Bridging Digital Divides: Multi-Level Governance Transformation and Poverty Reduction in Post-Pandemic Indonesia

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ABSTRAK

Pandemi COVID-19 mempercepat transformasi tata kelola digital di seluruh dunia, tetapi bukti sistematis mengenai efektivitasnya dalam mengurangi kemiskinan di negara berkembang dengan sistem tata kelola multi-level (MLG) yang kompleks masih terbatas. Penelitian ini mengkaji bagaimana transformasi digital dalam koordinasi MLG memengaruhi keberhasilan pengurangan kemiskinan di Indonesia pasca-pandemi (2020–2024). Menggunakan Systematic Review with Thematic and Bibliographic Analysis (SR-TBA) yang memadukan tinjauan sistematis sesuai PRISMA, sintesis tematik induktif, visualisasi co-occurrence kata kunci, serta validasi dari delapan praktisi tata kelola, kami menyaring 294 rekaman Scopus dan mempertahankan 32 studi yang memenuhi kriteria ketat. Hasil mengidentifikasi lima klaster tematik utama: Infrastruktur Tata Kelola Digital, Digitalisasi Sistem Perlindungan Sosial, Mekanisme Koordinasi Multi-Level, Pemberdayaan Masyarakat, dan Percepatan Respons Pandemi. Sebanyak 81,3% studi melaporkan hubungan positif antara intervensi digital dan indikator pengurangan kemiskinan. Namun, hampir separuhnya menyuarakan kekhawatiran keberlanjutan finansial, dan triangulasi pakar menunjukkan perbedaan sistematis antara kerangka akademik dan praktisi terkait hasil koordinasi. Kontribusi teoretis meliputi: Kerangka Efektivitas Kondisional, Tesis Bias Optimisme Terstruktur, serta Mekanisme Jebakan Keberlanjutan khas konteks Indonesia pasca-pandemi. Implikasi praktis mencakup desain program berorientasi siklus hidup, diferensiasi investasi digital berdasarkan wilayah, dan penargetan perlindungan sosial yang lebih tepat.

ABSTRACT

The COVID-19 pandemic accelerated digital governance transformation worldwide, yet systematic evidence on its effectiveness for poverty reduction within developing countries' complex multi-level governance (MLG) systems remains limited. This study investigates how digital transformation in MLG coordination affects poverty reduction effectiveness in post-pandemic Indonesia (2020–2024). Employing a Systematic Review with Thematic and Bibliographic Analysis (SR-TBA) — integrating a PRISMA-compliant systematic review, inductive thematic synthesis, supplementary keyword co-occurrence visualisation, and expert validation from eight governance practitioners — we screened 294 Scopus records and retained 32 studies meeting rigorous inclusion criteria. Five thematic clusters were identified: Digital Governance Infrastructure, Social Protection Systems Digitalisation, Multi-Level Coordination Mechanisms, Community Empowerment, and Pandemic Response Acceleration. Based on the reviewed studies, 81.3% reported positive associations between digital interventions and poverty-reduction indicators. However, nearly half the corpus raised financial sustainability concerns, and expert triangulation revealed systematic divergence between academic and practitioner framings of coordination outcomes. Three theoretical contributions are advanced: a Conditional Effectiveness Framework specifying jointly necessary preconditions for durable gains; a Structured Optimism Bias thesis explaining field-level evidence distortion; and a Sustainability Trap mechanism localised to the Indonesian post-pandemic context. Findings carry direct implications for lifecycle-oriented programme design, geographic differentiation in digital investment, and social protection targeting policy.

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INTRODUCTION

Background and Global Context

The intersection of digital transformation and governance has emerged as one of the most consequential frontiers in contemporary public administration, with particular significance for poverty reduction in the developing world. The COVID-19 pandemic fundamentally accelerated digital adoption across government sectors, creating unprecedented opportunities for governance innovation while simultaneously exposing digital divides and implementation vulnerabilities that demand systematic investigation (Gumah & Aziabah, 2020; Kudyba, 2020). Digital governance — encompassing the application of information and communication technologies (ICT) to enhance government operations, improve service delivery, and strengthen democratic accountability — promises to address longstanding coordination failures in multi-level governance systems (Dunleavy et al., 2006; Klievink et al., 2016). Yet the theoretical understanding of how digital technologies mediate governance relationships and influence poverty-reduction outcomes remains underdeveloped, particularly in developing-country contexts where institutional capacity constraints, infrastructure deficits, and cultural factors create distinct implementation dynamics (Heeks, 2018; Luna-Reyes & Gil-Garcia, 2014).

Digital governance and poverty reduction are connected through multiple pathways. Direct service delivery improvements enhance access to social protection, healthcare, and essential services (Muzareba, 2021; Roztocki et al., 2019). Economic empowerment pathways operate through improved market access and reduced transaction costs (Duncombe & Boateng, 2009). Institutional empowerment mechanisms strengthen community capacity for collective action and governance participation. However, the specific conditions under which these pathways operate — and the structural barriers that impede them — remain poorly specified in the existing literature, particularly for archipelagic, decentralised contexts such as Indonesia.

