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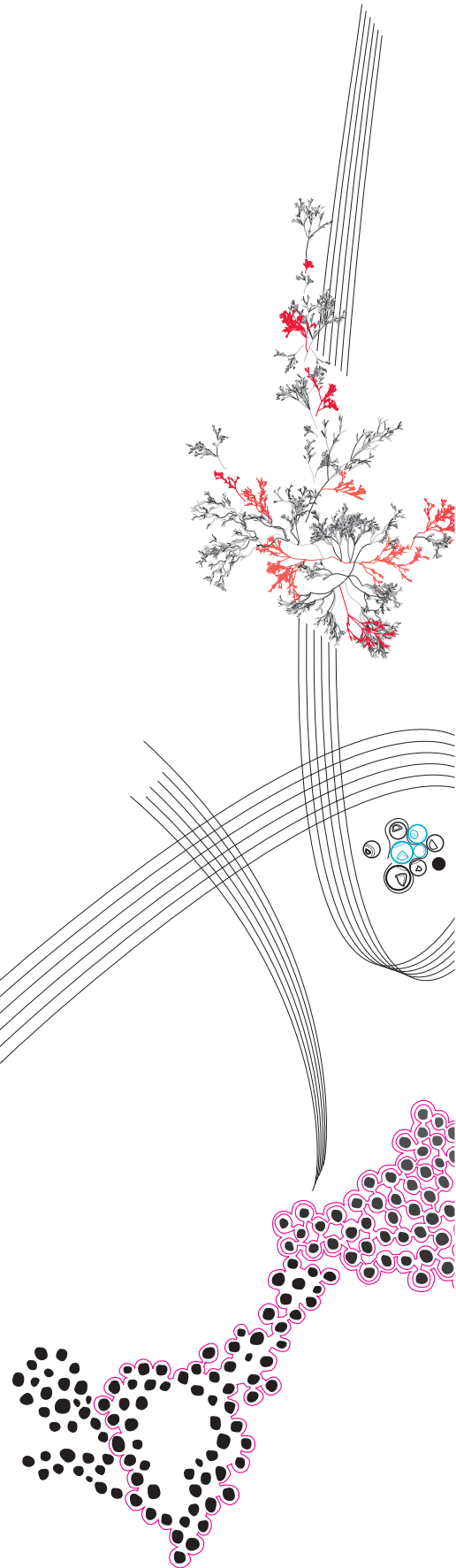
**Towards Smart Governance: A  
Framework for Improving  
Digital and Social Inclusion in  
Marginalized Communities**

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# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Research Problem . . . . .	2
1.2	Research Question . . . . .	2
1.3	Research Methodology . . . . .	3
<b>2</b>	<b>Theoretical Background</b>	<b>4</b>
2.1	Literature Review . . . . .	4
2.2	Smart City Research Analysis . . . . .	7
2.3	Theoretical Framework on Inclusion in Smart Cities . . . . .	8
2.3.1	Marginalized communities . . . . .	8
2.3.2	Social Inclusion . . . . .	9
2.3.3	Digital Inclusion . . . . .	10
2.3.4	Digital Literacy . . . . .	10
2.3.5	Citizen Participation . . . . .	11
2.3.6	Smart Governance . . . . .	12
2.4	Conceptualizing the Smart City Inclusion Framework . . . . .	14
2.5	Case Studies of Existing Smart City Initiatives . . . . .	15
2.6	Amsterdam Smart City . . . . .	15
2.7	Barcelona Smart City . . . . .	17
2.8	Hamburg Smart City . . . . .	18
2.9	Reflection on the Existing Case Studies . . . . .	20
<b>3</b>	<b>Methodology</b>	<b>22</b>
3.1	Research Design . . . . .	22
3.2	Data Collection . . . . .	23
3.3	Validation . . . . .	24
<b>4</b>	<b>Case Study Analysis</b>	<b>26</b>
4.1	Summary of Respondents . . . . .	26
4.2	(Case A - Valencia, Spain) . . . . .	27
4.2.1	Background . . . . .	27
4.3	Interview Insights . . . . .	28
4.3.1	Digital Inclusion . . . . .	28
4.3.2	Social Inclusion . . . . .	28
4.3.3	Citizen Participation . . . . .	29
4.3.4	Governance . . . . .	30
4.4	(Case B - Rotterdam, Netherlands) . . . . .	30
4.4.1	Background . . . . .	30
4.5	Interview Insights . . . . .	31

4.5.1	Digital Inclusion . . . . .	31
4.5.2	Social Inclusion . . . . .	32
4.5.3	Citizen Participation . . . . .	32
4.5.4	Governance . . . . .	32
4.6	(Case C - Achterhoek, the Netherlands) . . . . .	33
4.6.1	Background . . . . .	33
4.7	Interview Insights . . . . .	34
4.7.1	Digital Inclusion . . . . .	34
4.7.2	Social Inclusion . . . . .	34
4.7.3	Citizen Participation . . . . .	35
4.7.4	Governance . . . . .	35
4.8	(Case D - Tamil Nadu, India) . . . . .	35
4.8.1	Background . . . . .	35
4.9	Interview Insights . . . . .	36
4.9.1	Digital Inclusion . . . . .	36
4.9.2	Social Inclusion . . . . .	37
4.9.3	Citizen Participation . . . . .	37
4.9.4	Governance . . . . .	37
4.10	Comparison Cross-Case Study . . . . .	38
4.11	Linking Theory to Practice . . . . .	40
4.11.1	Digital Inclusion . . . . .	40
4.11.2	Social Inclusion . . . . .	40
4.11.3	Citizen Participation . . . . .	40
4.11.4	Governance . . . . .	41
<b>5</b>	<b>Results</b> . . . . .	<b>42</b>
<b>6</b>	<b>Discussion</b> . . . . .	<b>45</b>
6.1	Theoretical Contributions and Future Research . . . . .	46
<b>7</b>	<b>Conclusion</b> . . . . .	<b>47</b>

