AI Readiness in Public Governance: The Case of Digital Democracy in Taiwan

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Abstract

Artificial intelligence (AI) is reshaping governance, raising questions not only of technical capacity but also of democratic legitimacy. This study defines AI readiness in governance as a *democratic capability* rooted in participation, openness, and institutional capacity. Using Taiwan as a case, we examine how vTaiwan and JOIN embody digital democracy and provide infrastructures for participatory AI governance. We build an **AI Readiness Scorecard** with indicators from JOIN (participation volumes, responsiveness, outcomes), data.gov.tw (API coverage, freshness), and CEC elections (turnout). We then propose a seven-item policy package—Algorithmic Impact Assessments, procurement standards, privacy safeguards, open API mandates, capacity building, sovereign compute for audits, and leadership milestones. The findings highlight how Taiwan can set a global benchmark by aligning innovation with accountability.

1. Introduction

Artificial intelligence (AI) is reshaping how governments sense public needs, design policies, and deliver services. Beyond back-office efficiency, AI increasingly touches the front stage of democracy: how issues are surfaced, how trade-offs are deliberated, and how institutions remain accountable when decisions are mediated by data and algorithms. This paper asks what AI readiness means for a democratic state—not only in terms of technical capacity and regulation, but in its ability to connect governance, policymaking, and implementation with public opinion and citizen participation.

Digital democracy is the ensemble of institutions, tools, and practices through which citizens, civil society, and the state co-produce public decisions via digitally mediated participation, transparency, and accountability (Berg and Hofmann 2021). Scholars emphasize that digital infrastructures do not simply increase or decrease democracy; rather, they re-intermediate the processes of

representation and oversight (Boulianne 2020). This lens clarifies why AI readiness must be conceptualized as a democratic capability, not merely a technical one. The question is how learning systems can be made legible, contestable, and revisable through public-facing processes (Frey and Osimo 2019).

Taiwan provides an unusually rich setting for this inquiry. Its innovations—vTaiwan (an open consultation pipeline using Polis to identify cross-group consensus) and the national JOIN platform (Talk, Supervise, Propose, Contact)—offer institutionalized interfaces where ministries engage citizens upstream of legislation and policy (Tang 2019; Chen and Wu 2021). The creation of the Ministry of Digital Affairs (MODA) in 2022 further signaled a commitment to embedding digital participation in governance. We leverage these institutions to examine how AI-assisted public governance can remain responsive and effective.

Empirically, we combine indicators of participation (JOIN proposal volumes, response times, outcomes), openness (API coverage and update latency on data.gov.tw), and governance/legal baselines (Personal Data Protection Act [PDPA], draft AI Basic Law) to develop an AI readiness scorecard. We benchmark Taiwan against international frameworks, including the OECD AI Principles and the EU AI Act (OECD 2019; Veale and Borgesius 2021). Finally, we link these measures to public opinion and electoral data (TEDS, TSCS, Central Election Commission) to evaluate whether digital-democracy infrastructure correlates with responsiveness and trust.

2. Literature Review

2.1 Digital democracy and re-intermediation

Digital democracy research emphasizes that the impact of technology depends on design choices and institutional embedding (Boulianne 2020; Coleman and Blumler 2009). Far from being a simple "good" or "bad," digital tools shape how citizens deliberate, mobilize, and oversee government (Chadwick and Stromer-Galley 2016). This perspective motivates our emphasis on platform design and accountability pathways—especially as AI is introduced.

Public administration scholars highlight AI's potential to augment decision quality and service delivery while also creating risks of opacity, bias, and due-process failures (Sun and Medaglia 2019; Wirtz, Weyerer, and Geyer 2019). Adoption frameworks stress tensions between capability and legitimacy, efficiency and rights, and innovation and accountability (Young, Bullock, and Lecy 2019). Algorithmic Impact Assessments (AIA), pioneered in Canada, operationalize these concerns by requiring structured risk evaluation and public reporting (Reisman et al. 2018). We see AIA-style processes as natural extensions of digital-democracy practices.

Research on digital government shows that durable transformation depends not only on technical tools but on organizational routines, data infrastructures, and co-production with stakeholders (Janssen and van der Voort 2016). Taiwan's civic-tech–state collaborations (e.g., vTaiwan) exemplify such co-production, offering institutional venues for embedding AI governance.