Indonesian Context and Significance

Indonesia presents an analytically compelling case for examining digital governance and poverty reduction. As the world's largest archipelagic state, with over 17,000 islands and 270 million people, it faces extraordinary coordination challenges that digital technologies may help address (Vel & Bedner, 2015). Its decentralised governance system, implemented since 1998, grants significant autonomy to provincial and district governments while requiring coordination mechanisms to ensure policy coherence (Aspinall & Mietzner, 2019). The country's Village Fund programme — providing direct transfers to over 74,000 villages — represents one of the world's largest decentralised development instruments and creates unique opportunities for village-level digital innovation (Lewis, 2006).

Indonesia's poverty reduction trajectory has been substantial: rates declined from 23.4% in 1999 to 9.8% in 2018, before rising to 10.2% during the pandemic (BPS-Statistics Indonesia, 2022). Poverty remains concentrated in rural areas and eastern regions, creating targeting and coordination challenges where digital governance may add greatest value (Sumner et al., 2020). The pandemic period (2020–2024) represents a critical juncture: government responses required rapid digitalisation of service delivery, emergency coordination mechanisms, and social protection systems — generating quasi-natural experiments and substantial research attention that provide rich material for systematic analysis.

Research Problem and Knowledge Gaps

Despite growing policy investment and implementation experience, academic understanding of digital governance effectiveness in poverty reduction remains fragmented. Five compounding

gaps constrain actionable synthesis. First, theoretical underspecification: dominant conceptual models were developed in high-income, institutionally stable contexts and do not adequately account for multi-level governance dynamics, customary institutional arrangements, or structural resource constraints in developing-country settings (Luna-Reyes & Gil-Garcia, 2014; Heeks, 2018). Second, causally inadequate evidence: single-site case studies dominate the literature and are structurally ill-suited to identifying consistent mechanisms or informing scalable policy (Savoldelli et al., 2014). Third, methodological bifurcation: traditional systematic reviews and bibliometric analyses address complementary questions but are rarely integrated with practitioner knowledge. Fourth, a sustainability blind spot: research predominantly documents initial implementation outcomes, systematically under-representing the post-deployment sustainability challenges that practitioners routinely encounter. Fifth, academic–practitioner framing divergence: publication and access biases generate a research base that over-documents successful implementations, creating misleading evidence about coordination effectiveness.

Research Questions and Objectives

This study addresses the primary research question: How does digital transformation in multi-level governance coordination affect the effectiveness of poverty reduction programmes in post-pandemic Indonesia (2020–2024)? This is operationalised through six secondary questions covering implementation mechanisms (RQ1), technologies used (RQ2), effectiveness extent (RQ3), challenges and barriers (RQ4), success factors (RQ5), and pandemic-specific acceleration effects (RQ6). The objectives are to: (a) synthesise the empirical evidence through a rigorous systematic review; (b) identify thematic clusters characterising this research domain; (c) triangulate academic findings against practitioner knowledge to surface framing gaps; and (d) advance theoretical frameworks that can orient both future research and evidence-informed policy design.

Literature Review

Digital Governance Theory

Digital governance theory has evolved through three generational shifts since the mid-1990s. The first generation, centred on e-government, conceptualised the technology–government relationship primarily in transactional terms: digital systems automate processes, reduce costs, and expand access (Moon, 2002; Heeks, 2001). The second generation, Digital-Era Governance (Dunleavy et al., 2006), reintegrated political and institutional dimensions, recognising that outcomes are institutionally contingent rather than technologically determined. The third generation — contextualisation — explicitly addresses heterogeneous institutional contexts and non-linear implementation pathways in developing-country settings (Janowski, 2015; Heeks, 2018).

The foundational theoretical debate concerns the relative weight of technological versus institutional factors in governance transformation. Technological determinist positions, pervasive in policy documents though rarely stated in their strong form, hold that digital systems produce predictable governance improvements when deployed. The institutionalist counter-position argues that digital technologies are interpretively flexible: the same platform may enhance accountability in one governance context while reinforcing existing power asymmetries in another (Avgerou, 2010; Walsham, 2017). A third, increasingly prominent position synthesises both by distinguishing between affordances — structured possibilities for action — and their actualisation through institutional practices and political choices (Leonardi, 2011; Orlikowski & Scott, 2008). This

capabilities-actualisation framework has particular utility for developing-country contexts, where institutional capacity deficits and coordination failures constrain the realisation of digital potential.

Multi-Level Governance Theory and Digital Coordination

Multi-Level Governance (MLG) theory emerged from European integration studies as a framework for understanding how policy authority is distributed across and negotiated between multiple governance levels and non-state actors (Hooghe & Marks, 2001, 2003). The post-functionalist strand emphasises that MLG outcomes depend on political mobilisation patterns as much as functional efficiency (Hooghe & Marks, 2020; Börzel, 2020). Indonesia's decentralisation since 1998 created a formally multilevel system while leaving significant institutional capacity asymmetries between central and subnational levels — asymmetries that profoundly affect digital governance implementation (Vel & Bedner, 2015; Aspinall & Mietzner, 2019).

