Review

Smart Cities, Digital Inequalities, and the Challenge of Inclusion

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Highlights:

What are the main findings?

- New smart cities have deepened social and digital inequalities among the technologically savvy residents and those who are usually left behind due to their age, lack of abilities, or resources.
- The reflective framework for inclusive smart cities offers a comprehensive and holistic approach from the perspective of who is included or excluded, what is the value of digital inclusion, and what are the key premises of inclusive digital governance.

What is the implication of the main finding?

- The framework is meant to act as a starting point in the design of inclusive digital urban policies and strategies and can also be employed to assess the directions taken to date by city governments towards more inclusive practices.

Abstract: While cities on a global scale embrace smartness as a roadmap for efficient urban governance, disparities persist in the domain of digital accessibility, literacy, and skills, with manifestations of digital exclusion, ageism, and ableism prevalent in most digital urban experiences. Despite their commitment to bridging the digital divide, governments lack comprehensive frameworks to inform policymaking and action for inclusion in smart cities. This review paper aims to deepen the understanding of the multifaceted challenges confronting the governance of inclusion in smart cities. Drawing from a review of research encompassing digital inclusion, digital transitions, smart cities, and urban governance, we discuss who is included and excluded in the governance of smart cities; what are the necessary conditions to be met for smart cities to be considered inclusive; and how can smart city governance deliver public value and equal benefits for all. As a novel contribution, this paper outlines a reflective framework to inform citizen inclusion in the governance of smart cities. This framework is meant to act as a starting point in the design of inclusive digital urban policies, and can also be employed to assess the directions taken to date in public organizations towards more inclusive urban practices.

Keywords: digital divide; digital inequalities; inclusion; smart cities; urban governance

1. Introduction

Since the emergence of the smart city concept in 1994 with the launch of digital city Amsterdam [1,2], the smart city phenomenon has become widespread among both global and prosperous cities striving to increase efficiency of government services through data-driven solutions and developing cities looking to become more competitive [3]. The definitions of smart cities emphasize the synergy between information and communication technology (ICT), logistics, and energy production and their impact on enhancing the well-being of citizens, their inclusion, and engagement [4]. However, critics of the smart

city phenomenon have raised concerns regarding the widening inequalities in access to and usage of ICT, drawing attention to the digital divide of 'new urban poor' class of low-paid workers [5] and citizens left behind the digital progress [6–9].

The priority focus of smart cities on profit maximization through the accumulation of data, information, and knowledge as a main source of urban production and consumption [3,10] leads to a new smart mentality of urban governance [11], assuming that citizens should have the knowledge, skills, abilities, and resources to engage in a digital urban experience. Hence, 'younger', more 'digital savvy', 'able', highly educated and highly skilled citizens are actively embraced by the smart city digital economy, creating exclusion and socio-economic segregation of others (i.e., the working class, older people, people with disabilities) [12–14].

Albeit there exist growing concerns about the marginalization of particular groups of citizens from smart cities strategies and discourses [15–19], to date the literature lacks a reflective conceptual framework to guide the development of governance arrangements that will effectively deliver digital inclusion in the smart city. Anttiroiko and De Jong [15] developed a comprehensive framework of inclusive cities positioning inclusion as an instrumental tool of urban value creation and prosperity of urban communities. Enhancing equality of opportunities, capacity building, motivation, and incentivization are some of the proposed actions aimed at inclusion on an urban scale [15]. Sha et al. [16] argue that poor policymaking in the context of technology-led urban governance can hinder the access of large groups of citizens to the benefits of technology adoption. The authors propose a conceptual model connecting the drivers of disruptive urban technology with specific challenges of inclusive governance. Addressing the needs of vulnerable groups is identified as one of the pillars of inclusive policymaking [16].