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## **Abstract**

The concept of a 'Smart City', is seen as a paradox; despite the term being around for a couple decades, due to its unbounded definition. Oftentimes described as the urban development of a city through means of Information and Communication technologies (ICT) for the overall sustainable improvement of the city and the standard of well-being of its citizens. However, smart cities have been known to be technocratic due to their top-down orientation, and thus looking past the complex problems faced by its citizens. As a result, failing to address the needs of the marginalized groups, namely the disabled, the elderly, and other unrepresented groups. So accordingly, shifting the perspective to a citizen-centric smart city, can be helpful in making it inclusive for its citizens. The main aim is to clearly define the various smart governance strategies that smart cities can utilize to improve inclusion. The methodology uses a qualitative cross-case study approach to examine four smart city and region with different geopolitical contexts. A cross-case analysis was conducted on four specific subjects namely digital inclusion, social inclusion, citizen participation, and governance. The results reveal that the adoption of a collaborative governance framework promotes a citizen-centered smart city with a multi-stakeholder model to encourage citizen participation, community-driven solutions, equitable digital access, and designing inclusive technological services.

*Keywords: Smart Governance, Digital Inclusion, Social Inclusion, Citizen Participation*

# Chapter 1

## Introduction

The concept of 'Smart' cities or regions are mostly dominated and fueled by ambitions of technology-enabled urban and economic development, community engagement, and improved well-being of citizens. This discourse on smart cities have been operated in a way to further the interests of the corporate firms to intervene in the development and governance processes [53]. As we are aware that this notion has been around for over 20 years, it is however constantly undergoing dynamic changes. This had led to technologies and societies in and around the smart city, the need to be redefined and experimented with ICT services and to be certain that the advancements are heading in a way to serve the common good and social welfare [6]. In light of all this development, it is evident that not only has the production capacity of citizens has increased, but it has also empowered them in return so that they can participate in the innovation dynamics of their cities [11]. All this perspectives and deflecting the attention back to a more human-centered notion of a 'smart' city, where the idea reinforces that the people rather than technology are the true actors, and harnessing the ability to use technologies as enablers that connects, and engages the government and citizens. Ultimately, aiming to rebuild, recreate and motivate urban communities, by stimulating and supporting their collaboration activities leading to an increase of social well-being [42].

Despite the concept first catching the attention of policymakers, business leaders, and citizens due to its multidisciplinary subject of interest [11]. The study and research of smart cities are not only being examined by scholars in architecture and urban planning but also by other disciplines namely, social and technical sciences [6]. Moreover, with the increasing urbanization of countries, and the prevailing challenges namely economic development, social inclusion, security, sustainability, infrastructures, transport and housing, etc. [11]. As a result, a larger number of commercial partnerships and research organizations are creating smart city applications and services that can be applied as a solution in an urban context and for smart government [58].

Due to the main publicity around smart cities mostly being technocratic, and since there is no strong evidence to show that a smart city can provide solutions to the number of complex problems that cities face today [65]. Smart cities have been widely critiqued for their top-down approach and for being technocratic, mainly serving the states and corporations [13]. In response to which the smart technologies developers and deployers have sought to reposition it as being citizen or community-centric. Thereby reinforcing that

idea that Smart cities need to "start with people" instead of thinking that technology can automatically transform and "improve cities" [27]. Alongside, with some recognition that a smart city has to be an inclusive and not just a technological city (Helgason, 2002 as cited, in Hollands,2008)[27]. The role that ICT can play is limited role in a 'Smart' city initiative and that one of the pivotal factors observed for a successful adoption of 'smart' strategies that transforms a city is - social inclusion and the active participation along with the various stakeholders within the community [38]. The enhancement of citizen and stakeholder involvement reflects the need to democratize innovation-driven urban development and accompanying the participatory turn in urban governance, policy making, thus once again reinforcing the factors in community that can lead to social inclusion within a city [8].

Smart Cities can be seen as an inclusive space for the citizens to achieve their best options within a framework of sustainable development, and this take of harnessing technological solutions as a means to address social, economic, and political issues have resulted in the creation of the smart city. Although it is pertinent to assume that technology by itself cannot be the solution to the societal problems. ICT has led to an increased democratization of the production capacity of citizens and has empowered them to participate and be a part of the innovative dynamics of these emerging smart cities [11].

## 1.1 Research Problem

As the smart city discourse evolves, stakeholders are increasingly aware of the inequalities that are present within the smart environment. The need to revisit why we need smart cities and to whom they serve, we can ensure that no one is left behind in this progressing environment. For instance, there are barriers that arise in terms of income, language, education, and skill development faced by these members in the community. Furthermore, technology is often cited as a promoter of inclusion among the marginalized communities, when challenges presented by information and communication technologies (ICTs) arise for human rights, accessibility, and inclusion in a smart city environment [30]. This thesis seeks to investigate and address these issues that arise in the inclusion in smart city developments and identifying the practices that curb the marginalization within the community and effectively improve the overall design and application of smart initiatives.