Digital technologies carry theoretical potential to address MLG coordination failures through shared databases, interoperable platforms, and real-time reporting mechanisms (Klievink et al., 2016; Conteh & Harding, 2023). However, the evidence on whether these affordances translate into sustained coordination improvements in developing-country contexts is mixed. The infrastructure–practice gap — between the existence of coordination platforms and their operational use — is a recurring empirical finding that the theoretical literature has not yet adequately incorporated.

Poverty Reduction, Social Protection, and the ICT4D Debate

The theoretical understanding of poverty has shifted from income-centric approaches toward multi-dimensional frameworks emphasising capability deprivations (Sen, 1999). This reframing has governance implications: if poverty is constituted by capability deficits, state institutions must address structural barriers beyond income transfers. Social protection programmes — including Indonesia's Programme Keluarga Harapan (PKH) conditional cash transfer and the Unified Database — represent the primary state mechanism for poverty reduction, and their digitalisation has received substantial research attention (Gentilini et al., 2020).

The Information and Communication Technology for Development (ICT4D) literature has evolved from early techno-optimism toward a more nuanced assessment of contextual determinants of digital impact (Heeks, 2018; Qureshi, 2015). Digital governance in poverty reduction contexts faces a fundamental tension between administrative efficiency gains — which digitalisation achieves reliably — and inclusion improvements for the most marginalised populations — which require deliberate design choices that automated systems do not inherently produce (Avgerou, 2010; Kleine, 2013). This tension is central to the present study's interpretive framework.

RESEARCH METHODS

Research Design

This study employs a Systematic Review with Thematic and Bibliographic Analysis (SR-TBA) design, integrating three distinct but sequentially connected analytical operations: (1) a PRISMA-compliant systematic literature review as the primary evidential layer; (2) inductive thematic analysis for mechanism identification and theoretical interpretation; and (3) limited bibliographic analysis of keyword co-occurrence patterns from the 32-study corpus, positioned explicitly as exploratory and illustrative. A fourth component — expert validation with eight

governance practitioners — provides practitioner triangulation. Components 1 and 2 carry the primary evidential burden; components 3 and 4 provide supplementary context and boundary-condition identification. An earlier manuscript version labelled this design 'Scientometric Literature Network Analysis (SLNA)'; following peer review, the SR-TBA label is adopted as more precisely reflecting the study's analytical claims, particularly regarding the limitations of bibliometric inference from a 32-document corpus.

Database, Search Strategy, and Study Selection

The systematic search was executed exclusively in Scopus (Elsevier) on 15 January 2025. Scopus was selected for its comprehensive coverage of Indonesian and Southeast Asian social science publications and its structured metadata supporting both screening and keyword analysis (Mongeon & Paul-Hus, 2016). The search applied a four-concept Boolean structure to TITLE-ABS-KEY fields: (C1) digital governance and e-government terminology AND (C2) multi-level governance and intergovernmental coordination concepts AND (C3) poverty reduction and social protection terms AND (C4) Indonesian geographic and temporal identifiers (PUBYEAR 2020–2024), yielding 294 initial records. Grey literature was excluded from the systematic corpus because the research question requires peer-reviewed evidence amenable to quality assessment; practitioner knowledge is incorporated through the expert validation component.

Study selection was operationalised through a PICO framework: Population (Indonesian governance institutions across national, provincial, district, and village levels); Intervention (digital governance initiatives and ICT-mediated coordination mechanisms); Context (post-pandemic Indonesia, January 2020–December 2024); Outcome (any reported indicator of poverty reduction, programme coverage, targeting accuracy, service delivery efficiency, or coordination quality). Eight pre-specified eligibility criteria (P1–P8) covered publication type, language, temporal scope, geographic scope, digital governance focus, poverty/welfare outcome dimension, minimum quality threshold (MMAT ≥ 4/10), and data accessibility.

Two-stage screening was conducted independently by both authors using Covidence systematic review software. Stage 1 (title/abstract, criteria P1–P4) excluded 186 records: 116 (62.4%) for temporal scope, 45 (24.2%) for insufficient governance focus, and 25 (13.4%) for non-Indonesian context or language. Stage 2 (full-text, criteria P5–P8) excluded 76 further records: 38 (50.0%) for absence of poverty/welfare outcomes, 25 (32.9%) for quality below the MMAT threshold, and 13 (17.1%) for inaccessible full texts. The final corpus comprised 32 studies (18.9% inclusion rate). Inter-rater agreement was Cohen's κ = 0.83 at Stage 2 and κ = 0.81 at Stage 1, indicating substantial agreement (Landis & Koch, 1977); all 25 disagreements were resolved by consensus.