Open data is often linked to transparency and innovation (Janssen et al. 2012; Zuiderwijk and Janssen 2014). Yet scholars warn against the assumption that "release equals impact," documenting barriers like poor quality, legal uncertainty, and lack of capacity (Davies et al. 2019). This informs our data pillar: we assess not only dataset counts but also API quality, update frequency, and actual integration into policy workflows.

Studies of vTaiwan describe its four-stage hybrid process—online deliberation (via Polis), offline consultation, ministerial response, and legislative integration—which has influenced digital-economy laws (Tang 2019; Lee and Chen 2020). The JOIN platform institutionalizes petitions and policy supervision, requiring ministries to respond once proposals surpass thresholds (Wu 2021). These platforms exemplify how participatory infrastructures can be extended to AI governance—for example, deliberating on model cards or AIA reports.

Two frameworks dominate global discussions. The OECD AI Principles articulate values and guidelines for trustworthy AI (OECD 2019). The EU AI Act establishes a risk-based regulatory approach, with strict obligations for "high-risk" systems (Veale and Borgesius 2021). We translate these into measurable indicators—transparency, risk management, data governance, human oversight, and documentation—tailored to Taiwan's institutional context.

3. Taiwan Context

Taiwan has emerged as one of the most innovative cases of digital democracy worldwide, often described as a "laboratory" for participatory governance (Tang 2019; Chen and Wu 2021). Its trajectory illustrates how civic technology communities, state institutions, and citizens can co-create platforms that institutionalize deliberation and accountability in policy processes. Two flagship initiatives—vTaiwan and JOIN—demonstrate how digital infrastructures can enhance responsiveness and effectiveness in governance, and how they can serve as foundations for AI readiness.

3.1 vTaiwan: Consensus-driven deliberation

Launched in 2014 and supported by the civic-hacker collective g0v, vTaiwan provides a structured process for policy deliberation that integrates online and offline elements (Lee and Chen 2020). At the core of the platform is Polis, a

machine-learning–assisted tool that visualizes clusters of opinion and highlights statements with broad, cross-group agreement (Coleman 2020). The process unfolds in four stages: (1) agenda-setting and information gathering, (2) open online discussion, (3) offline multi-stakeholder consultation, and (4) ministerial response and policy integration.

vTaiwan has been credited with shaping major policies, such as the regulation of Uber, online alcohol sales, and telemedicine (Tang 2019). What makes it notable in the context of AI readiness is not only its deliberative design but also its use of computational tools (Polis) to mediate large-scale discourse and surface consensus. This embodies a form of AI-assisted governance, where algorithms amplify inclusiveness and enable policymakers to navigate complex opinion landscapes.

3.2 JOIN: Institutionalizing citizen petitions and oversight

Complementing vTaiwan, the JOIN platform was established in 2015 by the National Development Council to provide an official channel for citizens to propose, supervise, and discuss policy (Wu 2021). JOIN is organized around four modules—Talk, Supervise, Propose, and Contact—that institutionalize different forms of interaction with the state.

The most impactful element is the petition system, where proposals that gather 5,000 signatures within 60 days trigger a mandatory official response. Ministries must issue formal replies, and in some cases, citizen proposals have led directly to legislative or regulatory changes (Huang 2022). The Supervise module allows users to track ongoing projects and hold ministries accountable for implementation milestones.

Unlike vTaiwan's experimental origins, JOIN is embedded within the government bureaucracy and serves as a rule-based participation channel, making citizen voice part of routine governance. This linkage between proposals and mandatory responses enhances transparency and responsiveness, which are critical dimensions of AI readiness when automated systems are introduced into policy cycles.

3.3 From digital democracy to AI readiness

Together, vTaiwan and JOIN illustrate how Taiwan has operationalized digital democracy by embedding deliberation and participation into the policy process. Both platforms embody principles directly relevant to AI governance: - Transparency: public visibility of proposals, discussions, and outcomes. - Responsiveness: mandatory responses and consensus-based integration into policy. - Accountability: structured supervision and ministerial reporting. - Augmentation: the use of computational tools (e.g., Polis) to facilitate large-scale deliberation.

