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ORIGINAL ARTICLE

Technocratic Data Storytelling and Street-Level Service Realities: Municipal Open-Data Dashboards, Bureaucratic Discretion, and Citizen Epistemic Trust Across Subnational Governments

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ABSTRACT

Background: Subnational governments use open-data portals, dashboards, and complaint platforms to signal technocratic competence. Does this storytelling build citizen epistemic trust? Or does it mask stale catalogs, visibility-driven triage, and unresolved grievances?

Objective: To examine how portal supply, grievance handling, hotline triage, maintenance equity, and survey experiments relate to citizen trust and uptake.

Methods: Tier 1 was telemetry from 16 West Java open-data portals (26,551 datasets; 8,806 analyzed by doubly robust AIPW and RIF quantile regression). Tier 2 covered 17,881 SP4N-LAPOR! complaints from 38 East Java jurisdictions, hotline tickets (254,257), and a repair panel (3,655 tract-years), and Tier 3 re-analyzed three archived randomized experiments (N = 1,600, 914, and 3,485). Tier 4 was a four-value fsQCA of 28 municipal regimes.

Results: Median dataset staleness was 408.1 days. No downloads were recorded for 23.02% of datasets. Showcase-curated datasets had +2.724 higher log views after adjustment; recent uploads alone did not (+0.030, p = 0.431). In SP4N-LAPOR!, 25.52% of complaints were pending, unactioned, or archived, yet 98.59% of satisfaction ratings were positive. In hotline data, repeat complaints had a 5.06 percentage-point lower probability of priority, and cross-platform escalation a 12.44-point higher one. In the archived experiment, substantive performance disclosure raised trust by 13.45 points and symbolic claims by 1.23 (p = 0.386). The fsQCA solution for high uptake had consistency 0.914; the low-uptake pathway, 0.866.

Conclusion: Dashboards alone do not suffice. Storytelling appears more likely to build trust when paired with substantive disclosure, prompt grievance closure, need-based maintenance, and accountable street-level discretion.

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1. Introduction

1.1. Municipal dashboards, data storytelling, and the epistemic trust puzzle

Subnational governments in established democracies and in rapidly digitalizing Global South states now rely on executive command centers, open-government-data (OGD) portals, and real-time service dashboards. Together, they are emblematic of administrative modernity. Municipal leaders no longer govern only through bureaucratic files or physical service counters. They curate public narratives with interactive indicators, color-coded completion gauges, and data-driven showcase portals, all built to project managerial efficiency or a commitment to social reform.[1] Dashboards are no longer treated in public administration and data studies as neutral mirrors of urban reality. Instead, they act as contested boundary objects. Dashboards select what counts as policy-relevant evidence. Unmeasured street-level frictions drop out of view.[2,3] Citizens, journalists, and civil-society monitors now meet local government through standardized digital catalogs, and state legibility may therefore be increasingly mediated by what Cullen, Ellison, and Pasquetto call 'seeing like an API'. Under this logic, the institutional politics of schema design, metadata curation, and selective endpoint exposure determine what publics can actually inspect.[4] Algorithmic and neural abstractions compound this. They flatten heterogeneous neighborhood realities into aggregate optimization targets, which then become the object of governance.[3,5]

An empirical and theoretical puzzle surrounds this global spread of municipal transparency infrastructure. A common institutional expectation is that expanding OGD portals and publishing performance indicators should raise perceived government transparency and, in turn, strengthen public trust.[6] Practice looks different. Subnational governments often launch open-data portals and display high online satisfaction counters, yet they still face citizen skepticism over uncollected waste, potholed neighborhood roads, stalled administrative permits, and unactioned digital complaints. Recent experimental evidence sharpens this puzzle. Telling citizens that a public agency discloses abundant information, or that it voluntarily publishes more than the law requires, does not automatically generate trust unless the disclosures reveal credible, substantive performance.[7] Raw technical tables and dense bureaucratic spreadsheets burden lay residents. Accessible, citizen-centric 'popular reporting' and narrative data storytelling are needed to turn raw fiscal or operational disclosures into genuine comprehension, civic interest, and institutional trust.[8] Publication of performance metrics is not the end of it. Citizens' trust in public performance information depends heavily on data accessibility and source credibility.[9] Technocratic performance indicators often

collide with citizens' lived experiential knowledge logics,[10] and they can exacerbate epistemic injustice when the everyday grievances of marginalized communities are left out of official dashboard summaries.[11,12]

1.2. Open government data ecosystems, bulk catalog dumping, and citizen uptake

Digital-government scholarship increasingly warns that digital transparency yields open-government accountability only when disclosed datasets are timely, usable, and meaningfully connected to public problem-solving.[13] Macro-comparative evaluations show that municipal OGD platforms can stimulate urban public-value innovation.[14,15] The condition is that data supply sits within an active ecosystem, one that links government publishers, civic intermediaries, and end-user utilization across data, information, and service layers.[16] Demand matters too. Citizen uptake of OGD portals depends on perceived usefulness, information quality, and institutional trust.[17,18] Some municipalities have therefore experimented with conversational interfaces and curated discovery tools to lower search barriers.[19] Systematic audits tell a less favorable story. They repeatedly uncover severe usability deficits, broken metadata schemas, and supply–demand mismatches across municipal portals,[20–22] and they also find uneven organizational data capacities across local government departments.[23]

We propose the label 'Bulk-Dump versus Citizen-Uptake Paradox' (our own term) for the resulting pattern in subnational data governance. Suppose national mandates or annual e-government rankings judge local governments mainly by the sheer number of files uploaded to an open-data portal. Line agencies then face strong bureaucratic incentives to dump hundreds of fragmented, uncurated historical tables into public catalogs. Many are years out of date. Most lack any explanatory storytelling, so citizens are not enlightened by them. Uncurated catalog inflation may bury high-salience neighborhood service datasets beneath thousands of stale administrative records, depress per-dataset citizen engagement, and widen the gulf between internal bureaucratic reporting and public civic utilization.

1.3. Digitalizing street-level bureaucracy, grievance hotlines, and triage

Technocratic dashboard narratives diverge sharply from everyday citizen experience. To understand the gap, open-data scholarship has to be integrated with street-level bureaucracy theory. Frontline public administration is digitalizing fast. Caseworkers, inspectors, and complaint-desk operators therefore experience acute role strain, because they must work with rigid digital intake platforms while facing complex citizen demands.[24] Decades of street-level bureaucracy research confirm that frontline discretion cannot be removed from public service delivery, and that resource scarcity, organizational routines, and social embeddedness continue to shape it.[25–27] Digital portals do not remove it. Neither do generative or algorithmic decision aids, which instead reconfigure administrative burdens, policy alienation, and selective rule application.[28,29]

Centralized digital citizen-complaint hotlines and public-service portals show this street-level reconfiguration most clearly. Examples include municipal 12345 hotlines in East Asia[30,31] and Indonesia's national SP4N-LAPOR! (*Sistem Pengelolaan Pengaduan Pelayanan Publik Nasional – Layanan Aspirasi dan Pengaduan Online Rakyat*) platform.[32] The latter operates alongside Indonesia's *Satu Data Indonesia* subnational open-data mandate (Presidential Regulation No. 39/2019).[33–35] Executive dashboards celebrate aggregate ticket-closure percentages and glowing portal visitor ratings. Street-level operators hold wide gatekeeping discretion. They decide which citizen complaints receive priority flags, which linger in unverified backlogs, and which are administratively archived without any remediation of substance. We propose two interlocking mechanisms, named here with our own labels, that may erode citizen epistemic trust. The first is a 'Visibility-Over-Persistence Triage Paradox.' Digital hotline operators face top-down performance audits, so they may prioritize complaints that threaten external reputational exposure, such as cross-platform media escalation or strategic legal-discursive framing. Chronic repeat complaints from ordinary citizens, who repeatedly report the same neighborhood service failures, may be penalized. The second is 'Bureaucratic Rule-Shielding.' When a service fails, frontline staff have strong self-protective incentives to invoke rigid portal rules ('the system does not allow it'). Blame is deflected. Personal responsibility shifts onto institutional agency rules, and citizens' institutional trust may corrode as a result.

1.4. Proactive transparency, cognitive storytelling, and research questions

Recent behavioral public administration experiments suggest that passive compliance disclosure is not enough to bridge the citizen–state trust gap. Proactive transparency strengthens trust only when citizens can cognitively process the disclosed evidence, free from partisan or technocratic alienation;[36,37] experimental studies of popular financial and performance reporting find that visual, citizen-centered storytelling improves lay citizens' comprehension relative to traditional bureaucratic reports.[8,38] Institutional transparency in high-stakes municipal domains, such as policing or urban service allocation, behaves differently, because its trust effects are contingent and shaped by perceived fairness and equity.[39,40] At the macro-urban scale, one question remains: does open government data promote urban–rural and inter-neighborhood service equalization[41]? That depends on three things. Bureaucracies must overcome ideological and socioeconomic responsiveness biases.[42] They must resist politicized backsliding.[43] Human professional judgment, in turn, must be calibrated against automated recommendations.[44]

In the studies we reviewed, scholarship remains methodologically siloed despite these advances. Critical data studies examine dashboard narratives qualitatively.[1,2] Hotline studies analyze single-city ticket logs.[30,31] Survey experiments test hypothetical vignettes in isolation from live municipal portals.[7,8,36] To our knowledge, no earlier study has triangulated four sources within one unified econometric and set-theoretic comparative design: live subnational open-data portal API telemetry, official multi-jurisdiction citizen-grievance disposition records, census-tract proactive maintenance panels, and multiple randomized experiments (re-analyzed here from public replication archives; Section 2.1). To close this gap, we address four integrated research questions:

- RQ1 (Portal Telemetry & Bulk-Dump Dilution): Across live subnational Indonesian Open-Data portals and comparative OGD benchmarks, does a larger dataset catalog or recent uploading generate citizen uptake? Or does citizen engagement depend on showcase storytelling curation and active utilization across the Q10–Q90 distribution?
- RQ2 (Street-Level Grievance Triage & Proactive Equity): How do official municipal grievance dispositions (SP4N-

LAPOR!), digital hotline operator prioritization (12345 microdata), and proactive street repairs (311 census tracts) distribute bureaucratic responsiveness? The comparison covers urban/rural jurisdictions, repeat complainants, and socioeconomic strata.
• RQ3 (Experimental Micro-Foundations of Epistemic Trust & Blame): To what extent does substantive performance disclosure, as opposed to symbolic transparency claims, drive citizen epistemic trust? Is that effect mediated by citizen-centric popular storytelling, and is it undermined by institutional blame transfer when frontline workers retreat behind rigid rules?
• RQ4 (Equifinal Governance Configurations vs. Dashboard Theater): Across subnational Indonesian municipalities and regencies, which conjunctural combinations are sufficient for high citizen epistemic uptake, as against performative dashboard theater? The candidate conditions are granular openness, storytelling curation, responsive closure, low bureaucratic silos, and urban capacity.

2. Methods

2.1. Data sources and research ethics

We run a convergent and sequential four-tier mixed-methods research design. It follows the STROBE guidelines for the observational tiers,[45] uses the CONSORT-SPI reporting standards[46] only as a reference for describing the archived survey experiments and draws on the Mixed Methods Appraisal Tool (MMAT 2018)[47] and set-theoretic good practice.[48] Every observation comes from a publicly accessible digital repository, and the integrity of each file was checked with SHA-256 checksums. No synthetic or simulated observations were used.

Tier 1 covers the supply, curation, and citizen uptake of municipal open data. Tier 1A harvests live structured JSON telemetry through REST API endpoints (/api/datasets). The sources are 16 subnational Open-Data portals in West Java, Indonesia: 7 municipal ones (*Kota*: Bandung, Bogor, Sukabumi, Cirebon, Bekasi, Cimahi, Tasikmalaya) and 9 regency ones (*Kabupaten*: Bogor, Karawang, Purwakarta, Kuningan, Majalengka, Indramayu, Cirebon, Bandung Barat, Pangandaran). They index 26,551 cataloged datasets. From these, 8,806 deduplicated dataset records were extracted (Table 1 lists at most 600 records per portal, which implies a per-portal cap; the sample is therefore not proportional to catalog size). Each record logs showcase highlight curation (is_highlight), real-time status (is_realtime), creation and modification timestamps (cdate, mdate), and the publishing agency (organisasi_name). Public citizen views and downloads (count_view_opendata, count_download_opendata) are included. So is internal bureaucratic *Satu Data* traffic (count_view_satudata).[33,49] Tier 1B pairs this Indonesian telemetry with two Harvard Dataverse datasets on open government data. One is a US-state open-government-data dashboard dataset (DVN/SPNU4S, 2025).[50] The other is a Chinese city-level panel on open government data and urban innovation (DVN/NJLP6S, 2026).[51] Both are re-used here as comparison data from outside Indonesia.

