

Digital Equity and Inclusion Gaps in Municipal Digital Transformation: A Systematic Review of Global South Evidence

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ABSTRACT

Municipal digital transformation is increasingly promoted as a pathway for improving public service delivery, administrative efficiency, and citizen participation across cities in the Global South. However, emerging evidence suggests that digitally mediated governance systems frequently generate uneven inclusion outcomes due to variations in institutional capacity, governance arrangements, and sociotechnological inequalities. This study examines how municipal digital transformation shapes digital equity and inclusion outcomes. Through an interpretive thematic synthesis of 57 Scopus-indexed empirical studies, we construct a governance-focused typology conceptualizing municipalities as service providers, platform orchestrators, data stewards, inclusion enablers, and institutional capacity builders within digitally mediated governance systems. Our results indicate that digital inequities emerge not only from access-related issues but also from weak institutional responsiveness, digital governance fragmentation, reliance on platforms, exclusionary service provision, and inconsistent participation. The findings contribute to the literature on digital governance in municipalities, advancing knowledge about digital equality as institutionally and governance-enabled rather than technologically determined. Finally, we highlight the importance of institutional capacity strengthening, inclusive digital governance, and responsible digital platforms to enable public value creation globally, especially in the Global South.

ABSTRAK

Transformasi digital kota semakin didorong sebagai jalur untuk meningkatkan penyelenggaraan layanan publik, efisiensi administrasi, dan partisipasi warga di kota-kota Global South. Namun, bukti yang muncul menunjukkan bahwa sistem tata kelola yang dimediasi secara digital seringkali menghasilkan hasil inklusi yang timpang akibat variasi kapasitas institusional, pengaturan tata kelola, dan ketimpangan sosioteknologi. Studi ini mengkaji bagaimana transformasi digital kota membentuk hasil kesetaraan digital dan inklusi digital. Melalui sintesis tematik interpretatif terhadap 57 studi empiris yang terindeks di Scopus, kami membangun tipologi berfokus tata kelola yang memposisikan pemerintah kota sebagai penyedia layanan, orkestrator platform, pengelola data, penggerak inklusi, dan penguat kapasitas institusional dalam sistem tata kelola yang dimediasi secara digital. Hasil kami menunjukkan bahwa ketidaksetaraan digital muncul tidak hanya dari masalah akses, tetapi juga dari lemahnya responsivitas institusional, fragmentasi tata kelola digital, ketergantungan pada platform, penyediaan layanan yang eksklusif, dan partisipasi yang tidak konsisten. Temuan ini berkontribusi pada literatur tentang tata kelola digital di tingkat kota, memperluas pengetahuan tentang kesetaraan digital sebagai sesuatu yang dimungkinkan oleh institusi dan tata kelola, bukan semata-mata ditentukan oleh teknologi. Akhirnya, kami menyoroti pentingnya penguatan kapasitas institusional, tata kelola digital yang inklusif, dan platform digital yang bertanggung jawab untuk mendorong penciptaan nilai publik secara global, terutama di Global South.

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INTRODUCTION

Municipal digital transformation describes rapid increases in smart city adoption, e-government deployment, and platform-mediated service delivery, intended to support administrative efficiency, service coordination, and citizen inclusion across municipalities worldwide. In practice, recent trends in municipal digital governance have translated into the broader adoption of data-driven infrastructure, platformized service arrangements, and algorithmic governance techniques within municipal operations (Grossi & Welinder, 2024; Mora et al., 2023). Municipal digital transformation efforts are often promoted as pathways toward improved service accessibility, responsiveness, sustainability, and value generation through digital governance mechanisms (Barrutia et al., 2022; Eom & Lee, 2022). Recent findings, however, show that municipal digital transformation is increasingly mediated by governance priorities and institutions, generating divergent inclusion, participation, and value outcomes both between and within cities (Datta, 2023; Heeks, 2022). However, uneven implementation, poor institutional alignment, and entrenched digital inequities remain common across municipalities—particularly within cities of the Global South (Galushi & Malatji, 2022; Sigurjonsson et al., 2024).

Digital equity and inclusion represent one area in which municipal digital transformation has been particularly uneven. Despite platforms for digital public services being designed under assumptions of universal access, reliable connectivity, and baseline technical skills among constituents, affordability, skill gaps, complex authentication requirements, language access, accessibility, and connectivity remain core barriers to inclusion among digital service users (He, 2026; Rahman & Zhang, 2018). This challenge becomes more pronounced as municipalities integrate across mobility platforms, spatial data infrastructure, e-participation tools, and central service portals (Chen & Jiang, 2025; Hairudin et al., 2025). Evidence shows that thoughtfully designed digital services will not ensure inclusive experiences when institutions, service platforms, and governance mechanisms exclude the voices and perspectives of marginalized populations (Perng, 2025). Rather, municipal digital transformation may lead to exclusionary improvements in service efficiency, illusory forms of participation, and adverse digital incorporation for marginalized communities (Heeks, 2022; Zheng & Walsham, 2021).

Emerging research on digital government adoption from Global South cities has highlighted how digitalization can produce uneven outcomes based on differences in institutional readiness, governance quality, managerial effectiveness, and data governance (Aldhi et al., 2025; Sucupira Furtado et al., 2023). Empirical evidence from these governments has shown that digital governments can facilitate greater coordination of accessibility across specific service providers and citizenries while reinforcing existing power relations that further marginalize and exclude slum populations, lower-income citizens, and technologically marginalized groups from accessing political engagement opportunities (Datta, 2023; Mullick & Patnaik, 2025). These findings imply that institutional processes and dynamics, governance arrangements, and socio-technical power relations are consequential to technological efforts to implement smart urban governance.

While considerable work has been produced on smart cities, digital governments, and urban digital transformations, research on digitalization has historically been siloed within sectoral, disciplinary, and thematic boundaries. Scholarship on digital inequalities ‘within’ cities is scattered across literatures on e-government, digital public services, urban innovation, smart urban infrastructures, the digitalization of economic life, and platform governance, but has not been systematically connected or integrated into broader governance-focused explanations of digitally mediated equity outcomes at the city level (Yang et al., 2019; Yang & Lin, 2025).

