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Protocol for the Systematic Literature Review on Electoral Integrity Strategies (ELIS 2025)

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Date:
June 2025

Document Type:
Protocol for the Systematic Literature Review
Adapted from PRISMA-P 2015 Guidelines

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Version: 1.2 | **Date**: 25 June 2025
Principal Investigator: Carlos Rocha (Imperial College Business School)

1. Administrative Information

1.1 Title

Protocol for the Systematic Literature Review on Electoral Integrity Strategies (ELIS 2025)

1.2 Registration

Planned registration with the Open Science Framework (OSF).

1.3 Authors and Contributions

- **Carlos Rocha** – Protocol design, AI-assisted methodology, review strategy, lead author.
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- **Tommaso Valletti** – Conceptual advisor, research supervisor.
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1.4 Amendments

Amendments will be documented in versioned changelogs and appended to the OSF registration.

1.5 Support and Sponsor

Support: Hosted at Imperial College Business School under Visiting Researcher programme.

Sponsor: Instituto Voto Legal (IVL), Sao Paulo, Brazil - The sponsor had no role in protocol development, analysis, or publication decisions.

2. Introduction

2.1 Rationale

This review investigates the technological, operational, and institutional dimensions that influence electoral integrity. It seeks to generate robust academic evidence on the strategies, mechanisms, and design features that strengthen auditability, publicity, and public trust, across diverse electoral system models. Particular emphasis is placed on interdisciplinary approaches to evaluating voting systems, including electronic and paper-based modalities, in light of rapid technological evolution and renewed concerns over democratic resilience. The synthesis aims to inform academic research and policy design toward effective and independent elections auditing.

2.2 Objectives

Primary Research Question (PRQ)

> What operational and technological strategies have demonstrably improved the integrity or auditability of electoral systems since 1990?

Methodological Sub-question (MSQ)

> What types of empirical designs and evaluation frameworks have been used to assess the effectiveness of electoral integrity strategies since 1990?

Analytical Sub-questions

a) **Systems & Mechanisms:** What specific technological or operational mechanisms have been associated with increased auditability or verifiability in voting systems?

b) **Institutional Conditions:** Under what institutional, legal, or regulatory conditions have these mechanisms been implemented?

c) **Trust & Perception:** How have these strategies influenced public trust, voter confidence, or perceptions of electoral integrity?

d) **Regional Variation or Global Trends:** What regional patterns or cross-national differences are observed in the adoption and evaluation of these strategies?

SPIDER Framework (suitable for qualitative + mixed-methods reviews)

Component	Evaluation
S (Sample)	“Electoral systems" – Broad but acceptable. Could be more specific (e.g., national elections, public elections).
PI (Phenomenon of Interest)	"Integrity and auditability" – Strong, but combining both may dilute focus if not clearly defined separately.
D (Design)	Implicit. Since the question targets evaluated features, the design is assumed to be empirical. Could clarify in criteria.
E (Evaluation)	"Effectively improved" – implies causal or outcome-based analysis, which is good. Be mindful of overclaiming "effectiveness" from purely descriptive studies.
R (Research Type)	Mixed empirical studies – aligns with your protocol’s inclusion of quantitative and qualitative work.

3. Methods

3.1 Eligibility Criteria

Inclusion Criteria:

- Peer-reviewed or preprint academic articles (1990–2025).
- English, French, Spanish or Portuguese languages.
- Empirical studies (quantitative, qualitative, or mixed).
- Studies assessing voting system integrity, auditability, transparency, or trust.
- Studies using formal methods, simulation, field experiments, or evaluation frameworks.

Exclusion Criteria:

- Opinion pieces or editorials without empirical basis.
- Theoretical or normative essays lacking methodological rigour.
- Articles focused solely on party politics or turnout without relation to voting system design.
- Studies flagged as unverifiable or AI-generated without traceable sources.

3.2 Information Sources

Databases and repositories to be searched include:

1. **Scopus** – A leading multidisciplinary database offering broad international coverage across political science, governance, law, and engineering, suitable for both empirical and theoretical studies.