## 1.2 Research Question

The Main Research Question and the following sub-research questions were used to guide the research study:

**"How can smart cities adopt collaborative governance frameworks that improve their digital and social inclusion initiatives for marginalized communities?"**

To answer this main question, the following sub-questions are answered :

RQ1: What measures can be implemented to improve both digital and social inclusion in the planning of smart city projects?

RQ2: How can policies and governance frameworks be improved to support inclusion in smart cities?

RQ3: What barriers do marginalized groups face in accessing the smart city initiatives?

### 1.3 Research Methodology

Firstly, the systematic literature review in this thesis is methodically done by utilizing the framework of the "Five-Stage Grounded Theory Literature Review" by Wolfswinkel et al., through which the findings and insights of the literature are gained and presented [62].

Following this, the Design Science Framework as described by Wieringa will be implemented to address the research questions and develop a conceptual framework. According to Wieringa, the design cycle has three phases as shown in Figure 2.1 : Problem Investigation, Treatment Design and Treatment Validation [60]. This framework provides guidelines and the steps needed to conduct a design research and support the answering of the knowledge questions in the study.

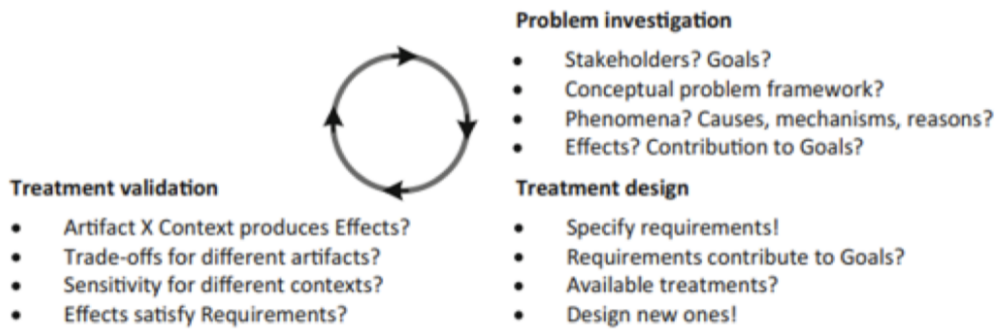


FIGURE 1.1: Design Research Methodology [60]



## Chapter 2

# Theoretical Background

### 2.1 Literature Review

As discussed briefly in the previous chapter, the systematic research method used to conduct the literature search is done in the form of a five-stage grounded theory approach as proposed by Wolfswinkel, Furtmueller and Wilderom (2013) [62]. The search process is taken from the following steps as shown below in Figure 2: "Define", "Search", "Select" and "Present", from which the findings and insights of the literature are gained using this review process and is presented in this document.

<i>Number</i>	<i>Task</i>
<b>1. DEFINE</b>	
1.1	Define the criteria for inclusion/exclusion
1.2	Identify the fields of research
1.3	Determine the appropriate sources
1.4	Decide on the specific search terms
<b>2. SEARCH</b>	
2.1	Search
<b>3. SELECT</b>	
3.1	Refine the sample
<b>4. ANALYZE</b>	
4.1	Open coding
4.2	Axial coding
4.3	Selective coding
<b>5. PRESENT</b>	
5.1	Represent and structure the content
5.2	Structure the article

FIGURE 2.1: Five-Stage Grounded Theory Literature Review Method (Wolfswinkel et al.2013)

[62]

SEARCH AREA	SEARCH COMBINATION
Digital Inclusion	TITLE-ABS-KEY ( "smart city" AND "inclusion" OR "digital divide" )
Digital Literacy	TITLE-ABS-KEY ( "digital inclusion" AND "digital literacy" )
Social Inclusion	TITLE-ABS-KEY ( "smart city" AND "inclusion" AND "social" )
Citizen Participation	TITLE-ABS-KEY ( "smart city" AND "citizen participation" OR "governance" )
Bottom-Up Approach	TITLE-ABS-KEY ( "smart city" AND "bottom-up" OR "inclusion initiatives" )

TABLE 2.1: Search Combinations

Following the literature study method, for the first two stages of the process namely DEFINE and SEARCH, the main keywords used were: "smart city", "smart city initiatives", "inclusive strategies", and "digital and social inclusion' were used in combination to refine the search. The search was conducted using mainly the SCOPUS and Google Scholar search engines.

In the past couple of decades, the idea behind "Smart Cities" and the concept of what makes a city "smart" has been defined in numerous ways by a number of authors. The researcher (Hollands, 2008) in his article stated that when it comes to the concept of smart cities, there is a lack of clarity with several disagreements on a common definition and labeling of a smart city[27]. Hence, for this study, the smart city definition followed is (Caragliu et al, 2009) "*When investments in human, social capital and traditional (transport) and modern ICT communication infrastructure fuel sustainable economic growth and high quality of life, with a wise management of natural resources, through participatory governance*" [12]. Generally, the topic of people and communities in a smart city has been traditionally neglected in exchange for conversations of their technological and policy aspects (Chourabhi et al, 2012)[17]. The researchers exhibit that not only is it important to refer to the citizens as part of a community but also to recognize their respective wants and needs. While research on this topic ranges wide, only a few have investigated as to what it means to be 'inclusive' in the smart city discourse. Hence the definition of what it means to be inclusive is given by (Roy, 2016) "*To adopt a democratic approach and connect information technology with the marginalized groups to improve accessibility to employment, the market, education and health and to help build resilience in the community*"[49].