Tier 2 measures street-level municipal service realities, digital hotline triage, and spatial maintenance equity. Tier 2A draws on official SP4N-LAPOR! monthly complaint disposition records from the East Java Office of Communication and Informatics (Diskominfo Jawa Timur), spanning all 38 *Kabupaten/Kota* (760 jurisdiction-months) and 17,881 citizen complaints. Each complaint is classified as unverified, unactioned, in process, resolved *selesai*, deferred *tunda*, or archived *arsip*. Public portal visitor satisfaction adds 44 monthly tallies (12,411 ratings).[32] Tier 2B examines 254,257 citizen-complaint tickets from the municipal 12345 digital hotline (DVN/KZNZZC, 2026; Chinese hotline calls recorded in 2019),[52] and the tickets carry machine-classified citizen discursive framing (discourseXGB), chronic repeat-complaint indicators (repeatedComplaints), cross-platform escalation (Otherplatforms), sentiment, salience, and the street-level operator's priority assignment (Priority).[30,53] Tier 2C analyzes 3,655 municipal census-tract-years across 731 census tracts (DVN/BYA5PI, Policy Studies Journal; a US city study).[54] It pairs citizen 311 calls with proactive bureaucratic pothole repairs across neighborhood socioeconomic status (SES_R). Tier 2D adds a survey of 72 social workers in Rome on organizational effects on discretion (DVN/ZY6DGL),[55] which we use as a measure of frontline autonomy and vertical control.

Tier 3 re-analyzes three randomized survey experiments that other research teams archived on the Harvard Dataverse, to examine psychological and institutional mechanisms. Together they supply N = 5,999 complete experimental evaluations. (i) Tier 3A (DVN/8T0XOD; US adults recruited online in April 2024; Ripamonti 2024[7,56]) has N = 1,600 vignette evaluations from 200 respondents in 20 balanced blocks. The design is a 2^5 factorial. According to the Dataverse record, the five factors are the type of department (police or sanitation), disclosure beyond the legal requirement, and abundant versus limited disclosure of performance, financial information, and public meetings. It orthogonally varies voluntary 'beyond-the-law' disclosure claims against substantive performance, financial, and public-meeting transparency. The outcomes are continuous 0–100 citizen sliders for epistemic trust, integrity, and competence. (ii) Tier 3B (DVN/6SHIKB; online panel; N = 914 complete citizen responses; Yu et al. 2026[8,57]) randomizes citizens to citizen-centric popular data storytelling (n = 440) or dense technocratic financial reporting (n = 474). (iii) Tier 3C (DVN/W7WD7J)[58] rests on N = 3,485 complete constant-sum allocations, drawn from 3,994 raw respondents. Its randomization contrasts frontline bureaucratic strict rule-following with discretion and client deservingness during a street-level employment-service failure. To meet research ethics and data-protection standards, Qualtrics respondent keys in Tier 3C were hashed with irreversible SHA-256 digests. Open-ended gender text was purged at ingestion.

2.2. Doubly robust AIPW, fixed effects, and Oster bounds

The key institutional treatments in the observational municipal catalogs (Tier 1A) and digital hotline logs (Tier 2B) are not randomly assigned. Examples are featuring a dataset on a portal's citizen showcase (is_highlight), updating records within 180 days (fresh_180d), submitting chronic repeat complaints (repeatedComplaints), and escalating across external platforms (Otherplatforms). Assignment varies across agencies, topics, and urban capacities. Naive ordinary least squares risks selection bias and functional-form misspecification. We therefore estimate Average Treatment Effects (ATEs) under the usual ignorability assumption. The method is Doubly Robust Augmented Inverse Probability Weighting (AIPW). It pairs Newton–Raphson iteratively reweighted least-squares (IRLS) propensity-score weighting with treatment-specific conditional outcome regressions,[59] and it bounds propensity scores within [0.025, 0.975] to enforce positivity

and to prevent extreme weights. Double-robustness matters here. The AIPW estimator stays asymptotically consistent if either the propensity model or the conditional outcome expectation is correctly specified.[59] Highlighted datasets are chosen by the portal and may already be popular, so the AIPW estimates are read as adjusted associations and not as causal effects.

Next to AIPW, we estimate cluster-robust OLS and municipality fixed-effects (Muni-FE) regressions. Both absorb all time-invariant municipal heterogeneity across the 16 portals. Clustering differs by tier. Standard errors are clustered at the municipality and publishing agency (OPD) levels in Tier 1A, at the census-tract level (731 tracts) in Tier 2C, and at the individual respondent level (200 respondents) in Tier 3A. To gauge sensitivity to unmeasured selection on unobservables, we compute Oster's proportionality coefficient δ[60] under R_max = min(1.0, 1.3 * R^2_full). By convention, $\delta > 1.00$ means that unmeasured confounders would need to exceed the observed institutional, age, and interagency traffic controls in explanatory power before they could drive the estimated treatment effect to zero. With 16 municipalities, municipality-level clustering has few clusters, so these standard errors should be read with caution. Oster's δ addresses omitted-variable bias, not selection on the outcome itself.

2.3. Unconditional quantile regressions and mediation analysis

Conditional-mean regressions can hide sharp distributional asymmetries. One question is whether showcase curation lifts neglected datasets in the lower tail (Q10) or merely concentrates clicks among superstar datasets at the top (Q90). Another is whether proactive street repairs protect neglected tracts. We therefore estimate generalized Firpo–Fortin–Lemieux Recentered Influence Function (RIF) unconditional quantile regressions across τ in {0.10, 0.25, 0.50, 0.75, 0.90}.[61,62] The transformation is RIF(Y; q_τ, F_Y) = q_τ + (τ − I(Y ≤ q_τ)) / f_Y(q_τ), where q_τ denotes the sample τ-th quantile and f_Y(q_τ) is estimated with a Gaussian kernel density. Boundary mass points would cause degeneracy. To avoid them, all RIF models are estimated strictly on continuous outcomes with distinct interior quantiles (q_10 < q_25 < q_50 < q_75 < q_90). These outcomes are continuous log(1 + public views) in Tier 1A, continuous inverse-hyperbolic-sine proactive repairs asinh(repairs) across active maintenance tract-years in Tier 2C, and the continuous 0–100 epistemic trust slider in Tier 3A. In Tier 3B, we also decompose the total randomized treatment effect of popular data storytelling on citizen institutional trust. One part is the direct unmediated path. The other is the indirect cognitive-epistemic pathway that runs through objective comprehension, subjective understanding, and civic interest. We use causal mediation analysis,[63] whose estimates require sequential ignorability; the mediators were measured after treatment and were not randomized.

2.4. Four-value fuzzy-set qualitative comparative analysis

Configurational research is prone to confirmation and positive-results biases.[64,65] Tier 4 is designed to limit both. It also uncovers conjunctural equifinality and causal asymmetry across Indonesian subnational governments, and it synthesizes N = 28 Indonesian municipal data-governance regimes. The set comprises all 16 West Java Open-Data *Kota* and *Kabupaten* from Tier 1A. Added to them are the 12 highest-volume East Java SP4N-LAPOR! jurisdictions from Tier 2A (6 *Kota* as cities and 6 *Kabupaten* as regencies). Within each provincial measurement block, empirical rank-percentiles calibrate the cases into standard four-value fuzzy sets {0.00 (fully out), 0.33 (more out than in), 0.67 (more in than out), 1.00 (fully in)}. Calibration by rank places exactly seven cases at each outcome value (Figure 6A), so the outcome is relative: it marks the top quartile of portal use or ticket closure, not an absolute level of trust. Five theoretical conditions and one outcome enter the calibration:

- GRANULAR_OPENNESS (G): Total indexed catalog breadth. In grievance portals, active digital citizen-grievance volume.
- STORYTELLING_CURATION (S): Citizen-facing curation of featured showcase datasets together with 180-day update freshness (or, in grievance portals, low archival burial);
- RESPONSIVE_CLOSURE (R): Timely dataset maintenance (inverse staleness lag) or the rate of substantive verified complaint resolution (*selesai* %);
- LOW_BUREAUCRATIC_SILO (B): External public citizen orientation relative to insular internal *Satu Data* traffic. Alternatively, a low unactioned bureaucratic backlog.
- URBAN_TECH_CAPACITY (C): Metropolitan *Kota* administrative status and multi-agency digital organizational breadth.
- EPISTEMIC_TRUST_UPTAKE (Y) and ~EPISTEMIC_TRUST_UPTAKE (~Y): Composite citizen public views/download conversion or, alternatively, the volume of verified substantive grievance closure. Y is a proxy for citizen uptake and not a direct measure of trust.

Single-condition necessity is tested at a 0.90 consistency threshold. Set-theoretic sufficiency requires Consistency ≥ 0.80 and Proportional Reduction in Inconsistency (PRI) ≥ 0.70. Both thresholds apply to Y and to its negation ~Y alike.

3. Results

3.1. Tier 1: Portal telemetry, showcase curation, and the bulk-dump pattern

Live REST API telemetry covers the 16 West Java municipal and regency Open-Data portals (26,551 cataloged datasets; n = 8,806 sampled records; Table 1 and Figure 1). It reveals a gap between supply-side catalog proliferation and demand-side citizen engagement that the raw counts hide. At first glance, subnational compliance with *Satu Data Indonesia* looks impressive. Regency and city catalogs index thousands of machine-readable tables, led by Kabupaten Bandung Barat (5,343 datasets), Kabupaten Purwakarta (2,818), Kabupaten Cirebon (2,466), Kota Bandung (2,283), and Kabupaten Majalengka (2,031). Yet the metadata tell another story. Catalogs are stagnant and almost nothing is curated. Across all 8,806 sampled datasets, the median modification staleness reaches 408.1 days (over 13 months since the last update). Only 19.85% of datasets were updated within the preceding 180 days. None (0.00%) provide live real-time streaming feeds. And 23.02% have never been downloaded by a single citizen. Just 0.24% are curated as citizen-facing dashboard showcase picks (is_highlight).

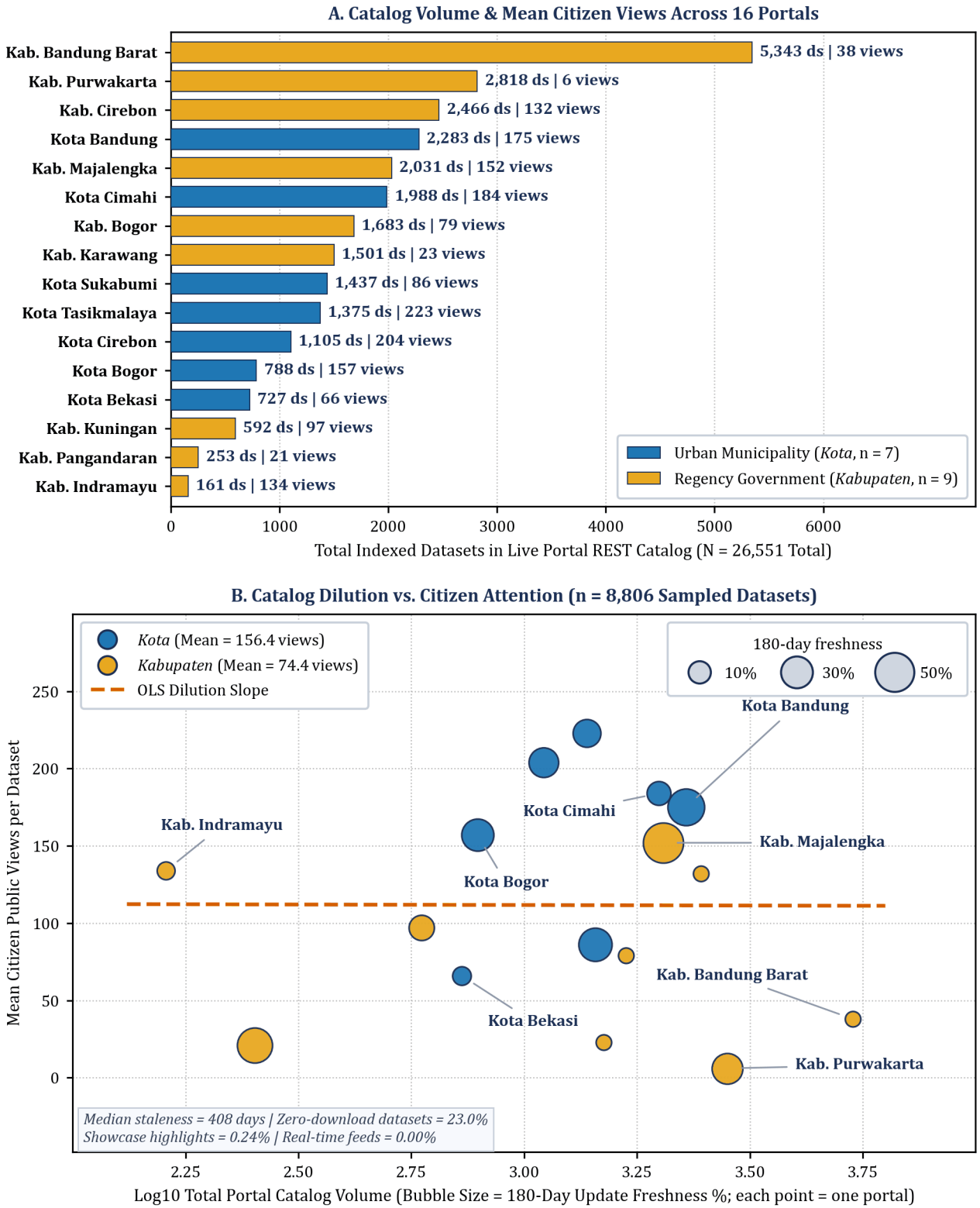


Figure 1. Live REST API telemetry across 16 Indonesian subnational municipal Open-Data portals (26,551 indexed datasets; n = 8,806 sampled records): total catalog volume and mean citizen views across urban *Kota* and regency *Kabupaten* portals (Panel A) and the Bulk-Dump vs. Citizen-Uptake pattern plotting log10 catalog scale, 180-day update freshness, and mean citizen views (Panel B; each point is one portal).

