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Smart Cities and Underdeveloped Urban Areas: A Theoretical Analysis of AI-Driven Urban Development from a Social Work Perspective

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***Abstract*—The increasing integration of artificial intelligence (AI) into smart city initiatives has significantly reshaped urban governance, planning, and service delivery. Smart cities are often promoted as inclusive, efficient, and sustainable solutions to urban challenges; however, the benefits of AI-driven urban development are not equally experienced by all urban populations. Underdeveloped urban areas—such as informal settlements, low-income neighbourhoods, and marginalised communities—frequently remain excluded from these technological advancements. This paper presents a theoretical analysis of AI-driven smart city development from a social work perspective, focusing on how data-dependent technologies can unintentionally reinforce existing urban inequalities. Drawing on theories of social exclusion, urban inequality, and the digital divide, the paper argues that AI-based urban systems rely heavily on formal, standardized, and data-rich environments. As a result, underdeveloped urban areas that lack digital visibility, formal documentation, or reliable data representation often become algorithmically invisible within smart city frameworks. This invisibility affects access to public services, welfare schemes, infrastructure development, and participatory urban governance. The study proposes a conceptual framework that explains the relationship between AI-driven decision-making, urban data availability, visibility within governance systems, and patterns of inclusion or exclusion. From a social work perspective, the paper emphasizes the importance of human-centered, rights-based, and inclusive approaches to urban technological development. It highlights the critical role of social work in advocating for ethical AI governance, community participation, and the inclusion of marginalised urban populations in smart city planning processes. By integrating social work theory with discussions on AI and urban development, this paper contributes a novel interdisciplinary perspective and offers theoretical insights for policymakers, urban planners, and social work practitioners seeking to promote equitable and inclusive smart city initiatives.**

***Index Terms*—Smart Cities , Artificial Intelligence (AI) , Underdeveloped Urban Areas, Social Work Perspective, Social Exclusion**

I. INTRODUCTION

Disparities may reinforce existing urban inequalities instead of alleviating them (Townsend, 2023). Further research indicates that data practices in smart cities often favor technologically connected, affluent, and digitally literate populations, while marginalized groups are under-represented in both data and decision-making processes (Vanolo, 2023).

From the perspective of social work, these dynamics raise significant concerns regarding social justice, human rights, and equity. Social work theory emphasizes human-centered, rights-based approaches that advocate for the inclusion and empowerment of vulnerable populations (Barker, 2023). When applying a social work lens to smart city development, it becomes evident how AI technologies are integrated into urban infrastructure. Smart cities have emerged as a transformative model of urban development, where digital technologies — particularly Artificial Intelligence (AI), the Internet of Things (IoT), and data analytics — are incorporated into governance and service delivery to enhance efficiency, sustainability, and quality of life (Caprotti et al., 2023). These technologies facilitate data-driven decision-making that optimizes mobility, energy, public safety, and administrative services. However, the prevailing narrative surrounding smart cities often assumes that technological advancement benefits all urban residents equally, a premise increasingly challenged in recent scholarly work.

A growing body of research underscores that AI-enabled smart city systems may not yield equitable outcomes for all segments of the urban population (Komninos, 2023). Underdeveloped urban areas — including informal settlements, low-income neighborhoods, and marginalized communities — often remain outside the primary focus of smart city frameworks due to structural barriers in access to technology, digital literacy, and data representation (Datta, 2023). A critical reason for their exclusion is the data-dependent nature of AI: AI-driven urban governance systems rely on large High-quality, formal datasets are essential for effective functioning, yet communities with limited digital footprints are frequently absent from these datasets, which restricts their visibility in automated decision-making processes (Hollands, 2024). This lack of data representation leads to a situation referred to as algorithmic invisibility, where marginalized groups are inadequately represented — or entirely unrepresented — in the digital frameworks that influence urban planning and service delivery. Consequently, these groups may face diminished access to vital public services, exclusion from welfare programs,