Relatedly, much work on smart cities and digital governance remains focused on technology-centric metrics of infrastructure deployment, technology innovation, and service delivery efficiency at the expense of engaging more centrally with the role of institutions in shaping the outcomes of digital inclusion and exclusion efforts (Grossi & Welinder, 2024; Mora et al., 2023). In addition, although there is growing work on Global South cities, the empirical attention given to these contexts is still concentrated in certain geographic regions and has not been well integrated.

Drawing on previous work in institutional theory, public value scholarship, digital government research, and digital equity scholarship, we conceptualize municipal institutional configurations as our theoretical starting point for theorizing why digital transformation may vary. Past work in the institutional tradition has suggested myriad pathways through which various facets of government effectiveness, bureaucratic goodness of fit, managerial capability, and organizational performance shape digital government adoption speed, diffusion, quality, and equity outcomes (Aldhi et al., 2025; Guenduez & Mergel, 2022). Drawing on public value and coproduction scholarship, researchers have also begun to demonstrate how municipalities function as networked institutions tasked with effectively producing system-level outputs while also holistically and meaningfully investing in technology throughout their constituent public service ecosystems to advance equity, inclusion, and legitimacy (Barrutia et al., 2022; Grossi & Welinder, 2024). Research on digital equity and platform governance has also begun to highlight how technology, algorithmic governance platforms, data infrastructure, and platform-mediated forms of civic engagement can exacerbate existing geographic and demographic digital divides and service outcomes if not thoughtfully managed by cities with equity and responsiveness in mind (Datta, 2023; Heeks, 2022; Zhang et al., 2025).

Against this backdrop, this study makes four major contributions to the literature. First, it develops and extends the existing literature on municipal digital transformation and digital equity with a governance-oriented interpretive synthesis focused on Global South contexts. Second, it integrates institutional capacity, digital governance, public value, and digital equity literatures to develop an analytical framework for examining the drivers and mechanisms of uneven digital transformation. Third, drawing on the reviewed literature, it presents a role-based framework of municipal digital governance that outlines the roles and responsibilities of municipalities as service providers, platform orchestrators, data stewards, inclusion enablers, and capacity builders operating across digitally mediated governance ecosystems. Fourth, it develops and synthesizes fragmented qualitative and quantitative evidence from Southeast Asia, China, Latin America, and Africa to illustrate how institutional arrangements, governance structures, and sociotechnological inequalities intersect to produce and shape digital inclusion and exclusion dynamics across municipal contexts.

To achieve these aims, our scoping review systematically searched for Scopus-indexed journal articles related to municipal-level digital transformation, smart government reforms, and digital equity. Screening procedures identified 155 eligible articles for full screening and abstraction. A qualitative synthesis was performed on 57 eligible full-text journal articles. We qualitatively evaluated the empirical discussion of digital equity across five related topics: Internet access, digital literacy skills, inclusive design of services/platforms, institutional responsiveness, and distributive outcomes.

Literature Review

Digital Governance, Public Value, and Institutional Mediation

An expanding body of literature connects digital governance to civic inclusion, bureaucratic legitimacy, and service provision, but emphasizes that these connections are contingent on both institutional design and the implementation landscape (Mills et al., 2021; Sadat, 2025). Research on e-governance in the context of open government frameworks stresses that transparency and participation aims can be undermined by minimal institutional capacity to drive accountability and responsiveness (Jibladze et al., 2024). Studies on the governance of sharing economy services (e.g., mobility platforms) have argued that regulatory design and institutional coordination underlie the differential public benefits vis-à-vis incumbents from digital innovation interventions or the concentration of advantages among certain users (Castellanos et al., 2025; Feng et al., 2024).

Platformization, Data Infrastructures, and Equity Risks

City digitalization increasingly relies on platforms and data infrastructures. Research on data platforms in response to crisis relief indicates that platform architectures and data-sharing workflows shape institutional visibility to government systems and who remains invisible (Radu & Popescu, 2023). Empirical work on big data systems for public administration has highlighted that design and implementation choices (data sources, interoperability, and governance controls) directly affect service targeting, responsiveness, and legitimacy (Chakiri et al., 2020; Sun et al., 2023). Open data research also finds that, where open data and data activism intersect, it results in potential new forms of inclusion, but guarantees the reproduction of inequalities to the extent that participation reflects the dominance of organized or digitally capable actors (Ricker et al., 2020).

Further equity issues exist in data governance and surveillance-related infrastructure. Research on facial recognition systems shows how “beta” implementation can institutionalize algorithmic bias and accountability issues, with downstream impacts focused on marginalized populations (Cao & Sun, 2025). Governance analysis of oversight working groups additionally highlights how geomeia governance can institutionalize selective visibility and uneven surveillance to the detriment of equity in city decision-making (Berniker & Humphreys, 2024). In the Global South context, the data–technology nexus intersects with long-term inequalities and institutional limitations, which have implications for both the feasibility of implementation and public trust (Ranchod, 2020).

Inclusion, Accessibility, and Public Service Design

Findings on the accessibility of local public enterprises reveal that online services do not necessarily mean that alternative services are accessible if design standards and user-centered approaches are implemented inconsistently (Ferza & Lee, 2026). Additionally, research on digitization and service provision calls for a multidimensional approach that links digital uptake with the responsiveness of institutions and the distribution of benefits from services (Greavu-Şerban et al., 2025). Studies on sustainable service quality have also pointed out that improvements in digital quality may not necessarily lead to equitable results when vulnerable groups continue to struggle with access and skill barriers (Xia et al., 2025).

Institutional Capacity, Change Management, and Implementation Constraints

The literature review shows that institutional capacity is a key determinant of municipal digital performance. Research on reinforcing human resource management systems highlights the importance of workforce proficiency and organizational structure in facilitating continuous digitization (Nematollahi et al., 2024). Studies related to social responses and change management highlight that institutional change processes—leadership, motivation, and internal coherence—influence adoption and equity outcomes (Shayan & Kim, 2025). Emerging research on sustainable urban governance via digital transformation has also shown that organizational readiness and institutional coordination determine whether digital transformation becomes substantive or merely symbolic (Afinowi, 2025).