The focus on specific needs of vulnerable and underrepresented citizens, such as people with disabilities, older people, and migrants, who often face discrimination and marginalization in access, use, or ownership of digital technologies due a lack of skills, abilities, and/or resources, is increasingly getting the attention of scholars [8,9,17]. However, research by Wang et al. [18] highlights that the value of inclusion is still not a priority in the development of smart city strategies, and stresses the need to expand the understanding of digitally vulnerable and underrepresented citizens in policymaking of smart cities. This trend is also observed in place management literature. For instance, Kavaratzis et al. [19] advocate for citizen-centricity, effective stakeholder engagement, and observing citizens' rights in decision-making processes about places. Against this backdrop, the need to develop more inclusive urban governance frameworks emerges, one that can provide a holistic perspective on the determinants of the digital exclusion of specific groups of citizens, the priorities for their digital engagement, and the effective drivers of their visibility and representation in the decision-making process.

Despite several previous attempts to conceptualize inclusion in the context of smart city developments (i.e., social inclusion or citizen participation) [8,10,18,20], to our knowledge, no comprehensive and holistic framework to deliver digital urban inclusion of the vulnerable and underrepresented groups has been developed to date. In order to fill this research gap, we engage in a problematizing review of digital inclusion in smart cities to provide a first attempt to develop a reflecting framework to inform inclusive smart city governance. We base this framework on previously identified barriers to inclusive urban development [16] and previous work addressing the critical challenges in the design of inclusive urban strategies [15,18]. Thus, we draw from theories and empirical research addressing concepts such as inclusive governance, digital accessibility; digital skills, abilities, and motivations; digital citizenship; co-creation and open innovation, among others, and we address the following guiding questions:

1. Who is included and excluded in the governance of smart cities?
2. What are the necessary conditions for smart cities to be considered inclusive?
3. How can smart city governance deliver public value and equal benefits for all?

To that effect, we first identify key pillars of inclusive urban governance, particularly focusing on vulnerable and underrepresented groups of citizens. We then contextualize the main enabling components of inclusion in digital urban policy processes along with their strategic implications on inclusion outcomes. Finally, we highlight critical challenges that signal important barriers to digital inclusion on an urban scale. The proposed reflective framework aims to enhance the governance of inclusive smart cities by offering a comprehensive approach to inclusion, encompassing stakeholder engagement, policy development, and implementation. It also serves as a starting point in the design and/or enhancement of inclusive digital urban policies and strategies aimed at redefining urban power dynamics and representation structures, enabling an effective exercise of digital rights of all citizens through access and participation, and ensuring that no one is left behind in technologically-assisted urban progress.

The aim of this paper is to provide a deep understanding of how inclusion is embedded in the governance and discourses associated with smart city transitions and digital agendas, with the secondary aim to inform decision making towards a more inclusive digital urban governance logic. Hence, rather than providing a systematic and integrative account of the literature, we aim to critically interrogate the literature to problematize [21] how inclusion has been conceptualized, operationalized, and evaluated, and which are the implicit assumptions underscoring current approaches to delivering inclusion.

This paper is organized as follows. We start by discussing how inclusion has been approached in the literatures of smart cities, urban planning, urban studies, digital transitions, and urban governance, and then turn to the literature on citizen engagement, citizen participation, and inclusive policymaking, among others, to reflect more broadly on the challenges of governing and delivering inclusion at the city level. We provide a theoretical review of concepts, theories, and empirical accounts of inclusion in smart cities. We then present a framework for the governance of inclusive smart cities. This paper concludes by discussing the theoretical and practical implications of our reflection for the scholarship on inclusive digital urban governance and for practitioners and policymakers committed to ensuring inclusion in smart city projects and urban digital transitions at large.

2. Theoretical Framework

"*We believe a city to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance*" [22] (p. 70).

2.1. Why Are Cities Going Smart?

Digital technology has become the main driving force shaping urban development and imaginaries of urban futures on a global scale [23]. Cities embrace digital economies and smart agendas as a roadmap towards efficiency, sustainability, and resiliency [24–26].

The promise of applying technology to the betterment of cities has resulted in industrial urban neighbourhoods transformed into high-tech precincts (see Barcelona's 22@ district's case in [27]). At the other extreme end of the spectrum, a series of entirely new smart cities are built from scratch around the world as beacons of a new digital urban age through private–public partnerships [28]. However, the smart city construct goes beyond physical transformations, it "has evolved to mean almost any form of technology-based innovation in the planning, development, operation, and management of cities" [29] (p. 146), and more conceptual work is needed to develop a comprehensive definition of smart city encompassing its multiple dimensions and implications [4].

