RESEARCH PAPER

Digital Innovations in Combating Corruption and Bribery

Kuldeep Mandle[1], Dr. Suchitra Srivastava[2*], Dr. Yogendra Singh Thakur[3], Dr. Swati Rathore[4], Dr. Pooja Sharma[5], Dr. Smita Raj Jain[6], Dr. Prasann Jain[7], Dr. Amrita Tiwari[8]

[1,2,7,8]Department of Management, Sagar Institute of Research & Technology, Affiliated to Barkatullah University, Bhopal, RGPV University Bhopal
[3,5]Department of Management, Sagar Institute of Research & Technology-Excellence, Affiliated to Barkatullah University, Bhopal, Madhya Pradesh, India.
[6]Department of Applied Sciences, Sagar Institute of Research & Technology-Excellence, Affiliated to RGPV University Bhopal, Madhya Pradesh, India.
[4]Sagar Institute of Research Technology and Science Pharmacy, Bhopal, Madhya Pradesh, India. Affiliated to RGPV University Bhopal, Madhya Pradesh, India.

Corresponding Author
Dr. Suchitra Srivastava
Email ID: suchitra.srivastava@yahoo.co.in

ABSTRACT
Corruption and bribery continue to pose significant challenges to India's governance and economic development, undermining public trust and the efficient allocation of resources. According to recent global assessments by Transparency International, India scored 38/100 and ranked 96th in 2024, reflecting a decline from previous years and indicating persistent corruption concerns. In 2025, India showed marginal improvement, ranking 91st with a score of 39, yet still lagging behind several comparable economies. Furthermore, data from the World Bank shows India's control of corruption percentile at approximately 41.5% in 2023, highlighting moderate but insufficient governance effectiveness. These figures demonstrate that corruption remains systemic across sectors such as healthcare, housing, infrastructure, and public service delivery.
Despite the existence of legal frameworks like the Prevention of Corruption Act and institutions such as the Central Vigilance Commission and Lokpal, enforcement gaps, bureaucratic opacity, and weak accountability mechanisms continue to enable corrupt practices. Recent reports also indicate ongoing corruption cases at state levels, including multiple bribery and misconduct cases registered in 2025, reflecting the persistence of the issue.
This study explores the potential of digital technologies as transformative tools in combating corruption. It examines ten corruption cases from 2024–2025 involving major government schemes such as Ayushman Bharat and Pradhan Mantri Awas Yojana, as well as sectors like smart metering and e-tendering. The analysis demonstrates how technologies such as Artificial Intelligence, Blockchain, biometric authentication, and Global Positioning System could enhance transparency, reduce leakages, and detect irregularities in real time.
Findings of the study suggest that while technology alone cannot eliminate corruption, its strategic integration into governance systems may significantly improve monitoring, accountability, and enforcement. Therefore, combining digital innovation with institutional reforms is essential for reducing corruption and strengthening public administration in India.

Keywords: GPS Tracking, Artificial Intelligence, Ayushman Bharat, Transparency International, Digital Governance

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Introduction

Corruption remains one of the most serious governance challenges in India, undermining public trust, delaying economic development, and weakening institutional effectiveness. It affects both high-level policymaking and everyday service delivery, creating inefficiencies and inequalities across sectors. For instance, marginalized citizens are often denied basic services such as ration cards or healthcare benefits without informal payments, while large-scale corruption in public procurement and tendering distorts fair competition and leads to misuse of public funds [1,3].
Recent data highlights the magnitude and persistence of the issue. According to the World Bank (2024), India faces substantial corruption-related leakages, with estimated annual losses of approximately ₹8.3 lakh crore (over $100 billion), equivalent to around 2-4% of GDP. Furthermore, the Transparency International Corruption

**Author for Correspondence:* suchitra.srivastava@yahoo.co.in

Perceptions Index (2024) ranked India 96th out of 180 countries with a score of 38, with only marginal improvement in 2025 (rank 91, score 39). Globally, nearly 6.8 billion people (about 85% of the population) live in countries with CPI scores below 50, indicating the widespread nature of corruption [2].

Despite the presence of strong legal and institutional mechanisms such as the Prevention of Corruption Act, the Central Vigilance Commission, and the Lokpal, corruption continues to persist due to systemic challenges. These include bureaucratic opacity, manual administrative processes, weak enforcement, delayed investigations, and lack of real-time monitoring systems. Surveys such as those conducted by the FICCI (2024) reveal that nearly 68% of businesses in India face corruption-related obstacles, particularly in land acquisition, environmental clearances, taxation, and licensing procedures [3].

