



**ELECTRAL DEMORCAY AND APPLICATION OF NEXT GENERTAION  
TECHNOLOGIES: CHALLENGES AND THE FUTURE OF EVM AND BALLOT BOX IN  
INDIA**

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**Abstract**

*The paper is a critical reflection on the revolutionary effects of next-generation technologies on electoral practices in democracy including Electronic Voting Machines (EVMs), voter verified paper audit trails (VVPATs), Biometric identification, artificial intelligence (AI), and social media on aspects of electoral democracy in India; the institutions, processes and principles of the same. The paper is set in a political science context and examines the way in which digital innovations are transforming the process of democratization, openness, accountability, and trust in the institutions and **reducing fraud in elections**. Supported by the experience of India and the international experience of other countries, it magnifies the dual character of technology as an enabler of inclusion and threat in the form of misinformation, algorithmic control, and monitoring. The case of Election Commission of India is analysed, as well as the implications of tech-mediated elections in terms of the legislation, **legal**, ethical, and constitutional issues. The research methodologically uses thematic-analysis and comparative political-assessment basing on the data obtained by official sources and academic literature. The paper ends by providing policy recommendations which will help to strengthen the integrity and democratic nature of policies as well as enhance the mechanisms of institutional protection and instill the belief that the digital revolution of elections does not become a digital devolution of democracy but that digital transformation of democracy becomes a positive growth that is beneficial to the major values of the world's largest democracy.*

**Keywords:** Electoral democracy, political participation, digital authoritarianism, India, technology and politics, electoral integrity, EVM, digital electoral frauds, cyber politics.



## 1. INTRODUCTION

The foundation of representative democracy is elections which offer an institutionalized tool via which citizens can exercise their political choices and place governing institutions under accountability. In a democracy, the government derives its legitimacy out of the consent of the governed and elections are the major means through which the consent is periodically renewed. Elections promote the principles of participation, representation and accountability that are the pillars of democratic government, by facilitating a peaceful transfer of power, and by allowing political competition.

The nature of elections and its validity in the case of India, the largest democracy in the world has not only a national implication but also has a significant international implication. The elections in India are considered to be a model of the democratic work in the Global South. International interest in the technological progress of the Indian electoral system is based on the scale, complexity and variety of the Indian elections. With much of the world struggling with the problems of eroded trust, voter apathy, and electoral manipulation, experiments with election technology in India are regarded as a case study as well as a test bed in balancing the democratic ideal of inclusivity with efficiency.

Paper ballots are currently regarded as the most secure and transparent choice, the U.S. still grapples with the complex task of balancing security, accessibility, expense, and public confidence in its elections. In other democracies, such as Germany in 2009, the constitutional court ruled that EVMS violated the principle of transparency and returned to the paper ballot system. EVMs were also experimented with in Ireland in the early 2000s but returned to paper ballots in 2006. However, several developing Asian democracies, such as Thailand and the Philippines, show that paper ballots are still trustworthy, manageable, transparent, and democratic.

The Indian electoral system is the most complex one, managing elections registered voters across thousands of constituencies in a diverse landscape. In recent years, civil society organizations, election monitors, and opposition parties have raised concerns about the transparency of EVMs, reigniting the discussion on whether India should revert to paper ballots. This is due to EVM voting failing to adhere to the fundamental principles of democracy that any electoral system must meet.



The use of technology in the development of electoral democracy has become more topical over the past decades. Since the advent of the Electronic Voting Machines (EVMs) to the advent of the social media platforms as sources of political communication, technology has completely transformed the process of political participation and voter behaviour. In India, the incorporation of digital solutions in the form of voter verified paper audit trails (VVPATs), biometric identification, and online registration portals have enhanced the efficiency of administration and tried to alleviate electoral fraud. Nevertheless, it has also ignited the discussions of surveillance, privacy, algorithmic bias, and the integrity of elections. These technological interventions in the sphere of elections draw attention to an even more significant change in the interaction between state institutions, civil society, and political forces critical questions arise about the future of democratic governance in an increasingly online world.

### **1.1.Changing Electoral Democracy of India and Uses of Technology**

India's electoral democracy has undergone significant transformation since independence, evolving through different political phases and technological innovations. These changes reflect not only administrative adjustments but also deeper shifts in political behavior, electoral competition, and the role of the state in ensuring electoral integrity. The gradual inclusion of next-generation technologies—such as EVMs, VVPATs, biometric verification, and digital campaigning—has redefined how elections are conducted and experienced in the country. To understand this evolution, India's democratic journey can be divided into four key phases:

➤ The First Phase (1950s–1960s)

This period was marked by the establishment of electoral norms in a newly independent state. The focus was on institutional consolidation, the strengthening of the Election Commission of India (ECI), and voter education in a largely illiterate society. Paper ballots, manual counting, and single-party dominance (especially by the Indian National Congress) characterized this era.

➤ The Second Phase (1970s–1980s)

This phase saw rising political contestation, the Emergency (1975–77), and increasing challenges to democratic functioning. Electoral manipulation, booth capturing, and ballot stuffing were prevalent in some regions. These issues triggered initial debates about electoral



reforms and a growing demand for administrative neutrality and technological solutions to curb fraud.

➤ The Third Phase (1989–2014)

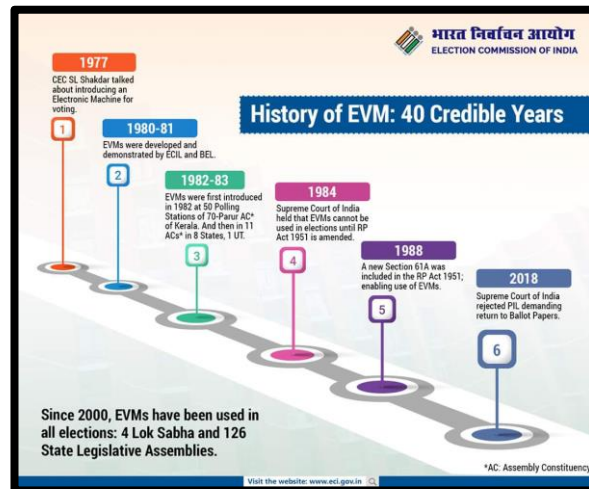
This period witnessed coalition politics, decentralization of power, and increased voter participation. It also marked the introduction and gradual implementation of Electronic Voting Machines (EVMs), first on a pilot basis and then across the country by 2004. The adoption of EVMs was intended to reduce electoral malpractice, simplify the voting process, and accelerate counting. However, concerns about transparency and verifiability persisted, leading to the eventual integration of VVPATs.