2.2. Smart City Discourses

Giffinger et al. [30] (p. 11) define the smart city as "a city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living, built on the smart combination of endowments and activities of self-decisive, independent and

aware citizens". However, the authors acknowledge that the concept of smart city has been strongly influenced by city marketing experts who often promote optimistic but vague claims about the benefits of smart development. Wiig [31] (p. 535) adds that a "rhetoric of intelligent, transformative digital change works much more to "sell" a city in the global economy than to actually address urban inequalities". Governments around the world also increasingly engage in smart city branding, primarily as a tool to signal innovative and future-oriented strategies and to attract investment [28] or to tag their cities as belonging to a new digital urban elite [32]. In this context, branding and marketing are often applied to digital transformation projects rather than becoming aligned with an overall smart city brand. As such, they become targeted communication exercises to promote the benefits of certain technological interventions in urban efficiency [33,34] or to attract investment [35].

What this tells us is that, in the face of global competition, governments introduce measures that favour private rather than public interests [36], thus risking converting 'smart city' into a new valuable urban adjective for promotional purposes [37] that does not necessarily contribute to the betterment of citizens' lives. In fact, the concept of 'smart city' took over from that of 'sustainable city' as the most popular tag around 2010, peaking in 2015 [38], and is often tied into the agendas of big corporations that apply the 'smart' label to rebrand creative and eco city projects [39,40], reinforcing utopian approaches to solving urban societal issues with technology in urban planning.

2.3. Technology, Society, and Urban Governance

Given the open and fuzzy character of smart cities, the literature is characterized by multidisciplinary approaches to understanding and questioning the change technological advancements bring to the urban fabric. The initial approach puts forward a techno-centric and top-down perspective linked to the disruptive role of technology in optimizing urban efficiency, operability, and sustainability [41]. Such an approach emphasizes a new urban metabolism led by a selective group of corporations and business providers, and fueled through centralized dashboards that monitor advanced mobility systems, smart power grids, urban security applications, and waste management [42,43]. The techno-centric approach is increasingly challenged by an alternative social logic of smart urbanism that demands a critical understanding of the transformational impact of urban technologies on the social fabric of cities [23]. An alternative people-centred approach has since emerged, emphasizing that smart innovation can have positive and negative effects for the wellbeing and the quality of life of residents; and highlighting the key role of citizens in digital transformation processes as they embody the digital city experience [6,37].

Regardless of whether technology or people are put at the centre, scholars have long been concerned with the governance of the smart city, mainly considered as a multi-faceted policy and normative framework that regulates the management of digital public services, defines decision-making processes, roles, responsibilities, and procedures guiding interactions and cooperation between local governments and urban stakeholders in the digital transition [44–46]. This has led to the transformation of local governments' digital communication channels into dynamic platforms combining several roles as data and information sharing platforms providing access to administrative procedures, tools for enabling online public consultation and citizen engagement processes, and open data management platforms [47]. Similarly, a wide range of municipal services such as payment of municipal bills, property taxes, or fines, as well as welfare assistance, are increasingly performed online through ICT platforms [48]. Hence, digital apps and online platforms enable citizens to actively engage in discussions and decision-making processes and urban knowledge production [49]. Increased digital interaction of citizens with their city gives rise to digital citizenship, or the ability to participate in society online [50] and with smart urban governance models [44]. However, the digital experience is only available for those acquainted with and able to access it, which brings about the challenge of ensuring universal digital inclusion and accessibility [8,51,52].

2.4. The Challenge of Inclusion in the Governance of Smart Cities

Despite the potential inclusive benefits of digital innovation, some critical aspects of everyday life in the city are reproduced and reinforced as many are left behind due to their lack of access, skills, resources, or abilities [12,13,53,54]. Hence, notwithstanding transformative dynamics of the new digital urbanism, its polarizing effects on the citizens' wellbeing and its role within the urban ecosystem are under constant scrutiny by scholars. Evans et al. [55], for instance, critique the excessive technological triumphalism of policymakers and corporations dedicated primarily to the economic growth of digital cities rather than striving to support digital social transformations aimed at tackling widening social inequalities and the digital divide of the most vulnerable.