Hence, for the Smart City to evolve, the ICT systems need to be complementary with the human capital of that local population. According to (Bresnahan and Traitenberg, 1995) as cited in (Neirotti et al., 2014) the deployment of ICT should not only be identified with the concept of Smart Cities, as Smart Initiatives encompass not only technical changes but also investments in human capital [38]. ICT is a tool that is complementary to human and organizational capital whose usage is tailored to the political choices and the urban ecosystem of the city according to its needs. One of the key findings in the paper shows a negative correlation between hard and soft domains, due to it being a result of municipalities and their technology vendors focusing on technology and not people [38].

(Nam et al., 2011) [36] state the use of the word "Smart" now captures innovative and transformative changes that are driven by new technologies. The UN has a flagship programme called 'People-Centered Smart Cities' to address the benefits of urban digital transformation in order for the sustainability, inclusivity and prosperity of human rights in cities. A set of principles that centers people on smart city development, policy transformations, and inclusivity is established to aid in reducing barriers for various countries. This initiative contributes to a couple of Sustainable Development Goals such as SDG 10 which focuses on reducing inequalities and SDG 11 which specifically focuses on 'making cities and human settlements inclusive, safe, resilient and sustainable' [57]. In a research study by Deloitte, they have identified six enablers namely, Data and Security, Digital and Technology, Ecosystem, Finance and Funding, Internal Organization and Policy and Regulation [40]. Under the Digital and Technology section, they stress on the importance of expanding digital access and skill. They have shed light that many cities still face internet adoption issues due to lack of internet infrastructure in some households, especially low-income communities. The research also says that 'Neighbourhood internet adoption surveys' help cities understand why some residents do not subscribe to certain services and then strategize to establish tailored programmes to improve the internet adoption in the city. The importance of equipping the residents with digital knowledge and skills in order to help them use the internet to find information, access services, look for jobs and academia purposes [40].

## 2.2 Smart City Research Analysis

This section presents an overview of the literature obtained on the topic of Smart Cities but in relation to the various aspects with a specific focus on the categories namely Inclusion in Smart Cities (I) which encompasses three subjects namely, Marginalized Communities (M), Social Inclusion (S) and Digital Inclusion (D), Digital Literacy (L), Citizen Participation (P), Governance in Smart Cities or 'Smart Governance' (G). The table below helps visualize from which paper the relevant topic is obtained and analyzed in the text.

No.	Reference	Category			
		I=M+S+D	L	P	G
P1	(Capdevila et al., 2015)		✓		✓
P2	(Reuter, 2019)	✓		✓	✓
P3	(Anttiroiko, 2016)	✓		✓	✓
P4	(Shelton & Lodato, 2019)	✓		✓	
P5	(Residorf & Rhinesmith, 2020)	✓			
P6	(Ton et al., 2017)			✓	✓
P7	(Cardullo & Kitchin, 2018)			✓	
P8	(Kolotouchkina et al., 2022)		✓		
P9	(Allam & Newman, 2018)				✓
P10	(Oliveira & Campolargo, 2015)				✓
P11	(Jaeger et al., 2012)	✓	✓		✓
P12	(Nam & Pardo, 2011)	✓			✓
P13	(Willis, 2019)	✓			✓
P14	(C. Ansell et al., 2017)	✓		✓	✓
P15	(Sadoway & Shekar, 2014)	✓	✓	✓	✓
P16	(Angelidou, 2017)			✓	✓

TABLE 2.2: Smart City Literature Search Framework

## 2.3 Theoretical Framework on Inclusion in Smart Cities

The previous section in the study gives a brief introduction into the Smart City discourse but now the study aims to find out why it is necessary for smart cities to not just rely on technology solutions but keep citizens at the core of the research. The primary factors that are focused in the research are the promotion of 'Digital Inclusion', which can help narrow the divide, 'Social Inclusion', where we ensure that all members of the society including the marginalized community can participate .

### 2.3.1 Marginalized communities

One of the common methods of fostering the integration of the marginalized communities in smart cities is by heeding the opportunities and challenges that arise with the use of Information and Communication Technologies (ICTs) for human rights, accessibility, and inclusion [30]. The use of smart technologies, can in fact be serviceable to marginalized groups as it is, namely accessible, cheap connectivity, and localized, utilizing low-cost sensors, and shared data assets. (Sadoway & Shekar, 2014) additionally underscore the involvement of local associations and longstanding community groups alongside the researchers and engineers, coders working on the smart city discourse[50].

The author (Reuter, 2019) [30] reinforces the notion of creating 'inclusive cities' by including stakeholders in the planning process and reaching out to the marginalized communities, and providing policymakers with the notion to engage with the community. The notion of looking at technological solutions as a means to address social, economic, and political issues has resulted in the creation of the smart city. The recognition of the social capital of marginalized groups involves engineers, coders and scientists but most importantly, community groups and local associations would give the marginalized groups a number of possibilities to be included in the smart city ecosystem[50][61]. However, technology by itself cannot be the solution to societal problems. The author entails a notion of Smart cities where it needs to serve people first and achieve a human-centred urban environment where the marginalized communities are involved in the urban planning, and actively engaged or employed in product development, designing of solutions and problem solving. Figure 3, is a visualization of a generalized smart city engagement processes by authors (Sadoway & Shekar, 2014) where they show how Information and Communication Technologies are used to complement and support, instead of driving engagement processes in a smart city [50].