In recent years, however, digital transformation has opened new avenues for combating corruption. Government initiatives under Digital India, along with Aadhaar-based identification, Direct Benefit Transfer (DBT), and digital payment systems, have improved transparency and reduced intermediary involvement. Reports indicate that DBT alone has helped save approximately ₹2.5 lakh crore by eliminating fake beneficiaries and leakages. These developments highlight how reducing human discretion can significantly minimize opportunities for bribery and fraud [4].

Building on this progress, emerging technologies such as Artificial Intelligence, Blockchain, Internet of Things (IoT), biometric e-KYC, and Global Positioning System offer advanced capabilities to further strengthen governance systems. Artificial Intelligence can analyze large datasets to detect anomalies and fraudulent patterns in real time [7], while blockchain ensures tamper-proof and transparent record-keeping in areas such as land registration [5] and public procurement. Similarly, GPS tracking can verify the actual delivery of public services, such as transportation of goods, waste management, and water supply systems [6].

Existing literature has extensively examined corruption from legal, economic, and institutional perspectives. Studies by global organizations and academic researchers confirm that corruption significantly impacts economic performance and governance efficiency [1-3]. While recent research has begun to explore technological interventions, much of it remains theoretical or limited in scope [5-7]. There is a noticeable lack of studies that integrate real-world corruption cases with specific, technology-driven solutions, particularly using recent data from 2024-2025.

This paper addresses this gap by presenting a comprehensive analysis of ten real corruption cases reported during 2024-2025 across sectors such as healthcare, housing, and public procurement. Each case is examined in detail, and tailored technological solutions are proposed to prevent or mitigate similar instances in the future. By linking practical case evidence with digital tools, this study moves beyond theoretical discussion and offers actionable insights.

The primary objectives of this study are to analyze recent corruption trends in India, identify key sectors vulnerable to bribery and fraud, evaluate the effectiveness of emerging technologies such as AI and blockchain in reducing corruption, and propose a comprehensive technology-integrated framework for transparent governance. Ultimately, the study argues that while technology alone cannot eliminate corruption, its strategic integration with policy reforms, institutional accountability, and administrative efficiency can significantly reduce corrupt practices and strengthen governance systems in India.

2. RESEARCH METHODOLOGY

This study adopts a descriptive, qualitative, and case study based research methodology to examine corruption and bribery incidents in India during the period 2024-2025. The research focuses on analyzing real-world cases and evaluating the potential application of emerging digital technologies in preventing and mitigating corruption. A combination of secondary data analysis and technology-mapping frameworks is employed to ensure a structured and evidence-based approach.

2.1 Research Design

The research follows a case study-based and problem-solution oriented design, aimed at understanding corruption patterns and identifying suitable technological interventions. A descriptive analytical approach is used to interpret trends, assess systemic weaknesses, and propose practical solutions.

2.2 Data Sources

The study relies exclusively on secondary data collected from credible and authoritative sources, ensuring reliability and validity. The primary data sources include:

i. National newspapers such as Economic Times, Dainik Bhaskar, and Hindustan Times, for recent case reporting (2024-2025)
ii. Government portals and official platforms, including the Central Vigilance Commission, Lokpal, and DBT Dashboard
iii. International and national reports published by the Transparency International, World Bank, and FICCI
iv. Audit reports and summaries from the Comptroller and Auditor General of India

These sources provide comprehensive insights into corruption cases, governance challenges, and policy frameworks.

2.3 Sampling Criteria

A total of ten major corruption cases were selected using purposive sampling based on the following criteria:

i. High financial impact, involving losses of ₹250 crore or more
ii. Sectoral diversity, including healthcare, education, housing, transportation, and public procurement

iii. Relevance for technological intervention, where digital tools could potentially prevent or detect corruption

This selection ensures both analytical depth and cross-sectoral representation.

2.4 Analytical Tools and Techniques

The study employs multiple qualitative analytical tools to examine corruption patterns and evaluate technological solutions:

i. Comparative analysis of traditional administrative approaches versus technology-driven governance systems
ii. Literature-supported evaluation of emerging technologies such as Artificial Intelligence, Blockchain, Global Positioning System, and biometric e-KYC
iii. Sectoral risk mapping, to identify vulnerable areas and systemic loopholes
iv. Fraud pattern analysis, to trace recurring methods and operational weaknesses in corruption cases

This multi-layered approach enables a comprehensive understanding of both the problem and potential solutions.