➤ Since 2014

The post-2014 era reflects a digitalized, high-tech electoral environment, marked by the use of social media, AI-powered political advertising, Aadhaar-voter ID linkage, and algorithmic profiling. While technology has streamlined logistics and expanded outreach, it has also led to increased surveillance, data privacy concerns, and allegations of voter manipulation. Simultaneously, opposition parties and civil society groups have raised doubts about the neutrality and transparency of electoral technologies, especially EVMs and VVPATs.

### **1.2. Historical Perspectives: Use of technology in Electoral process in India**

The introduction of technology into India's electoral process emerged from a pressing need to strengthen the credibility and efficiency of elections in the world's largest democracy. In the decades following independence, elections were conducted using paper ballots, which though effective in the early years, soon became prone to large-scale malpractices. Rampant issues such as booth capturing, ballot stuffing, and delayed vote counting undermined the legitimacy of the electoral process, especially in politically sensitive and conflict-prone regions. The Election Commission of India (ECI), faced with the dual challenge of scale and security, began exploring electronic solutions. This led to the conceptualization of Electronic Voting Machines (EVMs) in the 1980s as a technological fix to human-centered fraud and inefficiencies.



**Figure 1: History Of EVM**

The first experimental use of EVMs occurred during the 1982 Kerala State Assembly elections, but they lacked a legal framework at that time. The Representation of the People Act, 1951 was amended in 1988 to allow for electronic voting. By 2004, India had fully transitioned from paper ballots to EVMs for all Lok Sabha and Assembly elections. The main causes for adopting EVMs included the desire to reduce electoral fraud, improve logistical management, and accelerate the vote counting process. EVMs were also promoted as a cost-effective and environmentally friendly solution, reducing the need for millions of paper ballots in every election. Over time, complementary technologies like the Voter Verified Paper Audit Trail (VVPAT) were added to address concerns over transparency and to allow for verification of voter intent.

Despite their benefits, the use of EVMs has not been without controversy. Political parties and civil society organizations have repeatedly questioned the transparency and auditability of electronic voting systems, particularly in the absence of an independent verification mechanism. Allegations of EVM tampering and manipulation, especially by opposition parties, have sparked legal challenges and calls for reverting to paper ballots or hybrid systems. Moreover, critics argue that while EVMs improve administrative efficiency, they reduce public trust by obscuring the voting process from common understanding. Thus, the implications of adopting voting machines in India reveal a classic tension between technological modernization and democratic accountability, calling for stronger institutional safeguards and citizen-centric reforms.



### **1.3. Research Questions**

- Q1. How are next-generation technologies transforming the electoral process and democratic institutions in India?
- Q2. In what ways do digital tools enhance or hinder democratic participation, transparency, and political representation?
- Q3. What are the institutional, legal, and ethical challenges posed by technologies like EVMs, VVPATs, social media, and AI in Indian elections?
- Q4. How does India's experience with electoral technology compare with global practices, and what lessons can be drawn from comparative political systems?
- Q5. What safeguards and policy frameworks are necessary to ensure that technological innovation in elections strengthens, rather than weakens, Indian democracy?
- Q6: Digital technology became tool of electoral fraud and changing voting behaviour for electoral gains for ruling party?

### **1.4. Research Objectives**

1. To examine the impact of next-generation technologies—such as Artificial Intelligence (AI), Electronic Voting Machines (EVMs), social media platforms, and biometric systems—on the processes and institutions of electoral democracy in India.
2. To analyze the opportunities and challenges these technologies present in enhancing or undermining democratic participation, electoral transparency, and political accountability.
3. To explore the role of political institutions, particularly the Election Commission of India, in managing the integration of digital technologies in a manner that upholds constitutional values and electoral integrity.
4. To assess global experiences and best practices related to electoral technologies and evaluate their relevance for the Indian democratic ecosystem.

5. To develop policy recommendations for safeguarding democratic values in the face of rapid digital transformation and mitigating the risks of digital authoritarianism, misinformation, and algorithmic manipulation.

## 2. LITERATURE REVIEW

**Goswami (2021)** discussed the increasing role of new technologies in the Indian democracy with an accent on the highly complicated relationship between digital means and democratic principles. His research pointed out the increased infiltration of technologies like electronic voting machines (EVMs), biometric ID systems and social media platforms into the electoral and political domains in India. Although admitting the advancements in administrative efficiency and voter accessibility, Goswami also cautioned about the threats of digital surveillance, marginalization of deprived communities, and the degradation of the trust of people to democratic institutions because of the opaque nature of technological governance.]

**Jacobs et al. (2018)** offered a larger philosophical and international background by analyzing the future of democracy in the light of technological and institutional issues. They emphasized the necessity of the democracies to adjust to the fast-changing scientific, economic, and informational processes. The authors observed that the emerging digital ecosystems were transforming not only elections but also the deliberation of the people, their civic engagement as well as the very concept of democratic legitimacy. Their research indicated that unless there is conscious ethical control, technology may intensify inequality and consolidate power in both the state and corporate control, which opposes the very essence of the sovereignty of the citizenry.

**Patil (2019)** studied how the democratic participation can work in the context of the so-called Robocracy, where the political life is controlled by automation, algorithms, and AI systems. Concentrating on the Indian experience, especially in the context of the Digital India initiative, Patil claimed that the growing automatization of the mechanisms of governance would lead to the loss of the citizenry due to the diminishing role of the human factor in decision-making. The research projected several future scenarios, such as enhanced engagement through digital technologies, as well as the danger of algorithmic domination and data-driven political manipulation that may interfere with the inclusive democratic practice.



**Cheeseman et al. (2018)** examined unintended effects of election technology in different developing nations. Using comparative field data, they discovered that digital technologies, which are commonly implemented to address a problem such as fraud or inefficiency, regularly created new kinds of disenfranchisement, elite capture, and distrust in the voting process. The authors emphasized that the political environment, in which the technology was implemented, played a huge role in its performance. Instead of being neutral instruments, technologies of elections frequently turned into controversial instruments, which transformed the balance of power in weak democracies.

**Asimakopoulos et al. (2025)** concentrated on the effects of the information and communication technologies (ICTs) on democratic processes and citizen participation, especially in the European context. According to their research, ICTs had the potential of enhancing participation, promoting transparency, and participatory governance. But the authors also mentioned the obstacles that remained there, including digital illiteracy, algorithmic discrimination, and information saturation, and these factors undermined the bearability of citizen engagement. They claimed that the layout and management of online platforms should be based on democratic morals to prevent increasing disparity and decreasing civic confidence.

