



Policy Brief



SECURE AND VERIFIABLE VOTING FOR PAKISTAN

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INTRODUCTION

Elections in Pakistan suffer from poor execution, persistent rigging and fraud, and a pronounced lack of transparency, which undermines citizens' confidence in elected leaders and negatively impacts civic participation and trust in democracy. In this context, the government's recent push for electoral reforms is a welcome step to restore citizen confidence and trust in elections. Election technology, such as electronic voting machines (EVMs), result transmission system (RTS), and Internet voting have documented benefits at curbing fraud. However, these technologies are prone to fail and may even result in disastrous election day outcomes if deployed without careful research and homework.

These brief structures the ongoing debate around EVMs and election technology in Pakistan and grounds the discourse in research, international best practices, and expert guidelines. This is to the best of our knowledge, the first technology-focused study that provides a systematic framework to evaluate and address the challenges faced in the transition to EVMs in Pakistan.

KEY FINDINGS

International Experience

1. The international experience has documented considerable benefits to using EVMs:
 - a. EVMs dramatically reduce the time and manual effort required for vote tabulation and result reporting and significantly mitigate certain types of electoral fraud.
 - b. EVMs provide accurate counts by eliminating spoiled ballots and human errors in counting.
 - c. The adoption of EVMs can improve voter turnout, empower marginalized communities to vote, reduce electoral expenses, and may even correlate with improved governance.
2. The disadvantages are also considerable:
 - a. EVMs are closed systems, prone to malfunction, and can be easily hacked. While EVMs counter certain types of electoral fraud, they may open the door to new and more dangerous attacks.
 - b. Voters might find EVMs difficult to use.
 - c. EVMs can be very costly and can necessitate further significant costs in infrastructure & logistics.



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3. EVMs have been used in different countries since the 1960s and have proved highly controversial. Developed countries, like Ireland, the Netherlands, and Germany, have phased out or terminated their EVM deployments over concerns of voter privacy and election integrity. At the same time, deployment of EVMs in developing countries, such as India, Brazil, Venezuela, and Philippines, has yielded mixed results. There is, therefore, an urgent need to understand this trend such that we may maximize the gains of these technologies and avoid mistakes made by other countries.

New Election Technologies

4. Revolutionary new technologies have emerged in recent years which enable citizens and observers to verify and audit election results to ensure trust in poll results:
 - a. **End-to-end verifiable (E2E-V)** voting Systems are a promising new paradigm that provide voters strong cryptographic guarantees that the vote was **cast as intended, recorded as cast, and tallied as cast**. These cryptographic guarantees make the entire election life cycle auditable by third parties, the voters, and the election administration alike. The voter does not have to blindly trust the voting system, polling officers, or election authorities regarding the integrity of the election. If there is any malfeasance or rigging, it will be exposed by the protocol itself.
 - b. **Risk-limiting audits (RLA)** are statistical tests that reduce the risk of an erroneous election outcome by identifying anomalies. RLAs are public ceremonies, to which invitation is extended to the public, civil society, and media. Such public ceremonies can also be live streamed. They are a very effective measure to increase voter and stakeholder confidence in the outcome of elections and raise the perception of electoral integrity.
5. **E2E-V Voting Systems and RLA** are being developed and piloted in the developed countries. However, there is limited insight into how these technologies can be adapted to Pakistan's context.

Lack of fundamental expertise

6. There is no global standard or formula for deploying EVMs, and each country must carefully adapt these machines to their own unique ground realities and build a supporting ecosystem.
7. Our prior experiences with election technology demonstrated our lack of fundamental expertise in this domain and highlighted critical knowledge gaps in our discourse and strategy. An expert audit commissioned by the Supreme Court of Pakistan identified critical vulnerabilities in every major component of a homegrown Internet voting solution for overseas Pakistanis in 2018. Likewise, the mysterious failure of the result transmission system during the general elections of 2018 cast a cloud of suspicion on the election results.
8. Adapting election technology to our unique ground realities in a secure, reliable, and cost-effective manner requires great care, effort, and deliberation on the part of stakeholders and considerable work on building a supporting ecosystem for the technology.



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POLICY RECOMMENDATIONS

The following actionable recommendations based on our findings are accompanied by a summary of the roadmap that may serve as a guide in their implementation. We recommend the ECP

1. Foundational Principles

Ensure any election technology solution must expressly cater to the principles of *secrecy of the ballot*, *electoral integrity*, *openness* and *transparency*, *accessibility* and *usability*, and *sustainability*. these principles.