2.5 Limitations of the Study

This research is based solely on secondary data, and therefore does not include primary data collection methods such as interviews or field surveys. While efforts have been made to ensure data accuracy and credibility through verified sources, the study may be limited by reporting biases or incomplete disclosure in publicly available information. Nevertheless, all selected cases are supported by documented evidence from reliable media reports and official records.

3. ANALYSIS AND DISCUSSION

This section presents a comprehensive analysis of corruption trends in India during 2024-2025, supported by case studies and evaluation of emerging digital technologies. The discussion is structured according to the key objectives of the study, integrating empirical data, sectoral insights, and technology-based interpretations.

3.1 Analysis of Corruption Trends in India (2024-2025)

Corruption in India continues to evolve from traditional cash-based bribery to more sophisticated forms such as digital fraud, identity manipulation, and backend system tampering. According to the Transparency International (2024), India ranked 96th in the Corruption Perceptions Index, reflecting persistent governance challenges. Similarly, the World Bank (2024) estimates that corruption causes annual losses of approximately 2 to 3% of GDP.

Reports from enforcement agencies and the Comptroller and Auditor General of India indicate increasing involvement of public officials in corruption cases. For example, the Anti-Corruption Bureau reported 92 cases within five months in 2025, highlighting the scale of the issue.

Sector-wise distribution of corruption is summarized in Table 1, which shows that police, revenue, and welfare sectors are the most affected.

Table 1. Summary of Reported Corruption Cases

Sector	% of Reported Corruption (2024)	Source
Police & Law Enforcement	35%	CAG (2024), Lokpal data
Revenue & Land Registry	20%	ACB Reports (2025)
Health & Welfare Schemes	15%	National Health Mission
Infrastructure Projects	12%	CAG Audit (2024)
Education	10%	MHRD Reports (2025)
Urban Public Services	8%	Smart Cities Dashboard

The findings indicate a transition toward:

- Ghost beneficiaries and fake identities
- Data manipulation and software tampering
- False reporting of services

This shift necessitates stronger digital verification and monitoring systems.

6.2 Case-Based Analysis of Major Corruption Incidents (2024-2025)

This study analyzes ten major corruption cases across sectors such as healthcare, housing, procurement, and public services, with a total estimated loss of ₹7,120 crore.

A summary of these cases is presented in Table 2.

Table 2. Top 10 Corruption Cases (2024-2025)

No.	Case Name	Amount (₹ Cr)	Location	Year	Source
1	Ayushman Bharat Claim Scam	₹1,450	UP, Bihar, Chhattisgarh	2025	*Medical Dialogues*
2	Smart Meter Tender Scam	₹980	Tamil Nadu	2025	*Economic Times*
3	e-Tendering Scam	₹930	Ahmedabad, Surat, Vadodara	2024	*Gujarat Samachar*
4	Toll Booth Cash Underreporting	₹850	Maharashtra, Gujarat, Punjab	2024	*Navbharat Times*
5	Urban Cleanliness Scam	₹720	Lucknow, Kanpur, Varanasi	2024	*Amar Ujala*
6	PMAY Housing Fraud	₹600	Bhopal, Indore, Jabalpur	2024	*Nai Duniya*
7	Agriculture Subsidy Diversion	₹550	Nagpur, Amravati, Nashik	2024	*Lokmat*
8	Water Tanker Ghost Delivery	₹490	South & East Delhi	2024	*Hindustan Times*
9	Ration Card Bribery	₹300	Patna, Ranchi, Gaya	2025	*Hindustan*
10	Digital Education Procurement	₹250	Rajasthan	2025	*Dainik Bhaskar*

Key cases include fraud in Ayushman Bharat, Pradhan Mantri Awas Yojana, e-tendering systems, and urban service delivery.

Detailed analysis of these cases reveals three major corruption patterns:

1. Identity fraud (ghost beneficiaries)
2. Backend system manipulation
3. Fake service reporting

These patterns demonstrate that while digital systems exist, the absence of secure architecture allows exploitation.

3.3 Impact of Emerging Technologies on Corruption Reduction

Emerging technologies such as Artificial Intelligence, Blockchain, biometric e-KYC, IoT, and Global Positioning System have shown strong potential in reducing corruption.