### **3. CONCEPTUAL FRAMEWORK AND THEORETICAL LENS**

This research examines the application of new technology between technology and electoral democracy in India; the work will use a political science-led conceptual framework. It uses the classical and modern theories to comprehend the transformations of democratic institutions, processes and power relations with the help of digital tools. Through the consideration of the concepts, including state capacity, democratic resilience, algorithmic governance, and politics of technology, the framework offers a systematic prism through which the political ramifications of next generation technologies can be measured. This course of action allows us to have a subtle view of the opportunities and dangers that digital innovations place on the emerging democratic environment of India.



### **3.1. Political science concepts**

India follows a parliamentary representative democratic model, where the electoral system forms the backbone of democratic legitimacy. The first-past-the-post (FPTP) system is employed in elections to both the Lok Sabha and the State Legislative Assemblies, enabling citizens to directly elect their representatives. The Indian model of electoral democracy rests on key democratic principles such as universal adult suffrage, regular periodic elections, multiparty competition, and the peaceful transfer of power. These practices are deeply embedded in the constitutional framework that enshrines values like popular sovereignty, political equality, and institutional accountability. Over the decades, electoral participation in India has grown, reflecting increasing public engagement. However, significant concerns still persist regarding voter disenfranchisement, criminalization of politics, and the growing influence of money and technology in shaping electoral outcomes. Despite these challenges, India's electoral democracy remains resilient and adaptive, although the increasing use of digital tools is presenting fresh tests to its democratic ethos.

The Election Commission of India (ECI) plays a central role in managing and safeguarding the electoral process. As a constitutional authority established under Article 324 of the Indian Constitution, the ECI is tasked with overseeing all aspects of elections—from delimitation of constituencies, electoral roll preparation, and polling logistics to campaign finance monitoring and enforcement of the Model Code of Conduct (MCC). The Commission has been instrumental in modernizing electoral administration through innovations such as Electronic Voting Machines (EVMs), Voter Verified Paper Audit Trails (VVPATs), and online registration systems. However, over time, questions have been raised about the ECI's independence and transparency, particularly regarding its responsiveness to allegations of electoral misconduct or partisan bias. Instances of delayed action, selective enforcement, and lack of transparency have prompted public and judicial scrutiny over whether the ECI is fully upholding its constitutional mandate of neutrality and fairness.

In this regard, the Supreme Court of India serves as a critical check on the electoral process by interpreting the Constitution and adjudicating disputes that arise before, during, or after elections. The Court has played a vital role in reinforcing democratic values through landmark judgments. For instance, in the *PUCL v. Union of India* (2003) case, the Supreme Court held



that voters have the right to know the criminal, financial, and educational background of electoral candidates, thereby enhancing transparency and informed choice. Furthermore, the Court has directed the ECI to implement VVPATs in all EVMs, emphasizing the importance of auditability and public trust. Through such decisions, the Supreme Court ensures that the electoral process is not only technically sound but also substantively just and democratic, reinforcing constitutional safeguards.

The Central Government, primarily through the Ministry of Law and Justice, provides the legislative and infrastructural framework for electoral governance. This includes amending key laws such as the Representation of the People Act, providing funding for reforms, and supporting institutional capacity-building. Though the ECI operates independently, its implementation capacity often depends on the cooperation of the central and state administrative machinery, especially during large-scale elections. The public administration, composed of district magistrates, returning officers, and police forces, plays an indispensable role in executing elections at the ground level. These officials are placed under the ECI's command during elections to ensure neutrality, efficiency, and security. However, the risk of bureaucratic politicization or administrative bias, especially in states with polarized political environments, can compromise the impartiality of elections. As such, strengthening institutional independence and administrative accountability remains essential to preserving the integrity of Indian electoral democracy.

#### **4. METHODOLOGY**

This paper uses a qualitative research design multi method approach based on political science to understand the implication of next-generation technologies on the Indian electoral democracy. It integrates comparative, analytical and normative methods to give it a thorough and theory guided analysis of the technological changes that happen in the field of electoral systems.

##### **4.1. Political Science Research Design**

The study takes a comparative approach by comparing international experiences like the use and failure of EVM in Germany, USA, and the digital voting experience in Estonia to make useful comparisons with the Indian experience. The structural and institutional effects of such



technologies as EVMs, VVPATs, and AI tools on the electoral process are dissected through an analytical lens. The normative dimension of the design is concerned with assessing these developments in the context of democratic values like transparency, fairness, participation, and representation and what should be done in order to make sure that there is democratic integrity in a digital age.

#### **4.2. Computational Mirrors for Election System, Verification and Validation**

In order to further substantiate the analysis, the paper takes into account the possibility of using computational models or simulations, also known as computational mirrors, which simulate election systems and voter behavior in the digital world. These models offer valuable insights into how emerging technologies—such as Artificial Intelligence (AI), algorithmic targeting, and big data analytics—can influence voter decisions and potentially distort democratic outcomes. When deployed unethically, such technologies can be used to micro-target voters, spread disinformation, or manipulate public opinion through echo chambers, thereby undermining free and fair elections. Computational models are particularly useful for identifying vulnerabilities in the digital electoral ecosystem, such as susceptibility to bot-driven campaigns, fake news, voter suppression tactics, or algorithmic bias. By verifying and validating these simulations, researchers and policymakers can better anticipate systemic weaknesses and simulate scenarios of electoral fraud or manipulation, preparing legal and institutional frameworks to address such threats proactively. Thus, computational mirrors serve as powerful tools to test the resilience of democratic processes in the age of digital influence and cyber-politics.

#### **4.3. Data Sources**

The study is based on a wide range of primary and secondary data. These are official reports and publications of the Election Commission of India (ECI), party manifestos, government and legal documents and technology policy white papers. Academic literature and national data comparisons are also important sources to put the global situation of electoral technology into perspective. Collectively, such materials give the study empirical and theoretical depth.



#### **4.4. Case-Based and Thematic Analysis**

The case study method is used to target certain electoral events and reforms in India, including the adoption of VVPATs and, the linking of Aadhaar to voter ID. All the cases are discussed in a thematic manner to determine the common political, institutional, and technological trends. Thematic analysis aims at revealing issues of concern like trust in electoral institutions, digital divide and the influence of social media on voter behaviours. These themes aid in the categorization of data and its connection with the main research questions.