FIGURE 2.2: A Smart Citizenship civic-cyber engagement process [35]

### 2.3.2 Social Inclusion

Social Inclusion can be defined as "a multi-dimensional, relational process of increasing opportunities for social participation, enhancing capabilities to fulfill normative prescribed social roles, broadening social ties of respect and recognition, and at the collective level, enhancing social bonds, cohesion, integration, or solidarity [54]. A definition more appropriate to the context of inclusive cities is given by World Bank, where 'social inclusion' is ensuring that "an inclusive city that guarantees equal rights and participation of all, including the most marginalized" [63]. Research by authors (Nam & Pardo, 2011) state that the significance of smart cities also tends to rely on social factors and this signifies that smart technologies alone will not suffice as the smart city environment requires a comprehensive perspective of the interconnections and complexities of both social and technical components in the services [36]. (Reuter, 2019) [30] state that smart cities and ICTs need to serve people first and achieve a human-centered urban environment that involves marginalized communities in urban planning and train the ICT industry and Policymakers about the needs of the members of the marginalized communities [30]. (Anttiroiko, 2016) also focus on enhancing citizen and stakeholder involvement in innovation platforms as it can be a key factor in contributing to social inclusion [8].

(Neirotti, 2014) in their classification of smart community domains, include social inclusion as a sub-domain, the improvement of quality of life by stimulating social learning and participation, with particular reference to specific categories of citizens such as the elderly and disabled. The stakeholders namely policy-makers and city planners need to consider vulnerability, resilience, financial, sustainability and social inclusion to build cleverer cities [38].

### 2.3.3 Digital Inclusion

The (National Digital Inclusion Alliance, 2017) gives some key factors and defines digital inclusion as " the activities necessary to ensure that all individuals and communities, including the most disadvantaged, have access to and use of Information and Communication Technologies". This includes five elements [37]:

1. Affordable, robust broadband internet service;
2. Internet-enabled devices that meet the needs of the user;
3. Access to digital literacy training;
4. Quality technical support; and
5. Applications and online content designed to enable and encourage self-sufficiency, participation and collaboration

Reinforcing it with the article by (Jaeger et al., 2012), who state that digital inclusion is "the policy developed in order to close the digital divide and promote digital literacy." and digital inclusion will be defined here as outreach to unserved and under-served populations. It can also refer to strategies that provide training, services, or opportunities to address the challenges of the digitally disadvantaged. For those individuals who cannot make the best use of digital resources, digital inclusion refers to training or other opportunities to develop digital skills and comprehension [28].

The National Digital Inclusion (NDA) states the "digital inclusion ecosystem" is the existence of programmes and policies that work together in an ecosystem to address the issues that arise from the digital divide. The existence of affordable and subsidized broadband services, device ownership programmes and multilingual digital literacy and digital skill training that meet the community's needs, and digital navigation services that guide citizens with various needs to the above-mentioned services [37]. The topic of digital inclusion has become a core topic for policy-makers, briefly driven by the COVID-19 pandemic, where citizens were confined at home and had to work, and study using the internet. (Reisdorf & Rhinesmith, 2020) connect the issue of digital inclusion as a core component of social inclusion [48].

### 2.3.4 Digital Literacy

On the topic of digital inclusion, (Jaeger et al., 2012) define digital inclusion as "the skills and abilities necessary for the access of available technology, including a necessary understanding of the language and component hardware and software required to successfully navigate the technology".

The term Digital Literacy can be defined as "ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills" [37].

(Sadoway & Shekar, 2014) in their study emphasize on prioritizing local needs and community knowledge in their framework. ICT alone is not a singular solution to urban

challenges but rather is a tool that supports civic engagement. The authors highlight engaging the local communities and tailoring ICT applications to bridge local needs and knowledge [50].

At the EU level, the European Commission created the platform, European Innovation Partnership on Smart Cities and Communities (EIP-SCC) in their 2020 strategy, defined their vision and priorities for the 21st Century namely [31]: – Smart growth: developing an economy based on knowledge and innovation. – Sustainable growth: promoting a more resource-efficient, greener and more competitive economy. – Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion. The commission seeks to turn the EU into a smart, sustainable and inclusive economy by delivering ensuring that there are high levels of employment, productivity and social cohesion.

A study by (Kolotouchkina et al,2022) [31] focuses on digital inclusion for people with disabilities and highlights that despite technology remaining a challenge for PwD (People with Disabilities), the area of Digital Accessibility is helping in the transition to inclusive governance. Along with the leadership offered by Digital Accessibility sector, the government can help with the digital divide and foster digital inclusion through the standardization of digital access, developing a multi-faceted stakeholder commitment and ensuring the inclusion of PwD at the centre of their smart initiatives.

### 2.3.5 Citizen Participation

(Cardullo & Kitchin, 2018) [13] the authors in their field study of Dublin focusing on a 'citizen-centric' smart city deduce that there are a number of roles that citizens play in a smart city and that they can experience empowerment and participation. They say that although citizen participation is instrumental due to the focus on diverse activities namely providing feedback, negotiating, participating, and creating in a smart city. The author (Angelidou, 2017) in their research state that the objective of smart city strategies is to enhance citizen participation. (Reuter, 2019) shows that direct involvement of marginalized groups in the planning, development and implementation process of urban policy is crucial for effective participation and ensuring inclusion. The author structured a multi-stakeholder model to improve the level of participation of not only the individual level of representation of the marginalized groups but also the collective level of participation of organizations that represent the marginalized groups [30]. (Shelton & Lodato, 2019) in their study of "actually existing smart citizen" discusses about the complexities of citizen participation and highlights how different a 'general citizen' and 'absent citizen' can be used as tools that help understand how citizens are made use of in the planning of a smart city [53].