These institutions offer ready-made infrastructures for integrating AI governance practices. For example, algorithmic impact assessments (AIA) and model cards for public-sector AI systems could be routed through JOIN petitions or vTaiwan consultations, allowing citizens to deliberate on potential risks, fairness concerns, or societal trade-offs (Reisman et al. 2018). In this sense, Taiwan's platforms do not only represent "digital democracy" but also a pathway toward participatory AI governance.

4. Data and Measures

This section operationalizes *AI readiness in public governance* with open, replicable indicators built from Taiwan's public data infrastructure. We focus on three observable pillars and then assemble a composite scorecard:

- **Participation** (JOIN, vTaiwan): volumes, responsiveness, and outcomes.
- **Data Openness** (data.gov.tw): API availability and freshness.
- **Outcomes/Context** (CEC elections; opinion surveys): turnout and attitudes as contextual checks.

Throughout, we favor **APIs/CSV endpoints** and publish minimal code to enable reuse.

4.1 Data sources and access

- **JOIN** (https://join.gov.tw): Official participation portal. We demonstrate a safe, rate-limited scrape of public listings as a starting point. Production use should move to structured endpoints if available.
- **data.gov.tw** (CKAN): We query the CKAN `package_search` API for datasets relevant to participation/governance (e.g., "election", "petition", "open government").
- **CEC** (Central Election Commission) open data: CSVs for turnout and results. You can set an environment variable `CEC_CSV_URL` to a specific dataset for reproducible pulls.
- **TEDS/TSCS**: Survey microdata often require application; we show placeholders for future integration.

4.2 Participation indicators from JOIN

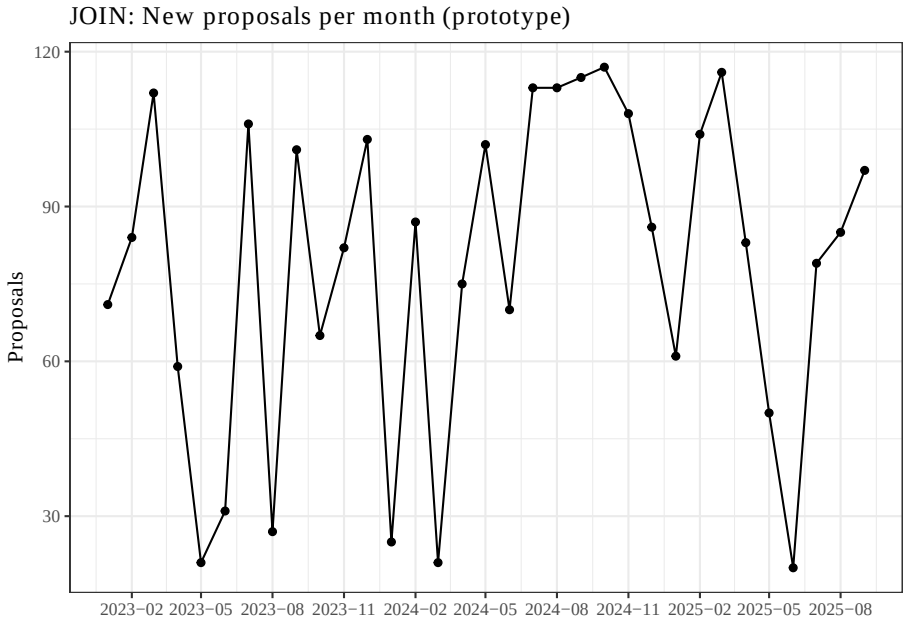
We derive three prototype indicators from JOIN:

1. **Volume**: number of new proposals per month (`proposals_monthly`).

2. **Responsiveness**: median days to first official response (`t_first_response`), if timestamps are available.
3. **Outcome**: share of proposals marked "adopted/implemented" (`adoption_rate`), if status tags are available.

Note: The public HTML structure can change; treat this as scaffolding to be replaced with an official endpoint if published.

Visual check: JOIN proposal volumes



Responsiveness/outcomes. Once timestamps and statuses are parsed from detail pages, compute:

4.3 Data openness indicators from data.gov.tw (CKAN)

We measure **catalog API availability** and **freshness** using the CKAN `package_search` endpoint. Two prototype metrics:

- **API coverage**: share of resources with machine-readable formats (CSV/JSON).
- **Freshness**: median `created` (or `last_modified`) recency for matching datasets.