#### **4.5. Stakeholder Interviews (Optional)**

Provided that it is done, semi-structured interviews with the key stakeholders, such as Election Commission officials, political party representatives, members of civil society, and voters, would provide qualitative depth to the research. These interviews may provide the first-hand experience of the perception, implementation, and confrontation of the electoral technologies in the field. This may be optional, but it would add a lot of experiential knowledge and local color to the research, particularly regarding public trust, the capacity of the institutions, and ethical issues.

### **5. CURRENT USE OF TECHNOLOGY IN INDIAN ELECTORAL DEMOCRACY**

The Indian electoral system has undergone a major improvement in the field of technology over the last few decades. These innovations aim to enhance the integrity of elections, improve administrative efficiency, and increase accessibility for voters, particularly through tools like Electronic Voting Machines (EVMs), VVPATs, and digital voter registration platforms. Nevertheless, their use has also raised serious concerns regarding surveillance, disinformation, algorithmic manipulation, and the erosion of democratic values. A central point of contention has been the credibility and transparency of EVMs, which many opposition parties argue lack independent auditability and public verifiability. Repeated allegations of tampering, mismatches with VVPAT slips, and selective enforcement of electoral norms have fueled widespread mistrust. Critics also question the Election Commission's impartiality, citing delays in action, lack of transparency in EVM audits, and perceived bias in handling complaints against ruling party leaders. These issues highlight the need for stronger institutional safeguards

and a more accountable electoral framework. The subsequent sub-sections expound on the various ways technology is currently shaping the electoral process in India—along with its democratic risks.

- **Role of Election Commission for Use of Digital Technology for Free and Fair Elections**

The Election Commission of India (ECI) is the key actor in the process of embracing and controlling the use of digital technologies to achieve fair and free elections. It has played a central role in the introduction of Electronic Voting Machines (EVMs), VVPATs and digital voter services. The ECI is also mandated with the responsibility of providing cybersecurity, keeping voter databases and providing guidelines concerning political advertisements on the internet. The active participation of the Commission in the technological reform is an indication that the Commission is trying to modernize the electoral process without jeopardizing the constitutional provisions of transparency, impartiality and inclusiveness.

- **Evolution of Voting Technology in Elections**

India has experienced a revolution in the voting technology whereby; it has evolved through paper ballots to the electronic voting system. The introduction of EVM in the 1990s was to solve logistical issues and electoral malpractices such as booth capturing and ballot stuffing. This change has over the years saved a lot of manual errors and the speed of counting the votes. But it has also led to discussions of transparency, reliability of machines, and the trust of the people, particularly, when physical verification of vote was not done till the arrival of VVPATs.

- **EVMs and VVPATs: Technocratic Intervention in Democratic Process**

Electronic Voting Machines (EVMs) and subsequent introduction of Voter Verified Paper Audit Trails (VVPATs) is a technocratic solution to election integrity. EVMs also ensure that voting is quick and less prone to human error and VVPATs provide a visual confirmation of a voter that his vote has been recorded. Even though such innovations have simplified the process of elections, critics believe that these innovations place excessive faith in technologies that are not easily auditable by ordinary citizens, thus creating a technocratic layer that can erode direct civic controls in the democratic process.



- **Aadhaar and Voter ID Linkage: Surveillance or Streamlining?**

The suggestion to connect Aadhaar (biometric identification) to voter identification cards is to avoid multiple and fake entries in the voter lists. Although this can increase the administrative efficiency, it has led to significant privacy and surveillance controversy. Opponents say that the connection of biometrics with voter databases may lead to voter profiling, disenfranchisement, and state surveillance, in particular when there is no effective data protection legislation. Therefore, this project walks on a thin border of simplification of electoral rolls and violation of rights of individuals.

- **Social Media Campaigns: Political Advertising and Opinion Manipulation**

The emergence of social media has transformed the political campaigning arena in India in a spectacular manner. Targeted political advertising, voter outreach and mobilization is being done by parties on platforms such as Facebook, Twitter, Instagram and WhatsApp etc. Nevertheless, these instruments are also applied to manipulate opinion, misinformation, and polarization of emotions via deepfakes, fake news, and micro-targeted media. Lack of robust regulatory controls over online campaigning brings about a lot of concern regarding the level of democratic discourse and informed consent of the voters.

- **Cybersecurity Efforts by the Election Commission**

The Election Commission has put in place a number of cybersecurity measures that secure electoral infrastructure in view of the threats associated with cyber-attacks and data breaches. Those are secure server protocols, voter data encryption, multi-factor authentication systems, and cooperation with cybersecurity agencies. But as digitalization is becoming more and more of a reality, the threat of hacking, external work, and digital sabotage is an urgent issue. ECI still has the challenge of keeping election technology secure and at the same time be transparent and trustworthy to the people.

- **Digital Voter Registration and E-Governance Portals**

The Election Commission has introduced online voter registration portals to make the process more accessible and efficient. These e-governance platforms also allow voters to update addresses, correct voter ID details, and make changes to the electoral roll. While these tools



significantly reduce the administrative burden and streamline voter services, they heavily rely on digital literacy and access to reliable internet infrastructure, which remain unevenly distributed across India. This leads to digital exclusion, particularly affecting rural communities, women, and marginalized groups, who may struggle to access or understand these platforms. Furthermore, errors in electoral rolls, allegations of faulty EVMs, or disruptions due to violence or malpractice in certain polling booths often compel the Election Commission to conduct re-elections or re-polling in affected areas. These measures are intended to uphold the fairness and legitimacy of the electoral process, but they also reflect systemic weaknesses that still persist despite the adoption of advanced technologies.

## **6. DEMOCRATIC OPPORTUNITIES AND POLITICAL GAINS**

Digitalization of the Indian electoral process has a number of democratic benefits. When used in an ethical and inclusive way these innovations, can be used to consolidate the principles of participatory democracy and enhance the efficiency of the work of public institutions. Some of the main spheres in which technological intervention can provide democratic prospects and political advantages are as follows.

- **Broadening Democratic Participation and Representation**

Online voter registration, e-governance and mobile campaigning are some of the digital tools that can be used to expand democratic participation. These technologies help to lower logistical obstacles and simplify the access to the electoral process by people, particularly the youth, urban migrants, and first-time voters. Additionally, digital outreach allows political parties to target geographically and socially different electorates, which increases the political representation and inclusivity in policy discourse.

