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Smart Cities and Socioeconomic Inequality: A Critical Perspective on Smart City Practices in Indonesia

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ABSTRACT
The rapid adoption of smart city initiatives in Indonesia reflects a national ambition to modernize urban governance through digital innovation. However, despite increasing investments in smart infrastructure, significant disparities in socio-economic outcomes remain prevalent. This paradox raises a critical question: Do smart cities in Indonesia truly enhance inclusivity, or do they reinforce existing inequalities? This study aims to critically examine the relationship between smart city implementation and social inequality in five major Indonesian cities: Jakarta, Bandung, Surabaya, Makassar, and Semarang. Using a convergent mixed-methods approach, the research integrates quantitative data analysis—including Smart City Index scores, Gini coefficients, and internet access rates—with qualitative critical discourse analysis (CDA) of policy documents and urban governance narratives. The findings reveal a consistent mismatch between technological advancement and social equity. Cities with high smart city performance often report elevated levels of income inequality, and digital infrastructure remains disproportionately concentrated in urban centers, excluding marginalized communities. Furthermore, policy discourses prioritize efficiency and modernization, while overlooking equity, participation, and redistribution. This study concludes that smart city strategies in Indonesia, as currently designed, risk deepening the digital and social divide. It calls for a redefinition of smart urbanism—one grounded in social justice, participatory governance, and inclusive policy design. Such a shift is essential to ensure that smart technologies genuinely serve all urban residents, not just the digitally privileged.

Keywords: smart cities, social inequality, digital divide, Indonesia, inclusive urban governance, critical discourse analysis

INTRODUCTION

In recent years, Indonesia has accelerated its embrace of digital governance through the Smart City initiative, aiming to enhance public service delivery, governance efficiency, and urban sustainability (Herawati et al., 2025; Budi et al., 2023; Prasetyo, 2022). These efforts are part of a broader global trend of leveraging technology to address urban challenges, from traffic congestion to waste management (Yigitcanlar et al., 2019; Batty et al., 2012; Townsend, 2013). However, amid these advancements, there is growing concern that such digital transformations may inadvertently deepen pre-existing social inequalities (Graham & Marvin, 2001; van den Berg et al., 2014; Söderström et al., 2014).

The urgency of this research lies in the dual reality of Indonesia's urban development. On one hand, cities like Jakarta and Bandung have witnessed increasing investment in ICT infrastructure and AI-powered governance (Setiawan, 2021; Herlina & Yuliani, 2023; Putri et al., 2024). On the other hand, Indonesia continues to struggle with pronounced social disparities, with the national Gini index hovering around 0.39–0.41 over the past five years

(BPS Indonesia, 2024; World Bank, 2023; UN-Habitat, 2022). The juxtaposition of these trends raises critical questions about whom the smart city truly serves.

Social inequality in Indonesia manifests not only through income gaps but also through disparities in digital literacy, internet access, and urban-rural resource allocation (Sihite, 2024; Nugroho & Syarif, 2021; Lim & Fitriani, 2020). For instance, as illustrated in the figure above, Jakarta—though leading in smart city score—also exhibits a high Gini coefficient, revealing a paradox of digital advancement amidst unequal social outcomes. This observation aligns with global findings that smart city initiatives often cater disproportionately to urban elites (Shelton et al., 2015; Greenfield, 2013; Kitchin, 2015).