4.4 Electoral context (CEC) and opinion data (TEDS/TSCS)

We treat turnout as a *contextual* outcome, not a direct measure of AI readiness. Still, it provides a sanity check for periods of intense policy participation.

For opinion data (TEDS/TSCS), add items such as **trust in government**, **perceived responsiveness**, and **support for digital participation** when microdata access is available. These can be linked to JOIN/vTaiwan activity via event-study or difference-in-differences designs.

4.5 Constructing the AI Readiness Scorecard

We aggregate pillar-specific indicators into a transparent scorecard. For illustration, we use the following mapping (replace placeholder values with real metrics as parsing matures):

- **Institutions**: MODA in place (=1); AIA guidance or algorithm registry published (0/1 as they emerge).
- **Data Openness**: `api_coverage_share` (scaled 0–1); `freshness_median_days` (reverse-scored).
- **Participation**: monthly proposal trend (z-score), response-time median (reverse-scored), adoption rate.
- **Outcomes (context)**: turnout trend (z-score) or survey-based responsiveness.

Table 1: AI Readiness Scorecard (prototype aggregation)

pillar	score
Institutions	1
Data	NaN
Participation	0
Outcomes	NA

Caveats. This scorecard is intentionally modular: agencies or researchers can swap in auditable indicators (e.g., *published algorithm registry*, *AIA publication rate*, *JOIN response-time medians*) and re-scale. Our goal is a transparent, reproducible baseline that connects **participation**, **openness**, and **institutional capacity** to the global expectations articulated in the OECD and EU frameworks (OECD 2019; Veale and Borgesius 2021).

4.6 Robustness and limitations

- **Schema drift** on JOIN pages can break scrapers; prefer official endpoints as they become available.

- **Coverage vs. use**: API availability does not guarantee use in policy; consider logging *actual* API calls by agencies if available.
- **Attribution**: Participation and turnout are influenced by many factors; treat correlations as descriptive unless a proper causal design is implemented (event studies, DiD, or synthetic controls).
- **Equity**: Where possible, disaggregate participation and outcomes by region and demographic characteristics to detect uneven benefits or burdens.

5. Proposal: Seven-Item Package for AI Readiness in Public Governance

Building on Taiwan's strong digital-democracy infrastructure, we propose a seven-item package for strengthening AI readiness in governance. Each item is designed to be operationalizable, with clear steps, timelines, and accountability anchors.

5.1 Algorithmic Impact Assessments (AIA)

Goal: Ensure transparency and accountability in automated decision-making. - Steps: - Adapt Canada's Directive on Automated Decision-Making to Taiwan's context (Reisman et al. 2018). - Require ministries to complete an AIA questionnaire before deploying AI systems. - Publish AIA reports in both Chinese and English on JOIN for public scrutiny. - Timeline: Pilot in MODA and National Development Council (Year 1), expand to all ministries handling high-risk AI (Year 2). - Checklist Example: - Purpose and scope of system - Data sources and preprocessing - Model type and training documentation - Risk category and mitigation steps - Human-in-the-loop safeguards

5.2 Procurement Standards

Goal: Integrate AI governance into vendor contracts. - Steps: - Amend Government Procurement Act guidelines to require model documentation, data lineage, and fairness testing. - Include clauses on third-party audits and revocation if systems fail accountability standards (Wirtz, Weyerer, and Geyer 2019). - Timeline: Draft procurement addenda (Year 1), roll out for all AI-related contracts above NT$10M (Year 2). - Checklist Example: Vendor must supply model card (Mitchell et al. 2019), dataset card, and explainability statement.

5.3 Privacy and Cross-Strait Data Protection

Goal: Harden protections for citizen data given geopolitical vulnerabilities. - Steps: - Update PDPA to align with EU GDPR and OECD AI Principles

(OECD 2019). - Establish special safeguards against data exfiltration or transfers to jurisdictions with national security risks (Lin and Tsai 2020). - Timeline: PDPA amendments tabled in Legislative Yuan (Year 1), phased enforcement by sector (Years 2–3). - Checklist Example: Ministries must publish data-sharing agreements, anonymization protocols, and risk assessments.