Resources and risks are important factors in this regard. An equilibrium for the sustainability and security of reviews shows that security governance and institutional protection are essential for maintaining trust and providing equal rights in the use of digital services (Aldehim et al., 2025). In addition, the literature on urban sustainability reinforces the importance of assessing the dimensions of social sustainability in line with municipal digitalization prospects, including for excluded groups (Czemiel-Grzybowska et al., 2024; Jonek-Kowalska, 2025).

Governance Pathways in the Global South Context

Evidence from the Global South emphasizes how participation and legality (authorization) frameworks can moderate equity risks and reform governance. Studies on the shift away from corporate control to more participatory governance demonstrate that institutional orders can either enhance or limit community voices or even dominance in digital urbanism (Ito & Kato, 2025). Legal analyses of personal data protection also highlight the role of privacy safeguards and enforcement capacity in framing inclusion and trust structures as they emerge from research in medicine or *vis-à-vis* vulnerable populations (Amnesti et al., 2024). Recent studies on municipal digital transformation in specific local governance (place) contexts also demonstrate that local implementation conditions (administrative capacity, infrastructure, and governance maturity) condition performance and inclusion outcomes (Anggraini et al., 2025; Jieutsa et al., 2024). Finally, research on digital technology in Africa highlights non-coordinated and fragmented governance coordination as a common driver of disparities (Jieutsa et al., 2024).

Rather, equity is the output generated by the interplay among governance design, platform/data stewardship, service access, and institutional capacity. This inspired the role-based framework used in this review to structure the evidence on how municipalities act as service providers, platform orchestrators, data stewards, and inclusion enablers, stewarding institutional capacity, each of which plays a part in shaping equity through access, skills, design, responsiveness, and results.

However, little research has been conducted to combine these literatures into a coherent municipal-level model that explicitly shows the relationship between governance models, organizational resources, and digital equity outcomes. This gap justifies the role-based interpretation assumed in this review, which seeks to model municipalities as service providers, platform orchestrators, data stewards, inclusion enablers, and institutional capacity builders.

RESEARCH METHODS

Research Design

This study adopts a systematic literature review (SLR) using an interpretive qualitative evidence synthesis approach to examine how municipal digital transformation shapes digital equity and inclusion outcomes in the Global South. Unlike conventional descriptive reviews that primarily summarize empirical findings, the present study applies an interpretive thematic synthesis approach to generate higher-order analytical explanations regarding the institutional and governance mechanisms through which municipal digital transformation produces uneven inclusion and exclusion outcomes.

The review methodology was informed by approaches to qualitative evidence synthesis and thematic synthesis methodologies – specifically, synthesis informed by an interpretive understanding of heterogeneous empirical literature in public administration research, digital government scholarship, urban studies, and smart cities literatures (Booth et al., 2024; Flemming & Noyes, 2021; Thomas & Harden, 2008). This study was guided by the following research question: How does municipal digital transformation in the Global South generate digital equity and inclusion gaps, and what institutional roles and governance mechanisms shape these outcomes?

Data Source and Search Strategy

Scopus was chosen as the initial bibliographic database due to its comprehensive interdisciplinary indexing of peer-reviewed literature in public administration, urban governance and management, digital government, information systems, development studies, and smart cities literature. Scopus has demonstrated strong coverage of governance-facing, policy-relevant digital transformation scholarship and seemed well suited to facilitate our goal of synthesizing academic literature on municipal digital governance and digital equity. Limiting our search to a single database will omit relevant studies that are regionally indexed or not included in Scopus, as well as grey literature. However, due to its wide international coverage, Scopus nevertheless provided broad interdisciplinary coverage suitable for systematically synthesizing governance-focused evidence. A structured Boolean search strategy was applied to article titles, abstracts, and keywords using four interconnected concept clusters:

- Municipal governance (e.g., municipal*, local government*, city administration*, urban governance*)
- Digital transformation (e.g., digital government, e-government, smart cities, digital public services, platform governance*)
- Equity and inclusion (e.g., digital equity, inclusion, digital divide, accessibility, vulnerability*)
- Governance and institutional factors (e.g., governance, institutional capacity, policy, participation, and management)

The search was limited to:

- peer-reviewed journal articles and review papers,
- English-language publications,
- and studies indexed within the Social Sciences, Business, Management and Accounting, Decision Sciences, and Computer Science subject areas.

The search process generated an initial dataset of 720 records.

Screening and Eligibility Criteria

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) principles guided a multistage screening and eligibility process, as shown in Figure 1. Following these steps allowed for a transparent, replicable, and rigorous process. At each stage, titles and abstracts were screened, followed by full-text reviews.

First, document type and language filters were applied to exclude conference proceedings, book chapters, and editorials. Peer-reviewed articles published in English were included, resulting in 273 journal articles (from 720).

Second, title and abstract screening was conducted to identify studies that explicitly addressed the following:

- municipal or local government contexts,
- digital governance or digital public service initiatives,
- and issues related to digital equity, inclusion, exclusion, vulnerability, and accessibility.

Studies were excluded if they:

- focused exclusively on national-level digital governance without municipal relevance,
- adopted purely technical or engineering perspectives without governance implications,
- lacked substantive discussion of inclusion or equity dimensions,
- or conceptual discussions without empirical grounding.

After title and abstract screening, we retained 155 studies for full eligibility assessment.