The limited and predominantly passive role of residents in smart city governance is also of concern to scholars. Residents are often regarded as sources of data feeding urban platforms, consumers of digital services, and/or investors in innovative urban technologies, such roles raising concerns about the ethics, the privacy, and the construct of digital citizenship in the smart city [7,11,56,57]. In parallel, key financial, hi-tech, and cultural services of the new digital economies are mainly aimed at highly educated and highly skilled global elites, leading to capital accumulation [3] and a widening of the societal divide as lower income, older, and migrant citizens lack the necessary digital literacy skills or access to engage in the digital city [58]. Furthermore, ageism and ableism are embedded in most digital experiences, perpetuating stigma and discrimination towards those in lower socioeconomic brackets, elderly, migrants, and people with disabilities. The disregard of specific needs, skills, and abilities of the disadvantaged and vulnerable groups leads to their systematic exclusion from smart city policies and discourses [9,14].

For instance, people with disabilities face significant digital barriers (i.e., a gap of 11% in access to Internet use in developing countries; low ownership rates of smart phones and computers; lack of compliance with web content accessibility guidelines of 63% of national governments portals and 98% of top websites [59]). At the same time, despite the meaningful impact of digital technologies on active ageing, personal autonomy, and community engagement of older people [60,61], the likelihood of using the Internet decreases by 8% each additional year after the age of 65 [13,62]. Furthermore, while digital technology has become a key enabler of social inclusion and place engagement of migrants and refugees [63], Alam and Imran [64] report that the digital divide for this group is further compounded by restricted affordability, low digital literacy, and language barriers.

Tackling digital inequalities and therefore fostering a barrier-free, inclusive, and ethical smart city remains one of the major challenges of policymaking and digital urban governance [7]. Inclusion, in this study, is understood as a public value that local authorities actively need to pursue to ensure it. In doing so, inclusion is not merely about guaranteeing that all citizens have the right to benefit from the innovations adopted, but that they also have a voice in deciding what smart city strategies they want to adopt and how to do so [18].

3. A Framework for Inclusive Smart Cities

A review of the extant scholarship on the emerging complexities and critical challenges of smart city development reveals that the application of urban technologies tends to favour the tech-savvy, wealthy, and well-connected, widening inequalities in ICT access, use, and outcomes of vulnerable groups of citizens. On a conceptual level, the digital divide has been conceptualized in three sub-levels: first order (ICT access or connectivity), second order (ICT use or capability), and third order (ICT outcomes/returns or content) [65–67]. Other scholars have rather focused on conceptualizing the determinants of the digital divide, distinguishing between: economic and technological determinants relating to prosperity and modernity; institutional determinants, relating to the political system and rule of law; and social determinants, relating to people-based characteristics, such as demographics and educational levels [68]. What these categorizations have in common is that inclusivity is measured broadly from the availability and accessibility of technology, the citizen groups

benefiting from it, and the nature of institutional arrangements supporting collaboration with stakeholders in the digital transition. In terms of economic and technological determinants, one could think about issues of physical and material access to the Internet and digital devices, but also access and skills to use smart devices and upgraded versions of technology [69]. Additionally, in the context of smart city strategies, institutional determinants can be related to how processes of data collection and data ownership are organized between governments and other stakeholders such as big tech companies [26], but also how participation of and communication with citizens is organized (especially with marginalized or vulnerable citizens) [51]. Finally, social determinants of inclusion [64,70] are often used to further express the importance of including certain vulnerable groups in the context of digitalization, focusing on characteristics such as age, disabilities, and migrant background.

In inclusive smart city policy, issues of decision-making power and democratic legitimacy also play a key role [44]. A focus on inclusion at the urban governance level should result in two significant shifts: lead to outcomes in terms of a higher quality of life for all citizens, but also provide an open participatory approach to planning and acting to achieve those outcomes (increased legitimacy [1,9,44]). Hence, inclusiveness is also required in the structures for collaboration and decision-making, and must be a guiding principle on how citizens and governments interact and for how material output (wealth) and post-material output (health and sustainability) are prioritized [20,65,71].