Quality Assessment and Data Extraction

All 32 included studies were assessed using a modified Mixed Methods Appraisal Tool (MMAT) adapted for governance and policy research (Hong et al., 2018), scoring ten items across five dimensions: conceptual clarity; sampling appropriateness; data collection rigour; analytical transparency; and contextual relevance to Indonesian governance. The mean quality score was 6.8 ± 1.4 (range: 4–10). High-quality studies (scores 8–10, n = 12) formed the primary evidence base; medium-quality studies (scores 6–7, n = 16) provided corroborating evidence; acceptable-quality studies (scores 4–5, n = 4) were noted but not used as principal evidence for theoretical claims. A structured data extraction form was developed and piloted on five studies; extraction covered study characteristics, governance level, sector, digital intervention type, outcome measures, reported effect sizes, sustainability observations, and coordination mechanisms.

Thematic Analysis and Bibliographic Visualisation

Thematic synthesis followed a six-phase iterative process adapted from Braun and Clarke (2006) and the qualitative evidence synthesis tradition (Carroll et al., 2013): familiarisation, initial coding, theme development, theme review, theme definition, and report writing. An audit trail was maintained; all coding decisions are available from the corresponding author on request. The supplementary keyword co-occurrence analysis used VOSviewer v.1.6.20 (van Eck & Waltman, 2014) with a minimum co-occurrence threshold of ≥ 3, yielding 47 keywords from the 32-document corpus. This analysis is explicitly positioned as orientation-providing for the thematic structure, not as independent bibliometric evidence about field-level knowledge architecture — a corpus of this scale falls substantially below standard minimum thresholds for such inference (Aria & Cuccurullo, 2017; Cobo et al., 2011).

Expert Validation

Eight governance practitioners participated in a two-stage validation process: (1) a structured Likert questionnaire (five items per cluster, 1–5 scale) assessing the five thematic clusters; and (2) semi-structured interviews with mandatory critical-probing questions designed to elicit qualification, contradiction, and horizon-expansion as well as confirmation. Participants were recruited purposively across four institutional categories: local government implementers (n = 2), national policy analysts (n = 2), NGO/CSO practitioners (n = 2), and academic-practitioners (n = 2). Seven bias mechanisms were documented, including confirmatory questionnaire design (Bias B1), social desirability (Bias B2), and geographic non-representativeness of the Java-based panel (Bias B7). The confirmatory questionnaire stage carries known agreement biases that cannot be fully resolved; accordingly, agreement rates are reported as indicators of practitioner recognisability rather than independent analytical validation. The analytically significant contributions derive from interview elaboration and contradiction data, which is presented with equal structural prominence alongside agreement statistics.

RESULTS AND DISCUSSIONS

Study Selection and Corpus Characteristics

The 32 included studies were published between 2020 and 2024: 1 study in 2020, 8 in 2021, 8 in 2022, 5 in 2023, and 10 in 2024. This temporal pattern is consistent with a three-phase narrative — crisis-driven adoption (2020–2021), systematic consolidation (2022–2023), and strategic optimisation (2024) — but the small annual cell sizes preclude statistical inference, and the distribution may also reflect publication lag. Geographically, provincial/regional analyses dominated (12 studies, 37.5%), followed by local/village-level governance (10, 31.3%), national-level analysis (8, 25.0%), and multi-level comparative work (2, 6.3%). Seventy-eight percent of studies were based in Java or Sumatra. This geographic concentration is a structural finding: the evidence base is not representative of Indonesia's poverty distribution, which is disproportionately concentrated in eastern regions and outer islands.

Sectorally, agriculture and fisheries represented the largest category (8 studies, 25.0%), followed by social protection (7, 21.9%), public administration (6, 18.8%), community development (5, 15.6%), environmental governance (4, 12.5%), and education/capacity building (2, 6.3%). Quality assessment yielded a mean MMAT score of 6.8 ± 1.4 (range: 4–10): 12 studies (37.5%) at high quality (8–10); 16 studies (50.0%) at medium quality (6–7); 4 studies (12.5%) at acceptable quality (4–5). Study designs were predominantly observational: case studies (71.9%), cross-sectional surveys (15.6%), and mixed-methods designs (12.5%). Table 1 summarises the corpus characteristics.

Table 1.
Corpus Characteristics: Distribution by Governance Level, Sector, and Study Quality (N = 32)

Dimension	Category	n	%	Note
Governance Level	Provincial/Regional	12	37.5	Dominant analytical focus
	Local/Village	10	31.3	Incl. Smart Banjar studies
	National	8	25.0	Incl. PKH, Unified Database
	Multi-level comparative	2	6.3	
Sector	Agriculture & fisheries	8	25.0	
	Social protection	7	21.9	TC2 primary evidence
	Public administration	6	18.8	
	Community development	5	15.6	
	Environmental governance	4	12.5	
	Education/capacity building	2	6.3	
Study Quality (MMAT)	High (8–10)	12	37.5	Primary evidence tier
	Medium (6–7)	16	50.0	Corroborating evidence
	Acceptable (4–5)	4	12.5	Not used as principal evidence

Source: Author Processed

Note. Source: Authors' analysis based on Scopus data (2020–2024). One study may contribute to multiple sector categories; percentages sum within dimension. 78% of studies based in Java or Sumatra. Study design distribution: case studies 71.9%, cross-sectional surveys 15.6%, mixed-methods 12.5%.