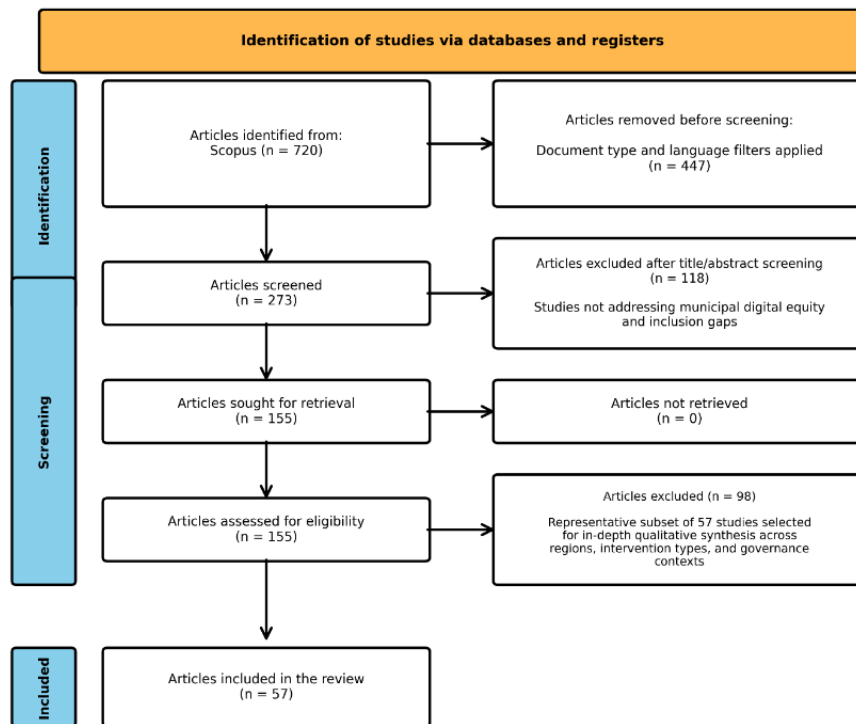
Third, eligible articles underwent full-text screening and analytical selection. The aim was to select studies providing the most robust evidence of municipal engagement, policy mechanisms, and digital equity impacts. Of the 155 potentially eligible articles, we selected 57 full-text studies for a qualitative review. Articles were chosen based on:

- analytical richness,
- governance relevance,
- diversity of digital intervention types,
- geographic representation,
- and conceptual contributions to digital equity and municipal governance discussions.

The studies involved represented cities from Southeast Asia, China, Latin America, selected African countries, and other cities for comparative governance perspectives.

Figure 1 presents the PRISMA-based article identification, screening, eligibility, and inclusion process used to systematically refine the final body of evidence included in the review.

Figure 1.
Article Selection Process using PRISMA Flow Diagram



Source: Processed by the author, based on the PRISMA diagram flow, 2024

Data Extraction and Analytical Framework

Structured data extraction templates were developed to ensure consistency and comparability between studies. For each article, the following information was extracted:

- authorship and year of publication,
- country or city context,
- type of digital intervention,
- public service domain,
- target or affected population groups,
- digital equity dimensions addressed,
- institutional and governance mechanisms,
- and major findings related to inclusion or exclusion outcomes.

The analytical framework was developed inductively through iterative engagement with the literature. Municipalities were conceptualized as performing five interrelated institutional roles within digitally mediated governance systems:

- Service Provider
- Platform Orchestrator
- Data Steward
- Inclusion Enabler
- Institutional Capacity Builder

Digital equity was operationalized across five interrelated dimensions as follows:

- Access
- Digital skills
- Service and platform design
- Institutional responsiveness
- Distributional outcomes

The governance mechanisms identified across the studies were coded into seven analytical categories.

- capacity-building initiatives,
- digital literacy and outreach programs,
- service and platform redesign,
- regulatory and policy frameworks,
- participatory governance mechanisms,
- platform integration and interoperability,
- and partnership or procurement arrangements, respectively.

Table 1 summarizes the analytically representative studies included in the synthesis, highlighting the major governance problems, institutional roles, digital equity dimensions, and governance-related findings identified across the reviewed literature.

Table 1.
Analytical Characteristics of Included Studies and Governance Themes

Study	Governance Problem	Institutional Role	Digital Equity Dimension	Major Governance Finding
Heeks (2022)	Adverse digital incorporation within digital systems	Data Steward	Distributional outcomes	Digital inclusion may still reproduce structural inequalities when governance arrangements disproportionately benefit already advantaged groups.
Datta (2022)	Informational peripheries and uneven digital urbanization	Platform Orchestrator	Participation and access	Digital infrastructures expanded state visibility while simultaneously reinforcing territorial and social exclusion in peripheral urban areas.
Mullick and Patnaik (2024)	Marginalized participation in smart city governance	Inclusion Enabler	Participation equity	Participatory digital governance often remained symbolic unless marginalized groups possessed sufficient institutional voice and representation.
Aldhi et al. (2025)	Weak managerial readiness in smart city implementation	Institutional Capacity Builder	Service accessibility and responsiveness	Institutional readiness and digital leadership significantly shaped the effectiveness and

Study	Governance Problem	Institutional Role	Digital Equity Dimension	Major Governance Finding
Furtado et al. (2023)	Weak equity-oriented data governance	Data Steward	Distributional outcomes	inclusiveness of municipal digital transformation. Data literacy and institutional coordination enabled municipalities to identify vulnerable populations and design socially responsive digital policies.
Lee et al. (2022)	Uneven inclusiveness in integrated smart city platforms	Platform Orchestrator	Access and participation	Inclusive governance structures and targeted digital inclusion programs improved participation among low-income and isolated populations.
Perng (2025)	Inclusion-by-design paradoxes	Service Provider	Service and platform design	Technically inclusive platforms may still exclude vulnerable users when usability and institutional responsiveness remain inadequate.
Kozaman Aygün and İnal Çekiç (2025)	Urban digital divide in municipal governance	Inclusion Enabler	Access and digital skills	Differences in institutional support and digital literacy programs significantly shaped equitable access to municipal digital services.
Sigurjonsson et al. (2024)	Sustainability challenges in municipal digital initiatives	Institutional Capacity Builder	Institutional responsiveness	Long-term sustainability of digital governance depended on administrative coordination, staff collaboration, and organizational support structures.
Grossi and Welinder (2024)	Fragmented smart governance paradigms	Platform Orchestrator	Governance inclusiveness	Smart city governance required integration of collaborative, digital, and network governance approaches to generate sustainable public value outcomes.
Mora et al. (2023)	Governance complexity in smart city transitions	Platform Orchestrator	Institutional responsiveness	Smart city transformation functioned as an innovation governance process shaped by institutional coordination and governance capability.