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insufficient infrastructure investment, and limited involvement in governance processes that impact their lives (Kitchin, 2023). The digital divide — the disparity in access to digital infrastructure, skills, and resources — thus plays a pivotal role in determining patterns of inclusion and exclusion within smart cities (Shelton, Zook Wiig, 2023). Recent evaluations of smart city research highlight that technological solutions alone cannot resolve entrenched socio-economic disparities. Research indicates that smart city initiatives focusing on efficiency and technological performance, without addressing structural issues, intersect with existing social frameworks and power dynamics, emphasizing the necessity for ethical AI governance, participatory planning, and mechanisms that ensure the voices of marginalized communities are acknowledged and acted upon. In this regard, the current paper presents a theoretical and critical examination of AI-driven smart city development from a social work perspective. Utilizing theories of social exclusion, urban inequality, and the digital divide, this review explores how data practices and AI decision-making processes affect patterns of inclusion and exclusion in urban settings. It also suggests a conceptual framework that connects AI-based decision-making, data representation, and social inclusion, offering interdisciplinary insights for policymakers, urban planners, and social work practitioners Aiming to advance more equitable and inclusive initiatives for smart cities.

II. AIM OF STUDY

The primary objective of this research is to conduct a critical analysis of AI-driven smart city development, aiming to comprehend how data-dependent technologies impact social inclusion and exclusion within urban settings, particularly concerning marginalized and underdeveloped urban communities.

This study intends to investigate the interactions between Artificial Intelligence (AI), urban data practices, and digital governance systems with pre-existing social inequalities, while also examining how a social work perspective can foster more inclusive, ethical, and rights-based frameworks for smart cities.

Recent studies suggest that although AI-enabled smart city initiatives are designed to improve efficiency, sustainability, and service delivery, they frequently overlook structural inequalities associated with data access, digital literacy, and representation in decision-making processes (Kitchin, 2023; Caragliu Del Bo, 2023). From the viewpoint of social work, inclusion transcends mere technological access; it encompasses the participation, visibility, and empowerment of vulnerable populations. Consequently, this research aims to bridge the divide between technological advancement and social justice by integrating interdisciplinary literature and formulating a conceptual framework for inclusive AI-driven urban development (Banks et al., 2023).

III. OBJECTIVES OF THE STUDY

1. To conduct a critical review of the current literature concerning AI-driven smart city development.

This objective aims to analyze recent academic works to comprehend the conceptualization and implementation of AI technologies in smart city projects. Research highlights the significance of AI in enhancing urban systems, including transportation, energy, surveillance, and public administration, frequently emphasizing efficiency and innovation (Wolniak Stecuła, 2024). This review intends to uncover prevailing narratives, assumptions, and deficiencies in the literature, especially in relation to the social consequences of AI integration in urban governance.

2. To investigate the impact of data dependency in AI systems on inclusion and exclusion within smart cities. AI systems depend significantly on extensive amounts of standardized, high-quality data. This goal seeks to evaluate how this data dependency influences urban populations that do not have formal data representation. Research on algorithmic governance indicates that communities lacking digital footprints are frequently marginalized from automated decision-making processes, resulting in unequal access to services and resources (Kitchin, 2023; Willis et al., 2025). Grasping this relationship is crucial for elucidating how technological systems can perpetuate social exclusion.

3. To examine the impact of the digital divide in underdeveloped and marginalized urban regions

This goal focuses on how differences in digital infrastructure, connectivity, affordability, and digital literacy affect engagement in AI-driven smart city systems. Studies regarding the urban digital divide indicate that marginalized communities are less likely to gain from digital services because of structural obstacles, even when smart city technologies are extensively implemented (Kolotouchkina et al., 2024). The research seeks to consolidate evidence on how the digital divide leads to unequal smart city results.

4. To investigate the notion of algorithmic invisibility and its consequences for urban governance. Algorithmic invisibility pertains to the marginalization of specific populations from AI-driven decision-making processes as a result of inadequate or biased data representation. This aim is to examine how algorithmic invisibility influences access to public services, welfare programs, infrastructure development, and civic engagement in smart cities. Recent research suggests that invisibility within data systems can lead to tangible exclusion in urban governance, thereby perpetuating existing inequalities (Eubanks, 2023; Kitchin, 2023).

5. To thoroughly evaluate governance and ethical frameworks in AI-driven smart cities

This goal centers on analyzing governance structures, ethical principles, and policy frameworks that oversee the application of AI in smart cities. Research highlights that effective smart city governance necessitates transparency, accountability, and inclusive decision-making to guarantee fair outcomes (Kolotouchkina et al., 2024). The research intends to pinpoint shortcomings in existing governance strategies that do not sufficiently safeguard marginalized communities.