Primary Outcome Evidence

Across the corpus, 26 of 32 studies (81.3%) reported positive associations between digital governance interventions and poverty-reduction indicators; 2 studies (6.3%) reported mixed outcomes; 4 studies (12.5%) focused on implementation processes without measuring outcomes directly. This 81.3% figure must be interpreted in light of publication bias — studies documenting positive outcomes are more likely to be indexed and accessible (Dwan et al., 2008). It reflects the distribution of available evidence in the indexed literature, not the prevalence of positive outcomes in implementation practice.

Service delivery is the most consistently reported outcome domain. Twenty-two studies (68.8%) documented increased accessibility; 18 studies (56.3%) reported reduced processing times; and 16 studies (50.0%) noted transparency and accountability gains. Among studies reporting quantified effect sizes: eight studies documented processing time reductions in the range of 30–65%; six studies reported administrative cost savings of 15–40%; and five studies reported programme coverage expansions of 25–80%. These ranges reflect genuine contextual variation across distinct studies under specific conditions — they represent the distribution of reported outcomes, not pooled average estimates or national-level figures. Targeting and coverage

improvements were reported in 20 studies (62.5%), with a critical qualification: as identified through expert validation (E3, NGO implementation practitioner), digitalisation tends to accelerate both correct targeting and pre-existing exclusion errors. Studies in the corpus measured over-inclusion reduction (ghost beneficiaries) far more systematically than under-inclusion, which limits conclusions about overall accuracy improvement.

Sustainability concerns appeared consistently across the corpus: financial sustainability challenges were identified in 14 studies (43.8%), technical maintenance problems in 10 studies (31.3%), and institutional continuity risks in 8 studies (25.0%). The presence of financial sustainability concerns in nearly half the corpus indicates a systemic pattern, not a peripheral implementation imperfection.

Thematic Clusters: Five Evidence Domains

Framework synthesis identified five thematic clusters representing the organisational structure of the 32-study corpus. These clusters describe the distribution of research focus within the reviewed literature and do not constitute a structural map of the broader field.

TC1 — Digital Governance Infrastructure (n = 9, 28.1%; MMAT mean 6.9): Studies examining technical foundations, platform architectures, system interoperability, and institutional configurations through which digital capabilities are established across governance levels. Nine studies documented ICT-related accessibility improvements; seven of nine reported persistent interoperability challenges between platforms operating at different governance levels. Expert triangulation (E3) emphasised that the principal barriers in this cluster are human-systems capacity deficits — particularly digital literacy and staff competency — rather than hardware availability.

TC2 — Social Protection Systems Digitalisation (n = 7, 21.9%; MMAT mean 7.1): Studies examining how digital technologies transform the design, targeting, delivery, and monitoring of social protection programmes. Five high-quality studies (MMAT ≥ 7) documented meaningful ghost-beneficiary reductions in PKH and the Unified Database, attributable to automated cross-verification against population registries. Four studies reported faster digital transfer processing. Critical qualification (E3): digitalisation accelerates both correct targeting and pre-existing exclusion errors — studies disproportionately measured over-inclusion reduction without systematic measurement of under-inclusion, limiting conclusions about overall system accuracy.

TC3 — Multi-Level Coordination Mechanisms (n = 6, 18.8%; MMAT mean 6.5): Studies addressing coordination between governance levels. Four studies reported vertical coordination improvements; five reported enhanced horizontal integration across sectors. A substantive expert finding modified the academic framing: E1 (local government implementer) explicitly characterised this cluster as a 'coordination failure cluster' rather than a coordination mechanism cluster. E2 (national policy analyst) corroborated this assessment, observing that shared databases frequently exist 'only on paper' — each implementing agency maintains its own operational version with inconsistent data standards. Both framings are reported; the academic–practitioner divergence is a finding in its own right.

TC4 — Community Empowerment and Village Governance (n = 5, 15.6%; MMAT mean 6.3): Studies documenting digital innovation in village governance, including the Smart Banjar system in three Bali-based studies. Smart Banjar integrates Bali's traditional adat governance structures with digital platforms for transparency and community participation. Generalisability boundary: all five studies derive from communities in Java or Bali with pre-existing digital capacity and institutional readiness. The most significant expert contradiction in the entire study came from

E4 (CSO practitioner): 'Most villages I work with are not empowered by these programmes — they are bypassed.' This suggests systematic selection bias in the published literature toward high-capacity communities.

TC5 — Pandemic Response and Digital Acceleration (n = 5, 15.6%; MMAT mean 6.7): Studies addressing digital governance responses to COVID-19 across 2020–2024. These studies document emergency-driven digitalisation of social protection delivery, coordination mechanisms, and public health programmes. E3 proposed distinguishing three temporally distinct sub-clusters — emergency response (2020–2021), consolidation (2022–2023), and institutionalisation (2024) — a theoretically plausible but empirically underspecified distinction from this corpus, treated here as interpretive framing rather than a statistical finding. The temporal distribution of the corpus (1→8→8→5→10 studies per year) is consistent with this framing but cannot establish it.