Study	Governance Problem	Institutional Role	Digital Equity Dimension	Major Governance Finding
Zhang et al. (2025)	Governance tensions in digital urban infrastructures	Data Steward / Platform Orchestrator	Participation and accountability	Digital governance modes influenced trust, coordination, and accountability within platform-mediated municipal governance systems.
Zheng and Walsham (2021)	Intersectional digital inequality	Inclusion Enabler	Distributional outcomes	Digital exclusion reflected intersecting inequalities associated with class, gender, and socio-economic marginalization.
Barrutia et al. (2022)	Public value creation in smart governance	Service Provider / Capacity Builder	Institutional responsiveness	Dynamic governance capabilities were necessary for municipalities to co-create inclusive public value through digital initiatives.
Caragliu and Del Bo (2023)	Persistent urban digital divides	Institutional Capacity Builder	Access and digital skills	Investments in human and social capital significantly influenced whether smart city strategies reduced or reinforced digital inequality.

Source: Developed by the authors based on the thematic synthesis of included studies, 2026.

Note: The table presents analytically representative studies included in the qualitative evidence synthesis. The selected studies were chosen to illustrate recurring governance mechanisms, institutional roles, and digital equity dynamics across diverse municipal digital transformation contexts.

Thematic Synthesis Procedure

We conducted the review using an interpretive thematic synthesis approach guided largely by Thomas & Harden's (2008) three-stage thematic synthesis framework and subsequent methodological guidance on qualitative evidence synthesis (Booth et al., 2024; Flemming & Noyes, 2021). We chose this approach given the anticipated diversity of qualitative, mixed-methods, and governance-focused empirical literature cutting across disciplinary traditions and urban contexts.

The synthesis process involves three sequential stages.

Stage 1: Initial Coding

Full-text articles were read iteratively and coded line by line to identify recurring concepts related to:

- municipal governance roles,
- institutional arrangements,
- digital inclusion and exclusion dynamics,

- governance mechanisms,
- and public-value outcomes.

Stage 2: Development of Descriptive Themes

Codes with underlying themes were clustered into larger descriptive categories based on repeated patterns across institutions, governance models, and digital inclusion dynamics. During this phase, comparisons across cases of municipalities, systems of governance, and settings of digital interventions were examined to reveal congruencies, discrepancies, and patterns of exclusion.

Stage 3: Generation of Analytical Themes

Codes and higher-order analytical themes were developed thematically through interpretive synthesis and ongoing cross-study comparisons. Themes were further developed by interpreting how factors, such as institutional capacity, governance arrangements, platform-mediated participation, and socio-technical infrastructures, contributed to unequal digitalization outcomes between cities in the Global South. Higher-order analytical themes guided the theory development of the municipal role-based governance framework introduced herein.

Saturation, Analytical Validation, and Methodological Rigor

Multiple methods were used during screening/data synthesis to increase transparency and improve reliability. Clear a priori inclusion/exclusion criteria were developed and utilized during screening/eligibility determination. Extraction forms/coding schema were utilized. Coding was completed iteratively and interpreted via constant comparison to increase consistency/reliability. Themes/governance categories were double-verified manually (rather than through automatic queries) to decrease automation bias and increase consistency. An audit log was maintained to document coding changes/theme/category development to improve transparency.

Overall, combining systematic screening with governance-focused interpretation of themes allows this study to make a replicable contribution to understanding municipal-level influences on digital equity through the lens of digital transformation.

RESULTS AND DISCUSSIONS

In this section, the study presents and discusses the findings of an interpretive qualitative synthesis of 57 Scopus-indexed empirical studies examining municipal digital transformation and digital equity in the Global South. Using the role-based analytical framework developed in this study, the findings are organized around five institutional municipal roles: service providers, platform orchestrators, data stewards, inclusion enablers, and institutional capacity builders. Across these roles, the synthesis examines how municipalities shape digital equity outcomes through five interrelated dimensions: access, digital skills, service and platform design, institutional responsiveness, and distributional outcomes.

Characteristics of Reviewed Studies

The included studies occurred in municipalities in Southeast Asia, China, Latin America, Sub-Saharan Africa, South Asia, and some selected comparative contexts on urban governance. Most of the empirical data came from Southeast Asia (particularly Indonesia), India, Brazil, and urbanizing municipalities in Africa, as the topic of municipal digitalization has been gaining more policy interest across newer systems of urban governance (Anggraini et al., 2025; Castellanos et

al., 2025; Jieutsa et al., 2024; Younus et al., 2025). The digital interventions examined across the reviewed studies included:

- e-government portals,
- smart mobility systems,
- integrated service platforms,
- biometric identification systems,
- open-data initiatives,
- participatory governance platforms,
- and community-centered digital inclusion programs (Feng et al., 2024; Mangai & Ayodele, 2025; Santos et al., 2025).

Access/digital literacy rates and digital service skills have been the most frequently focused on areas when researching digital equity. Institutional responsiveness, distributive issues, and future public value impacts have not been explored as much (Ferza & Lee, 2026; Kozaman Aygün & İnal Çekiç, 2025; Perng, 2025). This emphasizes the current literature's focus on municipal digital government research, with higher concerns about technology access and services rather than institutional and distributive impacts.

Table 2 synthesizes the relationship between municipal governance roles, dominant digital equity dimensions, recurring exclusion mechanisms, and institutional responses identified across the reviewed studies.