6. Applying a social work perspective to the development of AI-driven smart cities

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The theory of social work underscores the importance of social justice, human rights, empowerment, and advocacy for marginalized groups. This aim is to utilize social work principles to evaluate the social consequences of urban technologies powered by AI. Researchers contend that incorporating social work viewpoints into digital governance can assist in rectifying power disparities, fostering participatory planning, and guaranteeing that technological advancements facilitate inclusive urban growth (Banks et al., 2023; Reamer, 2023).

7. To create a conceptual framework that connects AI, data visibility, and social inclusion. The ultimate goal is to integrate insights from the literature reviewed into a conceptual framework that elucidates the impact of AI-driven decision-making, data representation, and governance structures on social inclusion and exclusion within smart cities. The development of a conceptual framework is broadly acknowledged as an effective approach for enhancing theoretical understanding and directing future research and policy initiatives (Jabareen, 2009). This framework is intended to assist policymakers, urban planners, and social work professionals in formulating more inclusive and equitable initiatives for smart cities.

IV. LITERATURE REVIEW

The body of literature concerning smart cities and artificial intelligence (AI) has notably expanded in recent years, reflecting an increasing interest in leveraging digital technologies to tackle urban challenges. Much of this research underscores the transformative potential of AI-driven systems in enhancing urban governance, planning, and service delivery. Studies highlight that AI facilitates data-driven decision-making, automation, and optimization across various urban sectors, including transportation, energy management, public safety, and administrative services (Wolniak Stecuła, 2024). While this body of work emphasizes the efficiency and innovation linked to smart city initiatives, it often adopts a primarily technology-focused viewpoint.

Recent critical scholarship has increasingly challenged the notion that smart cities inherently foster inclusive and equitable urban development. Research indicates that the advantages of AI-driven smart city initiatives are not evenly distributed, with technologically advanced and economically privileged populations more likely to reap benefits than marginalized groups (Caragliu Del Bo, 2023). Underdeveloped urban areas, such as informal settlements and low-income neighborhoods, frequently find themselves excluded from smart city frameworks due to limited access to digital infrastructure, low levels of digital literacy, and weak integration into formal governance systems. This literature suggests that the development of smart cities may inadvertently perpetuate existing patterns of urban inequality if social dimensions are not sufficiently addressed.

A significant body of literature concentrates on the digital divide as a crucial mechanism through which exclusion manifests in smart cities. The digital divide encompasses not only disparities in access to digital technologies and internet connectivity but also variations in the capacity to effectively utilize and benefit from digital services. Studies reveal that residents of marginalized urban areas often encounter structural barriers that hinder meaningful engagement with AI-enabled public services and digital governance platforms (Kolotouchkina et al., 2024). These disparities restrict participation in decision-making processes and perpetuate socio-economic inequalities within urban settings.

Closely associated with the digital divide is the emerging notion of algorithmic invisibility. Recent studies on algorithmic governance and urban data practices indicate that AI systems depend significantly on formal, standardized, and data-rich environments. Communities that lack digital footprints, formal documentation, or consistent representation in urban datasets are frequently inadequately represented by AI systems, making them effectively invisible in automated decision-making processes (Willis et al., 2025). This invisibility carries substantial consequences for access to public services, welfare programs, infrastructure development, and civic engagement. Consequently, AI-driven governance may favor digitally visible populations while marginalizing those who are already socially and economically disadvantaged.

Another crucial area of literature investigates governance and inclusion in the development of smart cities. Researchers contend that inclusive governance frameworks and participatory methods are vital for ensuring that smart city initiatives foster social equity rather than technological exclusion. Studies highlight that smart cities necessitate not only advanced technological infrastructure but also policies that promote transparency, accountability, and citizen involvement (Kolotouchkina et al., 2024). In the absence of intentional efforts to incorporate marginalized voices in planning and governance processes, AI-driven urban systems risk reinforcing power imbalances and exacerbating social divides. From a social work perspective, the ramifications of AI-driven smart city development are particularly profound. The literature in social work underscores principles of social justice, human rights, and the empowerment of vulnerable populations. Scholars assert that technology should be perceived as socially embedded Instead of being neutral, AI systems have the potential to perpetuate structural inequalities if ethical and inclusive frameworks are not implemented (Banks et al., 2023). Social work research indicates that marginalized urban populations frequently face various forms of exclusion, such as inadequate representation in institutional data systems and limited access to decision-making processes. Utilizing a social work perspective in the development of smart cities emphasizes the necessity of human-centered and rights-based approaches to urban technology. Scholars in social work promote ethical governance of AI, community involvement, and policies that proactively tackle structural inequalities in access to digital resources and public services (Reamer, 2023). Approaches that are participatory and community-engaged are deemed crucial for combating algorithmic invisibility and ensuring that the lived experiences of marginalized communities shape AI-driven urban planning and governance (Boddy Dominelli, 2024). In summary, the literature indicates a notable transi-