However, in the research study by (C. Ansell et al., 2011), they mention that the inclusion of a large number of actors may also contribute to the increase in transaction costs, result in 'muddy negotiations' and the quality of deliberation, etc,. Their proposed framework of 'Inclusion in Collaborative Governance' as shown in figure 2.3 examines what contributes to inclusion in collaborative processes and visualize on why participants oftentimes participate and do not in the collaboration processes. The citizens who do participate do it due to either out of general interest or sense of civic duty and also are more likely to withdraw in case of conflicts or some factors such as costs of participation namely time, energy and expertise [7].



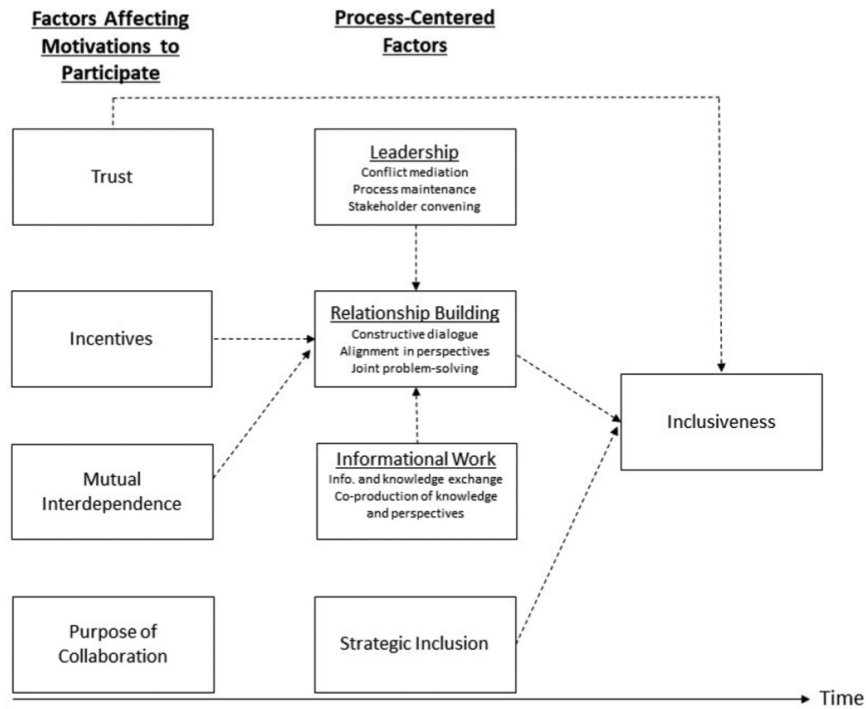


FIGURE 2.3: A synthetic model of collaborative inclusion as proposed by C. Ansell et al.

### 2.3.6 Smart Governance

An ICT based governance can be called ‘Smart Governance’ where it represents "a collection of technologies, people, policies, practices, resources, social norms and information that interact in order to support city governing activities" (Chourabi et al, 2012) [17]. In the study by (Nam & Pardo, 2011) the authors state that in the smart city discourse, there is a tendency to highlight the technological aspects more while the cultural context, governance and policy issues have not received much attention [36]. In addition, the role of local governments and policymakers helps facilitate a citizen-driven urban design process. The significance of Governance helps shape economic development in cities and the ICT-based approaches improve inclusivity while providing the city with opportunities to change and this is called ‘Smart Governance’ (Allam & Newman, 2018)[5].

(Cardullo & Kitchin, 2018) define that initiatives are considered to be top-down when devised by the city administrations or corporations and are said that they are ‘bound to succeed’ and are expected to deliver and not waste the taxpayers’ money or stakeholders’ money. On the other hand, a bottom-up initiative is when they are conceived by various citizens or groups, these initiatives are different from the more controlled top-down as they are experimental in nature and made aware that they may fail to be long-term [13]. Various smart cities have taken different approaches when it comes to their governance and management processes. (Capdevila et al, 2015) in their paper differentiate top-down and bottom-up approaches by means of the actors involved in it. The authors mention how smart city policies are considered as top-down whereas citizens’ initiatives where technologies are used to solve the arising urban problems are considered to be bottom-

up. A bottom-up approach are initiatives where actors organically emerge from lower levels of the hierarchical structure or from actors outside organizational structures. These grassroots level or community movements are initiated at the base of power structures and develop gradually by the progressive involvement of higher hierarchical levels [11].

The rise in a more bottom-up approach is evident in the way governance has evolved in a way where citizens are empowered and actively engage in the decision-making process (Ton et al., 2017)[56]. The study by (Neirotti et al, 2014) states that there should be focus on enacting "bottom-up" approaches that are not only based on the deployment of complex technological platforms but also on harnessing the collective intelligence and creativity of citizens. [38]

The human smart city concept by authors (Oliveira & Campolargo, 2015) stresses the need for a governance framework where the engagement of citizens is prioritized in order to build a trust environment that focuses on a citizen-driven, smart, all-inclusive and sustainable environment (Oliveira & Campolargo, 2015). In the study by Nam, where they name the core components in their smart city framework, the focus on governance is emphasized due to its citizen engagement and institutional improvement in smart city initiatives (Nam & Pardo, 2011)[36]. (Reueter,2019) [30] showcase the need for creating avenues for citizens, even the marginalized communities to voice their concerns. The author also states that the first step in order to create a smart inclusive city is to involve stakeholders in the planning process, reach out to marginalized communities and to have diverse participation. This would mean that the whole urban discourse needs to be re-framed and counteract policies that aren't inclusive. Getting to the root of the problems and working with the marginalized so as to come up with proposals, programmes, benchmarks, and strategies.

