

Robotic Process Automation in Electoral Administration in India: Governance and Ethical Considerations

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Abstract

Data management on a large scale, verification processes that are stipulated by rules and compliance requirements that are time-dependent have increasingly become the mark of electoral administration. With the growth in complexity of electoral processes, there is an increase in administrative pressure on the election officials and it is raising concerns about efficiency, accuracy, and transparency in the process. Robotic Process Automation (RPA), a technology that automates repetitive and rule-based online tasks, provides possible ways of streamlining electoral processes without necessarily involving significant system redesign. In this paper, discusses the implementation of RPA in the electoral administration in terms of governance and ethics. It evaluates how automation can be applicable in voter registration, scrutiny of nomination of the candidate, delegation of poll workers, polling-day reporting, and tabulation of the results. Although RPA has the potential to decrease compliance costs, increase consistency, and boost auditability, it also creates issues of governance over the problem of algorithmic authority, diffusion of accountability, data security, and transparency. The paper, based on the perspectives of the organizational theory, administrative burden theory, and information governance, claims that automation must be used as a supportive mechanism integrated into the visible oversight systems. Instead of substituting human judgment, RPA should exist under hybrid governance systems that do not eliminate statutory responsibility and democratic authority. The research is added to the emerging literature on the digital electoral governance by harmonizing the efficiency of operations and ethical considerations in elections with institutional trust.

1. Introduction

The concept of elections may be perceived as political processes, but in the institutional sense, it is one of the most complicated administrative systems. The Electoral Management Bodies (EMBs) have organized hierarchies of bureaucracies that perform voter registration, roll revision, nomination of candidates, polling logistics, vote counting, and distribution of results. They are rule bound, time sensitive, document intense and compliance driven functions. This has intensified the administrative burden of the election officials as the electoral processes grow in size and sophistication.

The electoral administration of large democracies entails management of large datasets, such as voter lists, candidate affidavits, polling station location master files, personnel deployment logs, and requirements by

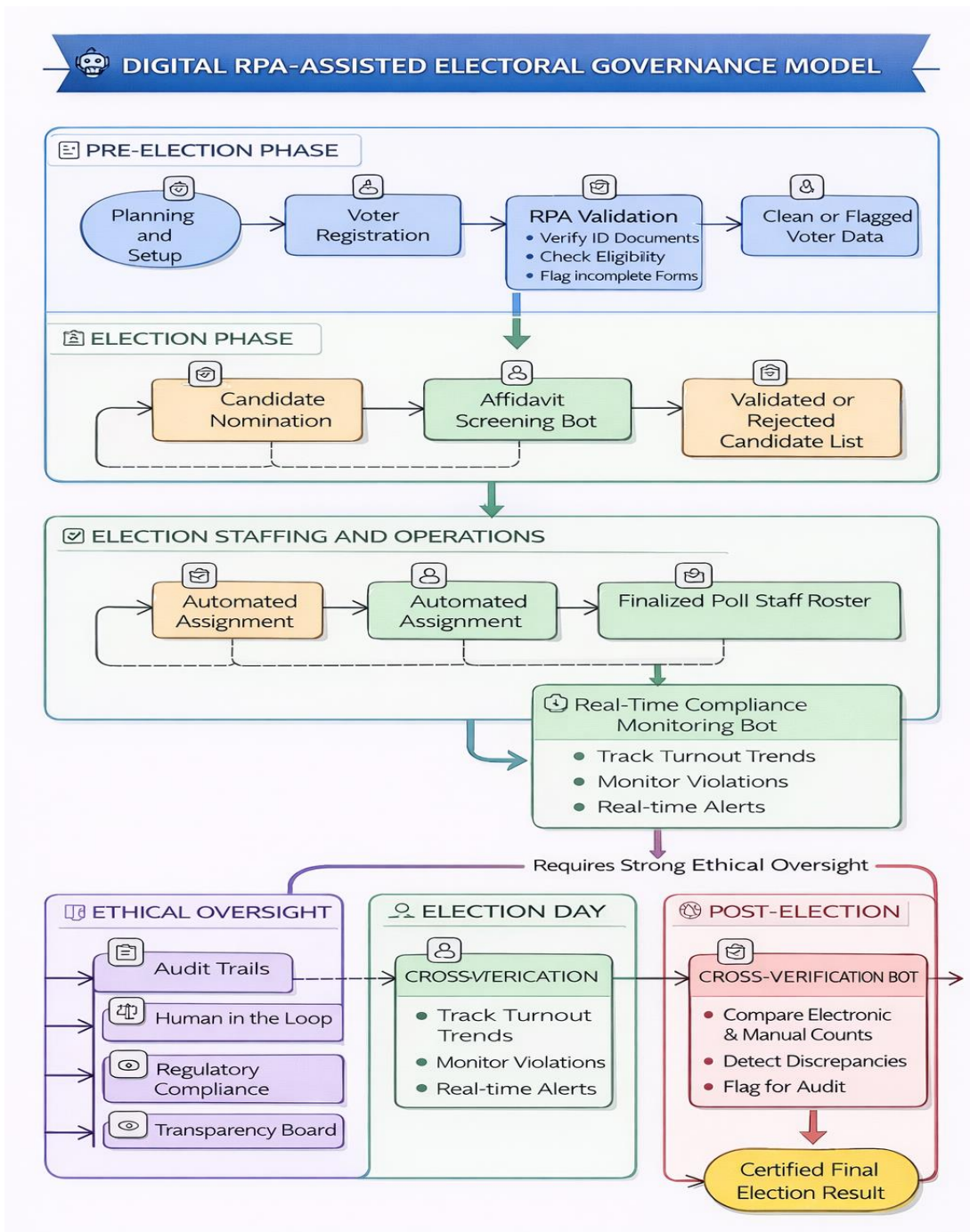
statute. Most of these processes are either partly manual or divided on digital platforms or have to rely on repetitive human verification. This type of operation poses the challenge of duplication of data, clerical mistakes, delays in compliance, and psychological pressure on frontline election officials. The administrative overload is evident especially in voter roll updates, the deployment of poll workers as well as the reporting on the poll day.