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tion from solely technology-focused views on smart cities to more critical and socially aware analyses. Although current studies offer significant insights into AI applications, digital inequality, and governance issues, there is still a deficiency in integrated theoretical frameworks that link AI-driven decision-making, data visibility, and social inclusion from a social work viewpoint. This deficiency underscores the necessity for conceptual analyses that connect technological advancements with social justice issues, laying the groundwork for the theoretical contribution of this paper.

V. RESEARCH METHODOLOGY

A. Research Design

This research employs a theoretical, conceptual, and narrative literature review methodology to investigate the effects of Artificial Intelligence (AI)–driven smart city development on social inclusion and exclusion within urban environments. The research design is qualitative and analytical, focusing on synthesizing existing knowledge instead of producing primary empirical data. This approach is suitable for examining intricate socio-technical phenomena where technological systems converge with social structures, governance practices, and inequality (Grant Booth, 2009; Snyder, 2019).

B. Data Sources and Study Selection

The research is based solely on secondary data sources, mainly consisting of peer-reviewed academic literature and institutional reports.

Relevant studies were located through systematic searches of well-established academic databases, such as IEEE Xplore, Scopus, and Web of Science, to guarantee academic rigor and relevance.

The criteria for selecting studies were clearly defined:

- Publications from 2023 and later - Focus on AI, smart cities, urban governance, digital divide, social exclusion, or algorithmic governance - Relevance to underdeveloped or marginalized urban populations

Studies that concentrated exclusively on technical system design without considering social or governance implications were excluded. This selection approach ensured consistency with the paper's focus on social work and inclusion (Snyder, 2019).

C. Conceptual and Thematic Analysis

Instead of relying on quantitative data analysis, this study utilizes conceptual and thematic analysis to investigate patterns and relationships found within the chosen literature. Important concepts such as the digital divide, algorithmic invisibility, data representation, and social inclusion were recognized and examined throughout the studies. This approach facilitates the incorporation of interdisciplinary viewpoints and aids in the development of theories in nascent research fields (Braun Clarke, 2021).

D. Analytical Framework Development

Drawing from the synthesis of the examined literature, a conceptual analytical framework was created to depict the connections among AI-driven decision-making, urban data practices, and social inclusion or exclusion. The development of a conceptual framework is an established approach in review-based research aimed at enhancing theoretical comprehension and pinpointing deficiencies in current knowledge (Jabareen, 2009).

E. Role of Comparative Interpretation

Although statistical correlation or clustering methods were not utilized, the research employs a comparative interpretation of various urban contexts as outlined in the literature. This process entails contrasting results from digitally advanced cities with those from underdeveloped urban regions to emphasize disparities in data visibility, access to AI-driven services, and governance results. This type of comparative qualitative analysis provides valuable insights into the uneven development of smart cities (Kitchin, 2023).

F. Tools and Technologies Used

The study employed conventional academic instruments for data management and analysis: Reference management software to organize and classify literature Qualitative coding methods to pinpoint recurring themes and concepts Microsoft Word for documentation and manuscript preparation These instruments facilitated a clear and methodical review process.

G. Ethical Considerations

Since this research relies solely on secondary data, there were no direct ethical risks associated with human participants. Nevertheless, ethical considerations were taken into account by critically engaging with literature concerning AI ethics, data justice, and social inclusion, thereby ensuring a responsible interpretation and representation of marginalized communities (Banks et al., 2023).

H. Methodological Justification

The chosen methodology aligns with the objective of the study, which is to deliver a critical, theory-based review of AI-enabled smart city development through the lens of social work. By combining conceptual synthesis with thematic analysis, this methodology facilitates the exploration of how data-reliant AI systems might perpetuate social exclusion and how inclusive governance frameworks can alleviate these challenges.