- **Reducing Administrative Corruption**

Technology also contributes in curbing administrative corruption by ensuring that processes of elections are automated and that the involvement of human beings is minimal. Biometric voting, electronic voting machines (EVMs) and Voter Verified Paper Audit Trails (VVPATs) minimize the chances of ballot manipulation, voter impersonation, and voter fraud. Online record-keeping and monitoring systems also enhance accountability of election expenditure and party finance, which reduces illegal activity that undermines electoral integrity.



- **Enabling Real-Time Political Engagement**

Real time political participation between the voters and political actors can be achieved through social media platforms, mobile applications, and online polls. Such sites enable candidates to communicate directly with constituents, address complaints and post policy agendas in real-time. This creates a more vibrant and reactive democracy whereby politics is not restricted during election periods but is a constant process.

- **Empowering Marginalized Communities (If Digital Divide is Addressed)**

Technology can serve as a strong tool of empowerment of marginalized communities in case the digital divide, i.e. the gap in access to digital tools and literacy is effectively addressed. Women, tribal, rural citizens and the differently abled population can have improved access to information, voter services and political participation. The policies to include all groups in technological systems, community engagement, and regional language platforms are critical to non-exclusion of these groups in a digital democracy.

- **Enhancing State Accountability and Transparency**

Online resources increase the accountability of the state by making elections more transparent and traceable. Voter roles being open to the public, the audit of the election data being done digitally, and the real-time information of the election actions all help to create a culture of transparency. Furthermore, digital reporting mechanisms can be used to track the process of campaign funding and reveal the instances of the breach of the Model Code of Conduct, so that citizens, watchdogs, and the media can keep the political actors accountable.

## **7. DEMOCRATIC CHALLENGES AND POLITICAL RISKS**

Although technology promises significant improvements to democratic procedures, it also poses severe threats and weak points that are capable of destroying electoral integrity, credibility, and democratic principles. The paragraphs below present the main issues and political risks of increasing digitization of the electoral democracy in India.

- **Political Polarization Due to Algorithmic Targeting**

Political polarization is mostly caused by algorithmic targeting, which is often employed by social media to personalize content. Digital echo chambers come about because voters are



presented with filtered information that supports their current beliefs. This reduces the access to different opinions and promotes ideological extremism that undermines the democratic ideal of informed and free discussion by the people.

- **Monitoring Electronic Technology in Electoral Process**

The electronic technologies used in the elections such as EVMs, VVPATs and biometrics are difficult to monitor and audit. This has cast a suspicion in the minds of the citizens and the political players due to lack of independent and transparent verification system. Without the close supervision, such systems can be interpreted as subjective or even manipulable, and that can cause the absence of trust in the outcomes of the voting procedure.

- **Social Media, Fake News and Deepfakes: Threats to Informed Consent**

Deepfakes, fake news, and edited images are quickly disseminated on social media and seriously undermine the informative potential of voters. These digital tools often distort reality, making it difficult for citizens to differentiate between factual information and fabricated content. Political opponents can be discredited through doctored videos, impersonations, and fake statements, while viral misinformation manipulates public emotions, altering voting behavior through fear, anger, or false hope. These tactics misrepresent the democratic principle of rational, fact-based voter choice, replacing informed deliberation with emotional manipulation. A recent example from Mexico, as discussed in the article shared, highlights how AI-generated deepfakes and coordinated disinformation campaigns were used to disrupt public trust in electoral outcomes. The Mexican case demonstrates that such strategies can be deployed systematically to favor certain candidates or parties, raising serious concerns about election legitimacy and democratic resilience in the digital age.

- **Electoral Manipulation: Bots, AI-Generated Content, Voter Profiling**

Electronic manipulation of elections can take the form of using bots, AI-created content and micro-targeting of voter profiles. On social media, bots saturate it with partisan propaganda and the voter profiling technique applies data analytics to target individual political messages. These are the practices that can be used to control the voting behaviour in a way that is not easily visible, sometimes even without the awareness of the voter, and this contributes to the unfairness of the electoral competition.



- **Dark Web and Democracy**

The Dark Web has a dark side of undermining the democratic procedures by facilitating the illegal of voter information, viruses, hacking software, and disinformation. This space can be used by political actors or foreign parties to interfere with election, propagate propaganda, or even launch cyberattacks, which are hard to trace and censor.

- **Role of Political Parties in Weaponizing Tech**

In many cases, the weaponization of technology happens at the center of political parties. Parties can control narratives and isolate dissension through data collection, the spread of fake news and troll armies. Such strategies undermine the ethos of civil intellectual discourse and create a culture of politics of coercion, cheating, and intimidation.

- **Proliferation of Misinformation**

The lack of control over misinformation on online sites discourages popular support of democratic institutions. Electors usually find it hard to identify between what is true or false even in areas that have low media literacy. This leaves a vacuum of confusion, ignorance or incorrectly directed indignation and this distorts the democratic process and undermines the participatory reaction in the vote.

- **Tech Monopolies and Erosion of Democratic Deliberation**

Tech monopolies, as Meta (Facebook), Google, and Twitter, dominate the industry and disproportionally influence the political communication and the talking points. In addition, these platforms serve as gatekeepers that determine how voices can be promoted or stopped. Their lack of transparency, and self-interested agendas may abuse democratic discussion and shut out nonconformity or minority opinions.

- **Risks of Digital Authoritarianism**

These technologies are piling up, at the cost of which excessive digital authoritarianism can be achieved, in the context of which states or influential forces may command the control of political actions by using surveillance, censorship, and artificial intelligence. Civil liberties, provision of opposition and institutionalization of control are some of the things such trends destroy and, therefore, are a deadly threat to the democracy of the country.



## **8. COMPARATIVE POLITICAL EXPERIENCES**

The interplay between technology and democracy is greatly different depending on the political system and culture. On the one hand, some states have invested in digital technologies to enhance democratic processes, whereas, on the other hand, some of them refused to use or undo their implementation because of fears of either transparency, trust, or authoritarian abuse. Political insights across political dimensions give a context to the political reforms in India and serve a guideline to the policy adjustment and democracy renewal.

- **Political Science Analysis of Tech and Democracy**

The effects of technological innovations in the electoral process have veered in different directions across nations, shaped by their institutional frameworks, political cultures, and the level of public trust. A political science analysis shows that countries choose to adopt or reject election technologies based on their compatibility with the core democratic principles of transparency, participation, and legitimacy. Notably, many modern democracies have rejected or limited the use of Electronic Voting Machines (EVMs), emphasizing that free and fair electoral practices require verifiable and publicly auditable systems. Their decisions reflect a commitment to strengthening democratic values, such as voter trust, institutional accountability, and electoral integrity. These cases highlight the fact that technological efficiency alone cannot substitute for transparency and citizen confidence in the democratic process.