3.1. For Whom Should Be Inclusive Smart Cities?

3.1.1. Vulnerable Groups and Digital Accessibility

Digital means of organizing access to services is becoming the norm in smart cities, as traditional face-to-face and phone-based ways of service delivery are diminishing. The phasing out of alternatives to the digital often leads to frustration among certain groups as they encounter barriers in the configuration of the Internet access, the outdated design of assistive devices, the cost of adaptive technologies, as well as other safety and security concerns [72,73]. Oftentimes, vulnerable groups such as older people, people with disabilities, low-income groups, ethnic minorities, and indigenous communities are most likely to be left behind in the progressive race to digitalization [51,74].

Van Dijk's [75] categorization of accessibility is useful here as a reflective framework as it encompasses four main elements: material access, motivational access, skills access, and usage access. The first element, accessibility of all citizens to physical or material tools and devices, is one of the most emphasized components of inclusive smart city strategies by local governments [76]. Such accessibility is a continuous concern as, on one hand, many cannot subsidize the cost and, on the other hand, the complexity of technology demands digital skills and upgraded versions of digital products [77]. On the other hand, motivational access refers to the mental barriers that prevent people from using ICT, often related to the level of self-esteem. Digital vulnerability and lower levels of self-esteem can lead to withdrawal from digital environments [9]. Furthermore, skills access refers to the lack of digital skills as a main barrier for usage. Finally, usage access refers to differences at the ICT user capability level [78]. This distinction is in line with the broader literature, in which there is an agreement on seeing accessibility as more than the level of possession of ICT or Internet connection, but rather incorporating (rational) digital literacy skills, abilities (i.e., knowledge) to access the digital environment, and finally (emotional) motivation to engage with the digital environment [70,79]. We expand on these non-physical requirements to access in the next section.

3.1.2. Digital Skills, Abilities, and Motivations

Digital skillsets often are limited to skills to navigate the Internet and to access information services [53]. Beyond the possession (or lack thereof) of the necessary skills to master digital devices, scholars have emphasized the importance of education and/or social support networks in enabling digital access [60,79,80]. This partly signals that digital access

often depends on both economic capital (monetary assets and other economic possessions) and social capital, that is, human relationships, networks, and social support.

At this point, we wonder, what constitutes digital skills? Helsper and Deursen [81], amongst others, argue for a classification of skills that transcends technicalities. Van Deursen and Van Dijk [54], in this sense, propose a distinction between medium-related skills such as operational skills (or 'button knowledge'), formal skills (such as browsing and navigating), content-related skills (which includes searching, selecting, and evaluating information), but also communication skills (think about mailing and creating online identities), content creation (e.g., contributions to the Internet), and finally strategic skills, which are related to using the digital environment to achieve one's own personal and professional goals (ibid). In effect, this means that digital skills go beyond digital literacy, to also encompass social media and critical thinking skills. In addition, other cognitive and physical abilities are required for engaging digitally [82]. In this paper, we prefer the use of 'digital abilities' to suggest a more comprehensive conceptualization of the needs for digital accessibility, as not only connectivity or literacy, but also limited hearing and sight, for example, may hinder access of older people and people with disabilities to Internet [14].

Equally as importantly, motivation as the emotional status of citizens in engaging with the online world is required for meaningful digital engagement. Deng and Fei [83] highlight how self-efficacy or an individual's judgement about his/her own skills and capability to perform computer-related activities influences engagement and involvement in smart city structures.

What emerges is that policymakers must be aware and actively consider citizens' differences in access, skills, and abilities to enable their full participation in the smart city. Ideally, policymakers would invest in identifying vulnerable individuals and groups; hear and raise awareness of their needs; and provide the necessary infrastructure and policies to overcome all barriers and motivate all citizens to get involved in the making of the smart city.