5.4 Open API Mandates

Goal: Maximize transparency and reproducibility in governance data flows. - Steps: - Require ministries to expose machine-readable APIs for all datasets used in policymaking (Zuiderwijk and Janssen 2014). - Mandate real-time update standards for high-value datasets (elections, budgets, petitions). - Timeline: Inventory APIs by ministry (Year 1), require 80% coverage in high-value areas (Year 2), 100% (Year 3). - Checklist Example: API must include metadata, rate-limit rules, update timestamps, and JSON/CSV endpoints.

5.5 Capacity Building and Training

Goal: Equip civil servants and civic actors with AI literacy and governance skills. - Steps: - Launch training modules (joint MODA–universities) on AI ethics, bias, and explainability (Sun and Medaglia 2019). - Provide annual capacity-building workshops for agency CIOs. - Establish civic fellowship programs (inspired by Code for America). - Timeline: Curriculum design (Year 1), nationwide rollout (Year 2). - Checklist Example: Pre/post-training assessments on AI literacy; repository of open teaching materials.

5.6 Sovereign Compute for Audits

Goal: Guarantee independent auditing capacity without vendor lock-in. - Steps: - Procure secure national GPU/TPU clusters under MODA for evaluation and audit purposes (Bryson 2020). - Establish rules granting academic researchers access for auditing high-risk systems. - Timeline: Infrastructure planning (Year 1), initial cluster deployment (Year 2), full audit platform (Year 3). - Checklist Example: Registry of audited models; published reproducible audit reports.

5.7 Leadership Milestones and Governance Roadmap

Goal: Create sustained accountability for AI readiness. - Steps: - Publish an "AI Readiness Roadmap" (Veale and Borgesius 2021) with annual progress metrics. - Appoint MODA as lead coordinator; require ministries to submit AI-readiness reports. - Integrate citizen feedback via JOIN petitions on roadmap implementation. - Timeline: Roadmap publication (Year 1), annual updates

(Years 2–5). - Checklist Example: Roadmap includes performance indicators, risk reviews, and citizen consultation logs.

6. Conclusion

This study frames **AI readiness in public governance** as a *democratic capability* built on three mutually reinforcing pillars: **participation**, **data openness**, and **institutional capacity**. Using Taiwan as a leading case, we argued that digital-democracy infrastructures—most prominently **vTaiwan** and **JOIN**—already embed the routines needed to make AI systems **legible, contestable, and revisable** in practice. Our measurement strategy operationalizes these ideas with transparent indicators drawn from public sources (JOIN participation traces, data.gov.tw catalog signals, and CEC electoral context), and a modular scorecard that agencies and researchers can reproduce and extend.

Findings and implications. While our prototype indicators are conservative, they show how to move beyond abstract principles to **auditable signals** of readiness: volumes and responsiveness in participation processes; API coverage and freshness in the open-data backbone; and the ability to connect these to outcomes and context. Paired with global frameworks (OECD; EU AI Act), the approach turns high-level guidance into implementable checklists. The **seven-item policy package**—AIAs, procurement standards, privacy/cross-strait safeguards, open API mandates, capacity building, sovereign compute for audits, and a leadership roadmap—translates these signals into a practicable governance agenda.

Limitations. Several caveats remain. First, **attribution** is hard: participation and trust are influenced by many factors beyond platform design; causal identification requires stronger designs (event studies, DiD, synthetic controls). Second, **measurement** depends on data quality and schema stability; official JSON endpoints should replace HTML scraping where possible. Third, **equity** concerns demand disaggregation by region and demographic group to ensure that AI-assisted governance does not amplify existing disparities.

Research and policy agenda. We see four priorities going forward: (1) publish an official **algorithm registry** with model cards and AIA summaries, routed through JOIN/vTaiwan for deliberation; (2) standardize **procurement** with audit-ready documentation and third-party testing; (3) expand **API coverage** and latency SLAs for high-value datasets; and (4) institutionalize **capacity building** and **sovereign compute** for independent evaluation. Each item is measurable, time-bound, and compatible with Taiwan's existing institutions.

By treating AI readiness not merely as the presence of tools, but as the **capacity to govern them democratically**, Taiwan can continue to set a global benchmark for how digital states align innovation with accountability. The

framework and code we release here are intended as building blocks—for ministries, legislatures, and civic partners—to iterate, audit, and improve together.