- **European Democracy and Rejected the EVM**

The European democracies have given more attention to procedural transparent-level and citizen verifiability in the process of elections. Most European countries have their political systems predominantly interested in achieving voter trust and institutional responsibility such that the Electronic Voting Machine (EVMs) have been discarded by many of these states. This is based on the political opinion that all votes ought to be verifiable by the voter independent of the expertise or the machines. The decision not to move to the EVMs shows a conservative spirit based on the notion of the democratic norms, with efficiency not allowed to be obtained at the expense of transparency in elections.



- **Ban of EVMs in Germany, UK, USA, France, The Netherlands, Ireland**

Germany, the UK, the USA, France, the Netherlands, and Ireland are some of the countries that have come out strongly against using of EVMs in their elections.

The Constitutional Court of Germany stated that the democratic rule of law is infringed by electronic voting as long as the electronic voting is not transparent to the common citizen. In the UK and Ireland doubts over software reliability and absence of audit trails were questioned during trial use of electronic voting. Institutional legitimacy, and the ability to be verified by its people are not policies that these democracies are willing to compromise. The bans articulate an idealistic political devotion to voter sovereignty, rather than the technical convenience.

- **Estonia: Digital Democracy**

Another example of an effective digital democracy is Estonia which currently has i-Voting (voting via the internet) entrenched in its political aspect. As a political scientist, it is possible to state that high institutional trust, a strong rule of law, and the prevalence of digital literacy makes Estonia successful. The Estonian model shows that democratic traditions can be compatible with technological innovation in case of sufficient protection, cybersecurity and enlightenment of the environment. In this case, technology improves rather than substitutes participation of people and bureaucracy efficiency.

- **USA: Cybersecurity, Foreign Interference, Accepted Ballot Box**

America has been experiencing ambivalence with electoral technology. Although it has had to rely on electronic systems to count and register the votes, emphasis is placed on the ballot boxes and paper. The 2016 and 2020 elections revealed significant threats to foreign interference and digital manipulation and brought a consensus in politics regarding the significance of auditability and cybersecurity. Through the perception of political theory, the United States pursues a proven balance between innovation and trust in existing institutional and prioritizes election integrity over the speed of digitization.

- **China: Tech-Enabled Authoritarian Control**

China demonstrates what happens when technology will be hijacked by the dictatorial forces instead of the democratic progress. Examples of this surveillance are the use of surveillance



technologies, internet censorship, facial recognition, and big data analytics in order to track and shut down political dissent, by the Chinese state. According to the perspective of political science, China is an example of the so-called digital authoritarianism, where its technology centralization supports a one-party system. Compared to a society of democratic nature, the digital electoral space is not governed by the citizen but the state, which becomes a grave issue to civil liberties and participatory governance.

- **Brazil/Kenya: E-Voting and Public Trust**

Instructive cases of e-voting implementation are present in Brazil and Kenya that are emerging democracies. Brazil has been using EVMs since decades and there is increased distrust, particularly under polarizing political situations. Kenya on the other hand has had problems with biometric verifications and hacking claims that resulted in disputed elections and civil unrest. These examples reveal that democracy does not necessarily instill a movement towards greater democratic legitimacy through technology, but rather through robust institutions, openness and conflict outlets. Technological reforms require political trust in order to become credible.

- **Learning points for India's political Electoral Ecosystem**

The experiences of India in electoral technology should be measured constantly with the international experiences and democratic ideals. Public awareness of transparency, verifiability by the masses, and legal responsibility is given a significant priority, as the rejection of Electronic Voting Machines (EVMs) in established democracies such as Germany, the UK and the Netherlands is giving rise to. The success of Estonia in utilizing digital voting underlines the importance of having a sound digital infrastructure, exceptional cybersecurity, and confidence of the people in the digital sphere, which are all preconditions of having secure and accessible tech-based elections. United States, however, shows that paper-based systems with computer backups can introduce both reliability and auditability, and it is possible to reconsider such a formula in India. Examples such as Kenya and Brazil reinforce the importance of public trust as the area in which systems ought to be rooted in absence of which even the technically sound systems may be subjected to political debate. Finally, China holds a lesson: technology can turn out a means of control, instead of empowerment, when employed without any democratic checks. The message to India is that technology should be emulated transparently,



inclusively, and guided in the context of the constitution to build on the integrity of the democratic roots but not at the expense of the same.

## **9. IMPLICATIONS FOR INDIAN POLITICAL INSTITUTIONS AND DEMOCRATIC VALUES**

The entry of the digital technologies in the Indian elections is not only a technical shift but a long-lasting and profound change that has ramifications on the organization of power, institutional quality, and the democratic spirit of the nation. This part goes on to examine the implications of these changes on critical political players and democratic values.

- **Reconfiguration of Power Between State, Civil Society, and Tech Corporations**

The fact that technology is finding more application in elections has resulted in the reorganization of forces among state politics, civil society, and individual technology companies. Though the state continues to regulate the behavior during elections, a technological company has taken center stage in determining how information is distributed, how it targets voters, and how election campaigns are conducted. The civil society, in its turn, is left responding to such changes with little to no influence as well. The development of this dynamic is worrying of creating imbalanced power of the private technology monopolies that have become too influential in the processes of democracy and suppressing the independence of collective institutions and the ability of the masses to hold those in power to account.

- **Role of Political Parties, and Electoral Commissions**

Political parties have become important subjects of the digital political environment. They are using data analytics, AI and social media to create messages that are appealing and ideally mobilize support. Nonetheless, this quantitative campaigning is usually not transparent and ethically controlled. Although the Election Commission of India (ECI) is mandated with the task of conducting free and fair elections, it needs to extend its mandate to the monitoring of digital content, privacy of data, and manipulation of data by algorithms. This requires enhancement in technical capability, self-sufficiency and regulatory powers of the ECI to respond to the digital epoch.

Several opposition parties in India, including the Congress, Samajwadi Party, AAP, and TMC, have alleged electoral fraud and bias in recent elections, especially regarding the use of Electronic Voting Machines (EVMs). They argue that limited verification of VVPAT slips undermines transparency and voter trust. These parties have also criticized the Election Commission of India (ECI) for delayed or selective action on violations of the Model Code of Conduct, particularly involving ruling party leaders. Concerns have also been raised over the ECI's silence on voter data breaches and social media manipulation. Critics, including civil society groups and scholars, have called for reforms to strengthen the ECI's independence and ensure greater accountability in the electoral process. The Election Commission of Indian failed to address the grievances of opposition leaders and also suspicion of common people in the context of technical and monitoring system of EVM during poll and post poll fault lines.