These systemic challenges can be solved by the recent development of automation technologies. Robotic Process Automation (RPA) is the implementation of software robots (so-called bots) that can perform repetitive tasks by following rules and imitating human interactions in digital environments (Hofmann et al., 2019). In contrast to the traditional system redesign, RPA works on the level of the user interface and does not presuppose the significant reorganization of the infrastructures (Syed et al., 2020). RPA can potentially help automate structured processes like data entry, validation, cross-checking of documents, and generation of reports, which can help considerably decrease administrative load and increase accuracy and compliance.

This essay discusses the use of Robotic Process Automation in the management of elections. It says that voting is becoming more an exercise in information management and that automation, properly directed, can simplify the administrative functions, decrease workloads, and enhance the transparency of the processes. Nonetheless, automation is associated with concerns about accountability, the bias of algorithms, the security of information and institutional controls, as well. The paper consequently analyses the administrative advantage and the risk of governance that comes with the deployment of RPA in electoral systems.

To place the steps of the electoral administration process to identify possible areas of automation intervention, the subsequent **figure 1.** charts out the cycle of elections and where Robotic Process Automation can be applied.

Figure 1: The Cycle of Elections and Robotic Process Automation



2. Theoretical Framework

The adoption of Robotic Process Automation (RPA) of the electoral administration should not be treated simply as a technological change but as a shift in the form of governance, its administrative power and accountability. This section places automation in three theoretical prisms that all interact, i.e. organizational theory, administrative burden theory, and information governance.

2.1 Organizational Theory and Electoral Bureaucracy

Electoral administration operates by a bureaucratic hierarchy that is characterized by formal powers, compliance through the procedure, and operations that are governed by rules. According to the organizational theory, institutional change, especially technological integration, changes the internal power relations, communication channels, and decision-making (Zhang et al., 2022). Once automation tools are implemented in structured bureaucracies, they no longer augment efficiency; they transform the discretion, oversight, and institutional control.

In the electoral systems, the power to make such decisions is conventionally held by specific statutory officials. RPA integration can lead to the centralization of information flows and decrease local discretion to hand over the control over the administrative power to the system-based protocols. This brings about issues of governance in terms of accountability, transparency, and procedural fairness.

2.2 Administrative burden theory.

Administrative burden defines the learning costs, compliance costs, and psychological costs, which people incur in their interactions with state procedures (Herd & Moynihan, 2018). Frontline officials in electoral administration are faced with volume documentation provisions, time bound reporting provision, and verification protocols.