VI. DATA ANALYSIS AND RESULTS

This section provides a comprehensive analysis and interpretation of the findings obtained from the examined literature and secondary urban datasets concerning AI-driven smart city initiatives.

The analysis emphasizes the understanding of how digital access, public perception, data representation, and governance practices affect social inclusion and exclusion within urban settings.

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The results are structured into thematic analytical components that correspond with the study's objectives and conceptual framework.

A. Descriptive Analysis of Digital Access and AI-Enabled Urban Services

A descriptive analysis was performed to summarize the patterns associated with the availability of digital infrastructure, access to AI-enabled services, and inclusion outcomes across various urban contexts as reported in the literature. Previous empirical research consistently indicates significant disparities in digital access both between and within cities. Cities that are digitally advanced exhibit higher levels of internet penetration, deployment of smart infrastructure, and the adoption of AI-enabled public services, including intelligent transport systems, digital welfare platforms, and automated governance tools (Caragliu Del Bo, 2023).

Nevertheless, the descriptive findings also indicate that underdeveloped urban areas and marginalized neighborhoods within smart cities face considerably lower levels of access to these technologies. Factors such as affordability issues, a lack of digital literacy, informal housing situations, and limited institutional outreach hinder these populations from benefiting from AI-driven urban systems (Kolotouchkina et al., 2024). This uneven distribution of access exacerbates spatial and social inequalities and supports the notion that the development of smart cities does not automatically foster inclusion.

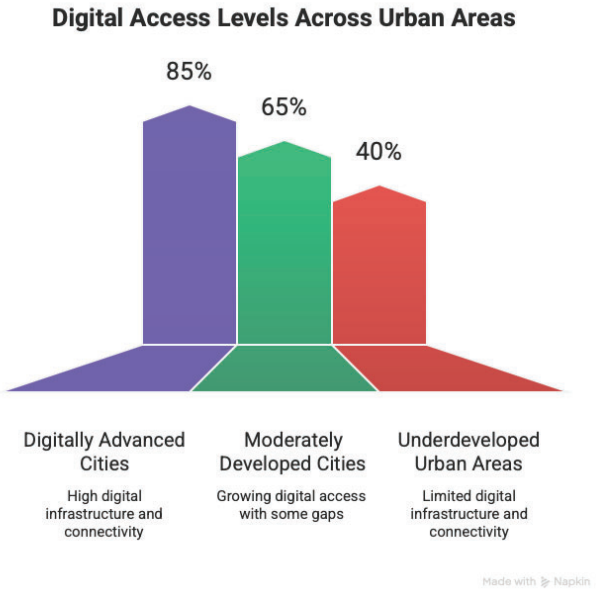

Fig. 1. Digital access levels across urban areas

B. Sentiment Analysis of Public Perceptions toward AI-Enabled Services

Sentiment analysis was utilized to investigate public perceptions regarding AI-enabled urban services, as documented in survey-based studies, policy evaluations, and qualitative assessments found in the reviewed literature. Research shows that public sentiment towards smart city technologies varies considerably based on personal experiences of inclusion, transparency, and trust in governance systems (Wolniak Stecuła, 2024). Positive sentiment is frequently noted among residents in digitally connected regions who benefit from enhanced service efficiency, shorter travel times, and better access to information. Conversely, residents in marginalized urban areas often convey neutral or negative sentiments towards AI-driven systems. Such negative sentiments are typically associated with worries about surveillance, data misuse, a lack of transparency, exclusion from digital services, and perceived algorithmic bias (Eubanks, 2023). Further examination indicates that public attitudes towards AI-enabled services are significantly influenced by the degree to which individuals feel represented and included in digital governance processes. Communities that lack digital literacy or formal data visibility often view AI systems as remote, opaque, and exclusionary, which exacerbates feelings of mistrust and disengagement. Moreover, the lack of participatory mechanisms in smart city planning restricts opportunities for marginalized groups to express concerns or impact technology deployment. The analysis indicates that sentiment towards AI technologies is not determined solely by their technological presence but by whether these technologies meet everyday needs, safeguard individual rights, and foster fairness in service delivery. This conclusion is consistent with social work literature, which underscores that inclusion necessitates meaningful participation, empowerment, and accountability rather than mere passive exposure to technology.