Table 2.
Five Thematic Clusters: Study Distribution, Evidence Strength, and Key Boundary Conditions (N = 32)

Code	Cluster	n (%)	MMAT	Key Finding & Boundary Condition
TC1	Digital Governance Infrastructure	9 (28.1%)	6.9	ICT accessibility gains reported; interoperability failures persistent; binding constraint is human capacity, not hardware
TC2	Social Protection Digitalisation	7 (21.9%)	7.1	Ghost-beneficiary reduction well-documented (5 high-MMAT studies, PKH/Unified Database); digitalisation may accelerate exclusion errors; under-inclusion not systematically measured
TC3	Multi-Level Coordination	6 (18.8%)	6.5	Coordination improvements reported academically; practitioners frame as 'coordination failure cluster'; shared databases exist on paper but not in practice (E1, E2)
TC4	Community Empowerment	5 (15.6%)	6.3	All evidence from high-capacity Java/Bali communities; E4 (CSO): majority of villages bypassed, not empowered — most significant expert contradiction
TC5	Pandemic Response	5 (15.6%)	6.7	Crisis-driven digitalisation documented; pandemic created path dependencies with structural sustainability deficits; three-phase structure is interpretive framing, not a statistical finding

Source: Author Processed

Note. Source: Authors' analysis based on thematic synthesis of 32 included studies and expert validation interviews. One study may contribute to multiple clusters. Percentages reflect distribution of research focus within this corpus. MMAT = mean quality score of studies with primary focus on cluster (scale 0–10).

Expert Validation Results

Questionnaire agreement rates across the five clusters were: TC1 Digital Governance Infrastructure, 100%; TC3 Multi-Level Coordination, 100%; TC2 Social Protection, 87.5%; TC4 Community Empowerment, 87.5%; TC5 Pandemic Response, 75.0%. These figures indicate practitioner recognisability of the academic clusters, not independent analytical validation. Four

types of expert contribution were documented: confirmation, elaboration, qualification, and contradiction. The most analytically significant contributions came from the final two categories.

Two expert findings materially modified the academic analysis. First, E1's reframing of TC3 as a coordination failure cluster — corroborated by E2's observation about nominal database sharing — reveals that the published literature systematically over-documents coordination infrastructure while under-documenting the persistent fragmentation practitioners experience. Second, E4's account of village-level bypassing in TC4 exposes a geographic selection bias in the corpus: the published evidence documents community empowerment primarily in contexts where it has already succeeded, producing a systematically optimistic picture of digital governance at the community level. Both findings are treated as substantive results that constrain the generalisability of the academic evidence base, and both are identified as priority targets for future research.

DISCUSSION

What the Evidence Base Can and Cannot Support

Before interpreting the thematic findings, this discussion establishes the epistemic boundaries of the 32-study corpus. The corpus is dominated by observational case studies (71.9%) without counterfactual designs; it is geographically concentrated in Java and Sumatra (78%); it is subject to publication bias toward positive implementations (Dwan et al., 2008); and it contains no longitudinal studies extending beyond 18 months. These features mean that the evidence supports pattern description and conditional hypothesis generation, not causal estimation or national prevalence claims. All interpretive claims in this discussion honour these constraints: 'reported in X studies' rather than 'digital governance achieves', and 'associated with' rather than 'causes'.

Within these boundaries, the corpus documents a meaningful and internally consistent pattern: studies in which digital governance interventions were introduced consistently reported improvements in service accessibility, targeting accuracy, and coordination effectiveness across diverse programmatic and geographic contexts. This consistency, replicated across 26 of 32 studies and multiple thematic clusters, constitutes empirically grounded basis for cautious theoretical and policy reasoning — provided that reasoning is explicitly conditioned on the structural preconditions under which the documented improvements occurred.

Service Delivery Improvement: Consistent Pattern, Conditional Mechanism

Service delivery improvement is the most consistently reported outcome: 22 studies (68.8%) documented accessibility increases, 18 (56.3%) reported reduced processing times, and 16 (50.0%) noted transparency gains. These findings align with Digital-Era Governance theory's predictions regarding joined-up government (Dunleavy et al., 2006) and with analogous findings from Sub-Saharan Africa and South Asia (Muzareba, 2021; Roztocki et al., 2019). The quantified effect sizes — processing time reductions of 30–65% reported in eight studies, administrative cost savings of 15–40% in six studies, coverage expansions of 25–80% in five studies — are substantively meaningful at the study level. They should not be aggregated: the wide ranges reflect genuine contextual variation, and the studies from which they derive represent specific, often high-performing contexts rather than the Indonesian digital governance system as a whole.

A theoretically important mechanism identified across multiple studies is geographic reach expansion: the largest proportional coverage gains were documented in remote and peri-urban areas where conventional service delivery faced structural access constraints. This aligns with

the infrastructure leapfrogging hypothesis from development informatics (Heeks, 2018): digital platforms can substitute for absent formal channels rather than merely supplementing existing ones, making the gains most transformative precisely where analogue alternatives are weakest. This conditional mechanism — digital governance performs best where physical alternatives are most limited — has direct implications for implementation prioritisation but is rarely incorporated into planning frameworks.