3.2. What Is the Value of Digital Inclusion?

3.2.1. Digital Citizenship

The understanding of the inclusive principles for governing smart or digital cities also requires attention to the construct of digital citizenship. This concept is grounded on digital competences, norms of behaviour with digital technology [50,84], and participation of digitally enabled citizens in social life [69]. "A digital citizen is someone with regular and flexible access to the Internet, the skills to apply this technology, and a regular use of the Internet for participation and functioning in all spheres of the society" [85] (p. 5). This definition highlights the performative nature of citizenship in the digital domain, determined by actions, processes, and outcomes, rather than by a formal given status of belonging [57,86].

The spread of Artificial Intelligence (AI), blockchain, and of the algorithmic data governance in urban management poses important ethical and social challenges to the construct of digital citizenship as mounting concerns over the dominant role of global Information Technology (IT) firms in ownership and management of data, and the lack of a specific digital rights policy framework emerge. As evidence of the pervasive impact of digital technologies on limiting civil liberties and increasing digital vulnerabilities, Calzada [87] highlights that the COVID-19 pandemic has led to the emergence of a new globalized digital pandemic citizenship regime framed by surveillance and cyber control, and that this has materialized through mobile apps, biometric technologies, and vaccine passports.

Digital rights of citizens in the inclusive smart cities should be therefore framed, on one hand, by the informed and enabling process of digital innovation and its transformative outcomes on their social, economic, and political engagement, and, on the other hand, by the ethical and moral implications of the unfolding algorithmic innovation on the human rights and social justice in the cyberspace [85,88].

3.2.2. Rights and Ownership of Technological Innovation and Data

Different authors have raised concerns about the exclusion of citizens and other stakeholders in the city when it comes to questions of rights and ownership of data and technology. Nederhand et al. [89], for example, argue that for technology firms, there is a lot to gain when it comes to ambitions of cities regarding their smartness, "whereby the knowledge and budgets of powerful private players overshadows those of local governments" (p. 3). In practice, the dominance of tech companies and other private players in smart cities leads to exclusion of citizens that are less tech-savvy, and often ends in the (mis)use of private data for profit making and information control (ibid). Lee et al. [90] similarly warn about the increasing involvement and power of big IT and consultancy firms that search for new business opportunities in smart city development. Governments interested in inclusive smart cities need to think not only about inclusion in terms of the technology they select, but also in terms of who is benefiting from the data and the rights that follow from that technology. The question is hence: from whose perspectives are data collected, who has access to the data, and who determines which data need to be collected?

Too often, smart cities focus on using big data to improve urban efficiency, planning, and policy making. Inclusive smart cities should rather focus on the implications of the collection and use of data for citizens. In the next sections, we elaborate on this technology (or top-down) led vs. people (or bottom-up centred) perspectives and their effects in smart urban governance.

3.3. How to Ensure Inclusive Governance in Smart Cities?

3.3.1. Commitment to Inclusive Governance

To build inclusive smart cities, where no one is left behind because of age, lack of abilities, or social and economic vulnerability, inclusion should become a backbone of key strategic and functional areas within city governments. Some of the emerging practices of institutionalizing commitment to inclusion in smart cities include the establishment of specific figures or departments focused on inclusion, public–private partnerships to deliver inclusion, specific training on inclusion for public employees, as well as community engagement aimed at identifying and effectively addressing critical challenges of digital inclusion [8].

Furthermore, establishing accessibility by designing a universal standard of urban policies for digital development of all communication channels and administrative tools and resources simplifies and unifies digital access to the city. In fact, the standardization and compliance with the WCAG (Web Content Accessibility Guidelines) levels A and AA make key urban platforms and digital channels accessible, understandable, and operable to all citizens [91].

3.3.2. Co-Creation and Open Innovation

Cities need to make room for people to participate in smart city decisions, as too often the starting point lies not in the existing knowledge and skills of citizens, but rather in technology and the interests of urban entrepreneurs, as stated above [37]. In the development of inclusive smart cities, citizens play a crucial role as they provide their experiences and expertise, help collect data, and enhance the democratic process through their active participation [71]. Jang and Gim [92] argue that "establishing a citizen-centred smart governance system can make a contribution by taking equity, inclusion and social justice into consideration at every stage of the development of smart city initiatives" (p. 140).