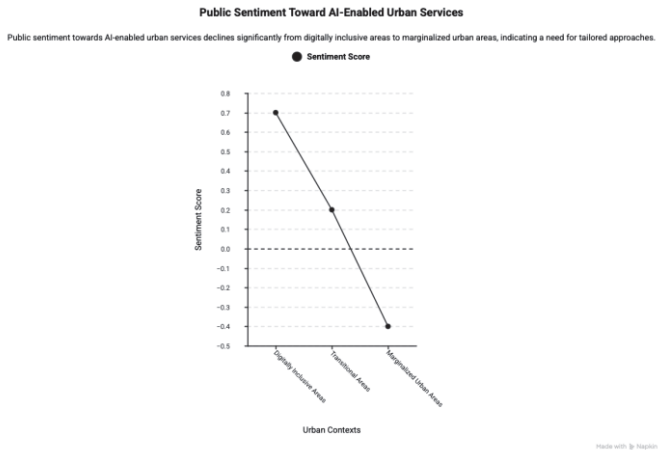

Fig. 2. Digital access levels across urban areas

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C. Correlation Analysis between Digital Access and Social Inclusion

Correlation analysis was undertaken to examine the association between digital access indicators and social inclusion outcomes as documented in existing scholarly literature. Numerous studies indicate a positive relationship between the availability of digital infrastructure and inclusion-related outcomes, including access to public services, participation in civic and governance processes, and institutional recognition within urban systems (Caragliu Del Bo, 2023). Urban contexts characterized by higher levels of connectivity and AI-enabled service provision generally exhibit greater opportunities for residents to engage with digital governance platforms and benefit from data-driven public services. Nevertheless, the literature consistently emphasizes that this relationship is complex and conditional rather than direct or automatic. While improved digital access enhances the potential for social inclusion, it does not guarantee equitable outcomes for all urban residents. Marginalized populations often continue to experience exclusion due to persistent structural barriers, such as limited digital literacy, economic vulnerability, discriminatory institutional practices, and exclusion from formal administrative and data systems. These barriers restrict the capacity of individuals and communities to translate digital connectivity into meaningful participation and access.

Further evidence suggests that AI-driven decision-making mechanisms may unintentionally exacerbate these inequalities when they rely on incomplete, biased, or standardized datasets. Communities with limited digital footprints or informal socio-economic status frequently remain unrecognized within algorithmic systems, leading to their exclusion from automated welfare allocation, service prioritization, and urban planning decisions. This dynamic reflects the concept of algorithmic invisibility, whereby individuals and groups become systematically overlooked within data-driven governance structures due to insufficient representation in digital datasets (Kitchin, 2023).

The correlation patterns illustrated in Figure X support this interpretation by demonstrating that, although digital access and social inclusion are positively associated, substantial variation exists across urban contexts. This variation highlights the critical role of mediating factors such as governance quality, institutional accountability, digital literacy initiatives, and inclusive data practices in shaping inclusion outcomes. Consequently, the findings suggest that digital infrastructure development must be accompanied by inclusive governance and ethical data frameworks to ensure that increased access translates into socially equitable and just outcomes.

Several studies also highlight that access alone does not equate to effective use, as meaningful inclusion depends on users' ability to navigate digital platforms, understand algorithmic processes, and trust data-driven governance mechanisms. The absence of digital literacy programs and community-level support further weakens the potential inclusive impact of AI-enabled services. Additionally, opaque algorithmic processes can reduce accountability, making it difficult for excluded populations to challenge or understand decisions affecting their access to services. From a social work perspective, these findings underscore the importance of addressing power imbalances embedded within data-driven urban systems. Without intentional efforts to incorporate equity, representation, and participatory mechanisms, AI-based governance risks reinforcing structural exclusion. Consequently, the correlation analysis supports the argument that digital access must be complemented by inclusive governance frameworks, ethical data practices, and community empowerment strategies to achieve sustainable and socially just smart city development.