Complex digital portals and updates on regulation are a burden on learning.

The compliance costs are caused by the form submission repetition and statutory reporting.

There are psychological burdens because of high-stakes accountability and fear of errors in the procedure.

Automation can minimize compliance and learning overhead charges by standardising repetitive activities. Nonetheless, automation that is not constructed well may add to psychological stress, as it causes obscurity of systems and lack of human control. Thus, RPA should be considered because of its efficiency benefits but also its effect on the experience of administration.

2.3 Perspective of Information Governance.

The elections are information systems whose legitimacy is based on data flows accuracy, integrity and traceability. The focus of information governance is on controlling data lifecycle management - gathering, verification, storage, processing and publicizing.

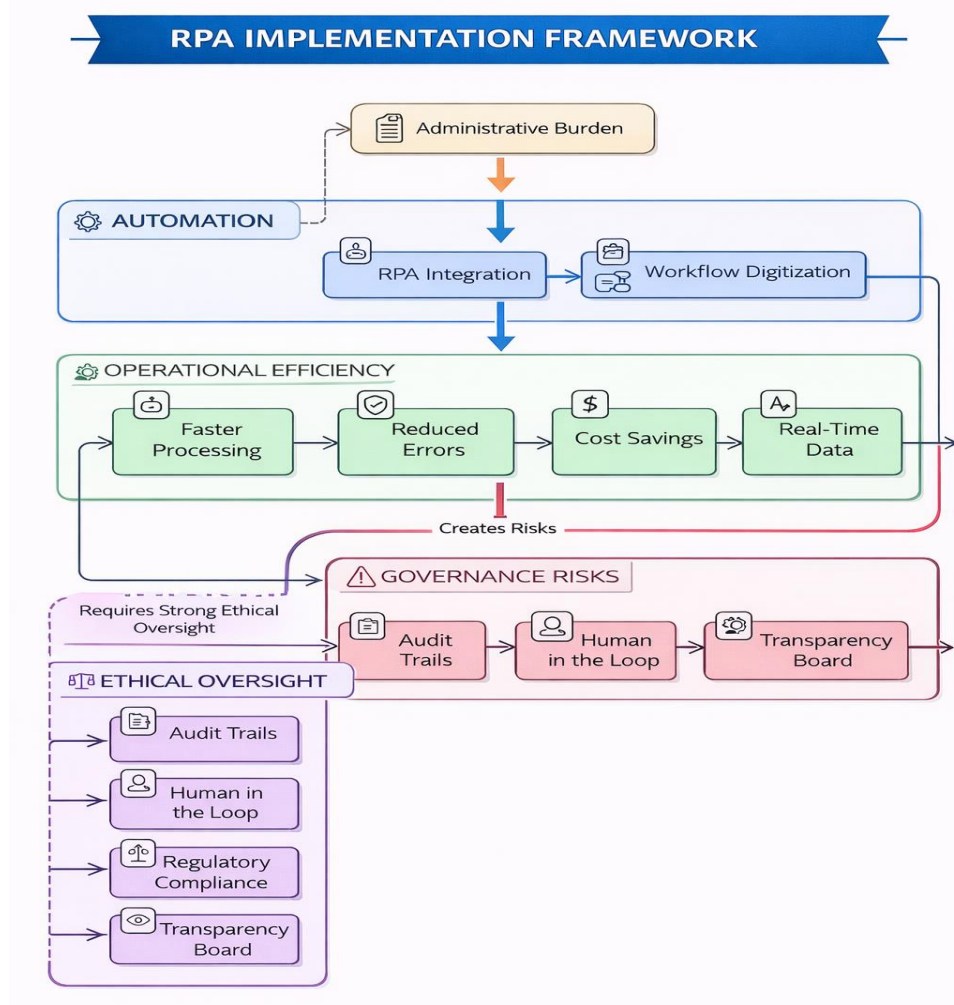
RPA brings in automated decision triggers in this information architecture. Although automation improves consistency and audit trails (Syed et al., 2020), it introduces new interfaces of algorithmic power. Government systems should thus be in a position to guarantee:

1. Openness of computerized decision rules.
2. Clear oversight mechanisms
3. Traceable audit logs
4. Human review channels

Making automation lawful without these kinds of protections will turn the administrative discretion into a faceless digital authority.

The theoretical interrelation between administrative load, automation integration and governance control is summarized in below **Figure 2**.