Table 2.
Municipal Roles, Digital Equity Dimensions, Exclusion Mechanisms, and Governance Responses

Municipal Role	Dominant Digital Equity Dimensions	Major Exclusion Mechanisms	Institutional and Governance Responses	Representative Evidence
Service Provider	Access; Service and Platform Design	Digital-by-default systems; interface complexity; language barriers; fragmented service architecture; accessibility limitations for vulnerable populations	Parallel offline service channels; multilingual interface redesign; user-centered service delivery; accessibility-oriented platform adaptation	Perng (2025); Rahman & Zhang (2018); Santos et al. (2025)
Platform Orchestrator	Service and Platform Design; Distributional Outcomes	Vendor lock-in; institutional fragmentation; elite capture; symbolic participation; weak interoperability between systems	Interoperability frameworks; collaborative governance arrangements; platform integration standards; participatory	Castellanos et al. (2025); Cao & Sun (2025); Radu & Popescu (2023)

Municipal Role	Dominant Digital Equity Dimensions	Major Exclusion Mechanisms	Institutional and Governance Responses	Representative Evidence
			governance mechanisms	
Data Steward	Institutional Responsiveness; Distributional Outcomes	Algorithmic bias; weak privacy protections; opaque data practices; asymmetrical accountability relationships; limited citizen recourse	Open-data governance; transparency standards; data ethics frameworks; privacy protection mechanisms; accountability systems	Berniker & Humphreys (2024); Santos et al. (2025); Ricker et al. (2020)
Inclusion Enabler	Digital Skills; Access	Limited digital literacy outreach; weak community participation; exclusion of marginalized groups; fragmented inclusion initiatives	Digital literacy programs; targeted outreach strategies; participatory co-design processes; community-centered inclusion initiatives	Anggraini et al. (2025); Jieutsa et al. (2024); Galushi & Malatji (2022)
Institutional Capacity Builder	Digital Skills; Institutional Responsiveness	ICT staff shortages; weak digital leadership; limited financial capacity; organizational silos; dependency on external vendors	Workforce development; institutional coordination mechanisms; leadership development; organizational restructuring; internal digital capability strengthening	Kozaman Aygün & İnal Çekiç (2025); Younus et al. (2025); Nematollahi et al. (2024)

Source: Developed by the authors based on the interpretive thematic synthesis of 57 Scopus-indexed studies, 2026.

Note: The municipal roles and digital equity dimensions were derived inductively through qualitative evidence synthesis. The table summarizes recurring institutional patterns, governance mechanisms, and exclusion dynamics identified across the reviewed literature on municipal digital transformation and digital equity in Global South contexts.

Digital Equity Gaps by Municipal Role

Municipalities as Service Providers

Local governments have offered an increasing number of digitally mediated services. Such services include permit applications and utility services, but also the welfare system, spatial information systems, and civic participation platforms. In many studies in the literature review, digitally-by-default services were implemented with assumptions around connectivity, reliable Internet access, and digital skills (uniform digital readiness). Instead, digitally-by-default service offerings from municipalities have excluded already vulnerable demographics, such as senior citizens, low-income families, rural inhabitants, immigrants, and people with disabilities (Perng, 2025; Rahman & Zhang, 2018; Santos et al., 2025).

Service barriers, such as complicated navigation menus, siloed systems, language accessibility, and digital verification, limit the meaningful use of citizens who lack digital privilege (Angraini et al., 2025; Hairudin et al., 2025; Kozaman Aygün & İnal Çekiç, 2025). Municipalities position access to digitally mediated city services as citizens' responsibility rather than institutionally addressing the systemic causes of service inaccessibility through customized user experiences.

Some studies have shown that although services exist online, this does not equate to access being enabled for all citizens to meaningfully participate. One article discussed that although online participation platforms were available for citizens to use, they excluded citizens with lower digital skills because the users who tended to utilize the systems were those with higher technological capacities (Perng, 2025). Another study addressing smart service systems showed that although services were available online for all citizens to use, they reinforced service barriers for informal workers and low-income groups while enabling formally working and tech-connected citizens to participate more fully (Santos et al., 2025).

Although some local governments have begun to provide citizens with offline channels to receive services, translated services, and redesigned platforms to be more accessible to citizens with disabilities, these changes have not been implemented as systemic changes but have instead been reactive governance responses to service inaccessibility (Mangai & Ayodele, 2025; Xia et al., 2025). Considering these findings through the lens of public value, local governments should work to better understand their users and create services that are accessible to all by building institutions that can adapt to the needs of their citizens.

Municipalities as Platform Orchestrators

Municipal governments were found to be platform orchestrators in ecosystems consisting of other platforms, third-party vendors, public-private partnerships (PPPs), and modular interoperable platforms for governing. Platformization typically resulted in increased degrees of innovativeness, scalability of services, and coordination across contexts. The drawbacks were vendor lock-in and power imbalances (Cao & Sun, 2025; Castellanos et al., 2025; Radu & Popescul, 2023). Platforms that were vendor-specific with low interoperability between vendors and between vendors and municipalities fostered siloed ecosystems in which citizens had to navigate to receive different services (Castellanos et al., 2025). The limited bargaining power that governments had with vendors also limited transparency, accountability, and citizen oversight of the platforms (Sun et al., 2023).

Citizen participation platforms also face platformization dilemmas. While local governments attempt to use participatory platforms to expand participatory governance, some participatory systems have been shown to be only "informative" or "consultative" rather than truly deliberative (Perng, 2025). When assigned to digital platforms, participation was not extended

to the general public but was dominated by institutionally advantaged actors.

Municipalities as Data Stewards

Cities have gained legitimacy as data controllers through the expansion of biometric ID programs, predictive technologies, algorithmic decision systems, and smart city infrastructures. However, how municipalities manage citizens' data was counterintuitively less liberal than other technology adoption literature suggested (Berniker & Humphreys, 2024; Cao & Sun, 2025; Santos et al., 2025).

Algorithms have been shown to disproportionately disadvantage marginalized populations and those with disabilities attempting to navigate automated government systems (Cao & Sun, 2025). Santos et al. (2025) uncovered that citizens lost trust in their local government when there was a lack of data transparency and the ability to correct inaccuracies. A lack of municipal data control could propagate further unfair distributions if algorithmic systems continue to punish marginalized groups. Some municipalities have taken steps to expand participatory data governance through open-data portals and by creating technical standards for governance. However, these efforts have done little to directly combat the lack of accountability at institutions, and Ricker et al. (2020) noted that engagement with open-data platforms can be limited to those with technical capacities.