Malek et al. [20] similarly state that an inclusive city provides the participatory infrastructure to enhance citizen centricity in its smart decisions. This means that there is not only attention for decision-making through consensus with citizens, but also power delegation in the design of decision-making structures. Inclusive cities hence need to actively invest in a city infrastructure—both online and offline—in which all citizens can attend and give input to decision-making processes regarding the smartness of the city.

3.3.3. Inclusive Communication and Representation

Finally, inclusive governance is also connected to questions regarding communication and representation. Information about participation in smart city processes needs to equally reach all citizens and communities, which means that government websites and other communication channels need to be accessible for all, including people with disabilities, older people, migrants, and so forth [93]. For underrepresented groups to be visible and to make their voices heard in these smart city processes, three elements are required [94]: to be present, to belong, and to take part not only in planning and development phases, but also in the implementation process of urban strategies. However, bringing these processes to all citizens, designing avenues for them to provide feedback through public forums, town halls, information campaigns, and community engagement depends on the will of local authorities [93].

Including a diverse spectrum of citizens in inclusive smart city processes can lead to a better relationship between cities and their people. This holds particularly true when it comes to citizen representation in (or identification with) smart city brands [95] and the legitimacy of such smart city branding efforts (albeit a full elaboration on smart city brands is out of the scope of this paper).

Drawing from the previous theoretical review and the discussion of the complexities facing smart city development, Table 1 outlines an overview of key questions, components, priority targets, and critical challenges for inclusive smart cities in support of a shift towards more open and inclusive digital transition processes.

Table 1. A reflective framework for inclusion of vulnerable and underrepresented citizens in smart cities.

Key Questions	Main Components	Priority Targets	Examples of Critical Challenges
WHO is included/excluded?	Digital accessibility	Affordability of resources, tools, and devices	Lack of resources (i.e., financial)
		Education, social support networks, social relationships	Lack of social capital (relationships, networks)
	Digital skills and abilities	Digital literacy	Lack of skills in a variety of domains, beyond digital literacy
			Lack of screen-skills, information seeking, communication skills, social media, critical thinking
			Misalignment between limited abilities and use of smart devices and digital services
	Motivations to engage with digital platforms	Enhancing self-esteem, self-efficacy, self-confidence	Persisting mental barriers (low self-esteem, anxiety, fear, etc.)
WHAT is the value of digital inclusion?	Digital citizenship	Ensuring informed and enabling process of digital innovation and its main outcomes	Lack of knowledge on the opportunities, risks, and outcomes of the digital innovation

Table 1. *Cont.*

Key Questions	Main Components	Priority Targets	Examples of Critical Challenges
WHAT is the value of digital inclusion?	Digital citizenship	Safeguarding social justice and human rights in the digital environment (digital/non-digital rights)	Neglecting ethical and moral concerns of algorithmic and datafied environments
	Open data	Ensuring open data system	Dominance of global tech companies, focus on economic profit
		Providing regulatory framework on data availability and access	Lack of control and misuse of private data
	Digital knowledge	Enabling effective access to knowledge resources and dissemination platforms	Lack of effective information resources
		Citizen-centricity in smart decision-making process	Technocratic leadership
HOW can smart cities ensure an inclusive governance?	Institutional commitment	Sustainable and standardized administrative procedures in the digital environment	Lack of commitment in aligning design of digital environment
		Specific training of public employees	Lack of knowledge and institutional procedures
		Compliance with web content accessibility guidelines (WCAG)	Lack of digital accessibility protocols
	Inclusive communication and representation	Inclusive city brands and discourses with active engagement of all urban stakeholders	Misalignment between information and reference world of hard-to-reach groups
		Broad scale of communication channels, both offline and online	Language barriers
		Aligning communication with shared interests and values, resonating with multiple audiences	Lack of intercultural competences and sensitivity
	Co-creation/open innovation	Fostering input from citizens in design and decision making	Aligning power structures to citizen-centricity
		Citizen-centricity in smart innovation	Lack of effective citizen engagement and representation