Figure 2: Interrelation between Administrative Load, Automation Integration and Governance



3. Electoral Automation and Governance and Ethical Considerations.

The use of Robotic Process Automation (RPA) in the management of elections presents a governance and ethics implication in addition to bringing the operational efficiencies. Democratic legitimacy is rooted in elections and, thus, any technological intervention that does not disrupt the electoral systems has to be analysed by considering the issues of accountability, transparency, fairness, and institutional trust.

Involving stakeholders in decision making is essential to ensure accountability and algorithmic power and authority (Yeung, 2018). It is necessary to involve the stakeholders in the process of the decision making and guarantee the accountability and algorithmic power and authority (Yeung, 2018).

Traditional electoral administration is provided on the basis of well-acknowledged statutory power with the officers in question being legally accountable to make decisions. When RPA performs checks,

validation or reporting functions, decision-making processes can be encoded into coded rules instead of discretionary processes. This move towards algorithms of execution as opposed to human control creates the challenge of accountability frameworks.

When an automated procedure alerts voter records as inconsistent or refuses to receive data entries on predefined logic, it can be difficult to identify who is responsible. Governance systems should then explicitly establish control systems that would safeguard the use of automation to complement, not substitute, accountable human control (Kedziora and Penttinen, 2021).

The automation must be supportive and the ultimate decision validation shall still be under the certified electoral officers.

3.2 Auditability and Transparency.

Electoral legitimacy is focused on transparency. Physical documentation and observable verification are common in determining procedural transparency in manual systems. Transparency relies on digital logs, system traceability, and available audit trails in automated systems.

RPA systems produce organized logs of activities which capture the execution of tasks, timestamps and workflow patterns (Syed et al., 2020). Although this improves traceability, it also changes transparency into a situation where it is visible in technical terms rather than physically. Audit trails should have the capability of being reviewed by oversight authorities and be subject to an independent review by the stakeholders in order to trust automated systems.

Transparency in automation design, especially rule set configuration, can become a challenge to the trust of the populace. As such, governance policies should mandate the recording of automated policies, audits and system validation processes.

3.3 Algorithms and Inequality of Process.

The automated systems perform tasks using logic programs. When there are invalid assumptions, missing data, or hard and fast rules as part of the underlying rules, these rules can have the unintended effect of excluding or discriminating. Even the slightest procedural anomaly has significant democratic implications in the electoral setting.

As an example, population with language or translation differences or historical records anomalies may be overrepresented in the lists of discrepancies detected by automated data validation processes that only

detect inconsistencies between texts. Ethical governance requires prevention of algorithmic bias, which means that automation does not enhance the existing administrative disparities (Madakam et al., 2019).

Automated workflows should include human review checkpoints in order to ensure that the application of rigid rules does not override judgement based on context.

3.4 Data Security and Privacy Protection.

Electoral databases hold very valuable personal information in terms of demographic details, identification records and polling data. Automation enhances the rate of data processing and interconnectedness of a system, which could increase cybersecurity vulnerabilities.

The systems of governance should provide encryption standards, access controls and stringent authentication protocols in automated systems (Bhamidipati, 2022). Moreover, the adherence to national data protection systems should be incorporated into the design of automation.

To apply RPA ethically, minimization principles of data must be followed, i.e., the automation must handle only the required data that is relevant in the administrative processes.

3.5 Institutional Trust and Democratic Legitimacy.














Elections also rely on the trust of the people besides efficiency. The technological interventions should thus reinforce but not undermine the attitudes of fairness and impartiality. Automated control mechanisms can be over-centralized and raise the fear of manipulation on a systemic scale or covert discretion.

There should be open communication regarding the scope, role, and constraints of the RPA systems. Electoral officials need to explain that automation is employed to normalize the administrative procedures and not to affect substantive electoral results.

The belief in digital electoral governance demands that there should be a clear distinction between automation of procedures and the political decisions.

In order to systematically summarise the governance risks of automation and the institutional protections needed in electoral systems, **figure 3.** provides a systematic summary.