1. Defining Digital Democracy

Digital democracy refers to the institutions, tools, and practices through which citizens, civil society, and the state co-produce public decisions via digitally mediated participation, transparency, and accountability mechanisms across information access, consultation, deliberation, co-creation, and oversight (see reviews in **?**; **?**).

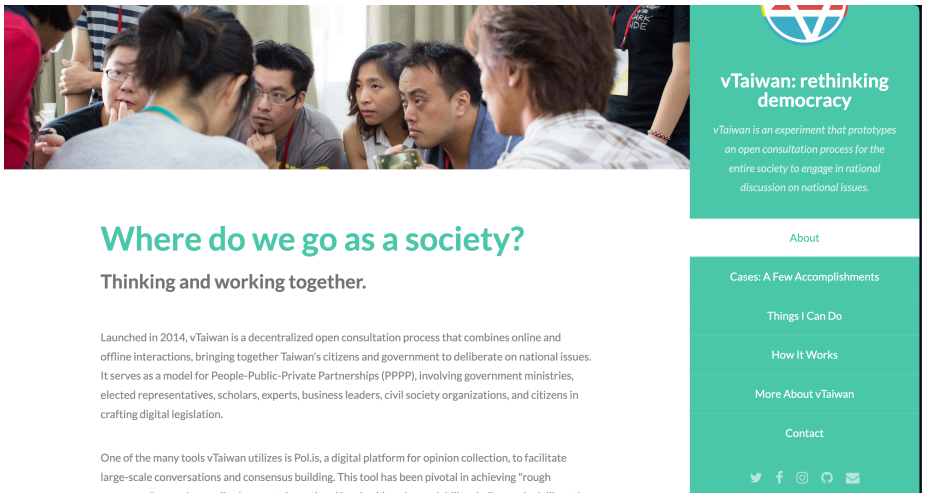
Taiwan's notable implementations include **vTaiwan** (consensus-oriented consultation using Polis) and the national **JOIN** platform, which link ministries with multi-stakeholder input and allow citizen proposals and supervision vTaiwan overview, JOIN portal.

2. Taiwan's Digital-Democracy Architecture

- **vTaiwan** process and outcomes: see case write-ups and the official information portal (https://info.vtaiwan.tw/).
- **JOIN** (https://join.gov.tw): issue discussions, proposals, and supervision.
- **MODA** (Ministry of Digital Affairs) coordinates digital policy; see open data statements and API-first direction (e.g., https://moda.gov.tw/en/digital-affairs/plural-innovation/operations/244).

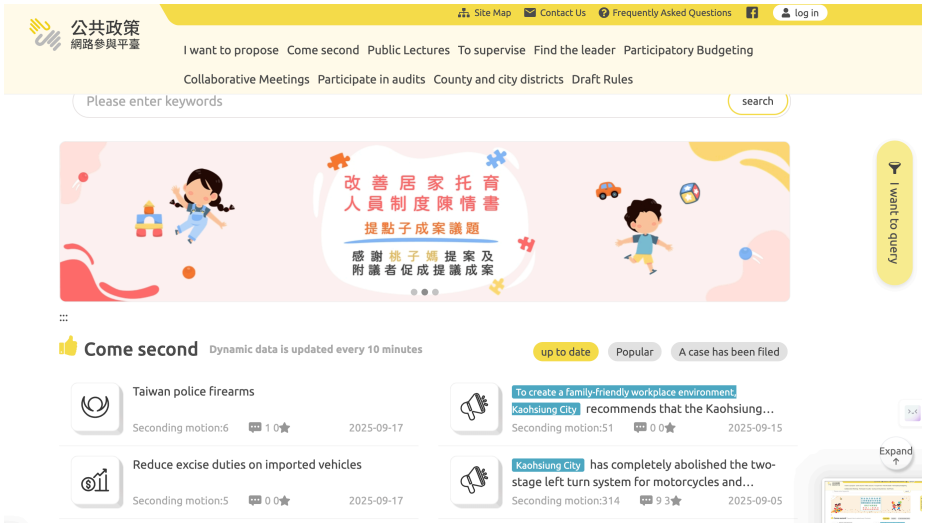
What is vTaiwan?