## 2.4 Conceptualizing the Smart City Inclusion Framework

While developing the theoretical framework of an inclusive smart city, it has become clear that there exists a gap in the empirical research on what makes a smart city inclusive. Hence, the choice to focus and investigate the four key components named in Figure 2.4 namely, Digital Inclusion, Social Inclusion, Citizen Participation, and Governance:

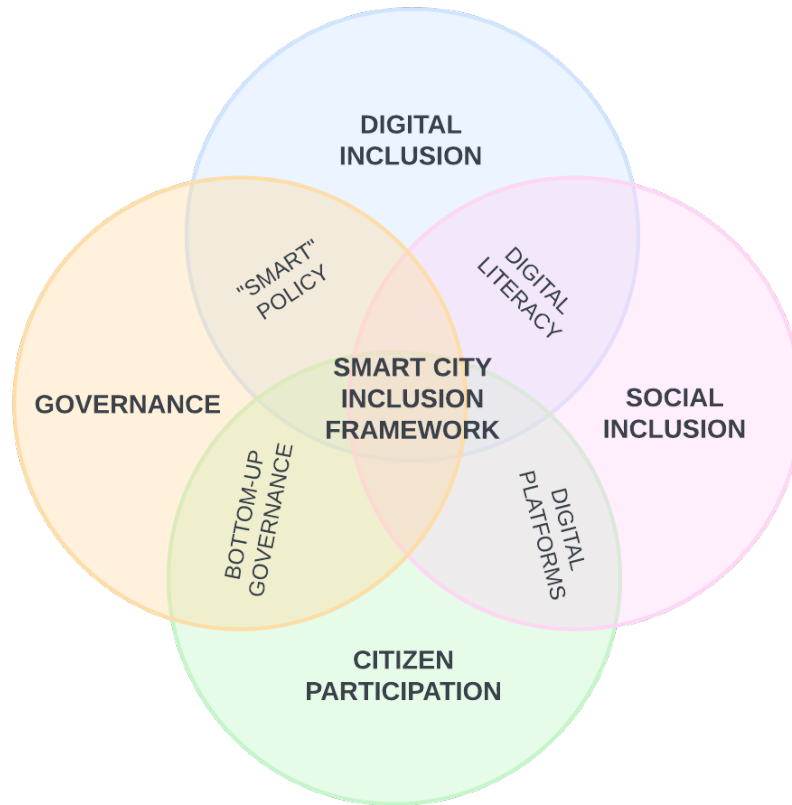


FIGURE 2.4: Conceptual Model of Smart City Inclusion Framework

The evolution of smart cities has seen an evident shift from a technological perspective to a more inclusive and human-centered discourse. The figure 2.4 as shown above presents the conceptual framework of a inclusive smart city. The primary pillars of what makes a smart city inclusive are digital and social inclusion, citizen participation, and governance. This framework conceptualizes a human-approach to smart cities, where at its core the citizens are involved in the planning, training policymakers and the ICT industries to recognize and prioritize the needs of the citizens including the marginalized groups (Reuter, 2019). The development of a platform or avenues where the citizens, even the marginalized communities can voice their concern (Reuter, 2019) and this reiterates the significance for a governance framework where the participation and engagement of citizens are given importance so that the development and environment of the smart city (Oliveira & Campolargo, 2015). In order for the citizens to be equipped for this, the local needs and community

knowledge has to be prioritized (Sadoway & Shekar, 201). Information Communication Technologies by itself cannot be the answer to this, it must rather be looked at as a tool that needs to be taught for it to be harnessed by the citizens. The availability and promotion of digital literacy, where workshops or tool-kits are designed to provide training for the citizens who need it.

By highlighting the importance of Smart Governance and 'smart' policies, the mainly technocratic approach of smart cities can gain a more cultural context and build trust in the environment that focuses on a citizen-driven or a human-centric approach, smart and an inclusive environment (Oliveira & Campolargo, 2015). This bottom-up approach is also starting to become more evident in the evolution of governance practices where citizens are being empowered to actively engage in decision making processes (Ton et al., 2017). A bottom-up approach not only ensures the engagement of citizens but also encourages the organic growth of citizen led initiatives (Capdevila et al, 2015) to solve emerging problems in the rapid urban development of smart cities. The idea that digital inclusion 'is a policy that is developed to close the digital divide and promote digital literacy' (Jaeger et al., 2012) and this idea has only grown further as policymakers have noted the importance of equipping all the citizens, including the marginalized groups. The smart initiatives can benefit from a multi-faceted stakeholder model where they can standardize digital access (Kolotouchkina et al., 2022) and alongside the implementation of designing literacy programs and tailoring them by considering factors like age, disability and language. Additionally, another benefit of collaborating and having a multi-stakeholder model is that it improves the level of participation in both the individual sense and the collective organizations that represent the marginalized (Reuter, 2019). On the other hand, however, there does seem to exist a number of factors that can influence the decrease in the collaboration and having a multi-stakeholder model. The inclusion of a large number of actors, can increase transaction costs, and time, energy and expertise (C. Ansell et al., 2011).

## 2.5 Case Studies of Existing Smart City Initiatives

The section focuses briefly on the existing smart city initiatives taken in three smart cities located in Europe, namely Amsterdam, Barcelona, and Hamburg.

### 2.6 Amsterdam Smart City

Amsterdam, the capital and most populated city in the Netherlands has experienced significant demographic growth, with its diversity ethnically and socially, the growing core-periphery divide that shows economic and cultural asymmetries in the city [51]. The city also has taken a people-centered approach to technology [24][15] and has an extensive knowledge base with a number of recommendations of how to overcome disparities. Ams-

terdam aims to equip its residents with digital skills to navigate and to keep up in today's society. According to a survey done in 2020 titled "De Staat van de Amsterdam 2020" (The State of the City of Amsterdam 2020) the groups that are at risk of falling behind are mainly the people living in poverty, slightly mentally impaired people, people with low level of education and semi-literate people. A number of training programmes and easy-to-use digital participation tools have been developed to encourage digital literacy in the city.