- **Public Trust in Democratic Institutions**

Democratic legitimacy is based on trust in democratic institutions like the ECI, parties and the judiciary. But the fact that electoral technologies remain in the dark, allegations of tampered with EVMs, and the unregulated online campaigning have added to a certain element of distrust to the electoral results. Unless these tendencies are halted, they are most likely to cause people to lose their belief in democratic practices and become voter apathetic and politically cynical.

- **Risks of Democratic Backsliding in a Digitally Mediated Polity**

An unregulated digital environment mediated by politics has the potential of causing democratic backsliding. Online surveillance, voter profiling, censorship, and misinformation to control the masses to influence them into making the citizenry should not be tolerated. The processes negate freedom of expression, confidence in consent, and electoral contestability, causing a severe menace to the wellness of the Indian republic.

- **Need for Institutional Safeguards and Constitutional Morality**

India should enhance institutional support of the democratic principles based on constitutional morality to defend democracy in the digital epoch. This will involve providing protection of data, increasing the independence of regulatory agencies, the enforcement of campaign finance rules, and building of a digitalized public sphere that facilitates a rational debate. Technologies



come into play in the election process and they should be employed in line with constitutional values such as justice, equality, liberty, and fraternity.

- **Election Campaign and Use of Tools of Technology**

The tools used in the modern election campaign in India are automated messages, geotargeted advertisement and behavior analysis. Although these devices permit more precise engagement with voters, they have also caused manipulation, bias, and unfair accessibility to technological resources to smaller parties and independent candidates.

- **Developing Content for Campaigns**

Development of campaign material too has shifted to be digital. The algorithms and sentiment analysis are used to design the messages of politics and create media on AI. Although this can be useful in terms of adjusting the content toward particular demographics, it raises the chances of disinformation, emotional exploitation, and a lack of critical communication in the community.

- **Post-Election Collecting Data and Distrust of Public Opinion**

After election, political organizations and data companies tend to collect an enormous amount of data to evaluate their voter activity and to develop the prospective strategies. Nonetheless, unwilling use of individual data and dependence on predictive algorithms may distort the picture in the media, causing mistrust in the process of electoral feedback and opinion surveys.

- **Digital Reporting Tools for Political Party Finance**

Online mechanisms of tracking or reporting on political funds are becoming common but these mechanisms remain to be in their developing stages. According to the cost of anonymous donation and the expenditure made by a third party there are a lot of loopholes. This secrecy within the systems of digital finance opens options of influence within the systems by rich benefactors or external forces, a change in digital financial accountability is imperative and urgent.



- **Future Trends and Legal Implications**

In the future, such technologies as blockchain voting, biometrics authentication, and machine prediction based on analysing voter behaviour may further revolutionize the election. But all these developments have necessitated the need to have robust legal frameworks to safeguard the privacy of voters, guarantee transparency in the electoral process and curb misuse. Legal infrastructure of India needs to transform to be at par with the changing technological trends so that innovation is within democratic ethics and constitutional ethos.

#### 10. Challenges for use of New Generation Technology in election Process

Introduction of new generation technologies in the electoral systems introduces efficiency, speed and modernity. It does not, however, come without placing serious technical and moral liabilities to the electoral infrastructure. The following are some of the main technological and security aspects that need to be sorted out to guarantee safe and reliable democratic process.

- **Network Security: Encryption, Redundant Firewalls**

One of the most significant issues during digital elections is a secure transmission and communication of data. Although encryption is common to encrypt data, the sophistications of cyberattacks are changing and this requires more simple and redundant systems which should include firewall in many layers. Without this, the election servers and the lists of voters will always be subject to interference, hacking and illegal access.

- **Virus, Trojan Horse**

Viruses, trojans and malware threaten to infect all electoral software and systems. Such malicious codes are able to halt activities, corrupt information or shutdown election sites. In particular, a trojan may offer backdoor access to the attackers that can interfere with the work of counting and/or voting machines without being noticed and to lose the trust of people.

- **Spoofing**

The spoofing enigmas are those of disguises in which the attackers impersonate real people or systems. Speaking about the elections, the spoofing may cause unauthorized access to electioneering servers, fake voter contact or duplication of official websites and messages. This



strategy has the capability of confusing voters, broadcasting false information, and jeopardizing the elections.

- **Denial of Services (DoS) Attacks**

It can use a Denial of Services (DoS) or Distributed Denial of Services (DDoS) attack to generate excessive interpretive traffic on a system and make it unusable, including voter registration websites, result period websites, or other online systems. These attacks may stall elections, cause postponement of results or administrative confusion during the day of the elections.

- **Voter Fraud**

Even though digital technologies can help to decrease voter fraud, it can give rise to forms of fraud that do not yet exist, like identity theft, multiple registrations on the basis of false information, or manipulation of digital records. In the absence of stringent measures of verifying activities and biometric protection, existence of fraudulent activities may undermine legitimacy of election results.

- **Invisible Attacks and Fraud**

Certain attacks on the electoral system are those that are invisible or stealth based where malicious code remains dormant or changes information discreetly without raising alarm bells. Such kinds of frauds are particularly perilous since they are difficult to detect and even could be identified many years after elections have been finished, not to mention the possibility of other manipulation being unidentified.

- **Birth of Moral Panic**

The increasing use of technology in elections has the potential to instil a moral panic in the general population when major news outlets race to spread news of how voting systems may be in jeopardy due to hacking or other digital mechanisms of fraud. The fearmongering with viral rumours, social media speciousness, and conspiracy theories about EVMs or voter databases, whether these systems have proper technical integrity or not, can be a significant source of fear, causing a lack of trust in the democratic institutions, as well as the overall belief in a safe and secure democracy.

- **Are EVMs Hackable?**

The issue of a hackable EVM has become one of the most contested in India. Technically, Indian EVMs are offline, non-networked equipment, and they are not subject to remotely located cyberattacks. Nonetheless, the physical manipulation or insider manipulation still poses a threat especially, during transport or when storing them. Although the Election Commission insists that EVMs are safe, existing types of auditing that are not independent as well as the lack of transparency has given a reason to the people to doubt that, emphasising on why it is necessary to have verifiable and trustworthy electoral technology.