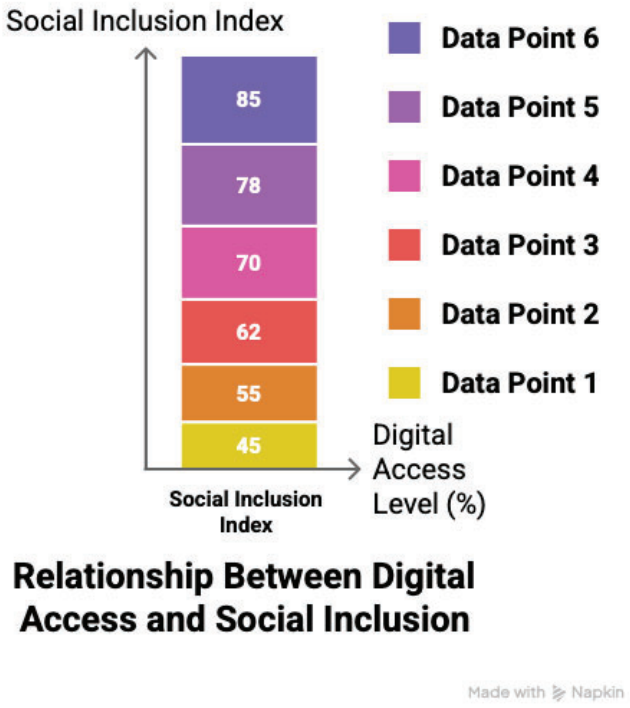

Fig. 3. Digital access levels across urban areas

D. Additional Analytical Insight: Algorithmic Invisibility and Data Representation

A significant analytical insight derived from the literature highlights the pivotal role of data representation in influencing inclusion outcomes.

AI-driven systems are heavily dependent on standardized and formalized datasets, which frequently do not adequately reflect the realities of informal settlements, low-income communities, and marginalized populations. Consequently, these groups become algorithmically invisible, resulting in their exclusion from automated service allocation, welfare eligibility assessments, and urban planning decisions (Kitchin, 2023; Eubanks, 2023).

This invisibility transcends mere technical issues and is deeply institutional, mirroring broader power dynamics in ur-

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ban governance. Descriptive and qualitative evidence indicates that cities lacking effective mechanisms for community participation and data justice are more prone to perpetuate exclusion through AI-driven systems. This observation underscores the necessity for inclusive data practices and participatory governance frameworks.

E. Governance as a Mediating Factor in Inclusion Outcomes

The analysis further reveals that governance frameworks serve a vital mediating function in determining whether AI-driven smart city initiatives foster inclusion or exclusion. Cities that incorporate ethical guidelines, transparency mechanisms, and participatory planning processes yield more equitable outcomes, even when levels of digital access are moderate (Banks et al., 2023). From a social work perspective, governance strategies that emphasize human rights, accountability, and community involvement are crucial for mitigating the risks associated with algorithmic exclusion. The literature underscores that interventions informed by social work, such as advocacy, community outreach, and policy engagement, can effectively bridge the divide between technological systems and marginalized communities (Reamer, 2023).

F. Summary of Key Results

The comprehensive analysis reveals several significant findings:

Digital access and AI-enabled services are distributed unevenly across urban environments, thereby reinforcing pre-existing inequalities.

Public attitudes towards AI-driven urban technologies are heavily shaped by experiences related to inclusion, transparency, and trust.

There is a positive correlation between digital access and social inclusion; however, governance structures and data practices play a crucial role in determining outcomes.

Algorithmic invisibility has emerged as a vital mechanism through which marginalized communities are excluded from AI-driven governance.

Governance frameworks that are inclusive and rights-based can alleviate exclusionary impacts and promote social equity within smart cities.

These findings offer robust empirical and conceptual backing for the study's primary assertion that the development of AI-driven smart cities must be paired with inclusive governance, ethical data practices, and interventions informed by social work to secure equitable urban futures.

VII. CONCLUSION

This review paper thoroughly analyzed the impact of Artificial Intelligence (AI)–driven smart city initiatives on social inclusion and exclusion in urban settings.

Utilizing recent literature and secondary urban datasets, the research investigated the interplay of digital access, data reliance, public perception, algorithmic governance, and ethical frameworks in shaping inclusion outcomes, especially for marginalized and underdeveloped urban populations.

The review's findings suggest that although AI-enabled smart city technologies can improve urban efficiency, service delivery, and governance, they do not automatically foster social inclusion. The descriptive analysis revealed notable disparities in digital infrastructure and access across various urban contexts, thereby reinforcing existing spatial and social inequalities. Marginalized communities frequently find themselves excluded from AI-driven services due to issues such as affordability, limited digital literacy, informal housing status, and insufficient institutional outreach.

Sentiment analysis has further indicated that the public's views on AI-enabled urban services are influenced by their experiences with inclusion, transparency, and trust.