Table 1. Live REST API Telemetry Across 16 Indonesian Subnational Municipal Open-Data Portals (26,551 Cataloged Datasets; n = 8,806 Sampled Records) and Comparative Subnational OGD Benchmarks.

Subnational Portal / Benchmark Stratum	Type / N	Indexed Catalog	Updated ≤180d (%)	Median Staleness (Days)	Mean Views / Downloads	*Satu Data* Internal Views & Agencies
Panel A: Urban Municipalities (*Kota*) in West Java *Satu Data* / Open Data Ecosystem	7 *Kota*					
Kota Bandung (opendata.bandung.go.id)	*Kota* (n=600)	2,283	43.0%	274 d	174.5 / 11.09	10.5 views (38 OPDs)

Subnational Portal / Benchmark Stratum	Type / N	Indexed Catalog	Updated ≤180d (%)	Median Staleness (Days)	Mean Views / Downloads	*Satu Data* Internal Views & Agencies
Kota Cimahi (opendata.cimahikota.go.id)	*Kota* (n=600)	1,988	12.7%	298 d	184.3 / 11.83	21.3 views (31 OPDs)
Kota Tasikmalaya & Kota Sukabumi (Combined)	2 *Kota* (n=1,200)	2,812	28.5%	382 d	154.5 / 8.82	52 OPDs combined
Kota Cirebon, Kota Bogor & Kota Bekasi (Combined)	3 *Kota* (n=1,800)	2,620	20.8%	251 d	142.2 / 9.95	Bogor = 157.2 views; Bekasi = 65.6
Panel B: Regency Governments (*Kabupaten*) — Exemplifying Bulk-Dump vs. Curated Regimes	9 *Kabupaten*					
Kab. Bandung Barat (Bulk-Dump Archetype)	Kab. (n=600)	5,343	0.0%	702 d	38.3 / 3.40	Largest catalog (5,343 ds), diluted citizen views
Kab. Purwakarta (High-Volume Low-Uptake)	Kab. (n=600)	2,818	27.3%	617 d	5.8 / 0.14	2,818 datasets; mean only 5.8 views/ds
Kab. Majalengka (Responsive Regency Benchmark)	Kab. (n=600)	2,031	53.2%	170 d	152.1 / 7.39	High freshness & public-to-internal orientation
Remaining 6 Regencies (Cirebon, Bogor, Karawang, Kuningan, Pangandaran, Indramayu)	6 Kab. (n=2,806)	6,656	15.2% (Kab avg)	408.1 d (All)	74.4 / 4.27 (Kab avg)	All 16 Portals: 23.02% zero-download datasets
Panel C: Comparative Subnational OGD Implementation & Innovation Benchmarks (Tier 1B)	N = 100					
Benchmark dataset	**N**	**Model fit**	**Predictor 1**	**Predictor 2**	**Predictor 3**	**Reading**
US-state OGD dashboard dataset (DVN/SPNU4S)	N = 50 States	52.0% Active	HC3 OLS R^2 = 0.620	Admin Staff β = +0.433*	Prob. Severity β = +0.435**	Pure Tech Capacity β = +0.060 (p = 0.721, null)
Chinese city OGD and urban innovation panel (DVN/NJLP6S)	N = 50 Cities	Full OGD Index	HC3 OLS R^2 = 0.361	Data Util. β = +0.197*	Data Supply β = +0.092 ns	Utilization—not raw dataset supply—drives innovation

Figure 1A–B shows that raw catalog volume does not by itself generate citizen uptake. In Figure 1B the fitted line across the 16 portals is nearly flat (about 112 to 110 mean views), so the unadjusted association between catalog size and mean views is weak; the adjusted coefficient is reported in Table 2. Urban municipalities (*Kota*) achieve more than double the mean public views of regency governments (*Kabupaten*), at 156.35 vs. 74.37 views/dataset. Mean downloads are also more than double (10.06 vs. 4.27), and update freshness over 180 days is higher too (25.00% vs. 15.15%). Within the regency tier, Kabupaten Bandung Barat and Kabupaten Purwakarta illustrate bulk catalog dumping. They host the two largest catalogs in our sample (5,343 and 2,818 datasets). Yet their means are only 38.0 and 6.0 citizen views per dataset, respectively. Urban portals draw more, namely Kota Bandung (175.0 views), Kota Cimahi (184.4 views), Kota Cirebon (204.2 views), and Kota Tasikmalaya (222.8 views), as do responsive regencies such as Kabupaten Majalengka (151.8 views).

Table 2 and Figure 2A–B describe these patterns in econometric and distributional terms. The Doubly Robust AIPW estimation controls for urban status, dataset cumulative exposure age, internal *Satu Data* bureaucratic views, and catalog scale. Under these controls, datasets featured through citizen-oriented showcase curation (is_highlight; 0.24% of datasets, roughly 21) have continuous log(1 + public views) that is higher by +2.724 (AIPW SE = 0.027, z = 100.4, $p < 0.0001$). This SE does not account for clustering and rests on few treated datasets, so it is read together with the clustered estimate below. Counterfactual mean log views rise from 3.715 (~40 views) to 6.439 (~625 views). View-to-download conversion is higher by +0.48 percentage points ($p = 0.0010$). Municipality fixed-effects OLS gives a within-portal showcase premium of +2.331 log views (agency-clustered SE = 0.319, $p = 1.41 \times 10^{-12}$), with an Oster proportionality bound of $\delta = 3.483$, above the conventional benchmark of 1.00. Recent 180-day uploading alone, without showcase curation, shows no association with views. Its AIPW estimate is statistically null (ATE = +0.030, SE = 0.038, $p = 0.431$). Unconditional quantile regressions (Figure 2B) show a sharp divergence across the tails. The showcase coefficient rises monotonically from +0.988 ($p = 0.0084$) at Q10 to +6.318 ($p < 1 \times 10^{-50}$) at Q90. Portal log catalog size, in turn, has negative coefficients in the lower tail (Q10 = −1.314, $p = 2.90 \times 10^{-05}$; Q25 = −1.378, $p = 2.30 \times 10^{-09}$). Catalog size varies across only 16 portals, so this is a portal-level association. Comparative subnational OGD regressions in Tier 1B (Table 1, Panel C) are consistent with this institutional diagnosis. Across 50 state OGD regimes (DVN/SPNU4S, R^2 = 0.620), dedicated administrative staffing (β = +0.433, p = 0.0114) and objective problem severity (β = +0.435, p = 0.0057) are associated with implementation, while raw technical capacity scores are not (β = +0.060, p = 0.7215). Across 50 municipal OGD ecosystems (DVN/NJLP6S, R^2 = 0.361), active data utilization (β = +0.197, p = 0.0489) predicts urban public-value innovation, whereas raw data availability does not (β = +0.092, p = 0.2588).[14,16]

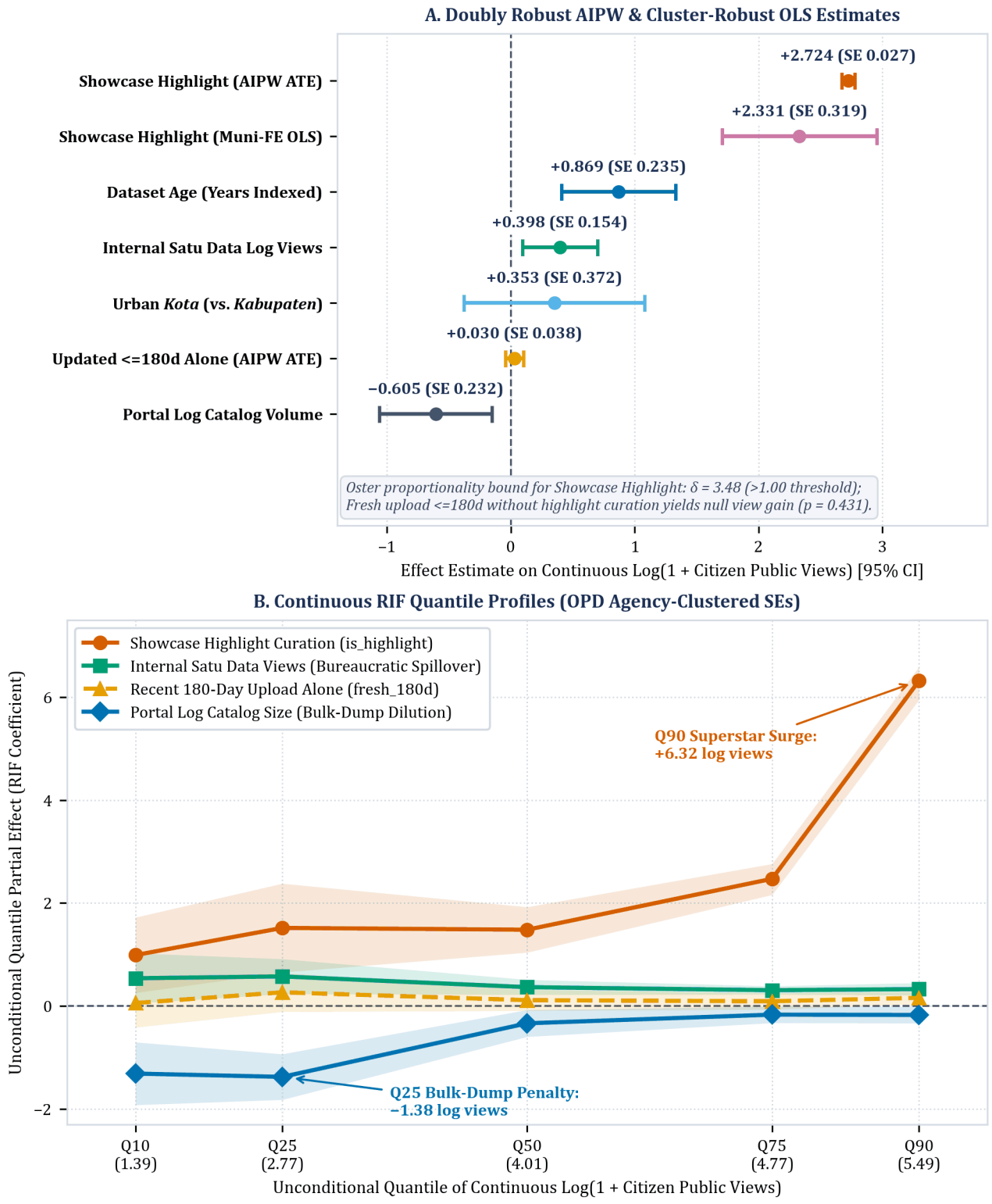


Figure 2. Econometric and distributional determinants of citizen open-data uptake across 8,806 municipal datasets: Doubly Robust AIPW and cluster-robust/municipality-FE OLS estimates with Oster proportionality bounds (Panel A: δ = 3.48) and continuous Recentered Influence Function (RIF) unconditional quantile profiles from Q10 to Q90 showing a larger showcase coefficient at Q90 (+6.32) and a negative catalog-size coefficient at Q25 (−1.38) (Panel B).

Table 2. Econometric, Doubly Robust AIPW, and Continuous Unconditional Quantile (RIF Q10–Q90) Models of Citizen Open-Data Uptake Across 16 Indonesian Portals (N = 8,806 Datasets).