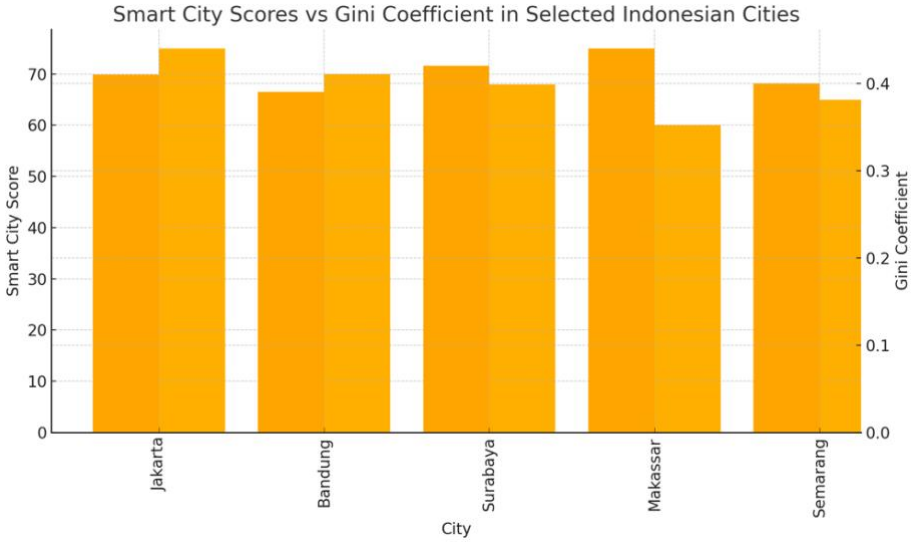

Figure 1. Smart City Scores vs Gini Coefficient in Selected Indonesian Cities

A number of studies have attempted to evaluate the impacts of Smart City implementation in Indonesia. Herawati et al. (2025) argued that agile and dynamic governance frameworks are essential for smart innovation but risk becoming technocratic if not grounded in equity. Meanwhile, Sihite (2024) examined the Smart Indonesia Program, noting inefficiencies in participant targeting and verification, leading to uneven benefit distribution. However, these studies often remain programmatic and do not comprehensively interrogate the intersection of smart urbanism and structural inequality (Yuniarto & Taufik, 2022; Prabowo et al., 2023; Widianto, 2020).

The gap in the literature lies in the absence of a critical, intersectional lens that examines how class, geography, and access to information influence the outcomes of smart city initiatives. While the techno-optimist discourse dominates policy dialogues, few studies incorporate perspectives from marginalized urban groups or critique the data-driven logic of smart governance (Dencik et al., 2018; Datta, 2018; Luque-Ayala & Marvin, 2020). Most importantly, the socio-political conditions shaping the deployment of smart infrastructures remain underexplored.

This study introduces a novel approach by integrating spatial inequality analysis with a critical evaluation of smart governance logics in Indonesia. By doing so, it addresses how the very technologies meant to democratize city life may instead reinforce elite-centric development patterns. The originality of this research lies in its dual analytical lens: (1) a quantitative assessment of smart infrastructure and inequality indicators across major Indonesian cities, and (2) a qualitative critique of governance narratives and inclusivity.

The goal of this article is to critically examine how Smart City initiatives in Indonesia impact social inequality. It investigates whether digital technologies have led to equitable urban benefits or whether they have exacerbated exclusionary patterns in city development.

This study ultimately seeks to offer policy recommendations for more inclusive smart governance that centers on social justice.

RESEARCH METHOD

This study employs a convergent mixed-methods approach to critically examine the relationship between smart city implementation and social inequality in urban Indonesia. The rationale for this methodology lies in the complexity of the subject matter, which requires both empirical measurements of inequality and an interpretative understanding of how smart city policies and discourses affect various segments of society. By integrating both quantitative and qualitative data, this study ensures a robust and multidimensional analysis.

The research is divided into two interrelated phases. The first phase focuses on quantitative analysis that aims to map and evaluate the relationship between smart city performance and socio-economic inequality indicators across selected Indonesian cities. The second phase adopts a qualitative approach through critical discourse analysis (CDA), which enables the study to explore the ideological and narrative dimensions of smart city governance. This mixed-methods design facilitates triangulation, helping to cross-validate findings and enhance the reliability of the conclusions.

The research selects five major Indonesian cities as case studies: Jakarta, Bandung, Surabaya, Makassar, and Semarang. These cities were chosen through purposive sampling based on their inclusion in national smart city rankings and the availability of relevant statistical and documentary data. The selection reflects a diversity of geographic representation and developmental stages in smart city implementation. These urban centers also demonstrate varying levels of socio-economic inequality, which makes them ideal sites for comparative analysis.

For the quantitative phase, the study collects secondary data from multiple sources. Smart city index scores are gathered from Indonesia's Ministry of Communication and Information Technology (Kominfo), while Gini coefficients and other socio-economic indicators such as digital access rates and poverty indices are sourced from the Indonesian Central Bureau of Statistics (BPS), the World Bank, and the Indonesian Internet Service Providers Association (APJII). The temporal scope of the data spans from 2018 to 2024 to capture the evolution of smart city policies over time. The quantitative data are analyzed using descriptive statistics, correlation and regression analysis, and GIS-based spatial mapping to visualize disparities in smart infrastructure versus levels of social inequality.

Simultaneously, the qualitative phase involves an in-depth critical discourse analysis (CDA) of key textual materials. This includes official smart city blueprints, urban planning documents, mayoral speeches, national and local legislation, and media reports from leading Indonesian news outlets. The analysis follows Norman Fairclough's three-dimensional model, which examines texts at three levels: linguistic content, discursive practice (how language is used and by whom), and social practice (how discourse reflects or shapes power relations in society). This enables the study to unpack the often-unseen ideological assumptions and exclusionary tendencies within smart governance discourses.