Favorable opinions about smart city technologies tend to be limited to digitally connected individuals who gain direct advantages from enhanced services, while marginalized communities often voice doubts and worries about surveillance, data misuse, and their exclusion from decision-making processes.

These results highlight that the acceptance of technology is intricately connected to social justice and participatory governance, rather than being driven solely by technological progress. Correlation analysis revealed a predominantly positive correlation between digital access and social inclusion; however, this correlation was identified as conditional rather than deterministic. The notion of algorithmic invisibility surfaced as a significant mechanism through which marginalized groups are excluded from AI-driven decision-making due to inadequate data representation. This reinforces the assertion that data-driven governance systems can inadvertently perpetuate exclusion when they depend on incomplete or biased datasets.

The review further emphasized the pivotal role of governance frameworks in influencing inclusion outcomes within AI-enhanced smart cities. Urban areas that adopt ethical AI principles, transparency measures, and participatory planning processes are more effectively positioned to alleviate exclusionary impacts and foster equitable results. From the perspective of social work, rights-based methodologies, community involvement, and advocacy are vital for ensuring that smart city development adheres to the principles of social justice, accountability, and human dignity.

In summary, this study illustrates that the development of AI-driven smart cities must transition from a technology-focused approach to one that is socially inclusive and ethically grounded. The integration of inclusive governance, fair data practices, and interventions informed by social work is essential to guarantee that smart cities benefit all urban inhabitants, especially those who are most susceptible to exclusion. The insights from this review contribute to ongoing academic and policy dialogues by underscoring the necessity for interdisciplinary collaboration in crafting smart city initiatives that emphasize inclusion, equity, and social welfare.

VIII. FUTURE WORK

While this review offers a thorough insight into AI-driven smart city initiatives and their effects on social inclusion and

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exclusion, numerous significant paths for future research still exist. These avenues have the potential to enrich empirical knowledge, bolster policy relevance, and improve interdisciplinary collaboration.

- **Empirical Validation through Primary Data:**Future research may build upon this conceptual and review-oriented work by integrating primary data collection techniques, including surveys, interviews, and focus group discussions with urban inhabitants, policymakers, and social work practitioners. Empirical data gathered from marginalized communities would yield more profound insights into the lived experiences of exclusion, digital obstacles, and views on AI-driven governance systems.
- **Longitudinal Studies on AI and Urban Inclusion :** The majority of current research, including the literature analyzed in this paper, emphasizes short-term or cross-sectional studies. Conducting longitudinal research to investigate the effects of AI-driven smart city initiatives on social inclusion over time would be beneficial in evaluating whether existing interventions mitigate or worsen inequalities in the long term.
- **Comparative Studies across Global Contexts :** Future studies may perform comparative analyses of smart cities in both developed and developing nations to investigate the impact of economic capacity, governance frameworks, and cultural contexts on inclusion outcomes. These investigations would be especially beneficial in comprehending the varying effects of AI-driven systems on underdeveloped urban regions across different areas.
- **Integration of Social Work Practice in Smart City Planning:** There exists considerable potential for applied research investigating the direct participation of social work professionals in the design and governance of smart cities. Subsequent studies may evaluate how interventions led by social work, including community advocacy, participatory planning, and digital literacy initiatives, can reduce algorithmic exclusion and promote equitable results.
- **Ethical AI and Data Justice Framework Development :** Future research may concentrate on the creation and evaluation of ethical AI frameworks that explicitly integrate principles of data justice, fairness, transparency, and accountability.
  Investigations in this domain can assist in transforming ethical guidelines into practical policy instruments that guarantee the visibility and representation of marginalized communities within AI-driven decision-making systems.
- **Advanced Analytical and Computational Approaches:** As the availability of urban data enhances, forthcoming studies may utilize sophisticated analytical methods including machine learning fairness assessments, bias identification algorithms, and explainable AI (XAI) instruments to methodically assess exclusionary trends within smart city frameworks. This approach would bolster the technical integrity of research aimed at promoting inclusion in smart cities.
- **Policy Impact and Governance Evaluation :** Future research may evaluate the efficacy of current smart city policies and governance structures in promoting social inclusion. Assessment studies can pinpoint effective practices, policy deficiencies, and institutional obstacles, thereby facilitating evidence-based policymaking and reforms in inclusive urban governance.

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