The functional roles of these technologies are summarized in **Table 3**.

Table 3. Impact Of Emerging Technologies on Corruption Reduction

Technology	Function
AI (Artificial Intelligence)	Detect fraud patterns, duplicate claims, overpricing
Blockchain	Lock records, prevent tampering of tenders/payments
Biometric e-KYC	Verify identity using Aadhaar + facial data
IoT + GPS	Track vehicles, services, and deliveries in real-time
Digital Payments (UPI, DBT)	Replace cash to reduce untraceable transactions

Real-world applications and their outcomes are presented in Table 4.

Table 4. Real Examples of Technology Impact (2024–2025)

Case/Application	Technology Used	Outcome
Ayushman Bharat Scam	AI & e-KYC	AI could have detected repeat hospital IDs and fake claims
PMAY Housing Fraud	Blockchain & e-KYC	Could have blocked ghost beneficiaries
e-Tendering Scam (Gujarat)	Blockchain	Successfully stopped bid tampering (2024)
Ration Card Scam (Bihar)	Facial Recognition e-KYC	Delhi used e-KYC to cut ghost cards by **40%** (2024–25)
Water Tanker Scam (Delhi)	GPS/IoT	Live GPS showed tankers were never dispatched

Highway Toll Fraud	UPI Payments	Toll income rose by **35%** after cash was banned (2025)

Findings indicate that:

- Fraud detection improves significantly with AI
- Blockchain prevents data tampering
- GPS ensures service delivery verification
- Digital payments reduce untraceable transactions

However, challenges such as partial implementation, system bypassing, and lack of integration reduce effectiveness.

3.4 Assessment of Effectiveness of Digital Governance Systems

The effectiveness of digital tools depends on implementation quality, monitoring, and system integration.

Key technologies evaluated are listed in Table 5.

Table 5. Key Technologies Reviewed

Technology	Role in Governance
AI	Data analysis, fraud detection, pattern alerts
Blockchain	Tamper-proof tendering, record integrity
Biometric e-KYC	Verifying real identity, reducing ghost entries
GPS/IoT	Real-time tracking of vehicles and deliveries
UPI/Digital Payments	Reducing manual handling of cash

Case-based effectiveness analysis is presented in Table 6.

Table 6. Case-Based Effectiveness Analysis

Sector/State	Technology Used	Outcome Achieved	Effectiveness (Scale of 5)
Land Records – Punjab	Blockchain (Jamabandi)	Reduced bribes in mutation, 99% digitized	★★★★☆ (4.5)
Tendering – Gujarat	Blockchain	Zero backend tampering in e-tenders	★★★★☆ (4.2)
Ration Cards – Delhi	Biometric e-KYC	40% drop in ghost cardholders	★★★☆☆ (3.8)
Toll Booths – Maharashtra	UPI-only tolls	Revenue increased by 35%	★★★☆☆ (3.5)
Tankers – Delhi South	GPS Tracking	Detected 62% false delivery logs	★★★★☆ (4.0)

Additionally, systemic challenges affecting effectiveness are summarized in Table 7.

Table 7. Systemic Challenges to Effectiveness

Challenge	Explanation
Insider Misuse	Officials disabling GPS/UPI or approving fake IDs
Lack of Monitoring Units	No dedicated AI or tech monitoring departments in districts
Manual Overrides	Systems allow admin-level changes without tracking logs
Tech Infrastructure Gaps	Rural areas lack internet for GPS or real-time blockchain syncing

Political Interference or Pressure	Some corruption cases are shielded despite proof

Key observations include:

- High effectiveness when systems are fully implemented
- Reduced impact when systems are bypassed or partially used
- Major challenges include insider misuse, lack of training, and infrastructure gaps

3.5 Proposed Technology-Integrated Anti-Corruption Framework

Based on the findings, a comprehensive framework integrating multiple digital technologies is proposed. The framework components are outlined in **Table 8**.