2. Groundwork to develop the requisite ecosystem

- a. Solicit stakeholder input from the onset to democratize the debate around EVMs and develop trust in the voting system. There is considerable polarization in the current discourse around EVMs and we need to provide forums for stakeholders to engage constructively on this topic. Research suggests that consensus building measures harmonize conduct of the elections, reduce post-poll tensions and violence, and contribute to the overall credibility of the polls.
- b. Establish a Research Division to provide quality inputs for technological, legal & policy decisions.
- c. Undertake a gap analysis to identify the limitations in its capacity that may hinder the project from achieving its objectives. An action plan should be developed to bridge these gaps.
- d. Assess the readiness of the ecosystem, specifically from a technological and infrastructure perspective. Countries including Brazil, India, and Bangladesh, have successfully innovated EVMs as per their own needs within their limited resources.
- e. Devise a Digital Transformation Strategy to modernize ECP and its systems to the point where they can successfully launch and manage large-scale EVM deployments.
- f. Develop a Cybersecurity Strategy to counter attacks on IT infrastructure. Identify & work towards implementing international information security standards such as ISO/IEC 27001.
- g. Undertake measures to foster social support and trust. This includes targeted strategies for media, voter engagement and communication, public oversight & technologists' involvement etc.

3. Technical Specification and Pilots

- a. Undertake a threat modeling study, to identify the security issues and vulnerabilities on the ground that we expect to address. Define baseline security requirements for EVMs accordingly.
- b. Conduct an analysis of the suitability of popular EVM types for use in Pakistan on a range of factors, including security, usability, costs, logistics, storage, and handling requirements.
- c. Devise voter verification strategies, like multi-finger authentication, computer vision solutions, tokens, and smart cards.
- d. Undertake multiple large-scale pilots in a mix of urban and rural areas to ensure adequate representation of the electorate



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4. Sustainability and Support

- a. Develop a comprehensive strategy for the testing, piloting, and implementation of supporting technologies such as Result Transmission System (RTS).
- b. Develop sustainability strategies for EVMs and supporting technologies. As a developing country, it is vital that we seek out cost-effective options and utilize our resources effectively.

5. Transparency and Security

- a. Develop comprehensive standards and testing and certification protocols for EVMs to provide stakeholders with greater transparency into the state of the machines
- b. Organize hackathons and solicit feedback from the international and local election technology community to identify vulnerabilities and provide stakeholders with greater transparency.
- c. Engage third party technical experts regularly to assess the security properties of EVMs.

6. Operations and Logistics

- a. Develop comprehensive storage and transport facilities and protocols for accessing, handling, and maintenance of EVMs that can be rigorously monitored and policed.

7. Legal Framework

We recommend ECP introduce and update legislation to support EVMs through

- a. Conducting pilots for End-to-end Verifiable Voting Systems and Risk Limiting Audits
- b. Establishing institutions, standards and provisions for technology trials and certifications
- c. Pre-audit and post-audit of EVMs and supporting equipment
- d. Defining rules for access of source code, EVM, procedures for observers and political parties
- e. Efficient dispute resolution mechanisms under the new voting modality
- f. Defining what constitutes admissible evidence in court
- g. Updating procedural checks according to the updated voting mechanism.
- h. Specifying data protection law for voter data and what recourse is required in case of breach

8. Phased Implementation

Planning and implementation should not be rushed, and time should be provided in the pre-election phase for systems review, revisions, and retesting.

Roadman: Ecosvstem for EVMs in Pakistan			
Key Steps	Document / Activity	Dependencies	Timeline
1	Establish Steering Committee	-	0-1 month
2	R&D Cell	-	1-2 months
3	Stakeholder Consultation and Outreach	[1-2]	3-4 months
4	Capacity Building	[1]	3 months onwards
5	E-Voting Readiness Strategy	[1-3]	3-4 months
6	A Digital Transformation Strategy for ECP	[1-3]	3-5 months
7	A Cybersecurity Strategy for ECP	[1-4] [6]	6-7 months
8	Public Engagement	[1-5]	4 months onwards
Roadmap: R&D Cell			
1	Building Linkages & Knowledge Mobilization		2-4 months
Roadmap: Electronic Voting Machines for Pakistan			
1	Threat Model for EVMs in Pakistan	-	2-4 months
2	Vulnerability Analysis of MoST EVM	[1]	5-6 months
3	Vulnerability Analysis of Smartmatic EVM	[1]	5-6 months
4	Comparative Analysis of Popular EVM Models	[1]	7-8 months
5	Deployment Study for E2EV Voting Systems	[1-4]	6-11 months
6	Deployment Study for Risk Limiting Audits	[1-4]	6-11 months
7	Voter Verification Mechanisms	[1-4]	6-8 months
8	Specifications and Requirements	[1-7]	12-13 months
9	Prototvpe EVM	[1-8]	14-16 months
10	Pilot Studies	[1-9]	16-18 months
11	Feedback and Improvement	[1-10]	18-19 months
12	Second Round of Pilots	[1-11]	20-21 months
13	Second Round of Feedback and Improvement	[1-12]	22-23 months
14	Hackathons, Source Code Review	[1-13]	16-17 months
15	Election System Certification	[1-14]	22-24 months
16	Procurement	[1-15]	24-42 months
17	System Integration	[1-15]	24-26 months
18	Infrastructure, Operations and Logistics	[1-15]	24-29 months
19	Updating Legal Framework	[1-4]	22 months onwards
20	Monitoring, Evaluation, and Innovation	[1-15]	30 months onwards