Figure 3: Governance Risks and Safeguards in Electoral Automation

 SAFEGUARDING RPA ADOPTION: KEY GOVERNANCE RISKS		
Governance Risk	Description	Required Safeguard
 Algorithmic opacity	Rules embedded in system	 Public documentation + audit review
 Accountability diffusion	Blurred responsibility	 Human validation checkpoint
 Data breach risk	Centralized data access	 Digital audit logs
 Administrative Burden	High compliance load	 Encryption + access control
 Bias amplification	Rigid automated thresholds	 Human oversight + periodic review
 Over-centralization	Reduced local discretion	 Multi-level supervision

As Figure 3. indicates, although automation increases the consistency and traceability of the procedures, it opens the risks of algorithmic opacity and diffusion of accountability. These dangers dictate institutional forms of control to maintain democratic validity.

4. Electoral administration uses of Robotic Process Automation.

Although considerations of governance are paramount, the practical importance of Robotic Process Automation (RPA) to electoral administration is that it provides an opportunity to simplify repetitive and rule-based processes in various phases of the electoral process. Electoral management is typified by formal work processes, standardized information, data checking procedures, and deadline reporting conditions, which are especially well adapted to automation (Hofmann et al., 2019).

The subsequent subsections describe the possible RPA use in the pre-election, election-day and post-election procedures.

4.1 Voter Registration and Roll Revision.

The processes of voter registration are used to check documents, verify age, address, duplicate, and roll revision. These activities are normally monotonous and have set rules.

RPA can automate:

1. Comparison of voter databases against identification database.
2. Duplication or inconsistency of entries.
3. Automatic identification of uncompleted forms.
4. Production of standardized revision reports.

RPA minimizes the number of clerical errors and enhances roll management consistency by undertaking controlled validation procedures. Traceability is also enhanced by automated audit logs when undertaking revision exercises (Syed et al., 2020).

Nonetheless, the automated flagging systems should be complemented with the human review to prevent unfair disqualification with minor inconsistencies in the data.

The nomination of the candidate and their affidavit scrutiny take place at stage four.

Candidate nomination involves the scrutiny of candidate affidavits, statements of assets, disclosure of criminal cases and adherence to statutory eligibility requirements.

RPA may assist by:

1. Automatic scan checking of affidavit format fields.
2. Comparison of areas of criminal disclosure with publicly accessible judicial databases.
3. Identifying irregularities in reported financial information.
4. Generating compliance checklists to Returning Officers

This type of automation has the effect of standardizing the procedures and minimizing time constraints on the scrutiny officers. It also reduces the chances of supervision in large-volume nomination dealings.

However substantive determination on the eligibility of the candidates should not go beyond legally mandated human discretion.

4.3.1 Management of Poll Workers Allocation and Training.

The administration of elections needs a significant number of temporary workers. Allocation: this has to do with matching availability, geographic proximity, training completion and eligibility conditions.

RPA can support:

1. Automated distribution of duties by rule-based parameters.
2. Detecting conflict of interest (e.g., local residence restrictions)
3. Following up on the completion of the required training modules.
4. Creation of appointment letters and compliance report.

This will decrease administration and enhance the allocation transparency.

4.4 Reporting and Compliance Monitoring on the Polling Day.

The activities of polling days provoke a considerable number of reporting requirements such as the data on the certification of the mock poll, hourly communications on the turnout, documentation of incidences, as well as the filing of the statutory forms.

RPA may automate:

1. Hourly turnout report consolidation.
2. Checking of obligatory forms filling.
3. Missing data entries alert generation.
4. The statutory summary sheets are auto-formatted.

With such automation, the real time monitoring ability is increased and compliance burden is relieved off the front-line officers. It also enhances procedural consistency in the case of time-dependent situations.

4.5 Compilation and Tabulation of Results Verification.

The post-election operations include tallying of votes, tabulation of machine information against manual data, and the ultimate result tabulation.

