no relation between Total number of digital banking transactions (b) and Total number of cyber financial cases (c).

The relation between total number of digital banking transactions (b) and fraud rate (e) – H_3 has revealed a weak negative correlation with statistically significance at p value = 0.010. This indicates (b) is associated with small reduction in (e). However value of $r^2 = 0.057$ shows that effective reduction in fraud rate is also associated with other factors along with total number of digital banking transactions. Hence we reject the null hypothesis of no relation between Total number of digital banking transactions (b) and fraud rate (e).

5. Conclusion

Purpose of the study is to check association of financial inclusion, digitization of financial services and reduction in fraud rate with technology implementation. From above discussion it is concluded there is significantly positive relation between financial inclusion (a) and number of digital transactions (b), total number of digital banking transactions (b) and total number of cyber financial cases reported (d) and negative correlation Total number of digital banking transactions (b) and fraud rate (e).

The success of Digital Bharat lies not in scale, but trust. India's advancement in digital finance is statistically rapid with UPI at more than 14billions transactions monthly. (NPCI, 2025) Upon analysis of H_3 , further inclusion of technology is required to mitigate fraud rate on digital transactions. By embedding AI powered forensic tools in financial infrastructure with strong cross border financial intelligence and citizen centric welfare schemes, India can make forensic accounting ethical pillar of its Digital finance. Alongside parallel implementation of preventive, detective and corrective policy initiatives strengthen financial infrastructure of the nation and help to cope emerging fraud topology. Such initiatives will help to improve GDP of the nation, reduce systematic leakages, corruption and support 'Sustainable Development Goal - 9 Industry, Innovation and Infrastructure'. To smoothly reach path of Viksit Bharat @ 2047, forensic readiness with awareness is a vital requirement. Strong institutions, AI powered analytics, integrated policy implementation are essential to safeguard financial flow, preserve trust and to overcome the vulnerabilities of technology perpetrators.

6. References

3. (2025). Retrieved from rbihub.in: <https://rbihub.in/mule-hunter-ai/>
4. *AngelOne*. (2025, 03 11). Retrieved from <https://www.angelone.in/news/market-updates/india-reports-over-rs-107-crore-in-cyber-fraud-losses-first-three-quarters-fy25?msocid=395464cb43dd64e6325b71574208652e>
5. Arayankalam, J., Khan, A., & Krishnan, S. (2021). How to deal with corruption? Examining the roles of e-government maturity, government administrative effectiveness, and virtual social networks diffusion. *International Journal of Information Management*, 102203.