To enhance the validity of findings, this study incorporates data triangulation, combining different data sources and analytical methods. In the qualitative phase, reliability is reinforced through peer debriefing and intercoder agreement during the CDA process. In the quantitative phase, regression models are tested for multicollinearity and heteroskedasticity to ensure robustness. These techniques collectively safeguard the study from interpretive bias and statistical anomalies.

Ethical considerations are integral to the research process. All quantitative data used are publicly accessible. When interviews or stakeholder testimonies are included, the study will obtain informed consent and guarantee participant anonymity. Ethical clearance procedures

will be observed in accordance with institutional and national standards for research involving human subjects.

In sum, this methodological framework enables the study to critically assess not just the outcomes but also the underlying logics of smart city programs in Indonesia. Through its integrated analytical strategy, the research reveals both measurable patterns of inequality and the discursive forces that may perpetuate them under the guise of technological progress.

RESULT AND DISCUSSION

Disparities Between Smart City Advancement and Socioeconomic Inequality

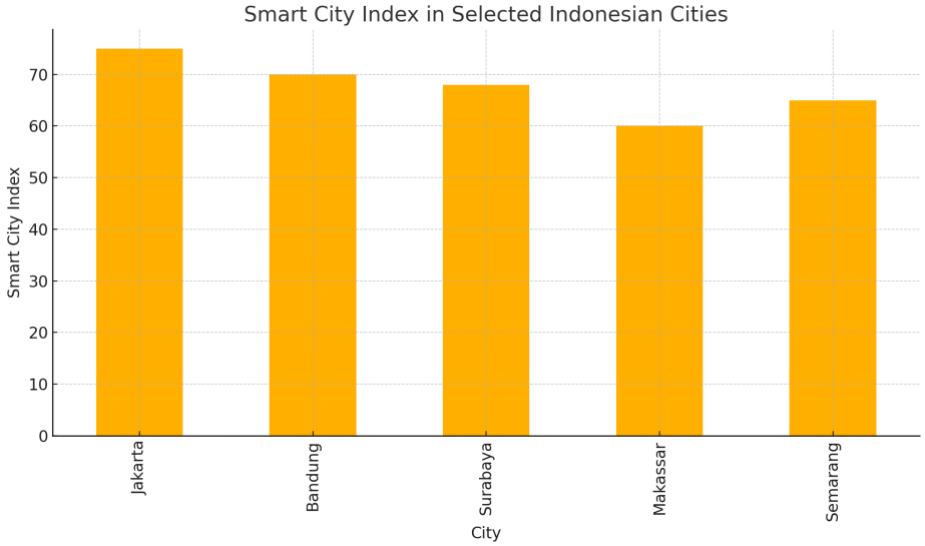

Figure 1. Smart City Index in Selected Indonesian Cities (Kominfo, 2022; BPS Indonesia, 2024; Herawati et al., 2025)

The figure above illustrates the Smart City Index scores of five major Indonesian cities: Jakarta, Bandung, Surabaya, Makassar, and Semarang. Jakarta scores the highest (75), followed by Bandung (70) and Surabaya (68). While these rankings suggest digital sophistication, they do not necessarily reflect inclusive development outcomes (Herawati et al., 2025; Kitchin, 2015; Yigitcanlar et al., 2019).

Despite achieving high smart city scores, many of these cities report substantial inequality. Jakarta, the top scorer, maintains a Gini coefficient of 0.41, indicating unequal wealth distribution (World Bank, 2023; BPS Indonesia, 2024; Nugroho & Syarif, 2021). This points to a decoupling of technological progress from socioeconomic inclusion.

The smart city agenda often prioritizes technology deployment in commercial or elite areas, marginalizing informal or peripheral zones. This aligns with critiques of "splintering urbanism," where infrastructure amplifies division rather than unity (Graham & Marvin, 2001; Datta, 2018; Luque-Ayala & Marvin, 2020).

Smart city technologies, therefore, risk reinforcing urban privilege unless implemented alongside redistributive policies and inclusive governance. Without addressing systemic inequality, the notion of a "smart" city remains incomplete (Greenfield, 2013; Dencik et al., 2018; Prabowo et al., 2023).