Table 8. Proposed Framework: Tech-Integrated Anti-Corruption Model (2025)

Component	Function	Target Problem Solved
1. **Blockchain-Based Tender Portal**	Lock bids, prevent post-deadline tampering, ensure transparency	e-Tendering scams (Gujarat, TN)
2. **AI Fraud Monitoring Dashboard**	Detect unusual patterns in DBT, billing, tenders, ration usage	Health, subsidy, toll fraud (Ayushman, PMAY)
3. **Facial Biometric e-KYC System**	Verify identities using Aadhaar + facial data	Ghost beneficiaries (ration, housing, pensions)
4. **GPS-Enabled Public Utility Tracker**	Track water tankers, garbage trucks, and deliveries live	Fake billing in urban sanitation and water services
5. **Unified National Transparency Portal**	Citizens can view project status, report delays/fraud	Hidden corruption in public works
6. **Whistleblower App + Legal Support**	Enable digital reporting with anonymity and protection	Bribery complaints, officer-level corruption
7. **Officer Training & Tech Literacy Unit**	Regular training on digital tools and fraud protocols	Misuse due to ignorance, weak enforcement

Application of the framework to real cases is illustrated in Table 9**.**

Table 9. How This Framework Solves Real Cases

Case	Technology Solution from Framework	Expected Outcome
Ayushman Bharat Fake Claims	AI + e-KYC	Duplicate claims blocked, real patients only
e-Tender Tampering (Gujarat)	Blockchain Tender Portal	No post-deadline changes possible
PMAY Ghost Applicants	Biometric Aadhaar Face Verification	Fake names detected instantly
Water Tanker Scam (Delhi)	GPS Tracker + Public Dashboard	Real vs fake delivery instantly visible
Smart Meter Procurement Scam	AI pricing dashboard + vendor e-KYC	Unqualified vendors blocked
Subsidy Diversion (Agri)	Drone imaging + Blockchain payment audit	Ghost farmers eliminated

The projected impact of the framework is summarized in Table 10.

Table 10. Projected Impact of this Framework (2025-2026)

Metric	Current Level (2024–25)	Projected After Framework	Source
Welfare Scheme Leakage	₹2.3 lakh Cr/year	↓ 60%	CAG + DBT Annual Reports, [19],[20]
Procurement Fraud	₹1.5 lakh Cr/year	↓ 70%	Economic Times (2024)
Fake Beneficiaries (Housing, PDS)	22–25% of entries	↓ 80%	UIDAI + PMAY Stats (2025)
Public Trust in Governance	45% (medium)	↑ 75% (high)	CSDS Survey (2024–25)

The framework integrates:

i. Blockchain-based tendering systems
ii. AI-powered fraud detection
iii. Biometric identity verification
iv. GPS-based service tracking
v. Citizen transparency platforms

It aims to significantly reduce leakages, fraud, and corruption across sectors.

3.6 Overall Discussion

The overall analysis demonstrates that corruption in India is driven by systemic weaknesses such as manual processes, lack of transparency, weak verification mechanisms, and poor data integration.

Emerging technologies provide a strong foundation for addressing these challenges. However, their success depends on:

i. Effective implementation
ii. Continuous monitoring
iii. Institutional accountability
iv. Integration across systems

Thus, a combined approach involving technological innovation, governance reforms, and administrative strengthening is essential for achieving transparent and efficient public administration.

4. POLICY RECOMMENDATIONS

Based on the findings of this study and the analysis of ten major corruption cases in India during 2024-2025, the following policy recommendations are proposed for government agencies, digital policymakers, and anti-corruption units. These recommendations focus on leveraging technology to prevent, detect, and reduce corruption in a systematic and scalable manner.

1. Centralized Blockchain Tender System

A centralized blockchain-based tender system is recommended for all major public procurements. By processing tenders on a blockchain platform, bids are securely locked, and all records remain tamper-proof, preventing unauthorized modifications or backend manipulation. This approach enhances transparency throughout the tendering process and ensures fair selection of contractors. Such a system directly addresses corruption risks in e-tendering and procurement, as evidenced by cases in Gujarat and Tamil Nadu, where post-submission bid alterations and favoritism had previously compromised integrity.

2. AI-Based Monitoring Teams

State-level AI monitoring teams should be established to oversee financial transactions and public scheme activities in real time. These units would use artificial intelligence to automatically analyze fund transfers, detect ghost entries, and flag inflated invoices, enabling authorities to respond promptly to irregularities. By providing continuous, data-driven oversight, AI monitoring can significantly reduce the risk of fraud in welfare schemes and digital procurement processes, as seen in cases like Ayushman Bharat and the Smart Meter Scam, where unusual patterns often went undetected under traditional manual audits.