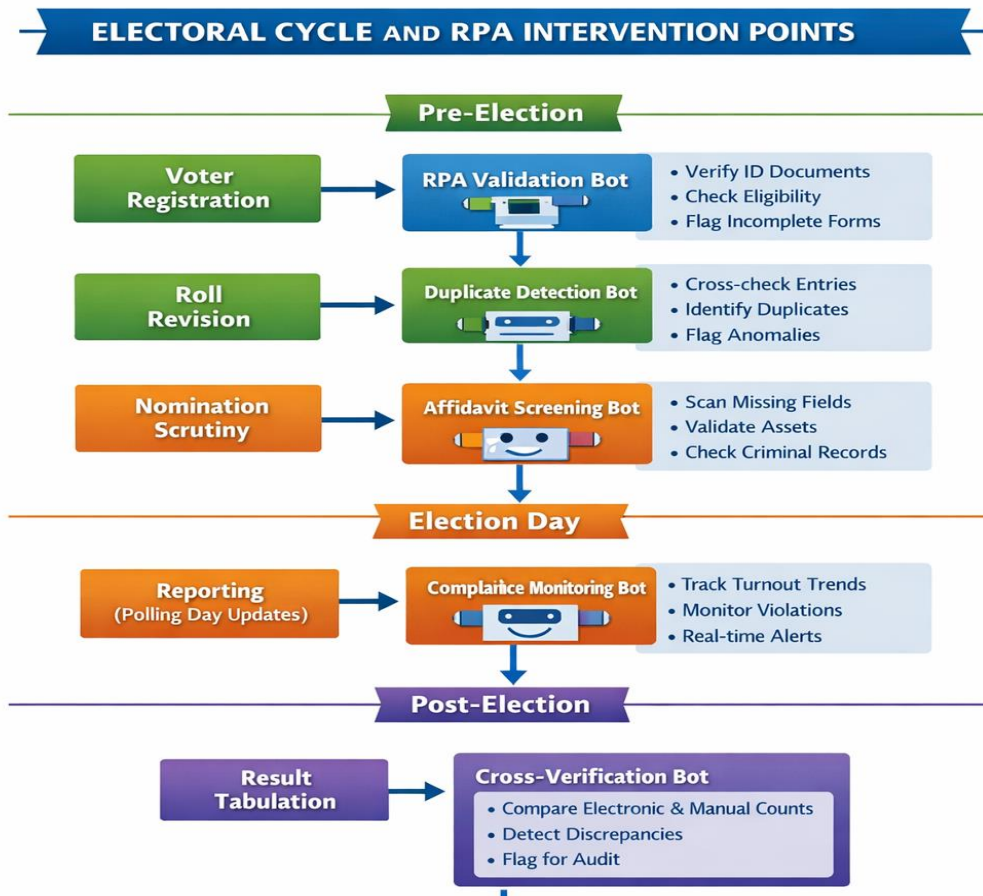
RPA can assist by:

1. Comparing machine output with entry votes.
2. Identification of arithmetic faults.
3. Producing tabulated sheets.
4. Creation of digital archives that are audit ready.

At this point, automation enhances precision in numbers and minimizes the chances of clerical errors. Nevertheless, due to the political nature of results processes, automated systems should be run with a high level of transparency and multi-level control.

The automation of RPA throughout the electoral cycle can be graphically depicted as shown below **figure 4**. to demonstrate the exact points at which automation can be introduced.

Figure 4: Electoral Cycle and RPA Intervention Points



5. Implementation Problems and Institutional Constraints.

Despite the good potential of Robotic Process Automation (RPA) to optimize electoral administration, there are structural, legal and organizational challenges of its application in democratic institutions. Systems of elections are characterized by tight statutory regulations, multi-layered bureaucracies and politically only environments. Thus, automation should be institutional in its approach.

5.1 Legacy Systems and Technical Fragmentation.

Most electoral management institutions are the ones which are utilizing old digital infrastructure which have been developed over the years. Such systems are frequently not standardized in either their interfaces or in interoperability. It might take a lot of customization and technical integration to implement RPA tools in discontinuous digital environments (Desai, 2020).

Besides, electoral data bases can be on different administrative levels which generates issues of synchronization. Poorly integrated automation can be applied with the intention to eliminate duplication or inconsistencies but instead, the situation could create them.

5.2 Law and Regulatory Limitations.

The control of the electoral administration is stipulated by the statutory provisions directing the authority of making decisions to the specific officers. Any automation process should be performed within the limits

of the election law and regulations requirements.

Automated verification, screening or reporting devices should not be used to override discretionary authority which is legally required. The governance structures ought to be clear in defining:

What processes are automatable?

1. What are the human decisions to be validated.
2. The consistency between automated logs and the statutory requirements about record-keeping.

Any inability to adjust automation to legal requirements can bring electoral authorities to the procedural difficulties or court investigations.

5.3 Change management and Organizational Resistance.

Resistance against technological transformation in bureaucratic institutions is common. To the election officials, automation might be a challenge to job description, discretion, or professional power. The research on the use of technology indicates that ease of use and perceived usefulness can greatly impact the process of acceptance (Zhang et al., 2022).