In summary, the lack of data governance institutionalization at the municipal level can lead to power being placed in the hands of federal agencies and private companies that build these technological systems. Through the lens of institutional governance, smart cities should focus on improving transparency, procedures, privacy, and citizen-focused accountability measures to achieve an equitable balance of technology and power.

Municipalities as Inclusion Enablers

As enablers of inclusion, cities should foster internet literacy, accessibility, and community participation. This function is characterized by chronic neglect and underinvestment, with little institutionalization, as reflected in previous studies. Digital literacy programs are often short-term or donor-induced, leaving informal settlements, rural areas, and women (Anggraini et al., 2025; Jieutsa et al., 2024; Kozaman Aygün & İnal Çekiç, 2025). Participatory design processes rarely engage marginalized user groups in a meaningful manner, and intersectional vulnerabilities (age, poverty, disability, and spatial exclusion) have rarely been addressed systematically (Galushi & Malatji, 2022; Perng, 2025). Inclusion strategies aimed at dealing with vulnerabilities in isolation and weakening them.

Municipalities as Institutional Capacity Builders

Inclusion providers were found to be municipalities that broadened access to digital literacy training, accessibility, community outreach, and participation in governance processes. Several studies have documented inclusion efforts as weakly instituted or institutionalized, underfunded, or siloed in their approach. Training programs designed to equip people with digital literacy skills were found to be short-term programs or donor-dependent, lacking integration into institutions (Anggraini et al., 2025; Jieutsa et al., 2024; Kozaman Aygün & İnal Çekiç, 2025). Some research has pointed out that the intersectional marginalization faced by people due to poverty, ability, age, gender, and territorial location was not addressed by inclusion efforts (Galushi & Malatji, 2022; Perng, 2025).

In summary, many inclusion efforts were not fully institutionalized in local governance. Instead, inclusion initiatives at the municipal level were implemented through peripheral and weakly

institutionalized initiatives. This diminishes the efficacy of inclusion efforts over time and municipalities' ability to combat structural digital divides. Therefore, the findings indicate the necessity of long-term community-centered engagement, inclusion through participatory co-design, and institutionalized initiatives for digital literacy.

Municipalities as Institutional Capacity Builders

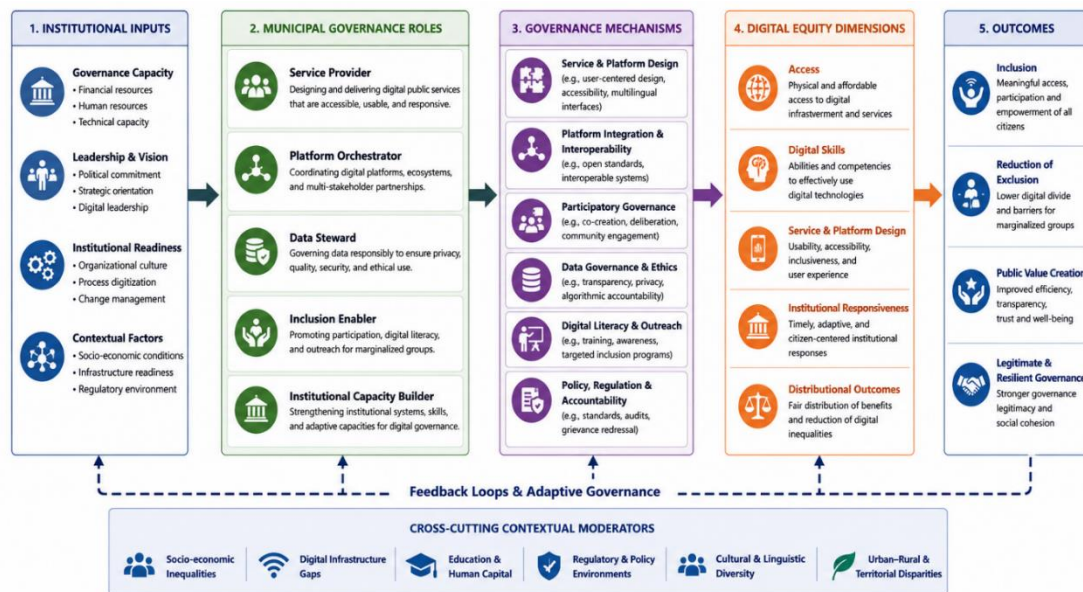
From municipal institution-building capability as an enabling governance factor, municipalities' role as institutional capacity builders was the most basic and pervasive limitation across literature. Shortages of ICT human capacity, financial resources, siloed organizational structures, poor leadership, and lack of institutional coordination are frequently cited challenges that inhibit municipalities from operationalizing inclusive digital transformation (Anggraini et al., 2025; Nematollahi et al., 2024; Younus et al., 2025).

In fact, there was consensus that municipalities' organizational and institutional deficits are a larger inhibitor of operationalizing inclusive digital transformation than technology constraints alone. For example, Kozaman Aygün & İnal Çekiç (2025) showed that ICT departments often exist on the periphery of municipal governance making it difficult for them to inform governance. Younus et al. (2025) echoed these findings and found that poor organizational coordination and a lack of institutional ownership impeded municipal digital initiatives.

Other research illustrates how dependency on external consultants and vendors to lead digital transformation has undermined municipalities' ability to learn internally and strategically (Afinowi, 2025; Shayan & Kim, 2025). In several cases, this dependency has led to institutionally fragile implementation structures with little organizational resilience. This indicates that institutions act as gatekeepers that predetermine whether digital transformation will be leveraged to produce inclusive benefits or exacerbate exclusion. Digital equity at the municipal level is as dependent on developing institutional capacity as it is on acquiring new technology.

Figure 2 presents the conceptual framework developed from the interpretive synthesis, illustrating how municipal governance roles and institutional mechanisms shape digital equity outcomes within Global South contexts.