Targeting and Coverage: The Inclusion–Efficiency Distinction

Twenty studies (62.5%) reported improvements in beneficiary identification accuracy. This finding requires substantive qualification before it can inform policy. Expert validation (E3) identified that digitalisation tends to accelerate both correct targeting and pre-existing exclusion errors: automated verification reduces ghost beneficiaries (over-inclusion) without correcting the data quality and definitional limitations that produce under-inclusion. The corpus measured over-inclusion reduction far more systematically than under-inclusion; this measurement asymmetry means that reported accuracy gains likely overstate actual system improvement.

This connects to a broader theoretical tension between administrative efficiency and social inclusion (Sumner et al., 2020). Digital systems optimise for the former more naturally: they excel at excluding ineligible claimants through automated verification, but the populations most in need of inclusion — those without documentation, irregular residential status, or limited digital literacy — are precisely those least likely to be captured by automated identification systems. The corpus provides insufficient evidence to assess whether digital governance in Indonesia has produced net improvements in inclusion rates for the most marginalised populations; this is identified as the study's most consequential research gap.

The Academic–Practitioner Framing Divergence: A Structural Finding

The most analytically significant finding from expert validation is not the aggregate agreement rates but the systematic divergence between academic and practitioner framings of coordination outcomes. E1's characterisation of the coordination cluster as a 'coordination failure cluster', corroborated by E2's account of nominal database sharing, reveals a structural gap between what the literature describes — coordination infrastructure and mechanisms — and what practitioners experience — persistent fragmentation and data dissonance.

This divergence is not incidental. It constitutes the study's second theoretical contribution — the Structured Optimism Bias thesis: the digital governance literature is subject to a systematic production bias in which publication incentives, project evaluation cycles, and implementing-agency research access collectively generate a research base that over-represents successful implementations. This bias operates at the field level and cannot be corrected by improving individual study quality. Its policy consequence is direct: a literature that over-documents coordination success will under-prepare policymakers for the coordination failures they will encounter. The methodological implication is structural: practitioner triangulation should be a standard design requirement for systematic reviews of digital governance effectiveness, not optional enrichment.

The Sustainability Trap: A Locally Specified Pattern

Financial sustainability concerns appeared in 14 studies (43.8%), technical maintenance problems in 10 (31.3%), and institutional continuity risks in 8 (25.0%). These three concern types are not independent; they constitute a theoretically coherent and self-reinforcing pattern: financial constraints limit technically capable staff retention; staff turnover reduces institutional knowledge for system maintenance; systems falling into disrepair lose the political support that

might otherwise generate maintenance budgets. This cycle — the study's third theoretical contribution — constitutes the Sustainability Trap.

The e-government evolution literature has anticipated that deployment success does not guarantee institutionalisation (Janowski, 2015; Heeks, 2001). This study advances that prediction by characterising the structural entry point: the trap is entered at procurement. Programmes approved without recurrent maintenance budgets, staff development plans, and technology refresh cycles are structurally predisposed to decay before institutionalisation occurs. This is a budget and regulatory design problem amenable to intervention — not a post-deployment failure of implementation quality. The corpus localises this pattern specifically for Indonesia's post-pandemic context, where pandemic-era emergency mandates compressed adoption cycles and created path dependencies that are now generating sustainability deficits as emergency-era momentum fades.

Three Theoretical Contributions

This study makes three theoretically distinct contributions, each of which advances existing frameworks rather than merely applying them. The first is the Conditional Effectiveness Framework. Existing digital governance theory oscillates between transformative optimism (Dunleavy et al., 2006) and institutional determinism (Heeks, 2018), with the contingency strand acknowledging context-dependency without specifying its structure. This study advances the contingency strand by identifying three jointly necessary conditions — connectivity, maintenance capacity, and political continuity — that determine whether digital governance investments produce durable poverty-reduction outcomes. The corpus provides no examples of sustained effectiveness in the absence of all three conditions, and several documented cases of post-deployment decay when one or more conditions were absent. The framework is falsifiable: future longitudinal studies in low-connectivity or politically unstable contexts can directly test its boundary conditions.

The second contribution is the Structured Optimism Bias thesis (described above), which characterises the field-level mechanism generating a research base that systematically misrepresents coordination effectiveness and sustainability challenges, with direct consequences for evidence-based policy design. The third is the Sustainability Trap as a locally specified theoretical mechanism, which translates abstract evolution theory into a describable pattern with identifiable intervention points at procurement — moving the concept from diagnostic to prescriptive utility.

Policy Implications

Three policy reorientations follow directly from the calibrated evidence. First, deployment logic must be replaced by lifecycle logic. The sustainability trap is entered at procurement, not during implementation. Budget frameworks requiring recurrent maintenance allocations as conditions of digital programme approval would address the most predictable failure mode in the current programme architecture. Second, geographic differentiation is not optional. Extending digital programmes to eastern Indonesia without first establishing minimum connectivity and literacy preconditions does not close the poverty-governance gap — it channels resources through systems that bypass the most marginalised populations. The 78% Java-Sumatra concentration of existing evidence means policymakers currently lack the empirical knowledge to design effective programmes for the regions where poverty is greatest; investing in that evidence base is itself a policy priority. Third, efficiency gains must be distinguished from inclusion gains. The evidence supports ghost-beneficiary reduction in PKH and the Unified Database; it does not support improvement in inclusion rates for the most marginalised, and practitioner testimony

(E3) indicates that digitalisation may be accelerating exclusion errors. Targeting policy relying on digital verification without parallel investment in documentation access risks making an inequitable system more efficiently inequitable.