Predictor / Causal Treatment	Cluster OLS / Muni-FE	Doubly Robust AIPW	RIF Q10 (q=1.39)	RIF Q25 (q=2.77)	RIF Q50 (q=4.01)	RIF Q75 / Q90 (q=4.77 / 5.49)
Showcase Highlight Curation (is_highlight)	+2.623*** (0.508) | FE: +2.331***	ATE = +2.724*** (SE 0.027)	+0.988** (0.373)	+1.516*** (0.440)	+1.481*** (0.225)	+2.470*** / +6.318***

Predictor / Causal Treatment	Cluster OLS / Muni-FE	Doubly Robust AIPW	RIF Q10 (q=1.39)	RIF Q25 (q=2.77)	RIF Q50 (q=4.01)	RIF Q75 / Q90 (q=4.77 / 5.49)
Recent 180-Day Upload Alone (fresh_180d)	+0.129 ns (0.168) | FE: −0.084 ns	ATE = +0.030 ns (p = 0.431)	+0.056 ns (0.240)	+0.265 ns (0.192)	+0.112 ns (0.104)	+0.091 ns / +0.158 ns
Urban Municipality Status (is_kota)	+0.353 (0.372) | DL: +0.366	Absorbed in propensity & Muni-FE	+0.583 (0.335)	+0.794** (0.289)	+0.454** (0.149)	+0.126 ns / +0.035 ns
Dataset Cumulative Exposure Age (Years)	+0.869** (0.235) | FE: +0.416***	Controlled in IRLS & outcome models	+1.597*** (0.281)	+1.679*** (0.159)	+0.658*** (0.057)	+0.360*** / +0.342***
Internal *Satu Data* Bureaucratic Log Views	+0.398* (0.154) | FE: +0.430***	Controlled in IRLS & outcome models	+0.538* (0.249)	+0.574** (0.173)	+0.365*** (0.074)	+0.306*** / +0.327***
Portal Log Catalog Volume (bulk-dump pattern)	−0.605* (0.232)	Controlled in IRLS & outcome models	−1.314*** (0.311)	−1.378*** (0.226)	−0.337* (0.133)	−0.169* / −0.175*
Model Fit & Robustness Diagnostics	OLS R^2=0.356 | FE R^2=0.538	Oster δ = 3.483 (>1.00) | Conv ATE +0.48 pp**	R^2 = 0.191	R^2 = 0.300	R^2 = 0.226	R^2 = 0.102 / 0.065

*Outcome is continuous log(1 + count_view_opendata). Standard errors clustered by municipality (OLS) and OPD agency (Muni-FE & RIF). IRLS propensity scores bounded in [0.025, 0.975]. * p < 0.05, ** p < 0.01, *** p < 0.001. Standard errors in parentheses. The AIPW standard error does not account for clustering and rests on about 21 highlighted datasets.*

3.2. Tier 2: Grievance realities, hotline triage, and proactive equity

Tier 2 examines what happens when citizens move from passive open-data browsing to active street-level service claims (Table 3, Table 4, Figure 3, and Figure 4A). The data cover all 38 *Kabupaten/Kota* in East Java's official SP4N-LAPOR! digital complaint system (760 monthly records; 17,881 complaints). Of these, 74.48% (13,318 tickets) reach verified substantive resolution (*selesai*), yet more than one-quarter of all citizen grievances (25.52%; 4,563 tickets) remain unresolved. Some sit in protracted processing queues (11.01%). Others are caught in unverified or unactioned bureaucratic backlogs (6.12%; 1,095 tickets), or end in deferred and administratively archived closures without frontline action (8.39%; 1,500 tickets). Stratification across subnational units is pronounced. Unweighted jurisdiction means are 59.72% resolution and 14.22% unactioned backlogs for regency governments, against 69.75% resolution and 8.56% unactioned for urban *Kota* governments. The pooled 74.48% is ticket-weighted and is lifted by large high-resolution jurisdictions such as Kota Malang (3,686 tickets at 93.3%). Even major metropolises such as Kota Surabaya show sizable administrative archival shares when complex cross-agency tickets accumulate (Figure 3A). Separately, the portal's public-facing visitor satisfaction widget (44 monthly tallies, whereas the disposition records cover 760 jurisdiction-months, about 20 months for each of the 38 jurisdictions) records 98.59% 'satisfied' or 'very satisfied' ratings, with only 0.98% dissatisfied across 12,411 voluntary responses. The two measures come from different sources and cannot be linked at the ticket level, but the contrast suggests how self-selected satisfaction gauges can give an impression of consensus that sits alongside a 25.52% non-resolution gap.[2,10,32]

Table 3. Street-Level Grievance Disposition Across 38 East Java SP4N-LAPOR! Jurisdictions (17,881 Tickets) and Doubly Robust AIPW Operator Prioritization Triage in Municipal 12345 Hotlines (N = 254,257 Tickets).

Analytical Dimension / Variable	Sample / Scope	Point Estimate / Share	Robust SE / z-Stat	p-Value	Substantive Street-Level Governance Mechanism
Panel A: Official SP4N-LAPOR! East Java Municipal Grievance Disposition & Portal Satisfaction	38 Kab/*Kota*				
Substantive Verified Resolution (Selesai)	17,881 Tickets (760 mos)	74.48% (13,318)	*Kota* 69.75% vs Kab 59.72%	LogVol p = 0.0372*	25.52% of citizen grievances remain pending, unactioned, or archived
Unverified & Unactioned Backlog Queue	38 Jurisdictions	6.12% (1,095)	*Kota* 8.56% vs Kab 14.22%	—	Unweighted regency mean is 1.66× the *Kota* mean
Deferred or Archived Without Action (Arsip/Tunda)	38 Jurisdictions	8.39% (1,500)	Administrative closure	—	Tickets closed/parked administratively without frontline remediation
Public Portal Visitor Satisfaction Widget	12,411 Ratings (44 mos)	98.59% Positive	Dissatisfied: 0.98%	—	Self-selected widget from a different source than the tickets (25.52% unresolved)
Panel B: Municipal 12345 Digital Hotline Street-Level Operator Prioritization (DVN/KZNZZC)	N = 254,257				
Chronic Repeat Citizen Complaints (AIPW ATE)	7.47% Treated (n=19,002)	−5.06 pp (15.33% vs 20.38%)	SE = 0.28 pp (z = −17.8)	$< 1 \times 10^{-70}$***	Lower priority for persistent unresolved local failures
Cross-Platform Public Escalation (AIPW ATE)	Multi-platform tickets	+12.44 pp (32.45% vs 20.01%)	SE = 0.10 pp (z = 124.8)	< 0.0001***	Higher priority for externally visible complaints
Negative Emotional Sentiment (LPM HC3)	N = 254,257	+41.17 pp	SE = 3.41 pp	1.88×10^{-33}***	Higher priority for negative sentiment

Analytical Dimension / Variable	Sample / Scope	Point Estimate / Share	Robust SE / z-Stat	p-Value	Substantive Street-Level Governance Mechanism
Standard 12345 Portal Intake (vs. Direct/Escalated)	N = 254,257	−4.80 pp	SE = 0.24 pp	1.93×10^{-86}***	Lower priority for routine portal submissions
Citizen Discursive Framing Stratification	Codes 0 vs. 2–6	19.02% vs. 81.74%–95.39%	97.09% in Code 0	< 0.0001***	Legal and public-interest rhetoric has 4.3×–5.0× the priority rate

*Source: Author's calculations from official East Java Diskominfo SP4N-LAPOR! records and Harvard Dataverse DVN/KZNZZC.[30] * p < 0.05, *** p < 0.001. Panel A means by jurisdiction type are unweighted, whereas the pooled shares are ticket-weighted. The satisfaction tallies (44 months) and the dispositions (760 jurisdiction-months) cover different periods. In Panel B the outcome is priority status, which includes rule-mandated priority (+21.86 pp for the mandated-priority tag in Figure 3B); the hotline data come from China (2019).*

Micro-econometric analysis of 254,257 municipal 12345 digital hotline tickets (Tier 2B, Table 3 Panel B and Figure 3B) points to operator prioritization patterns that may contribute to these frontline bottlenecks. Overall, hotline operators assign priority status to 20.01% of incoming citizen requests. Part of this status is rule-mandated (Figure 3B shows a +21.86 pp difference for the mandated-priority tag), so the outcome is not purely discretionary. Doubly Robust AIPW estimation points to what we call a 'Visibility-Over-Persistence Triage Paradox'. Citizens who submit chronic repeat complaints over unresolved local problems (7.47% of all tickets) have a −5.06 percentage-point lower probability of priority (AIPW ATE = −0.0506, SE = 0.0028, z = −17.77, $p < 1 \times 10^{-70}$; priority drops from 20.38% to 15.33%). Conversely, complaints involving cross-platform public escalation beyond the closed hotline have a +12.44 percentage-point higher probability of priority (AIPW ATE = +0.1244, SE = 0.0010, p < 0.0001; priority jumps to 32.45%). Negative emotional sentiment (+41.17 pp, $p = 1.88 \times 10^{-33}$) and issue urgency (+8.57 pp, $p = 1.71 \times 10^{-26}$) are also positively associated with priority. Routine submissions through the standard 12345 portal, by contrast, receive −4.80 pp lower priority ($p = 1.93 \times 10^{-86}$). Priority differs sharply by discursive frame. The 97.09% of citizens using routine everyday appeals (Code 0) receive only 19.02% priority. The <1.5% of complainants deploying strategic legal, regulatory, or public-interest rhetoric (Codes 2–6) secure 81.74% to 95.39% priority, 4.3 to 5.0 times the rate of Code 0.[30,53]

Table 4. Proactive Municipal Street Repairs vs. Reactive 311 Citizen Calls Across Socioeconomic Quantiles (DVN/BYA5PI, N = 3,655 Tract-Years) and Street-Level Bureaucrat Autonomy Models (DVN/ZY6DGL, N = 72).

Covariate / Structural Factor	Tract-Cluster OLS (All N=3,655)	RIF Q10 (q=2.78)	RIF Q25 (q=3.99)	RIF Q50 (q=5.02)	RIF Q75 (q=5.77)	RIF Q90 (q=6.31)
Panel A: Proactive Bureaucratic Street Repairs asinh(Filled) Across Active Census Tracts (731 Tracts)	$R^2 = 0.6029$					
Neighborhood Socioeconomic Index (SES_R)	−0.2211 (0.1177)	−0.2000 ns (0.2505)	+0.0169 ns (0.1627)	+0.0301 ns (0.1024)	−0.0100 ns (0.0936)	−0.0760 ns (0.1013)
Log Citizen 311 Service Calls (Demand Signal)	+1.3174*** (0.0502)	+0.7440*** (0.0962)	+0.5328*** (0.0596)	+0.3136*** (0.0428)	+0.2626*** (0.0369)	+0.1868*** (0.0377)
Black Resident Share (%) (per_black_mean)	+0.0215*** (0.0045)	+0.0126 ns (0.0090)	+0.0164** (0.0060)	+0.0119** (0.0038)	+0.0107** (0.0033)	+0.0075* (0.0033)
Road Network Length (Standardized Infrastructure)	+0.2813** (0.0990)	+0.1855 ns (0.1351)	+0.2552* (0.1113)	+0.2655** (0.0920)	+0.2847*** (0.0780)	+0.3322*** (0.0899)
Panel B: Frontline Street-Level Bureaucrat Work Autonomy Index (DVN/ZY6DGL, N = 72 Workers)	$R^2 = 0.1103$					
Frontline autonomy model	**Intercept**	**Vertical control**	**Bureaucratic pressure**	**Public visibility**	—	—
Vertical Controls, Pressure & Public Visibility	Intercept = 71.01***	Vert. Control: −2.30 (SE 1.91)	Bur. Pressure: +3.76 (p = 0.059)	Public Visib.: −1.94 (SE 1.95)	—	—

*Source: Author's calculations from Harvard Dataverse DVN/BYA5PI (Policy Studies Journal) and DVN/ZY6DGL (Journal of Public Policy). RIF estimated on strictly continuous active repair tract-years. * p < 0.05, ** p < 0.01, *** p < 0.001. Stars were recomputed from the printed estimates and standard errors (normal approximation). The submitted stars at Q10 (SES_R), Q10 and Q25 (road length), and Q10 to Q75 (Black resident share) did not follow from the printed standard errors. Mean 311 calls = 7.98 and mean repairs = 70.70 per tract-year. The repairs model conditions on 311 call volume. Panel B uses a survey of 72 social workers in Rome.*

Tier 2C (Table 4 and Figure 4A; 3,655 census-tract-years across 731 tracts) examines whether municipal repairs follow the inequalities of reactive citizen reporting. Reactive 311 calls average 7.98 per tract-year. Proactive bureaucratic street inspections and pothole repairs, by comparison, average 70.70 repairs per tract-year. Across active maintenance tracts, continuous RIF quantile regressions show that repair intensity responds strongly to demand signals (log 311 calls; in the full-sample OLS model +1.3174, p < 0.001, so repairs follow calls as well as being proactive) and to underlying road network length (+0.186 at Q10 to +0.332 at Q90; p = 0.170 at Q10, p = 0.022 at Q25, p = 0.004 at Q50, and p < 0.001 at Q75 and Q90, computed from the printed estimates and standard errors). Conditional on call volume and road length, the socioeconomic index shows no detectable gradient (SES_R: Q10 = −0.200, p = 0.425; Q25 = +0.017, p = 0.917; Q50 = +0.030, p = 0.769; Q90 = −0.076, p = 0.453). Because call volume is itself shaped by neighborhood characteristics, these coefficients describe the SES gap net of demand, not the total gap. Meanwhile, in Tier 2D's frontline worker survey (N = 72; Table 4 Panel B), the coefficients for vertical administrative control (−2.30, SE = 1.91, p = 0.23) and external public visibility (−1.94, SE = 1.95, p = 0.32) are negative but not distinguishable from zero ($R^2 = 0.11$), so the survey gives no reliable evidence on perceived frontline autonomy.[24–26,66]