Figure 2.
Conceptual Framework of Municipal Digital Transformation, Governance Roles, and Digital Equity Outcomes in Global South Contexts



Source: Author Processed

Note: The figure illustrates how institutional inputs and municipal governance roles shape digital equity outcomes through governance mechanisms associated with service provision, platform orchestration, data stewardship, inclusion initiatives, and institutional capacity building. The framework further demonstrates how digital equity dimensions—including access, digital skills, service and platform design, institutional responsiveness, and distributional outcomes—collectively influence inclusion, public value creation, and governance legitimacy within Global South municipalities. Cross-cutting contextual moderators such as socio-economic inequality, infrastructural gaps, regulatory environments, and territorial disparities condition these relationships.

Cross-Cutting Patterns of Digital Inequality

Taken together, across municipal roles, our findings uncovered common patterns of digital inequality cutting across different literatures. First, existing municipal digital governance interventions continued to focus heavily on digital access/divide and digital literacy/digital skills while paying relatively less attention to issues of institutional responsiveness/participation quality and distributive justice/equity outcomes (Greavu-Şerban et al., 2025; Perng, 2025; Younus et al., 2025). Second, peripheral residents/informal workers/older adults/women/people with disabilities/lower-income earners consistently participated less meaningfully in municipal digital governance initiatives (Anggraini et al., 2025; Santos et al., 2025; Yang & Lin, 2025). Third, empirical studies rarely conceptualized digital exclusion as stemming from a single technological barrier. Rather, exclusion tended to occur as a result of multiple compounding factors:

- weak institutional coordination,
- fragmented governance arrangements,
- limited participatory mechanisms,
- infrastructural asymmetries,
- and socioeconomic inequalities.

Methodologically, studies continued to focus heavily on cross-sectional case studies, with few examples of longitudinal analysis and limited evaluation of causality regarding the longer-term impacts of digital initiatives on governance (Castellanos et al., 2025; Dong et al., 2025). The focus on case studies limits the comprehension of institutional learning, adaptive governance, and how long-term organizational change affects digital equity.

DISCUSSION

Institutionalizing Equity in Municipal Digital Transformation

The results of this study collectively suggest that digital divides in Global South cities are constituted by institutional systems, government, and platform governance arrangements. We contributed to the knowledge on cities and digital transformation by connecting insights from institutional theory, public value, and digital government literatures to show how municipal digital transformation outcomes are institutionally mediated governance outcomes. Specifically, this research found that institutional capacity plays an important role in shaping digital government outcomes, as cities with higher levels of leadership, coordination, learning, and adaptation tended to have more participatory and inclusive digital government outcomes than cities with weak systems and institutional capacities. Platform governance also creates dependency and power asymmetries by centralizing institutional capacity within platform vendors and third-party service providers. Ultimately, this study expands on the studies of platform governance by offering empirical evidence of how smart cities can increase administrative efficiency at the expense of democratic accountability, institutional capacity, and citizen participation. If technology is to fulfill its promise of advancing equitable public value outcomes around the world, digital transformation must be coupled with institutional development, participation, inclusion by design, data justice, and reflexivity.

From a policy perspective, the findings suggest that municipalities should prioritize the following:

- institutional capacity strengthening,
- interoperable governance frameworks,
- inclusive platform design,
- participatory governance systems,
- digital literacy expansion,
- and accountable data governance mechanisms are needed.

Digital inclusion should thus be viewed as an institutional key performance indicator rather than a social auxiliary goal of smart city initiatives. Contributing to theory, this research provides a governance-based narrative review that integrates concepts from institutional capacity, public value, platform governance, and digital inclusion to frame disparate digitalization results in cities of the Global South.

CONCLUSIONS

Municipal digital transformation occurs in diverse governance and institutional contexts around the world, leading to distinct digital equity and inclusion outcomes. In this article, we review 57 Scopus-indexed empirical studies on municipal digital transformation using institutional theory, public value research, digital governance studies, and digital equity scholarship to analyze how municipalities influence inclusion outcomes across the Global South. Synthesizing the literature on municipal digital governance through these theoretical lenses, we interpret findings across five roles of municipalities: service providers, platform orchestrators, data stewards, inclusion

enablers, and institutional capacity builders. We found that municipal digital transformation is institutionally embedded and governed by a variety of organizational, governance, platform, and inequality dynamics.

The process of municipal digital transformation was found to reproduce digital inequalities through a lack of access, institutional silos, limited governance capacity, platformization, exclusionary service provision, limited participation, and inconsistent responses from institutions. The findings also indicated that municipalities with increased capacity, adaptive governance, interoperable platforms, and expanded participatory engagement were often associated with more positive inclusion outcomes relative to municipalities with fragmented institutions and limited capacity to respond to digitalization. Platformed governance also enabled administratively efficient service delivery but could reify power asymmetries, platform lock-ins, and discriminatory practices when deployed in contexts with weak institutional guardrails.

This study contributes to the literature on municipal digital governance by providing a governance-focused interpretation review that bridges smart city, e-government, public value, and digital equity literatures. We contribute to institutional theory and digital equity scholarship by demonstrating that municipal digital transformation is institutionally mediated. Additionally, our role-based governance framework of municipal governance contributes by offering a framework through which scholars can consider how municipalities play a role in enabling digital inclusion/exclusion.

Our review leads us to conclude that municipalities should prioritize institution building, interoperable governance, participatory service/platform design, inclusive participation, digital literacy, and data governance. Municipalities worldwide, and especially those in the Global South, require long-term investments in capacity building, coordination, inclusive governance, and outreach to digitalize in ways that are public and equitable.

This study has several implications for future research. Municipal digital governance research would benefit from longitudinal and cross-contextual work that studies institutional change over time. Additional future research should examine areas such as algorithmic governance, data justice, and the political economy of municipal digitalization. While we have focused primarily on cities in the Global South, future studies should also compare Global North contexts.

There are several limitations to this study. We only included peer-reviewed journal articles indexed by Scopus in English. As such, we may have excluded relevant local studies, policy documents, and grey literature. Furthermore, studies varied across contexts, types of governance, and digital initiatives, which limited our ability to make comparisons.

Our review of the local digital transformation literature finds that equitable digital transformation requires more than technology adoption or service digitization. Achieving inclusive digital transformation depends on municipal capacity, good governance, citizen engagement, and holding digital efforts accountable to the goals of public value and social equity.

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