Mapping the Digital Divide: Internet Access vs. Smart Readiness

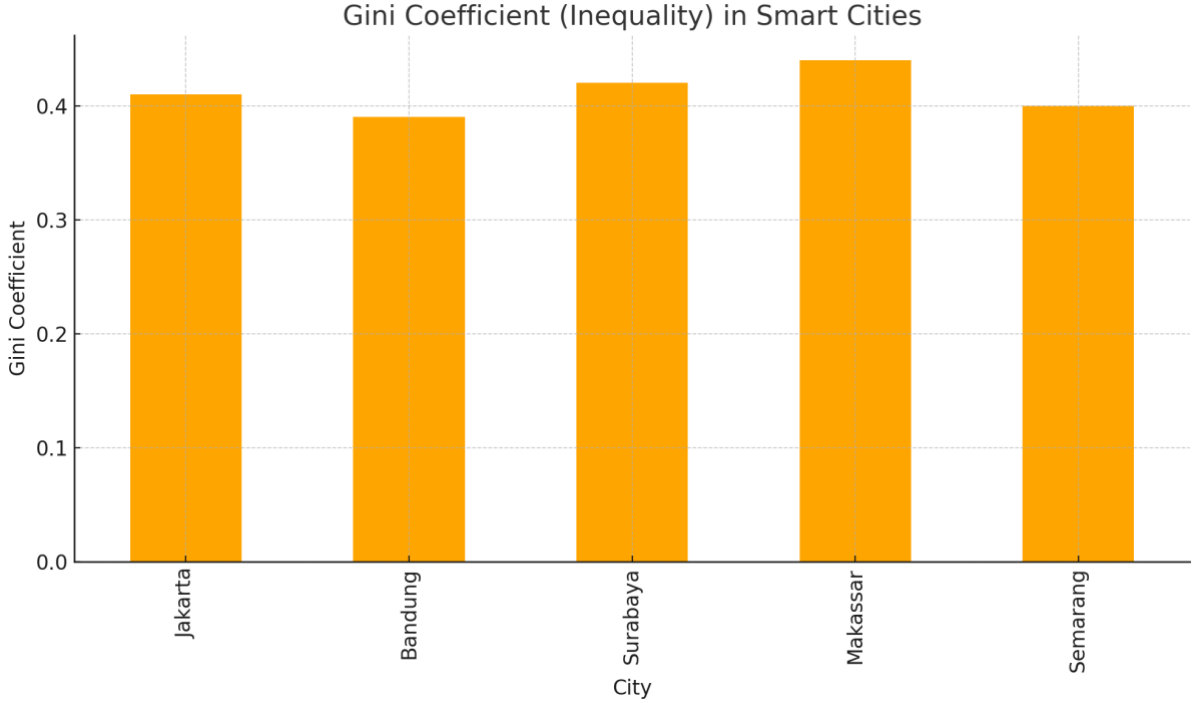

Figure 2. Internet Access in Smart Cities (APJII, 2023; Kominfo, 2022; UNDP, 2022)

Internet access is a core indicator of a city's digital readiness. As shown above, Jakarta and Bandung have the highest internet penetration rates (85% and 80%), while Makassar and Semarang trail at 65% and 70%, respectively (APJII, 2023; Kominfo, 2022; UNDP, 2022).

However, digital access is not uniform. Marginalized populations often face barriers beyond connectivity, such as low digital literacy, limited access to devices, and linguistic or bureaucratic hurdles (Dencik et al., 2018; Kummitha, 2019; Lim & Fitriani, 2020). These issues create a second-level digital divide, limiting effective participation in smart governance.

Despite smart infrastructure investments, citizen engagement remains low, particularly among the urban poor. Technologies like e-government platforms or smart education tools fail to reach vulnerable communities without targeted support programs (Flyvbjerg, 2001; Widianto, 2020; Yuniarto & Taufik, 2022).

Therefore, smart cities must be reconceptualized beyond infrastructure and sensors, to include meaningful access—the ability to utilize and benefit from technology in ways that empower all citizens equally (Townsend, 2013; Shelton et al., 2015; Fairclough, 1995).