2. **Web of Science** – A well-established platform indexing high-impact journals and allowing detailed citation analysis, particularly useful for tracing influential work across disciplines.
3. **Google Scholar** – Employed to capture grey literature, working papers, theses, and other academic materials not always indexed by commercial databases.
4. **IEEE Xplore** – Critical for technical literature on electronic voting systems, cryptographic security, system auditability, and voting machine design.
5. **ACM Digital Library** – A complementary source to IEEE, covering human-computer interaction, usability, and system design relevant to electronic voting interfaces.
6. **Electoral Integrity Project (EIP) Database** – Provides peer-reviewed and research-led comparative electoral data, expert surveys, and indices of electoral integrity across global democracies and hybrid regimes.
7. **International IDEA Publications and Datasets** – Offers policy-oriented research, electoral system databases, and technical guidelines from one of the leading intergovernmental organisations on electoral governance.
8. **OSCE/ODIHR Publications** – Contains election observation mission reports, technical assessments, and legal analyses on electoral processes in member states.
9. **JSTOR** – Used to identify foundational and historical literature on democratic theory, electoral models, and institutional development.
10. **SAGE Journals** – Access to key journals in political science, democratic governance, and electoral studies, including *Political Studies*, *Representation*, and *Electoral Studies*.
11. **Latin American Electoral Studies Databases** – Targeted databases and institutional archives (e.g., OAS, FLACSO, TSE Brazil) will be consulted for regional specificity and comparative analysis with emerging democracies.

This selection ensures the inclusion of both high-impact academic work and practitioner-oriented insights, allowing for a balanced and rigorous synthesis of findings relevant to electoral integrity, auditability, and public trust in voting systems.

3.3 Search Strategy

Boolean queries will target combinations of key terms related to voting technology, auditability, and public trust. Draft queries may be suggested by AI tools but are manually reviewed before application.

Example query:

```
("electoral integrity" OR "e-voting security" OR "ballot auditability" OR
"electronic voting trust")

AND

("VVPAT" OR "end-to-end verifiability" OR "blockchain voting" OR "cryptographic
audit" OR "risk-limiting audit")

AND

("evaluation" OR "empirical study" OR "comparative analysis")
```

Search logs and filtering decisions will be documented for reproducibility. Search queries are initially generated by LLMs and refined through expert validation.

3.4 Study Records

Data Management: Zotero for reference management; Rayyan for screening; Google Sheets for extraction.

Selection Process:

- Initial screening by the lead researcher using Rayyan, following predefined criteria.
- Titles and abstracts may be grouped thematically using AI tools, but no inclusion decision is automated.
- A second reviewer may be consulted for dispute resolution.

Data Collection Process

- Bibliographic data
- Method type (e.g., field experiment, technical validation)
- Voting system type (DRE, paper, hybrid)
- Institutional context
- Technical mechanisms studied
- Reported outcomes
- Policy implications

Tools and Platforms Used in the Review Process:

To support transparency and reproducibility, the following tools are being employed throughout the systematic literature review:

- **ChatGPT (OpenAI)**: Used to generate structured protocols, refine research questions, draft screening criteria, and synthesise technical standards.
- **Zotero:** Reference management software used to collect, organise, and annotate academic sources, including PDF storage and metadata export.
- **Rayyan:** Platform for collaborative screening of literature based on title and abstract, with tagging and inclusion/exclusion decisions.
- **NotebookLM (Google):** AI-powered tool used for summarising annotated documents, cross-referencing full-text sources, and identifying thematic overlaps.
- **Google Docs:** Platform for collaborative drafting, editing, and versioning of the review framework and extraction templates.

LLM assistance is used to extract structured metadata and identify technical standards, subject to human validation. All AI-assisted steps are subject to human oversight and documented for

auditability. No LLM-generated content is accepted without manual verification, especially for inclusion decisions or critical interpretations.

3.4 Outcomes and Prioritisation

Primary Outcomes:

- Reported impact on system integrity and auditability
- Level of public trust or perceived legitimacy
- Identified technical standards or practices

Secondary Outcomes:

- Implementation challenges
- Usability and accessibility issues
- Alignment with international norms

3.5 Risk of Bias and Quality Assessment

A bespoke checklist derived from PRISMA, Cochrane, and Norris (2014) criteria will assess:

- Assessment guided by PRISMA, Cochrane, and adapted Norris (2014) checklists.
- All evaluations conducted by the lead reviewer.
- ChatGPT may assist in drafting summaries but never replaces human judgement.

3.6 Data Synthesis

- Quantitative studies: descriptive statistics, frequency tables.
- Qualitative studies: thematic synthesis.
- AI tools (e.g., ChatGPT, Claude.ai, NotebookLM) may support pattern detection but must be manually confirmed.