4. Discussion and Conclusions

4.1. Policy Implications

In the last decades, cities have become unique places for advanced digital innovation aimed at ensuring urban efficiency, operability, and sustainability. While the impact of technological innovation has an undeniable impact on capacity building, cost reduction, and global attractiveness and competitiveness of the place, the negative outcomes of the progressive digitization of urban spaces should not be neglected. New smart cities have deepened social and digital inequalities among their technologically savvy residents and those who are usually left behind due to their age, lack of abilities, or resources. Despite several efforts to address the lack of inclusion, governments still lack comprehensive frameworks to guide policy and action toward inclusive governance in smart and digital cities. At the same time, extant research on smart cities has been primarily focused on the techno-centric dimension of digital urban development, lacking knowledge on social intelligence, social justice, and citizen-centred attributes [96].

Similarly, studies on inclusion in smart cities frequently have a one-dimensional approach, highlighting certain elements of an inclusive strategy while neglecting others, and mostly focusing on assessing effectiveness of digital interventions in the delivery of public services and on tackling the big challenges such as climate change and rapid urbanization [97]. In particular, the literature shows a lack of attention to a deeper understanding of how inclusion works within smart city structures [98].

This paper aims to address this gap by proposing a holistic framework for building inclusive smart cities. We engaged in a problematizing review of the literature to identify key challenges and priority targets for digital inclusion on an urban scale. We do so from the lens of digitally vulnerable and underrepresented groups of citizens and with their needs in mind. Our proposed framework is based on the main values of digital inclusion, as well as the fundamental principles of an inclusive urban governance logic.

The application of this framework as an evaluative tool to reflect on the effectiveness of certain strategies to deliver inclusion could similarly provide important insights into future policy and strategic directions by identifying areas of neglect. The framework is meant to act as a starting point to aid the design of inclusive digital urban policies and strategies, but can also be employed to assess the directions taken to date in the view of assisting learning and adapting in public organizations towards more inclusive practices.

We similarly wish to emphasize that the reflective framework introduced above offers a comprehensive, albeit not exhaustive, perspective to observing inclusion in smart city policy, discourses, and strategies. What also becomes apparent from our problematizing review of the literature is that the smart city concept is inextricably linked to other concepts in the literature such as 'vital city', the 'just city', 'sustainable city' or—more recently—'the societal smart city', in which citizen-driven governance, inclusive services, resilient infrastructures, and skills and information literacy are also considered key elements in the digital transition [99,100]. Our framework incorporates insights from research on city vitality, social justice, and sustainability.

4.2. Future Research

From a theoretical standpoint, this framework provides an overview of determinants of inclusion in smart urban governance that can inspire further empirical research on overlooked aspects of inclusion. For instance, on the misalignment between information of reference worlds for certain marginalized groups. A further discussion is also needed on the intersectionality and the exacerbation of existing vulnerabilities in the practice of smart urban governance and smart city developments. The concepts of social justice, equal opportunities, and digital citizenship are essential pillars of further research in the context of smart urban development.

As suggested above, we welcome further empirical research to reflect on and further develop the introduced framework. Of particular importance would be to get a better understanding of the degree to which the different pillars are considered in decision-making

for smart city policies. Importantly, also which pillars are not considered and the reasons underlying such choices. In addition, in line with scholarly concerns on the reinforcing of inequalities in the narratives and action surrounding the transition to digitalization, we call for empirical case research focusing on cities that claim to be smart, investigating the discrepancy between their storytelling and actual inclusive policy design and decision-making in smart city practices. This is particularly relevant as we observe that, in more recent years, smart city branding has been criticized for its economic and market-driven perspective, and its neglect of real community problems that are pushed to the back in brand narratives [101,102].

Finally, a limitation of this framework lies in its focus on the structure/process or decision-making-side of inclusive cities, and not on the equally important question of outcomes of smart city policies in terms of a higher quality of life for all citizens, which deserves equal attention. Nevertheless, we believe that our focus offers the preconditions for coming to such an equal distribution of benefits that lead to higher quality of life for all groups of citizens. By testing the framework in real-life contexts, it offers a method of transformation of smart urban governance into a much more participatory and bottom-up process.

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