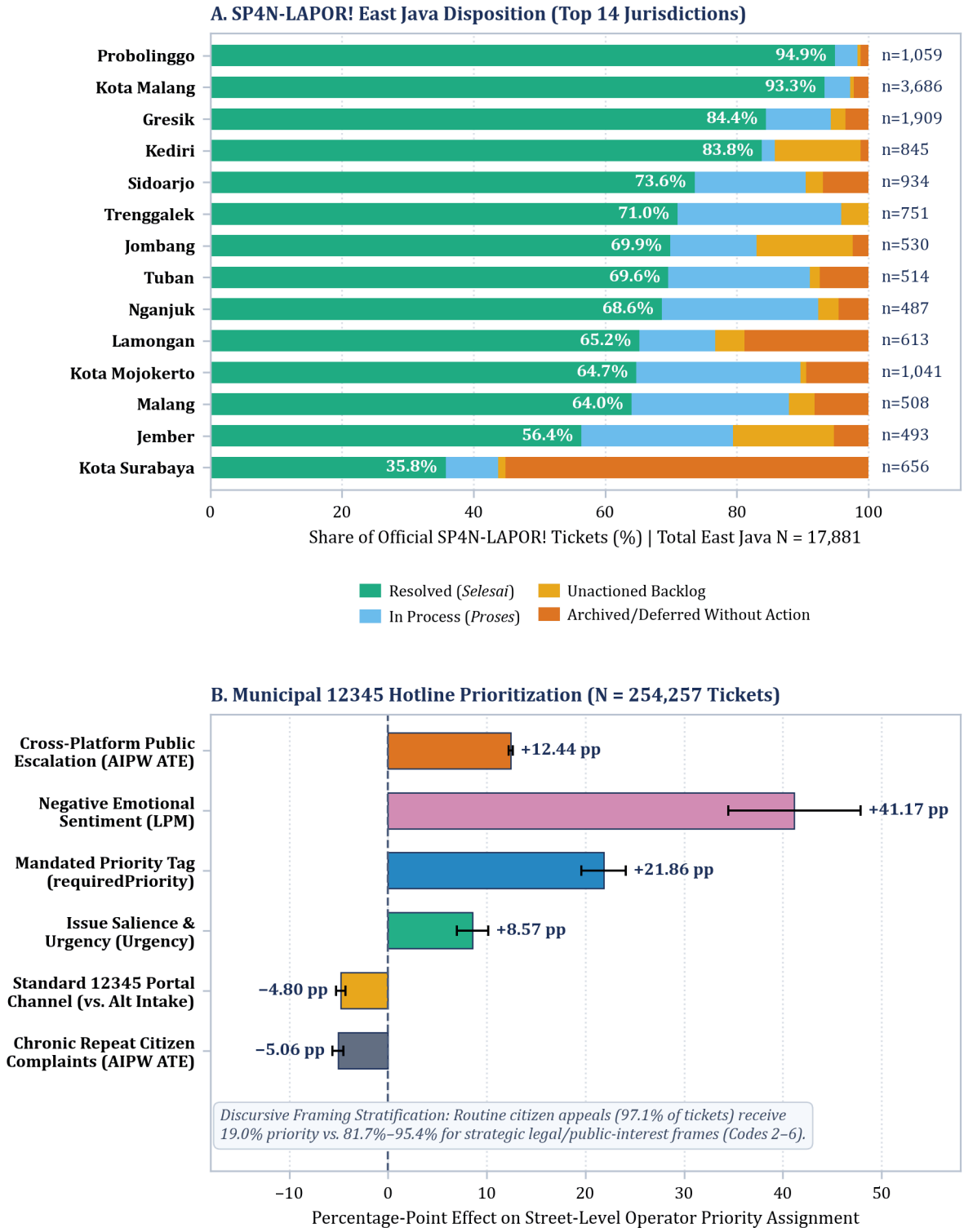


Figure 3. Street-level grievance realities behind municipal dashboards: normalized disposition breakdown across the top 14 high-volume East Java SP4N-LAPOR! jurisdictions within the 38-*Kabupaten/Kota* archive (Panel A: N = 17,881 complaints) and Doubly Robust AIPW / LPM operator prioritization estimates across 254,257 municipal 12345 hotline tickets showing the −5.06 pp chronic repeat-complaint difference versus the +12.44 pp cross-platform public escalation difference (Panel B).

3.3. Tier 3: Substantive performance, popular storytelling, and blame transfer

Why do performative dashboards and rigid frontline portals erode citizen epistemic trust? And which communicative and institutional designs restore it? Tier 3 examines these mechanisms in three archived randomized survey experiments (Table 5, Figure 4B, and Figure 5A–B). Start with Experiment 3A (DVN/8T0XOD; N = 1,600 vignette evaluations clustered across 200 respondents[7]). Announcing that a municipal department voluntarily 'discloses more information than it is legally required to disclose' is pure symbolic transparency storytelling. The estimated shift is +1.23 points on the 0–100 citizen epistemic trust scale (respondent-clustered SE = 1.42, 95% CI −1.55 to +4.01, p = 0.3857), which is not distinguishable from zero. Effects on perceived institutional integrity (+0.71, p = 0.6232) and competence (+1.60, p = 0.3136) are equally null. Substantive abundant performance disclosure, by contrast, raises citizen epistemic trust by +13.45 points

(SE = 1.31, 95% CI +10.88 to +16.02, p = 3.41 × 10^{-20}). The two point estimates differ by about 12 points. We report them with their intervals and do not express them as a ratio, because the interval of the symbolic estimate includes zero. Trust gains are also large for substantive financial disclosure (+14.30 points, p = 2.83 × 10^{-30}) and for open public-meeting disclosure (+8.71 points, p = 1.94 × 10^{-16}). Continuous RIF quantile trajectories (Figure 4B) indicate that substantive performance disclosure raises trust even among the most skeptical lower-tail citizens at Q10 (q_10 = 20 pts: +14.67 points, p = 7.90 × 10^{-07}). Median citizens at Q50 gain +18.20 points (p = 9.13 × 10^{-20}). Symbolic voluntary claims stay statistically null from Q10 through Q75.

Experiment 3B (DVN/6SHIKB; N = 914 citizens;[8] Figure 5A) suggests that presentation format affects whether citizens can epistemically appropriate municipal information, once substantive information exists. The comparison is with conventional technocratic municipal financial reports. Random assignment to citizen-centric popular data storytelling increases objective factual comprehension by +7.85 percentage points in the adjusted estimate (SE = 0.0200, p = 9.27 × 10^{-05}; +13.4% relative to the control mean). The raw means are 0.6636 and 0.5879, a difference of 7.57 points or +12.9%. It also elevates subjective understanding by +0.526 points on a 10-point scale (6.84 vs. 6.30, p = 0.0003) and stimulates epistemic civic interest by +0.137 (p = 0.0142). Citizen institutional trust rises by +0.110 points (p = 0.0326). In the mediation decomposition, the indirect cognitive-interest effect (+0.1190) is slightly larger than the estimated total effect (+0.110) and the residual direct effect is −0.0088, so the mediators account for all of the estimated trust gain (108% of the point estimate). This reading assumes sequential ignorability, because the mediators were measured after treatment. These results are consistent with the interpretation that data storytelling raises trust through citizen comprehension and epistemic engagement and not through cosmetic gloss.[8,38]

Experiment 3C (DVN/W7WD7J; N = 3,485 citizens; Figure 5B) examines how citizens assign blame when street-level services fail and a caseworker follows rules rigidly. Suppose a frontline caseworker strictly follows agency rules instead of exercising adaptive discretion during a client's service failure. Citizens then reduce the personal blame they allocate to the frontline bureaucrat by −0.722 points (SE = 0.130, p = 2.98 × 10^{-08}). At the same time, they place more blame on the public agency's institutional rules (+0.448 points, SE = 0.108, p = 3.54 × 10^{-05}). The cell means in Figure 5B show frontline blame falling from 3.04 to 2.33 points for less-deserving clients (−0.71) and from 3.17 to 2.23 points for deserving clients (−0.94), and agency-rules blame rising from 1.58 to 2.03 points (+28.5%) and from 1.85 to 2.39 points (+29.2%), respectively. We call this pattern the 'Rule-Following Blame Shift'. It suggests one way in which citizens may react when rule-following replaces discretion. The experiment measures citizens' blame in a vignette, not workers' behavior or digital auditing, so whether frontline workers shield themselves from audit sanctions by hiding behind rigid portal scripts, and whether frustration then moves upward into institutional distrust, remains a hypothesis.

Table 5. Synthesis of Three Randomized Survey Experiments on Symbolic vs. Substantive Transparency (N = 1,600), Popular Data Storytelling Mediation (N = 914), and Frontline Blame Attribution (N = 3,485).

Experimental Study & Randomized Factor	Outcome Measure	Treatment Effect (β / ATE)	Cluster / HC3 SE	p-Value	Distributional / Mediation Finding
Experiment 3A: Symbolic Claim vs. Substantive Disclosure (DVN/8T0XOD, N = 1,600; 200 Respondents)					
Symbolic 'Beyond-the-Law' Voluntary Claim	Citizen Epistemic Trust (0–100)	+1.23 pts	1.42	0.3857 (ns)	Null at Q10 (+3.48), Q50 (+0.18), Q75 (+2.09)
Substantive Performance Disclosure (Abundant)	Citizen Epistemic Trust (0–100)	+13.45*** pts	1.31	3.41 × 10^{-20}***	Q10 +14.67***, Q50 +18.20***; the symbolic claim is not distinguishable from zero
Substantive Financial & Meeting Openness	Citizen Epistemic Trust (0–100)	Fin +14.30*** | Mtg +8.71***	1.05 / 0.97	< 1 × 10^{-15}***	Integrity +12.88***; Competence +14.11***
Experiment 3B: Citizen-Centric Popular Data Storytelling vs. Technocratic Report (DVN/6SHIKB, N = 914)					
Popular Data Storytelling Treatment	Objective Comprehension (0–1)	+0.0785*** (0.664 vs 0.588)	0.0200	9.27 × 10^{-05}***	+12.9% raw relative gain in factual accuracy (adjusted +13.4%)
Popular Data Storytelling Treatment	Subjective Understanding (1–10)	+0.5265*** (6.84 vs 6.30)	0.1450	0.0003***	Higher subjective understanding among lay citizens
Popular Data Storytelling Treatment	Epistemic Civic Interest & Trust (1–5)	Interest +0.1372* | Trust +0.1102*	0.0558 / 0.0515	0.0142* / 0.0326*	Mediation by comprehension and interest: Indirect = +0.1190, Direct = −0.0088
Experiment 3C: Bureaucratic Rule-Following vs. Discretion in Service Failure (DVN/W7WD7J, N = 3,485)					
Frontline Bureaucrat Strictly Follows Rules	Blame on Frontline Worker (0–10)	−0.7217*** pts	0.1299	2.98 × 10^{-08}***	Lower blame on the individual worker

Experimental Study & Randomized Factor	Outcome Measure	Treatment Effect (β / ATE)	Cluster / HC3 SE	p-Value	Distributional / Mediation Finding
Frontline Bureaucrat Strictly Follows Rules	Blame on Agency Institutional Rules (0–10)	+0.4475*** pts	0.1081	3.54×10^{-05}***	Higher blame on the agency's institutional rules (+0.45 on a 0–10 scale)
Deserving Client Vignette Cue	Client Blame vs. Agency Rules Blame	Client −0.8231*** | Rules +0.2718*	0.1531 / 0.1072	8.14×10^{-08}*** / 0.0113*	Larger agency-rules blame when the client is deserving

*Source: Author's calculations from Harvard Dataverse replication archives DVN/8T0XOD,[7] DVN/6SHIKB,[8] and PII-hashed DVN/W7WD7J. * p < 0.05, *** p < 0.001. The three experiments are archived studies by other research teams (Section 2.1). Cell-mean differences in Figure 5B are −0.71 and −0.94 (frontline blame) and +0.45 and +0.54 (agency-rules blame) for the less-deserving and deserving cells, respectively.*