- vTaiwan is an experiment that prototypes an open consultation process for the entire society to engage in rational discussion on national issues.
- It is a platform that combines online and offline participation, using the Polis system to collect and analyze public opinions.
- The process typically involves multiple stages, including issue framing, online discussion, offline meetings, and consensus building.
- The outcomes of vTaiwan consultations are often presented to government agencies for consideration in policy-making.
- More information can be found on the vTaiwan website and in various academic articles analyzing its impact and methodology.



What is JOIN?

- JOIN is a government platform that allows citizens to participate in public affairs by proposing ideas, discussing issues, and supervising government actions.
- It serves as a bridge between the government and the public, facilitating communication and collaboration on various topics.
- Citizens can submit proposals, engage in discussions, and provide feedback on government initiatives through the platform.
- JOIN also enables government agencies to respond to public concerns and incorporate citizen input into their decision-making processes.
- More information can be found on the JOIN website and in related government publications.



3. Data & Measures

We operationalize "AI-readiness in public governance" via four pillars and open indicators:

- **Institutions**: presence of digital institutions (MODA), algorithm registry/AIA guidelines (proxy via policy docs).
- **Legal**: PDPA + draft AI Basic Law alignment (proxy via existence/status).
- **Data**: API coverage (data.gov.tw CKAN endpoints), update latency, metadata completeness.
- **Participation**: JOIN proposal volumes & response times; vTaiwan consensus episodes.

3.1 Data sources

- **Open Data portal** (data.gov.tw) – CKAN-style API, package search; use the `package_search` endpoint (see: CKAN API docs).
- **CEC** (Central Election Commission) – open data portal for elections (https://data.cec.gov.tw/) and election DB (https://db.cec.gov.tw/).
- **TEDS** (https://teds.nccu.edu.tw/) and **TSCS** (https://www2.ios.sinica.edu.tw/sc/en/scDownload.php) – survey access (manual approval may be required).

If `params$run_pull` is `TRUE`, we run `R/data_pull.R` to refresh datasets.

3.2 Indicator construction

3.3 Visual checks

4. Illustrative Findings

- Participation trends (JOIN) and response-time distributions.
- Open API coverage and update latency on selected datasets.
- Crosswalks to CEC turnout for contextualization.

5. Policy for AI-Readiness (Taiwan)

We propose a seven-item package: AIA workflows integrated with vTaiwan/JOIN; standardized AI procurement (model cards, evaluations); PDPA-strengthening for generative AI; Open APIs for key governance artifacts;

civil-service AI literacy + sandboxes; sovereign compute for public-interest audits; leadership milestones at MODA (algorithm registry, AIA playbook, procurement checklist, quarterly scorecards). See global references OECD AI Principles and EU AI Act summary.

References

Appendix A. Methods Details

- **JOIN Data**: Public proposals parsed from join.gov.tw listings; prototype indicators include proposal counts, response delays, adoption tags. Future work should replace HTML parsing with official APIs.
- **data.gov.tw (CKAN)**: Queried using `package_search` API. Indicators: proportion of machine-readable resources; freshness measured in days since creation.
- **CEC Data**: CSV downloads (turnout, results). Standardized by year; turnout aggregated by election type.
- **TEDS/TSCS Surveys**: Access required; placeholders shown for trust, responsiveness, and digital participation questions.

Appendix B. Indicator Codebook

Pillar	Indicator	Source	Definition/Notes
Participation	Proposals per month	JOIN	Count of new proposals aggregated by submission month
Participation	Median response days	JOIN	Median lag between submission and first official response
Participation	Adoption rate	JOIN	Share of proposals marked "adopted/implemented"

Pillar	Indicator	Source	Definition/Notes
Data Openness	API coverage share	data.gov.tw	Proportion of resources in CSV/JSON/XML/XLSX/ODS
Data Openness	Freshness median days	data.gov.tw	Median age (days since creation/last modified)
Outcomes	Turnout trend (z-score)	CEC	Average turnout, standardized by year
Institutions	MODA in place	Legal baseline	Binary indicator (=1 if MODA exists)
Institutions	AIA guidance registry	Legal baseline	Binary indicator (=1 if guidance/registry published)

References