### **11. RECENT DEBATES OVER EVM VERSEUS BALLOT BOX IN INDIAN DEMOCRACY**

The recent debate and controversy over the credibility of the EVM knock-up in 2024 in Maharashtra assembly election and as well as in last parliamentary election sparked the use and misuse of the EVM and questions on malpractices the electoral process to concluding the result and also Election Commissions' function and credibility under public domain. Many prominent leaders of Indian democracy including former Chief Minister of Uttar Pradesh Akhilesh Yadav, Leader of Opposition in Parliament Rahul Gandhi raised doubts and put question mark on the credibility of EVM and accountability of the Election Commission to conduct the free and fair elections in democracy and also urges to return to ballot box in democracy like US and Germany.

Former Chief Minister of Andhra Pradesh Y.S. Jagan Mohan Reddy urged India to follow the ballot paper. Rahul Gandhi criticised EVMs by linking them to black paper. Elon Musk has also expressed his doubts over the credibility of EVM and its risk of being hacked by AI or humans. Although his remarks were aimed at our system, they raise concerns over India too.

The ECI is also criticised for limiting the audits of VVPAT to just five EVMs per assembly constituency. This method doesn't follow proper statistics and lacks transparency; therefore, they called for a method named lot acceptance sampling. In this method, if one EVM shows a mismatch, then all EVMs of that population or group should be checked manually. But the election commission does not define what the population of machines is, how it picks the



number of five machines. So the debate is not only about EVM, it's about democratic legitimacy and public trust.

The question is whether India should return to using traditional ballot papers, as is done in the USA. The Supreme Court has supported EVMs and dismissed the demand for 100% manual verification of VVPAT slips and reintroduction of ballot paper. However, it maintained that full manual verification is not feasible.

India's electoral system has traditionally been its most robust democracy. However, as discussions and debates surrounding EVMs fill news articles and legal disputes, it is evident that technology by itself cannot sustain democracy. To regain electoral trust, India should explore a hybrid approach combining digital counting with paper audit trials like the one in the Philippines, integrating EVMs with compulsory complete VVPAT audits to achieve a balance of efficiency and reliability.

## 12. POLICY RECOMMENDATIONS AND DEMOCRATIC SAFEGUARDS

In order to have the next-generation technologies put to democratic use, India needs to introduce a comprehensive package of reforms and protective mechanisms. The proposals on how to maintain electoral integrity, institutional trust and citizen rights in the digital era have been provided as follows.

- **Political Reform to bring Transparency and Accountability:** Reform measures should impose publicly declaring digital campaign plans, funding, and data distribution to improve transparency and fairness in the political world.
- **Legal Framework to Control Political Use of AI, social media and Data:** A specific law is required that governs the usage of citizen data and voter data in campaigns, and election technology, including principles of transparency about the data used, consent to collect it, and ethical campaign limits that contain the use of AI and algorithms used on social media.
- **Election Commission and Digital Capacity-Building:** To track, govern, and audit the new technologies in the electoral process, the independence and the level of digital competence of the Election Commission is essential.



- **International Human Rights Framework to Govern Technology in an Election:** India needs to push its technology related regulations in election towards the principle of international human rights, i.e., freedom of speech, data protection and non-discrimination in cyberspace level of elections.
- **Online Censorship and Internet:** To fix this, online censorship during elections must have clear guidelines so it is not piecemeal whilst still trying to limit hate speech, misinformation and foreign influence, preserving freedom of speech.
- **Strengthening Civic Tech for Democratic Deepening:** The development of democratic involvement and closing of the gap between democratic institutions and the voter can be strengthened by investing in institutions of civic technology (e.g., a fact-checking app, citizen feedback app).
- **Increasing Digital Rights and Political Literacy of Citizens:** Citizens are in need of awareness of digital rights, the role of algorithms, misinformation, and being able to exercise choices in the digital environment and avoid being manipulated by it.
- **Employment of Biometric Technology and a Limit of its Use in Elections:** Although biometrics are effective in limiting fraud, excessive use endangers privacy data and marginalization. Its utilization on voter verification should be matched with stern data security measures.
- **Future of Importance of Indian Elections to Global Democracy:** Since it is the largest democracy in the world, the experience of digital elections that India may have played a significant role in the development of matters of global democracy. Transparency, fairness and participation in its leadership shall promote its moral leadership.
- **US Election Integrity Movement Needs India:** The experiences of Indian large scale voting technologies can be shared with the world at large as shown by election integrity movements such as the US, and at the same time India can learn the transparency models of auditability shown by the U.S.



- **Strengthen Democracy Via Exploring the Possibility of Paper Ballot System in Modern Elections:** India should explore the possibility of using a hybrid or paper ballot system in tough election which should be more verifiable and enjoyable by the masses as part of strengthening democracy in the country.

### 13. CONCLUSION

This paper underscores the point that although the second-generation technologies introduce a wide range of opportunities to improve voting and election results, participation, and governance in India, it poses serious threats to democratic integrity, transparency and confidence of the people. According to political-scientific analysis, uncontrolled application, as well as the use of AI, digital campaigning, and biometric systems, can change the power balance, increase inequality, and lead to the decline of democracy in the event of a lack of control. In its path to further innovation in its electoral processes India should use a middle course that preserves constitutional values, enhances institutional accountability and include informed and inclusive participation. Indian democracy in the digital age can also survive only in the future which is not merely based on technological development, but also based on ethical and democratic systems under which it can be used with focus.

The introduction and design of EVMs in India is viewed as a major milestone in worldwide democracy. It has increased transparency, speed, and acceptance within the system. The ECI is also criticised for limiting the audits of VVPAT to just five EVMs per assembly constituency. This method doesn't follow proper statistics and lacks transparency. But, The recent debate over the credibility of the EVM knock-up in 2024 in Maharashtra, Andhra Pradesh, Uttar Pradesh in recent elections. On going electoral controversy in upcoming assembly election 2025 and function of Election Commission for verification of voter list under public domain. The Supreme Court asked EC to reconsider the ADHAR and Voter ID for valid identity proof for Special Intensive Revision (SIR) dated on 28 July 2025. This incident has given rise to calls for returning to ballot paper voting. Former Chief Minister of Andhra Pradesh Y.S. Jagan Mohan Reddy and Samajwadi Party President Akhilesh Yadav urged India to follow the ballot paper. Case study of US for using Ballot Box and Other Global Practices including Germany, UK may advocate to return to ballot box along to new regulation for the uses of advanced



technology in future for the free and fair election for India's sustainable and credible democracy in the world community.

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