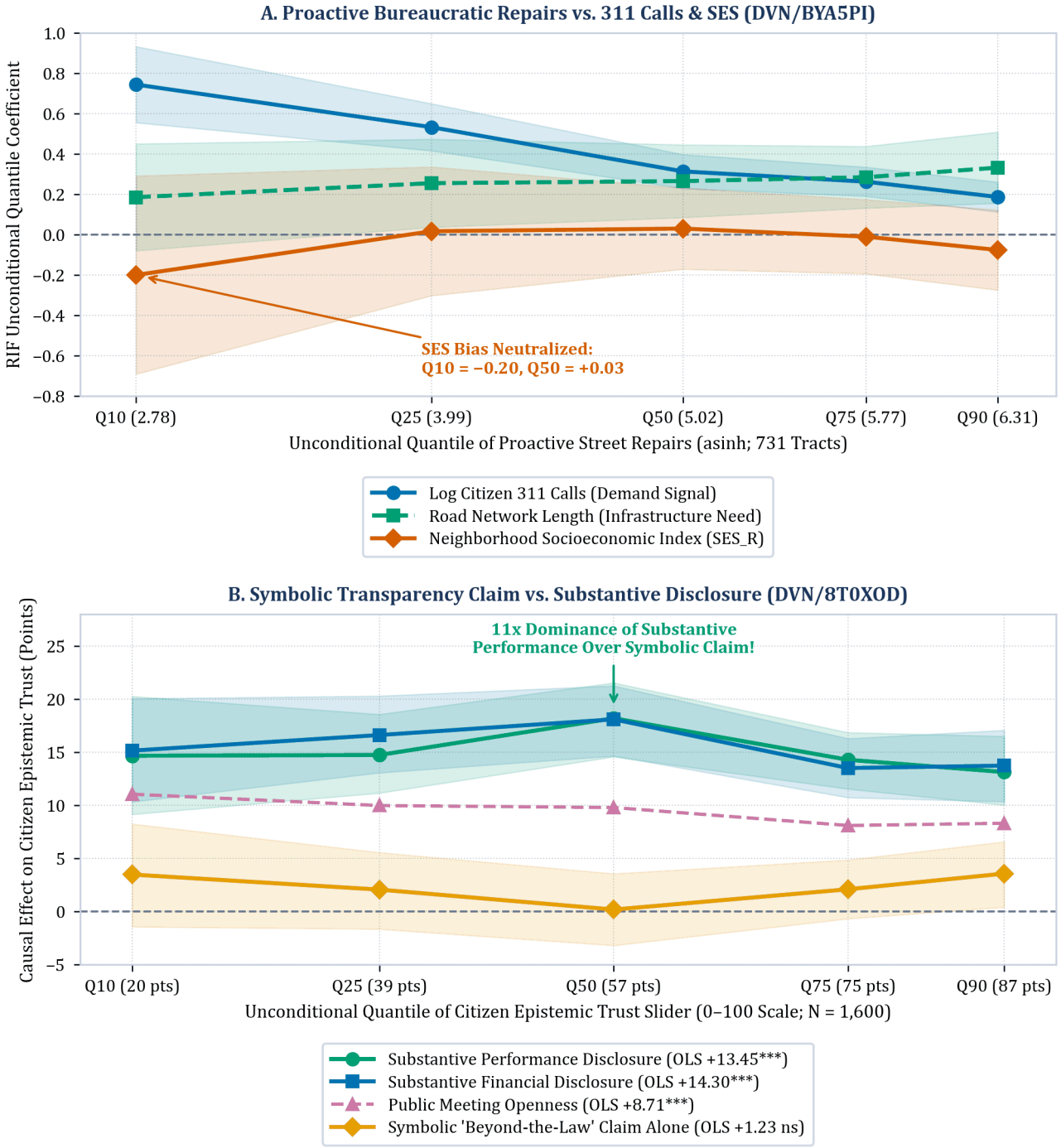


Figure 4. Distributional equity in street-level maintenance versus symbolic-substantive transparency mechanisms: continuous RIF quantile profiles of proactive street repairs across 731 municipal census tracts showing no detectable neighborhood SES gradient (Panel A: DVN/BYA5PI) and respondent-clustered RIF quantile trajectories from the factorial disclosure experiment showing +13.45*** for substantive performance disclosure against +1.23 ns for symbolic 'beyond-the-law' transparency claims across Q10–Q90 (Panel B: DVN/8T0XOD, N = 1,600).

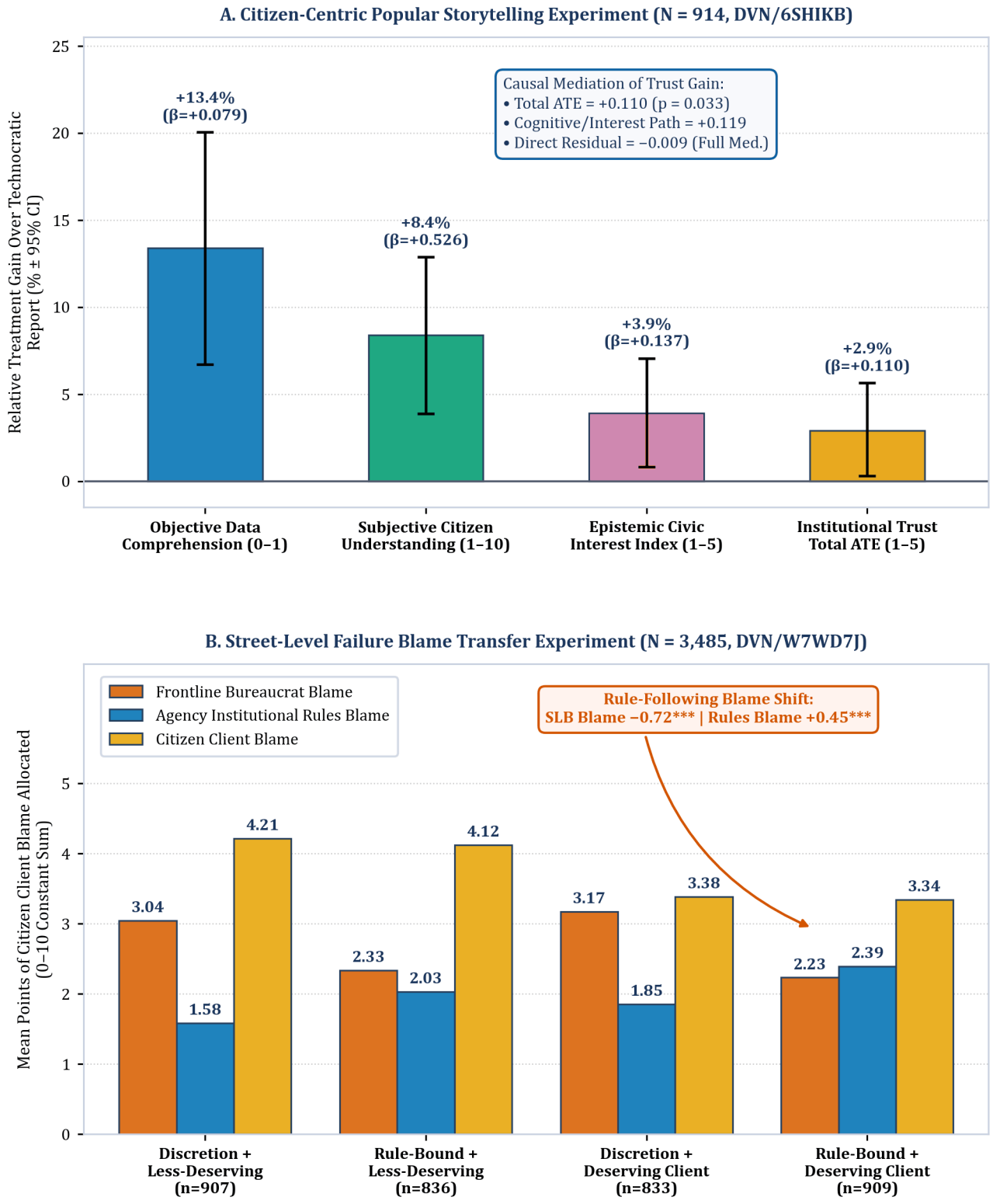


Figure 5. Micro-experimental mechanisms of citizen comprehension, epistemic trust, and frontline blame transfer: relative treatment gains and causal mediation decomposition of citizen-centric popular data storytelling over technocratic reporting (Panel A: DVN/6SHIKB, N = 914; mediation by comprehension and interest) and constant-sum citizen blame reallocation under rigid frontline rule-following versus discretion during street-level service failures (Panel B: DVN/W7WD7J, N = 3,485).

3.4. Tier 4: fsQCA across 28 Indonesian municipal regimes

Tier 4 integrates macro-portal and street-level governance across N = 28 Indonesian subnational regimes: all 16 West Java Open-Data municipalities/regencies and the 12 highest-engagement East Java SP4N-LAPOR! cities/regencies (Table 6 and Figure 6A–B). Necessity testing shows that no single condition or negated condition exceeds the 0.90 set-theoretic necessity threshold for high citizen uptake (Y). RESPONSIVE_CLOSURE (R) attains the highest necessity consistency (0.7614). STORYTELLING_CURATION (S = 0.7379) and LOW_BUREAUCRATIC_SILO (B = 0.7371) follow. These results are consistent with conjunctural patterns in which no isolated technical checklist item is necessary for citizen uptake.[67]

Boolean sufficiency minimization identifies three pathways to high citizen uptake (Y; operationalized as portal use or ticket closure). The overall combined solution reaches a consistency of 0.9136, a PRI of 0.8762, and a raw coverage of 0.4986 (Figure 6B).

- Pathway P1, Civic-Tech Responsive Metropolis (G * S * R * C; Consistency = 1.0000, PRI = 1.0000, Coverage = 0.3314). Kota Bandung (2,283 cataloged datasets, 38 OPDs, 175.0 mean public views) and Kota Malang (3,686 SP4N-LAPOR! complaints with 93.3% substantive resolution) exemplify it. Metropolitan digital capacity coincides with granular catalogs, active curation, and rapid closure.
- Pathway P2, Co-Created Accountable Portal (S * R * B; Consistency = 0.9097, PRI = 0.8680, Coverage = 0.4750). It spans Kota Bandung, Kota Bogor, Kabupaten Majalengka, Kota Malang, and Kabupaten Probolinggo. In these cases, pairing citizen-oriented curation with responsive closure and low internal bureaucratic silos is associated with high uptake, whatever the catalog size. Kabupaten Majalengka is the main inconsistent case (membership 1.00 in P2, outcome membership 0.67).
- Pathway P3, Pragmatic Regency Responsiveness (G * R * B * ~C; Consistency = 1.0000, PRI = 1.0000, Coverage = 0.2371). Kabupaten Majalengka in West Java and Kabupaten Probolinggo in East Java (94.9% resolution across 1,059 complaints) exemplify it. Non-metropolitan regencies lacking big-city fiscal/IT wealth (~C) still reach high citizen uptake when open catalogs are backed by substantive closure and low backlog silos. Both P3 cases are also members of P2, so P3 has no unique coverage (unique coverage recomputed from the Figure 6A matrix: P1 0.024, P2 0.071, P3 0.000) and is best read as a variant of P2.

Asymmetric negation analysis of low citizen uptake (~Y; Combined Consistency = 0.8379, PRI = 0.7481, Coverage = 0.4986) shows two distinct failure syndromes. The first is Negation Pathway N1, labeled Performative Dashboard Theater (G * ~R * ~B; Consistency = 0.8657, PRI = 0.7994, Coverage = 0.3086). It covers Kabupaten Bandung Barat (5,343 datasets, 0.0% 180-day freshness in the sampled records, 38 mean views), Kabupaten Purwakarta (2,818 datasets, 6 mean views), and Kabupaten Karawang. These regimes pile up very large dataset or ticket counts (G). Catalogs stay stale (~R). Records remain trapped inside internal silos or backlogs (~B). Sidoarjo also has an N1 membership of 0.67, but its membership in low uptake is only 0.33 (outcome membership 0.67), so it is a deviant case. The second is Negation Pathway N2, Peripheral Archival Stagnation (~S * ~R * ~C; Consistency = 0.8481, PRI = 0.7481, Coverage = 0.4029). It covers Kabupaten Bandung Barat, Kabupaten Kuningan, and Lamongan, whose memberships in low uptake are 1.00, 0.67, and 1.00. Kabupaten Cirebon and Kabupaten Indramayu also have an N2 membership of 0.67, but their membership in low uptake is only 0.33, so they are deviant cases. Weak curation, stale closure, and limited digital capacity may reinforce one another in such regencies and sustain citizen disengagement.

A case-level institutional comparison of the 28 calibrated Indonesian regimes illustrates how identical national statutory mandates may refract into divergent subnational realities.[49,68] The mandates are Presidential Regulation No. 39/2019 on *Satu Data Indonesia*[34] and the SP4N-LAPOR! guideline of the Ministry of Administrative and Bureaucratic Reform,[69] which Ministerial Regulation No. 46/2020 extends as a 2020–2024 road map.[70] In Kota Bandung and Kota Malang (Pathway P1), municipal communication and informatics offices (Diskominfo) may act as cross-sectoral editorial brokers and not as passive file repositories, although agency practice was not observed directly. Data stewards could standardize agency metadata across 30+ line departments (OPDs), move high-salience urban datasets onto visual portal landing pages, and enforce interagency ticket routing, which would keep unverified backlogs small. Pathway P3 offers an equally instructive non-metropolitan pair: Kabupaten Majalengka in West Java and Kabupaten Probolinggo in East Java. Neither has the fiscal tax base or the smart-city command-center budgets of provincial capitals (~C). Both still reach above-median citizen uptake and verified closure (151.8 mean dataset views in Majalengka, outcome membership 0.67; 94.9% resolution across 1,059 complaints in Probolinggo, outcome membership 1.00). Their route may rest on timely dataset refreshes, direct frontline verification, and low internal bureaucratic hoarding. These practices were not measured. Kabupaten Bandung Barat and Kabupaten Purwakarta (Pathway N1) differ sharply. Line agencies there appear to answer annual data-completeness scorecards by batch-uploading thousands of disaggregated historical spreadsheets, such as subdistrict administrative tallies from prior budget years, with no narrative context, update schedules, or citizen discovery tags. This divergence is consistent with the reading that open-data volume (G) can amplify either outcome. Paired with R and B, it coincides with high uptake. Paired with ~R and ~B, it coincides with what we call performative dashboard theater.