Successful management of change needs:

1. Timely participation of electoral officers.
2. Open dialogue on the extent of automation.
3. Operation adaptations training programs.
4. Guarantee that automation does not displace human responsibility, but is a complement.

Devoid of institutional buy-in, automation efforts can either be underused or used ad hoc.

5.4 Scaling and resource allocation.

The operations of the electors are intermittent, but extensive. The automation systems should be in a position to scale when the election seasons are at their peak and be flexible when the administrative work is off-cycle.

The implementation of scale of RPA can take:

1. Increased server capacity
2. Expanded licensing
3. Special technical monitoring departments.
4. Constant maintenance and upkeep.

The level of automation efforts can be restricted by the budgetary constraint and conflicting institutional priorities (Syed et al., 2020).

5.5 Data Security and Cybersecurity Vulnerabilities.

System interconnectivity and centralized data processing are enhanced with automation. Although this will lead to efficient operations, it will also increase possible vulnerability to the risks of cybersecurity. Targets Electoral databases are data that are sensitive and politically valuable.

Good governance structures should include:

1. Multi-layer access control systems.
2. Role-based access controls
3. Frequent cybersecurity inspections.
4. Incident response procedures.

Democratic security should not be compromised by technological efficiency.

Figure 5. provides an overview of the key institutional constraints and mitigation measures
Figure 5. Implementation Challenges and Mitigation Strategies

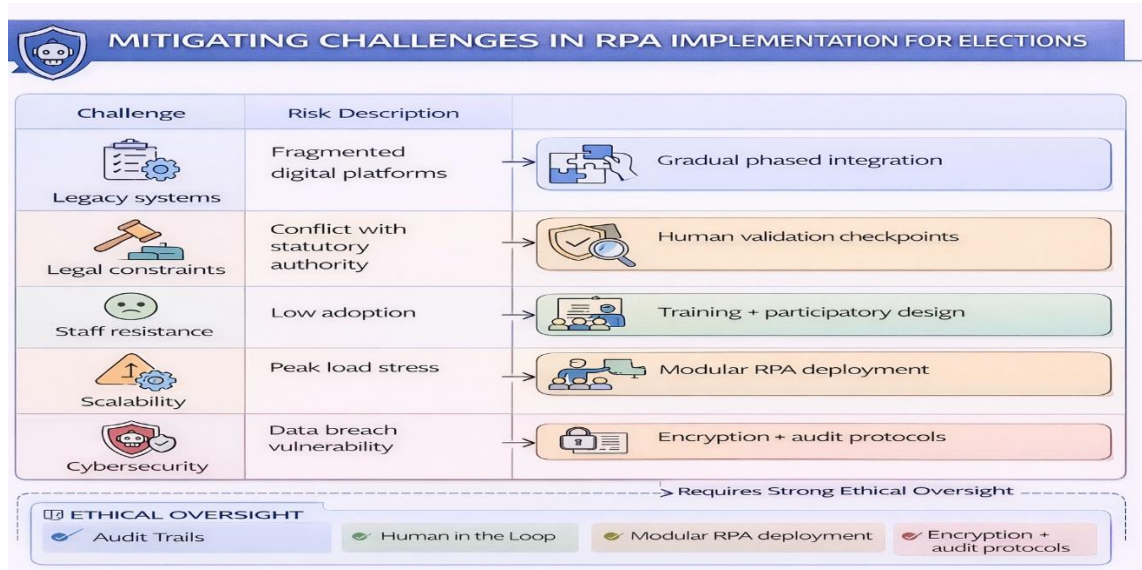


Figure 5. shows that the successful automation presupposes the technical preparation as well as the legal congruence, organizational adaptation and cybersecurity protection.

6. Comparative Analysis: Electoral Administration by Manual and RPA.

In order to evaluate the governance consequences of automation, one will need to compare the conventional manual electoral administration systems with the models that are supported by the use of RPA. As compared to manual system, where human verification, documentation and localized discretion are essential, RPA-based systems incorporate standardized rule execution in digital operations.

The following part will compare the two models on five main dimensions, namely efficiency, accuracy, transparency, administrative burden and governance risk.