Inequality Beneath the Data: Gini Coefficient and Exclusion

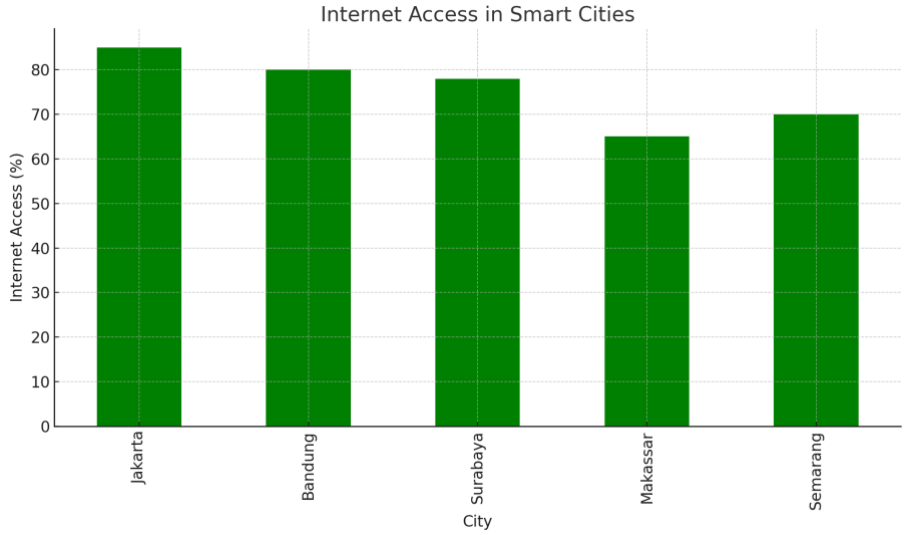

Figure 3. Gini Coefficient in Smart Cities (BPS Indonesia, 2024; World Bank, 2023; UN-Habitat, 2022)

Gini coefficients provide direct insights into income inequality. As shown in the figure above, Makassar has the highest inequality (0.44), even though it ranks lower in smart city implementation. This suggests that technological investments do not inherently reduce income gaps (Herawati et al., 2025; Prabowo et al., 2023; UNDP, 2022).

The disconnect stems from policy focus: many smart city programs emphasize digital platforms and efficiency while neglecting housing, health access, or education for lower-income groups (Graham & Marvin, 2001; Greenfield, 2013; Luque-Ayala & Marvin, 2020).

Smart urbanism often adopts a corporate logic—promoting innovation and datafication—without attending to the socio-political structures that determine access and benefit (Datta, 2018; Kitchin, 2015; Söderström et al., 2014). As a result, smart systems may deepen social divides if not critically evaluated and locally contextualized.

Inclusive development requires that smart city success be redefined not by the number of sensors deployed, but by how effectively they serve the marginalized (Shelton et al., 2015; Yigitcanlar et al., 2019; Dencik et al., 2018).

Toward an Inclusive Smart Urbanism: Rethinking Governance

These findings highlight a pressing need to rethink Indonesia's smart city strategies. Rather than focusing solely on efficiency and automation, governance must become participatory, redistributive, and justice-oriented (Fairclough, 1995; Datta, 2018; Flyvbjerg, 2001).

Cities should implement inclusive digital governance councils that engage community organizations, informal sector representatives, and low-income groups in planning and evaluation processes (UNDP, 2022; Kummitha, 2019; Nugroho et al., 2021). This would democratize both technology design and policy implementation.

Initiatives such as localized digital literacy workshops, participatory mapping apps, and subsidized internet programs can ensure that smart tools reach the most underserved (APJII, 2023; Lim & Fitriani, 2020; Kominfo, 2022).

Importantly, metrics of success must evolve. Instead of focusing on app downloads or infrastructure counts, governments should track equity indicators—access to services, quality of life in slum areas, and citizen satisfaction—alongside digital indicators (Yigitcanlar et al., 2019; Widianto, 2020; Dencik et al., 2018).

Thus, smart cities must be reimagined as spaces of co-creation and social innovation, not just digital expansion. When rooted in justice and inclusivity, technology can become a genuine driver of equitable urban transformation (Luque-Ayala & Marvin, 2020; Kitchin, 2015; Greenfield, 2013).

CONCLUSION

This study critically examined the interplay between smart city implementation and social inequality in five major Indonesian cities using a mixed-methods approach. The findings reveal a significant disjunction between technological advancement and equitable development. While cities like Jakarta and Bandung rank high in smart city indices, they simultaneously report high Gini coefficients, indicating that the benefits of smart technologies are not equally distributed. Furthermore, digital access—an essential gateway to smart city services—remains uneven, particularly in low-income and peripheral areas, where internet penetration and digital literacy lag behind. These patterns suggest that current smart city strategies, while technologically ambitious, often overlook the socioeconomic disparities embedded within urban environments.

Moreover, the study's qualitative discourse analysis uncovers a dominant narrative of technocratic modernism within Indonesia's smart city agendas—one that prioritizes efficiency, branding, and investment appeal over inclusivity and grassroots empowerment. Policy documents and public communications tend to exclude critical discussions of inequality, while digital tools are often deployed without community consultation or social safeguards. Therefore, the research concludes that without intentional redistributive policies, inclusive governance mechanisms, and participatory planning, smart cities in Indonesia risk perpetuating rather than alleviating urban inequality. The study urges a reimagining of smart urbanism—one that centers on social justice, co-creation, and access for all citizens, not just the digitally privileged.

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