Table 6. Four-Value Fuzzy-Set Qualitative Comparative Analysis (fsQCA) of Necessary and Sufficient Configurations for Citizen Epistemic Trust & Uptake (Y) vs. Performative Dashboard Theater (~Y) (N = 28 Regimes).

Configurational Pathway / Condition	Boolean Expression	Consistency	PRI	Raw Coverage	Representative Indonesian Municipal Regimes
Panel A: Single-Condition Necessity Analysis (Standard Necessity Threshold = 0.90)					
Responsive Closure & Freshness (R) for Y	R <- Y	0.7614	—	0.7614	Highest single condition (<0.90 confirms conjunctural causation)
Citizen Storytelling Curation (S) & Low Silo (B) for Y	S <- Y | B <- Y	0.7379 / 0.7371	—	0.7379 / 0.7371	Core enabling conditions across metropolitan and regency paths
Stale/Unresolved Closure (~R) & Silo Backlog (~B) for ~Y	~R <- ~Y | ~B <- ~Y	0.7614 / 0.7371	—	0.7614 / 0.7371	Highest negated-condition scores for low uptake
Panel B: Sufficient Configurations for High Citizen Epistemic Trust & Uptake (Y)					
Pathway P1: Civic-Tech Responsive Metropolis	G * S * R * C	1.0000	1.0000	0.3314	Kota Bandung (Open Data), Kota Malang (SP4N-LAPOR! Jatim)

Configurational Pathway / Condition	Boolean Expression	Consistency	PRI	Raw Coverage	Representative Indonesian Municipal Regimes
Pathway P2: Co-Created Accountable Portal	S * R * B	0.9097	0.8680	0.4750	Kota Bandung, Kota Bogor, Kab. Majalengka, Kota Malang, Kab. Probolinggo
Pathway P3: Pragmatic Regency Responsiveness	G * R * B * ~C	1.0000	1.0000	0.2371	Kab. Majalengka (West Java), Probolinggo (East Java)
Combined Sufficiency Solution for Y (P1 + P2 + P3)	R * (G*S*C + S*B + G*B*~C)	0.9136	0.8762	0.4986	Exceeds the 0.80 consistency and 0.70 PRI thresholds
Panel C: Asymmetric Sufficiency for Epistemic Disillusionment & Low Uptake (~Y)					
Negation N1: Performative Dashboard Theater	G * ~R * ~B	0.8657	0.7994	0.3086	Kab. Bandung Barat (5,343 ds), Kab. Purwakarta (2,818 ds), Kab. Karawang; Sidoarjo is a deviant case (outcome 0.67)
Negation N2: Peripheral Archival Stagnation	~S * ~R * ~C	0.8481	0.7481	0.4029	Kab. Bandung Barat, Kab. Kuningan, Lamongan; Kab. Cirebon and Kab. Indramayu are deviant cases (outcome 0.67)
Combined Negation Solution for ~Y (N1 + N2)	~R * (G*~B + ~S*~C)	0.8379	0.7481	0.4986	Consistent with asymmetry: G without R and B coincides with low uptake

Source: Author's four-value fuzzy-set calibration {0.00, 0.33, 0.67, 1.00} across 16 West Java Open-Data portals and 12 East Java SP4N-LAPOR! jurisdictions (tier4_municipal_regimes_28_fsqca.csv). The outcome Y is rank-based (seven cases at each outcome value). Recomputing from the Figure 6A membership matrix reproduces every consistency, PRI, and coverage value shown; unique coverage is 0.024 for P1, 0.071 for P2, and 0.000 for P3.

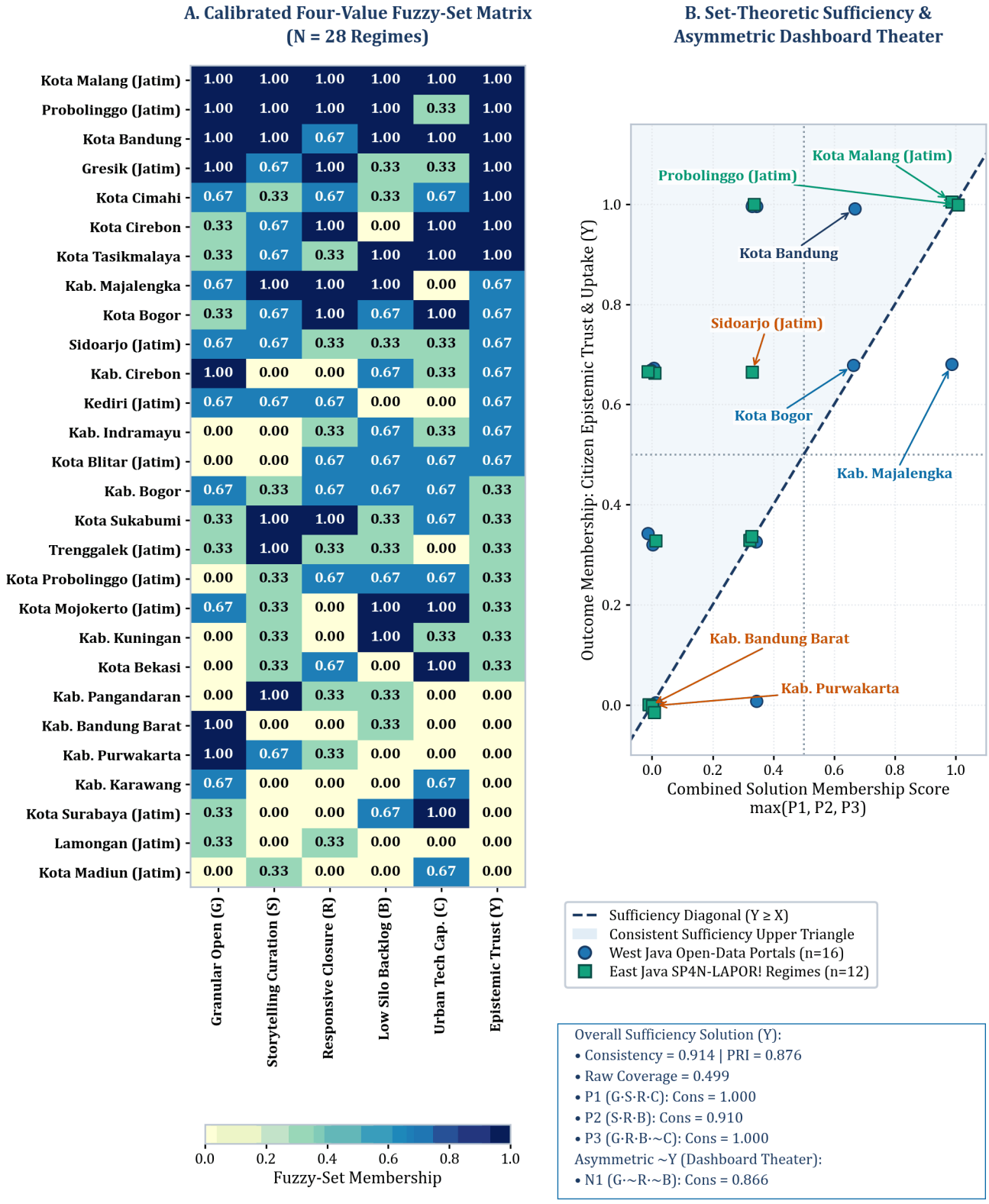


Figure 6. Four-value fuzzy-set Qualitative Comparative Analysis (fsQCA) across N = 28 Indonesian municipal data-governance regimes (16 West Java Open-Data portals and 12 East Java SP4N-LAPOR! jurisdictions): calibrated set-membership heatmap across [G, S, R, B, C, Y] (Panel A) and X–Y sufficiency plot contrasting equifinal citizen-trust pathways (Cons = 0.914, PRI = 0.876) against asymmetric Performative Dashboard Theater (N1: G*~R*~B, Cons = 0.866) (Panel B).

3.5. Cross-tier synthesis and meta-inferences

Table 7 brings all four empirical tiers together in a formal Mixed-Methods Joint Display. The tiers are observational portal telemetry, street-level grievance triage, randomized experimental micro-foundations, and set-theoretic municipal pathways. Three overarching meta-inferences emerge across them. The first, an Expanding and Discordant Meta-Inference, questions supply-side e-government rankings. Both the continuous RIF regressions (Q25 catalog size coefficient = −1.38, $p < 1 \times 10^{-8}$) and fsQCA Pathway N1 (G * ~R * ~B, Consistency = 0.866) are consistent with the reading that raw dataset proliferation, absent curation and closure, is associated with lower citizen uptake. The second, a Confirming and Explaining Meta-Inference, resolves the dashboard trust paradox. East Java shows a gap between 98.59% portal visitor satisfaction widgets and 25.52% unresolved SP4N-LAPOR! tickets. Experiment 3A, run on a

US sample, shows a large trust effect of substantive performance (+13.45 pts) and a symbolic-claim effect that cannot be distinguished from zero (+1.23 pts). Experiment 3B adds mediation of the popular data storytelling effect by comprehension and interest. The third, a Generative Institutional Meta-Inference, ties the 12345 hotline's −5.06 pp repeat-complaint penalty and +12.44 pp cross-platform escalation premium to Experiment 3C's Rule-Following Blame Shift (−0.722 bureaucrat blame vs. +0.448 agency-rules blame). It suggests, as a hypothesis, that top-down performance surveillance may induce visibility-chasing triage along with defensive frontline formalism.

Table 7. Formal Mixed-Methods Joint Display Integrating Multi-Tier Empirical Findings, Meta-Inferences, and the Five-Pillar Epistemic Governance Reform Architecture.

Governance Domain	Quantitative & Portal Telemetry Evidence (Tiers 1–2)	Experimental & Configurational Evidence (Tiers 3–4)	Mixed-Methods Meta-Inference	Actionable Policy & Institutional Reform Pillar
1. Catalog Supply vs. Citizen Curation	26,551 datasets across 16 portals: 408-day median staleness, 23.02% zero-download rate, null fresh-upload ATE (+0.030, p = 0.431), Q25 bulk-dump penalty (−1.38***), vs. +2.724*** AIPW highlight gain.	fsQCA N1 (G*∼R*∼B, Cons = 0.866) is consistent with high catalog volume without freshness and external orientation coinciding with Performative Dashboard Theater; popular storytelling raised comprehension +12.9%***.	Expanding & Discordant (questions dataset-count e-gov rankings)	Pillar 1: Replace raw dataset-volume KPIs under *Satu Data Indonesia* with mandatory citizen-storytelling briefs, 180-day freshness SLAs, and automated archival pruning.
2. Symbolic Banners vs. Substantive Service Truth	SP4N-LAPOR! East Java displays 98.59% positive visitor widget ratings while 25.52% of 17,881 complaints sit in pending, unactioned (6.12%), or archived/deferred (8.39%) states.	Factorial Experiment 3A (N = 1,600) shows symbolic 'beyond-the-law' claims yield +1.23 pts (ns), whereas substantive performance disclosure yields +13.45*** pts across Q10–Q90.	Confirming & Explaining (may explain why upbeat widgets fail to build trust)	Pillar 2: Abolish self-selected satisfaction banners; mandate audited, disaggregated publication of unverified backlogs, archival closures, and median time-to-remediation.
3. Frontline Triage & Repeat-Grievance Equity	Across 254,257 municipal 12345 hotline tickets, chronic repeat complaints have a −5.06 pp*** lower AIPW priority probability, while cross-platform escalation has +12.44 pp*** and elite frames get >81% priority.	fsQCA P2 (S*R*B, Cons = 0.910) & P3 (G*R*B*∼C, Cons = 1.000) show low bureaucratic backlog silos (B) and responsive closure (R) are essential for sustained citizen uptake.	Confirming (suggests visibility-over-persistence triage in digital intake)	Pillar 3: Institute automatic escalation triggers for repeat unresolved complaints (≥2 tickets) and plain-language intake assistance so non-elite citizens are not penalized.
4. Proactive Field Maintenance vs. Reactive Calls	Across 3,655 census-tract-years (731 tracts), municipal pothole repairs show no detectable SES gradient across active quantiles (Q10 SES = −0.200 ns, Q50 = +0.030 ns) while following infrastructure need.	In the comparative OGD benchmark (DVN/SPNU4S), problem severity (+0.435**) and dedicated administrative staffing (+0.433*), but not raw IT scores (+0.060 ns), are associated with implementation.	Expanding (identifies field allocation as a possible equity counterweight)	Pillar 4: Pair reactive SP4N-LAPOR! / 311 citizen dashboards with sensor- and need-indexed proactive municipal maintenance budgets in low-income and rural districts.
5. Street-Level Discretion & Blame Governance	In the frontline worker survey (N = 72), vertical control (−2.30) and public visibility (−1.94) are negatively but not significantly associated with perceived autonomy.	Blame Experiment 3C (N = 3,485) shows that strict rule-following lowers worker blame (−0.722***) and raises institutional agency-rules blame (+0.448***), especially for deserving clients.	Confirming & Generative (points to a possible micro-foundation of defensive digital formalism)	Pillar 5: Establish protected 'bounded-discretion' remediation windows and ombudsman override protocols so frontline staff can solve atypical citizen cases without punitive audit fear.