6.1 Operational Efficiency

Electrical systems are manual which means that there should be repetitive data entry, multi-level verification, and laborious compliance reporting. Such processes usually result in redundancy and slow consolidation of information.

Systems that run on RPA perform tasks with structured data at a high speed, without being tired, and validate data in real-time and automatically create reports (Hofmann et al., 2019). The most evident areas of efficiency are in the process of voter roll revision, allocation of poll workers and tabulation reconciliation.

Procedural scrutiny should however not be compromised by the speed of operations.

6.2 Accuracy and Consistency

Administrative procedures and methods conducted by humans are prone to clerical errors, mathematical errors and inconsistent application of regulations. The possibility of overlooking is also more likely to occur because of high workload conditions.

The consistency of RPA is rule-based, which means that it adheres to a specific logic (Syed et al., 2020). Automated cross-validation minimises the data inconsistency and arithmetic errors.

However, system logic should be checked on a regular basis to provide fairness and contextual flexibility.

6.3 Transparency and Auditability.

Transparency in manual systems is based on physical documentation, signatures and checkable verification processes. Although physical, these types of systems might not have structured audit logs and a centralized traceability.

RPA systems will leave digital records of each action, date, and step of the workflow. This improves the traceability and retrospective auditing. Transparency therefore becomes less tangible but more digitally traceable.

Nevertheless, in the event that automated rules are opaque, auditability may have a technical presence but substantive absence.

6.4 Administrative Burden

The administration of elections manually gives officials a great burden of learning, compliance, and psychological burden. Pressure on time and rules is another cause of stress especially in polling and counting stages.

RPA lightens compliance more, by automating the generation of forms, checking of their validity, and compiling reports. The burden on learning can also be reduced when user interfaces are made simplified. On the other hand, inadequately developed automation can create psychological load because of the failure of the system or technical doubt. There is hence the need to have governance supervision.













6.5 Governance and Democratic Risk.

Manual systems enable human visibility but could be inconsistent. The systems based on RPA enhance standardization but add algorithmic authority.

According to the comparative analysis, it is possible to think about automation as the governance tool instead of the institution responsibility. The most balanced way to go is hybrid models in which automation assists, and does not supersede, statutory power.

The comparison of the electoral administration procedures with manual and RPA support under major aspects is provided in figure 6.

Figure 6. Manual vs RPA-Based Electoral Administration

COMPARING MANUAL vs. RPA-BASED ELECTION SYSTEMS		
Dimension	Manual System	RPA-Based System
 Efficiency	Time-intensive	 Gradual phased integration
 Accuracy	Error-prone	 Rule-based consistency
 Transparency	Physical documentation	 Digital audit logs
 Administrative Burden	High compliance load	 Reduced repetitive workload
 Governance Risk	Human inconsistency	 Modular RPA deployment
 Cybersecurity	Ruin breach vulnerability	 Encryption + audit protocols

The comparative analysis shows that although RPA does increase efficiency and consistency, it should be implemented in a hybrid system of governance to avoid overcentralizing the power of algorithms.

7. Conclusion

The rising level of digitization of electoral operations has made election management a complex information governance system. Electoral administration has become the field of data validation, regulatory compliance, and institutional accountability. Robotic Process Automation, in this case, is a great opportunity to automate repetitive administration procedures, decrease compliance costs, and increase the consistency of the procedure.

The analysis has shown that RPA has the potential to enhance operational efficiency in voter registration, nomination scrutiny, poll worker allocation, reporting and tabulation. Digital audit trails; Automation enhances digital audit trails and eliminates clerical errors, which adds to procedural reliability. Nevertheless, efficiency benefits are not the sole reason why technological integration in democratic institutions should be acceptable. Electoral rule requires openness, responsibility as well as justice.

With the implementation of automated decision-support mechanisms, some of the administrative powers are transferred to individuals to system-built guidelines. Devoid of explicit governing structures, these changes will be prone to algorithmic opacities, diffuse responsibility, and distrust among the general population. Thus, RPA should be adopted as part of mixed supervision patterns that maintain regulatory power, add human control points, and offer auditing recoverability. Ultimately, automation in electoral administration should not be understood as a replacement for institutional responsibility but as an instrument of structured administrative support. When governed appropriately, RPA can enhance

administrative capacity while safeguarding democratic legitimacy. Future research may explore empirical assessments of automation's impact on administrative burden, institutional trust, and electoral integrity across different political contexts

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