Limitations and Future Research

Five limitations bound the interpretation of these findings. First, corpus size: 32 studies supports systematic thematic synthesis but falls substantially below minimum thresholds for bibliometric field-structure inference. Second, publication bias: the 81.3% positive-outcome reporting rate reflects indexed literature distribution, not implementation prevalence. Third, geographic concentration: 78% of studies are from Java and Sumatra; the Conditional Effectiveness Framework is empirically grounded primarily in higher-capacity contexts, and its applicability to lower-capacity settings remains theoretical. Fourth, absence of longitudinal evidence: no study provides sustained observation beyond 18 months; sustainability claims are based on concern reporting, not observed outcomes. Fifth, expert panel composition: eight institutional actors, all Java-based, with no beneficiary-level voices.

Six research priorities emerge from these gaps: (1) longitudinal panel designs (minimum three years) tracking whether initial digital governance gains persist, intensify, or erode; (2) systematic under-inclusion measurement in social protection systems, targeting populations without documentation or digital literacy; (3) replication studies in low-connectivity eastern Indonesian contexts to establish boundary conditions for current effectiveness claims; (4) quasi-experimental designs exploiting natural variation in programme rollout; (5) practitioner-centred mixed methods beginning from implementation failure accounts; and (6) comparative country analysis extending the conditional effectiveness framework to analogous MLG systems in the Philippines, Vietnam, and Bangladesh.

CONCLUSIONS

This study addressed the primary research question — how digital transformation in multi-level governance coordination affects poverty reduction effectiveness in post-pandemic Indonesia — through a systematic review of 32 high-quality studies, inductive thematic synthesis, and practitioner triangulation. The answer the evidence supports is conditional, not categorical. Digital transformation is associated with measurable improvements in service delivery reach, social protection targeting efficiency, and inter-governmental information exchange — but these gains are neither uniform nor self-sustaining. They occur consistently where three conditions are jointly present: pre-existing connectivity and basic digital literacy; institutional capacity for system maintenance beyond the initial deployment phase; and political commitment sustained through electoral and personnel transitions. Where any condition is absent, the corpus documents non-materialisation of expected gains or post-deployment decay.

The six secondary research questions are answered as follows. Implementation is concentrated across five thematic clusters, primarily through e-government platforms, Unified Database systems, and digital transfer mechanisms, with pandemic-era emergency conditions compressing adoption cycles (RQ1–RQ2). Effectiveness evidence is strongest for social protection digitalisation — ghost-beneficiary reductions in PKH and the Unified Database are credibly documented in five MMAT ≥ 7 studies — while the 81.3% positive-reporting rate reflects indexed literature distribution, not implementation prevalence (RQ3). Three interacting structural barriers constitute the sustainability trap that is the most pervasive systemic challenge in the corpus (RQ4). The three jointly necessary conditions of the Conditional Effectiveness Framework represent the empirically grounded success factors this corpus supports (RQ5). The pandemic's most consequential governance effect was institutional — emergency mandates

created path dependencies with structural sustainability deficits now becoming visible as emergency-era momentum fades (RQ6).

Three theoretical contributions advance the existing literature: the Conditional Effectiveness Framework, which specifies the joint preconditions determining whether digital governance investments produce durable poverty-reduction outcomes and is directly falsifiable by future longitudinal research; the Structured Optimism Bias thesis, which identifies the field-level production mechanism systematically misrepresenting coordination effectiveness in the indexed literature; and the Sustainability Trap mechanism, which translates abstract evolution theory into a locally specified pattern with identifiable intervention points at procurement. Together, these contributions shift the practical question from 'does digital governance work?' to 'under what jointly specified conditions does it work, and what structural changes enable those conditions to be met?'

Indonesia's poverty reduction challenge is not abstract: 26 million Indonesians remain below the national poverty line, rural poverty in eastern regions runs at more than double the national average, and the COVID-19 pandemic exposed the fragility of targeting and delivery systems that digital governance was intended to strengthen. Against this backdrop, the calibration of evidence claims in this study is an ethical responsibility. Overclaiming effectiveness on the basis of 32 observational studies concentrated in high-capacity regions misleads resource allocation and sets implementation expectations the evidence cannot support. This study demonstrates that calibrated, conditional, and epistemically honest evidence synthesis — integrating systematic review, thematic analysis, and practitioner triangulation — produces more policy-actionable guidance than uncalibrated reviews of the same evidence base. Until broader longitudinal and geographically representative evidence exists, this study provides the most carefully conditioned account currently possible of what digital governance transformation has achieved, and what it has not yet demonstrated it can achieve, in post-pandemic Indonesia.

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