Meta-inferences are labeled following the joint-display approach of Fetters and colleagues.[71]

4. Discussion

4.1. Theoretical contributions: from symbolic transparency to epistemic alignment

Our multi-tier findings advance digital-government, public-administration, and critical data scholarship in three ways. First, they move past dichotomous debates over whether open government data 'works'.[6,13,14,16,17] We describe a pattern that we call Epistemic Decoupling, the separation between what dashboards display and what citizens can verify in service delivery, and we estimate its components across subnational governments. Lee, Warren, and Mazmanian analyzed municipal data storytelling,[1] van Rij conceptualized dashboards as boundary objects,[2] and Cullen, Ellison, and Pasquetto described 'seeing like an API'.[4] Our audit builds on these accounts. Across 16 Indonesian Open-Data portals, it suggests that subnational compliance mandates may generate 'bulk-dump compliance', a regime in which line agencies upload thousands of uncurated tables (median staleness 408.1 days; 0.00% live feeds; 0.24% showcase curation) to satisfy top-down *Satu Data* checklists.[33,72] Uncurated freshness alone was not associated with citizen view gains (+0.030, p = 0.431), whereas showcase curation was associated with +2.724 log views in the AIPW model. In the archived experiment, popular storytelling raised trust. Comprehension and epistemic interest fully accounted for the estimated effect.[8,38] Transparency, then, may be less an additive quantity of uploaded files than an epistemic relationship, one that needs intelligible translation and verifiable alignment with lived public services.[7,9–11]

Second, our results connect open-data studies with street-level bureaucracy theory. The literature suggests that frontline co-creation and citizen trust depend on aligning digital platforms with street-level problem-solving.[24,73] Digital portals do not appear to flatten bureaucratic discretion, in Indonesian SP4N-LAPOR! jurisdictions or in municipal 12345 hotlines. The priority pattern is consistent with frontline attention being redirected toward externally visible reputational risks (+12.44 pp priority for cross-platform escalation; >81% priority for elite legal-discursive frames). Ordinary citizens who endure chronic unresolved neighborhood failures receive lower priority (−5.06 pp for repeat complaints).[30,31] Experiment 3C (N = 3,485) points to a possible micro-foundation of 'computer-says-no' bureaucratic rigidity. In the vignette, strict adherence to formal rules lowered the blame assigned to the frontline worker (−0.722 pts) and raised the blame assigned to agency rules (+0.448 pts). Real workers may anticipate this. If they do, punitive dashboard surveillance could inadvertently encourage caseworkers to abdicate problem-solving discretion and erode institutional legitimacy from below. Worker behavior was not measured.

4.2. Subnational equity: proactive allocation and regency pathways

Third, our findings offer an encouraging corrective to structural determinism about urban–rural and socioeconomic digital divides.[41] Critics of civic-tech platforms rightly warn that reactive complaint apps (311, 12345, SP4N-LAPOR!) risk amplifying the voices of residents who are digitally literate, affluent, or rhetorically strategic. Our results show this discursive asymmetry inside reactive hotlines (Table 3, Panel B). They also point to two possible institutional counterweights. The first sits in Tier 2C's census-tract panel (Figure 4A). Municipal repairs that follow citizen 311 requests show no detectable socioeconomic gradient across the active repair quantiles once call volume and road length are held constant (Q10: $\beta = -0.200$, $p = 0.425$), although this net-of-demand pattern does not rule out inequality in who calls. The second sits in Tier 4's configurational synthesis (Figure 6B). Pathway P3 (G * R * B * ~C, Consistency = 1.000) is consistent with the possibility that non-metropolitan Indonesian regencies such as Kabupaten Majalengka and Kabupaten Probolinggo reach high citizen uptake without metropolitan fiscal-tech wealth; the pathway rests on two cases that also belong to P2. Political and administrative attention to responsive service closure and cross-agency coordination may help,[74] and may also guard against regulatory capture and performative reporting.[75]

From a broader comparative governance perspective, the duality between metropolitan civic-tech capacity (Pathway P1) and regency responsiveness (Pathway P3) may offer lessons for decentralized states, although our evidence is limited to two Indonesian provinces. Donor-funded smart-city programs and central-ministry digitalization grants often rest on one assumption. Rural and peri-urban districts, in this view, fail to build citizen trust mainly because they lack cloud infrastructure, real-time IoT dashboards, or advanced data-science units. Our evidence from West Java's Open-Data ecosystem and East Java's 38-jurisdiction SP4N-LAPOR! network does not support this assumption in the cases we studied, although the capacity condition (C) measures metropolitan status and agency breadth and not cloud infrastructure or data-science capacity. Portal infrastructure without timely agency follow-through may accelerate bulk catalog dumping (as in Kabupaten Bandung Barat and Kabupaten Purwakarta). It may also accumulate archived unresolved grievances. Modest subnational bureaucracies may behave differently. They may enforce clear cross-departmental routing, verify physical remediation before closing citizen tickets, and curate intelligible plain-language service summaries; these practices were not measured here. Institutional commitment to epistemic honesty, rather than dashboard sophistication, may be an important factor across subnational tiers, but neither was measured.

A second finding concerns how internal *Satu Data* coordination relates to public discoverability in Tier 1A (Table 2 and Figure 2A–B). The link holds at all five unconditional quantiles (Q10 = +0.538, $p = 0.0313$; Q25 = +0.574, $p = 0.0010$; Q50 = +0.365, $p = 1.08 \times 10^{-06}$; Q75 = +0.306, $p = 3.01 \times 10^{-09}$; Q90 = +0.327, $p = 4.84 \times 10^{-08}$). Internal interagency *Satu Data* views are positively associated with external citizen public views, and the sign is positive each time. One reading is that datasets which agencies consult and cross-validate for operational budgeting also become more complete and more relevant to residents. Another is that both counts simply track the popularity of a dataset. Consultation, completeness, and relevance were not measured. The reverse case may look different: where agencies treat open-data portals only as ceremonial dumping grounds, uploaded tables may languish in the zero-download tail.

4.3. Five-pillar policy proposals

Our Mixed-Methods Joint Display (Table 7) suggests a Five-Pillar Epistemic Governance Reform Architecture, offered as proposals that the data motivate but do not test. It is addressed to Indonesia's Ministry of Administrative and Bureaucratic Reform (KemenPAN-RB), Bappenas's *Satu Data Indonesia* Secretariat, provincial and municipal Diskominfo agencies, and municipal governments globally:
1. Curated 'Popular Data Storytelling' Over Bulk-Dump KPIs: National e-government evaluations (EPSS, the Statistics Indonesia evaluation of sectoral statistics implementation, and *Satu Data* maturity indices) should consider replacing raw dataset-count scoring, which incentivizes bulk dumping (Pathway N1). Instead, every municipal agency should maintain a curated core of high-demand datasets, with plain-language visual 'popular reporting' briefs and 180-day automated staleness audits attached to each core.
2. Audited Disaggregated Grievance Dashboards: Self-selected visitor-satisfaction pop-up banners registered 98.59% positivity in East Java, alongside 25.52% unresolved tickets. Municipal portals should replace them. Audited, publicly queryable indicators should show unverified backlogs, administrative archival closures (*arsip/tunda*), and verified field remediation.
3. Automatic Repeat-Complaint Escalation & Plain-Language Triage Equity: The 12345 hotlines show a −5.06 pp chronic repeat-complaint penalty and a 4.3 to 5.0-fold elite discursive premium. Both should be addressed. SP4N-LAPOR! and municipal hotlines can do this by embedding automatic supervisory escalation that triggers whenever a neighborhood grievance is submitted twice without verified physical closure. The hotlines could also test AI-assisted intake summarization, which might equalize priority for vernacular citizen descriptions.
4. Need-Indexed Proactive Maintenance Compacts: Local public-works and social-service agencies should pair reactive complaint maps with proactive inspection quotas. The quotas would be indexed to road/infrastructure need and neighborhood deprivation quantiles, which prevents low-reporting rural and low-income communities from falling behind.
5. Protected 'Bounded-Discretion' Frontline Remediation Windows: Rigid script-compliance metrics punish frontline caseworkers and trigger defensive rule-following and institutional blame transfer (+0.448 pts onto agency rules). Municipalities should avoid this. They should grant street-level teams documented discretionary problem-solving protocols, together with cross-OPD ombudsman escalation authority for complex citizen cases.

4.4. Limitations and future research

Several limitations bound our inferences. The portal sample is capped per portal and is not random. The highlight, repair, and priority results are observational and may reflect selection. Tiers 1B, 2B, 2C, 2D, and 3 re-use archived data from the United States, China, and Italy, which limits what they say about Indonesia, and the experimental mediators were measured after treatment. The fsQCA outcome is rank-based, its conditions are measured differently in the two provinces, and its pathways overlap across only 28 cases. These limits also mark out avenues for future inquiry. First, Tier 1A captures live REST API

telemetry across 16 West Java portals (indexing 26,551 datasets), and Tier 2A covers all 38 East Java SP4N-LAPOR! jurisdictions. Automated longitudinal API observatories could be expanded across outer-island Indonesian provinces: Sumatra, Kalimantan, Sulawesi, Maluku, and Papua. That would enable dynamic panel tracking of portal reforms over multi-year electoral cycles. Second, the three archived randomized experiments (N = 5,999 evaluations) offer internal validity on symbolic versus substantive disclosure, popular storytelling mediation, and frontline blame attribution. A next step is to embed field randomized controlled trials directly inside live Indonesian *Satu Data* portals and SP4N-LAPOR! municipal desks, testing whether pairing visual storytelling briefs with verified photo-audited ticket closure durably shifts neighborhood epistemic trust.

Third, comparative public-administration research should investigate how municipal data intermediaries translate raw municipal APIs and grievance logs into collective accountability claims across decentralized democracies.[16,23,76] They include local investigative journalists, university civic-data clinics, neighborhood women's and youth associations, and legal-aid paralegals. Digital hotline text corpora could also be linked with ethnographic observation at municipal command centers (war rooms) and subdistrict (*kecamatan*) frontline service desks, which would show in real time how caseworkers negotiate algorithmic triage scores, political attention spikes,[74] and citizen emotional appeals. Finally, subnational governments are rapidly integrating large language models and automated summarization into citizen portals and open-data chatbots.[5,19,28,77] Audits are needed. One question is whether generative interfaces democratize popular data storytelling for non-elite citizens. Another is whether they add new layers of hallucinated technocratic reassurance. Both answers matter for safeguarding democratic epistemic trust.

5. Conclusion

Dashboards alone do not build trust. Municipal open-data dashboards and digital citizen-complaint portals are unlikely to earn citizen epistemic trust through bulk dataset dumping, symbolic voluntary-transparency announcements, or self-selected satisfaction banners. The evidence spans 274,205 public records from 16 live Indonesian municipal Open-Data portals and 38 East Java SP4N-LAPOR! jurisdictions, together with archived data on 254,257 municipal 12345 hotline tickets, 3,655 census-tract maintenance panels, three randomized survey experiments, and a 28-regime four-value fsQCA synthesis. The pattern is conditional. Technocratic data storytelling appears more likely to earn citizen trust when intelligible, citizen-centric curation is coupled with substantive performance disclosure, equitable repeat-grievance closure, proactive neighborhood maintenance, and accountable street-level bureaucratic discretion.

6. Declarations

Statement on the Use of Artificial Intelligence

None. The authors declare that no generative artificial intelligence tools were used in the design, analysis, or writing of this manuscript.

Author Contribution Statement

Conceptualization: I.A. Methodology: I.A. Software: I.A. Validation: I.S. Formal analysis: I.A. Investigation: I.A. Resources: I.A. Data curation: I.A. Writing – original draft: I.A. Writing – review & editing: I.S., H.P.P. Visualization: I.A. Supervision: H.P.P. Project administration: I.A.

Funding Statement

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Conflict of Interest / Competing Interests

The authors declare no financial, commercial, political, or institutional competing interests.

Data Availability Statement

The portal telemetry, the East Java SP4N-LAPOR! records, the harmonized CSV matrices, the SHA-256 manifest (data/raw_data_sha256_manifest_oaijss8.json), the Python scripts, and the JSON analytical outputs are kept in the project replication package (Complete_OJS_Submission_Package_OAIJSS8.zip). The archived datasets re-used in Tiers 1B, 2B–2D, and 3 are available from the Harvard Dataverse under the identifiers cited in Section 2.1.

Ethics Approval and Consent to Participate

This study analyzes only publicly accessible open-data portal records, official aggregated municipal grievance statistics, and open replication datasets archived on the Harvard Dataverse. The authors collected no data from human participants. Respondent keys in the Tier 3C archive were hashed and free-text demographic fields were purged before analysis, and no personally identifiable records were retained.

Consent for Publication

Not applicable. All analyzed records are publicly archived institutional telemetry or de-identified open replication data.

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