3.7 Confidence in Evidence

Modified GRADE-CERQual* approach for qualitative synthesis; confidence rated as High, Moderate, Low, or Very Low based on:

- Methodological limitations
- Coherence
- Adequacy of data
- Relevance to research questions

*GRADE-CERQual is a method used in qualitative evidence synthesis to assess the confidence one can have in the findings of a qualitative review.

4. Ethical Considerations

- All final evaluations and decisions will be made by the lead reviewer, no decision on study inclusion or interpretation is made solely by AI tools.
- All LLM-assisted processes are logged and reviewed.
- The protocol respects UKRIO principles on AI use in academic research.

5. Collaborative Review Process

- The review is led by the PI. While Rayyan is designed for multi-user collaboration, at this stage no additional human reviewers have been formally assigned.
- If additional reviewers join, their roles will be documented in amendments.

6. Appendices (still a work in progress)

- **Appendix A** – Full search strings per database
- **Appendix B** – Screening form template
- **Appendix C** – Extraction template
- **Appendix D** – AI audit log
- **Appendix E** – Codebook for thematic synthesis
- **Appendix F** – AI Agents Log Templates

AI Disclaimer

All AI-assisted stages are supervised by human researchers. All automation steps are logged for transparency and auditability using the AI Agents Log Templates template in Appendix F.

Table 3 PRISMA-P 2015 checklist: Recommended items to include in a systematic review protocol

Section / topic		Item #	Checklist item
ADMINISTRATIVE INFORMATION			
Title		1	
	Identification	1a	Identify the report as a protocol of a systematic review
	Update	1b	If the protocol is for an update of a previous systematic review, identify as such
Registration		2	If registered, provide the name of the registry (e.g., PROSPERO) and registration number
Authors		3	
	Contact	3a	Provide name, institutional affiliation, and e-mail address of all protocol authors; provide physical mailing address of corresponding author
	Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review
Amendments		4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments
Support		5	
	Sources	5a	Indicate sources of financial or other support for the review
	Sponsor	5b	Provide name for the review funder and/or sponsor
	Role of sponsor/funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol
INTRODUCTION			
Rationale		6	Describe the rationale for the review in the context of what is already known
Objectives		7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)
METHODS			
Eligibility criteria		8	Specify the study characteristics (e.g., PICO, study design, setting, time frame) and report characteristics (e.g., years considered, language, publication status) to be used as criteria for eligibility for the review
Information sources		9	Describe all intended information sources (e.g., electronic databases, contact with study authors, trial registers, or other grey literature sources) with planned dates of coverage

Search strategy		10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated
Study records		11	
	Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review
	Selection process	11b	State the process that will be used for selecting studies (e.g., two independent reviewers) through each phase of the review (e.g., screening, eligibility, and inclusion in meta-analysis)
	Data collection process	11c	Describe planned method of extracting data from reports (e.g., piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators
Data items		12	List and define all variables for which data will be sought (e.g., PICO items, funding sources), any pre-planned data assumptions and simplifications
Outcomes and prioritization		13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale
Risk of bias in individual studies		14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis
Data		15	
	Synthesis	15a	Describe criteria under which study data will be quantitatively synthesized
		15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data, and methods of combining data from studies, including any planned exploration of consistency (e.g., I^2, Kendall's tau)
		15c	Describe any proposed additional analyses (e.g., sensitivity or subgroup analyses, meta-regression)
		15d	If quantitative synthesis is not appropriate, describe the type of summary planned
Meta-bias(es)		16	Specify any planned assessment of meta-bias(es) (e.g., publication bias across studies, selective reporting within studies)
Confidence in cumulative evidence		17	Describe how the strength of the body of evidence will be assessed (e.g., GRADE)

Hybrid AI-human workflows define the path to automation

Stage	Role of AI	Role of Human Reviewer
Protocol Design	Draft structure, suggest terms	Approve, refine, document choices
Search Strategy	Generate strings, adapt syntax	Validate, test, optimise
Screening	Prioritise, cluster, classify	Review edge cases, resolve disputes
Extraction & Theming	Pre-fill data tables, summarise	Cross-check, interpret nuance
Synthesis & Drafting	Suggest outline & narrative	Author final text, ensure integrity