3. Facial Biometric e-KYC for Welfare Schemes

Aadhaar-based facial recognition e-KYC should be implemented across all welfare schemes to verify the identity of beneficiaries before disbursing public funds. This measure ensures that only legitimate recipients receive benefits, effectively eliminating the possibility of ghost beneficiaries. Such a system is particularly crucial for schemes like PMAY, ration distribution, and pensions, where fraudulent entries have historically diverted funds away from deserving citizens. By linking biometric verification to digital disbursements, the government can enhance transparency, reduce misuse, and strengthen public trust in welfare programs.

4. Real-Time GPS Monitoring for Municipal Services

Public service vehicles such as water tankers, garbage trucks, and other municipal service vehicles should be equipped with GPS tracking devices, with real-time movement data displayed on publicly accessible dashboards. This approach enhances transparency by allowing citizens and authorities to monitor actual service delivery, preventing false claims and fraudulent reporting. Such GPS-enabled monitoring is particularly effective in addressing urban cleanliness scams and water tanker delivery fraud, ensuring that services are

*Author for Correspondence: suchitra.srivastava@yahoo.co.in

provided as intended and that public funds are used efficiently and accountably.

5. One Nation, One Transparency Portal

A unified national portal should be developed to allow citizens to track the progress of welfare schemes, public works, and tenders, while also providing a platform to submit feedback or complaints. By integrating multiple government databases, this portal enhances transparency and accountability, making it easier to identify delays, opaque tender processes, and untraceable fund transfers. Such a system empowers the public to participate in governance oversight and reduces opportunities for corruption across various sectors.

6. Whistleblower App with Protection

A secure mobile application should be introduced to enable citizens and government employees to report instances of corruption anonymously. This platform must provide legal protection for whistleblowers and ensure prompt investigation and action on all reports. By removing fear of retaliation, the app encourages active participation in exposing bribery and officer-level misconduct, thereby strengthening accountability and reducing opportunities for corruption within public institutions.

7. Officer Training on Digital Tools

Government officials in key departments such as housing, procurement, and revenue should be systematically trained to use AI dashboards, blockchain platforms, and fraud-detection tools. Proper training ensures that technological solutions are implemented effectively, minimizes human errors, and strengthens monitoring mechanisms. By equipping staff with the necessary skills, the likelihood of misuse due to ignorance is reduced, making anti-corruption measures more efficient and reliable.

8. District Fraud Detection Cells

It is recommended to establish small, dedicated technology teams at the district level to continuously monitor real-time data activity, GPS logs, and suspicious fund flows. These units would enable rapid detection and prompt response to emerging corruption incidents, ensuring that local irregularities do not escalate into larger systemic fraud. By providing focused oversight, such teams can effectively curb localized corruption in welfare schemes, municipal services, and procurement processes.

5. CONCLUSION

This study provides a comprehensive examination of the evolving nature of corruption in India, with particular focus on the period 2024-2025. Through the analysis of ten real-world cases across multiple sectors, the research demonstrates a significant shift in corruption practices from traditional, cash-based bribery to more sophisticated forms of digital fraud, including manipulation of databases, tampering of e-tendering systems, and falsification of digital records.

While digital governance initiatives have enhanced transparency and efficiency, they have also introduced new vulnerabilities that are increasingly being exploited. The findings highlight that corruption is no longer confined to physical interactions but has penetrated digital infrastructures, necessitating advanced and adaptive countermeasures.

The study emphasizes the transformative potential of emerging technologies such as Artificial Intelligence, Blockchain, biometric identity systems, and Global Positioning System in addressing these challenges. Evidence from state-level implementations indicates that, when effectively deployed, these technologies can significantly reduce corruption often by more than 50% by improving transparency, ensuring data integrity, and enabling real-time monitoring.

However, the study also concludes that technology alone cannot eliminate corruption. Its effectiveness is contingent upon proper implementation, continuous monitoring, institutional accountability, and the capacity of public officials to utilize these tools effectively. Challenges such as system bypassing, lack of integration across platforms, and limited technical expertise continue to hinder optimal outcomes.

Therefore, addressing corruption in India requires a holistic approach that combines technological innovation with governance reforms. This includes strengthening institutional frameworks, enhancing digital literacy among officials, ensuring interoperability of systems, and promoting citizen participation through transparency mechanisms.

In conclusion, the technology-integrated framework proposed in this study offers a practical and scalable pathway toward reducing corruption. If implemented with strong political will and administrative commitment, it has the potential to transform public administration by making corrupt practices more difficult to execute, easier to detect, and quicker to penalize, thereby fostering greater public trust and accountability in governance.

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