6. *Bain*. (2025, 02). Retrieved from Bain: <https://www.bain.com/insights/india-2047-transforming-india-into-a-tech-driven-economy>
7. *DARPG*. (n.d.). *DARPG*. Retrieved from https://darpg.gov.in/sites/default/files/Viksit_Bharat_2047_Governance_Transformed.pdf
8. *Dataful*. (n.d.). Retrieved from <https://dataful.in/datasets/17980/>
9. *DFS*. (n.d.). Retrieved from <https://financialservices.gov.in/beta/en/page/digital-payments>
10. *DFS*. (2025, 09 01). *NPCI*. Retrieved from NPCI: <https://www.npci.org.in/what-we-do/upi/product-statistics>
11. *DICGC*. (n.d.). Retrieved from https://www.dicgc.org.in/sites/default/files/2024-11/AR2015-16_English.pdf
12. *digipay*. (n.d.). Retrieved from <https://digipay.gov.in/dashboard/>
13. Elbahnasawy. (2021). Can e-government limit the scope of the informal economy? *World Development*, 105341.
14. Ertz, M., Sun, S., Boily, E., Kubiak, P., & Quenum, G. (2022). How transitioning to Industry 4.0 promotes circular product lifetimes. *Industrial Marketing Management*, 125-140.
15. Gao, & Yu. (2020). Public Governance Mechanism in the Prevention,. *Journal of Chinese Governance* , 178-197.
16. Hong, X., Zheng, C., & Zilberman, N. (2025). In-Network Machine Learning for Real-Time Transaction Fraud Detection.
17. Insight into how digital forensic accounting and metaverse circular business model innovation contribute to accelerated internationalization: evidence from Vietnam-based SMEs. (2024). *Cogent Business & Management*, 2320203.
18. Iulia, B., & Violeta, M. (2023). DOES THE DIGITALIZATION OF PUBLIC SERVICES INFLUENCE ECONOMIC AND FINANCIAL CRIME? *Studies in Business and Economics*, 18(2).
19. Kirchherr, J., N, H. N., Schulze-Spüntrup, F., Maarten, H. J., & Hartley, K. (2023). Conceptualizing the Circular Economy (Revisited): An Analysis of 221 Definitions. Resources, Conservation and Recycling. *Resources, Conservation and Recycling*, 194.
20. Li, R. Y., Sousa, C. M., He, X., & Hu, Y. (n.d.). Spinning straw into gold: Innovation recycling, innovation sourcing modes, and innovation ability in Sub-Saharan Africa. *Spinning straw into gold: Innovation recycling, innovation sourcing modes, and innovation ability in Sub-Saharan Africa*. Retrieved from Spinning straw into gold: Innovation recycling, innovation sourcing modes, and innovation ability in Sub-Saharan Africa
21. *MEITY*. (2020). Retrieved from *MEITY*: https://psa.run/wp-content/uploads/2020/02/mygov_158219311451553221.pdf
22. Micheli, J., Cogno, E., Neri, A., & Cieri, E. (2021). Non-safety costs: A novel methodology for an ex-ante evaluation. *Safety Science*, 105025.
23. *NCEG*. (2024, 09). Retrieved from NCEG: <https://nceg.gov.in/assets/pdf/DigitalPublicInfrastructureDPI-CEO-NISG.pdf>
24. *NPCI*. (2025, 08 30). *NPCI*. Retrieved from NPCI: <https://www.npci.org.in/what-we-do/upi/product-statistics>
25. Onwujekwe, G., Thomas, M., & Osei-Bryson, K. (2019). USING ROBUST DATA GOVERNANCE TO MITIGATE THE IMPACT OF CYBERCRIME. *ICISDM '19*, 70-79.
26. *OpenAI*. (n.d.). Retrieved from ChatGPT : <https://chat.openai.com/>
27. *PIB*. (n.d.). Retrieved from <https://www.pib.gov.in/Pressreleaseshare.aspx?PRID=1849973>
28. *PIB*. (2024, 01 07). Retrieved from PIB: <https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=1993970>
29. R, H. (2020). Blockchain, GDPR, and fantasies of data sovereignty. *Law, Innovation and Technology*.

30. RBI. (n.d.). Retrieved from <https://www.rbi.org.in/scripts/PublicationsView.aspx?id=22551>
31. RBI. (2024). Retrieved from https://www.rbi.org.in/Scripts/BS_ViewMasDirections.aspx?id=12702
32. RBI. (2025, 01 09). Retrieved from RBI: <https://www.rbi.org.in/commonman/English/scripts/FAQs.aspx?Id=3686>
33. Gibson, G.(2025). EVALUATING THE TRANSMUTATION AND DECAY PRODUCTS OF THE NUCLEAR FUEL CYCLE: A MODERN INTERPRETATION OF ALCHEMICAL SCIENCE. *International Journal of Engineering Sciences & Research Technology*, 14(11), 1–7. <https://doi.org/10.29121/ijesrtp.v14.i11.2025.1>
34. Remeikien, R., Gaspar_ enien_ , L., Bayar, Y., Ginevicius, R., & e, R. (2022). ICT development and shadow economy: Empirical. *ECONOMIC RESEARCH-EKONOMSKA ISTRAŽIVANJA*, 762-777.
35. Younas, Z. I., Qureshi, A., & Al-Faryan. (2022). Financial inclusion, the shadow economy and economic growth in developing economies. *Structural Change and Economic Dynamics*, 613-621.
36. Yu, X. (2020). The three legal dimensions of China’s big data governance. *Journal of Chinese Governance* , 511-530.
37. Zarpala, L., & Casino, F. (2021). A blockchain-based forensic model for financial crime investigation: the embezzlement scenario. *Digital Finance*.