A brief look into the research by author Angelidou [6] shows that they gathered data in order to look at the Human and Social Capital Development of Amsterdam Smart City with the objective of environmental sustainability/sustainable lifestyles through means of initiatives for awareness/education/digital inclusion and civic innovation [6]. Taking Amsterdam as a lesson for a successful smart city, the author Mora [35] believes that "strategic planning" is based on three rules namely 1. strategic thinking 2. collaboration 3. inclusion is the key for it's success. Where 'Strategic Planning' is a systematic and iterative decision-making process with which a community organizes itself in the present to achieve a desired future (Albrechts, 2005; Fera, 2005).

The analysis by L.Mora and R.Bolici helped them create a road map that shows the road-map of the development process of the Amsterdam's smart city strategy, in brief, it contains five main phases and an overall 16 activities that can be seen in Fig 2.5.

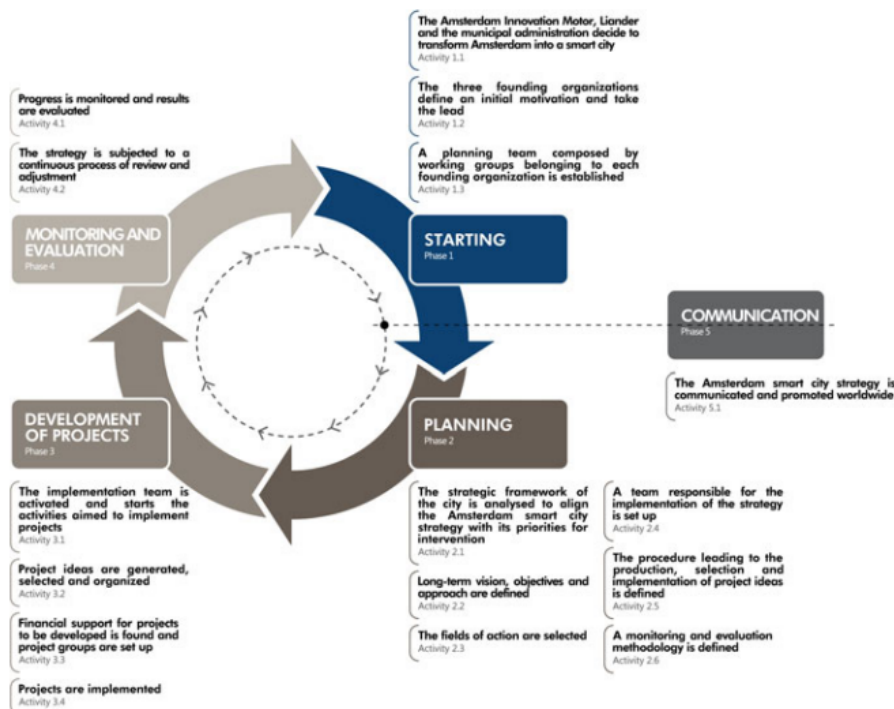


FIGURE 2.5: The Development process of Amsterdam's Smart City Strategy [35]

### Phase 1: Starting

The first phase helped initiate the "Amsterdam Smart City Programme" with three main organizations namely the Amsterdam Innovation Motor, Liander and the municipal administration. Their main goal was to transform Amsterdam into a smart city with the use of ICT to solve its environmental problems and build a urban environment that is sustainable.

### **Phase 2: Planning**

The planning phase is where activities were being conducted and ensured that the city's smart strategies were aligned with the strategic framework and also effective methodology for monitoring and evaluating the results of the various projects were ensured.

### **Phase 3: Development of Projects**

Since the strategy is based on continuous development of ICT-Based projects and ensure that the smart city programme's next phase was to enable the introduction of new applications and services

### **Phase 4: Monitoring and Evaluation**

The programme uses a dynamic approach where the stages in this phase are continuously reviewed and improved. The progress and evaluation results are performed periodically with the smart city and its project partners.

### **Phase 5: Communication**

One of the smart city's strategies is to focus on knowledge sharing, this is an activity that is continuously done from Phase 3 helps the smart city gain knowledge and share it across the city. This not only helps inform but also gain publicity and encourages alliances.

## **2.7 Barcelona Smart City**

Secondly, Barcelona, the capital of Catalonia in Spain aims to address social and gender inequalities of digitization to promote a human-centric approach to a smart city [16][20]. The main driver in the Barcelona smart city project is Social inclusion, where they wish to create a more sustainable, smart, and inclusive path for development [39]. Author Angelidou also surveyed the Barcelona Smart City and one of their objectives for Human and Social Capital Development was to be Digital Inclusive and the suggested means was again to have initiatives for awareness/education/digital inclusion [6]. The Amsterdam Smart

City and Barcelona have some similarities as they both have two-way communication and co-creation of strategies and policies with their citizens, they also share a collaborative governance platform called the 'city protocol' project where the 'Internet of Cities' platform allows diverse cities to communication and share solutions to learn from each other [10]. Their conceptual model shows three aspects, where firstly, Smart City provides the physical environment for the infrastructure, Second, a Knowledge Economy that is built with industrial clusters and economy within the physical area and forms relationships and social network between the citizens and the companies within the cluster which ultimately forms the last layer - Knowledge Society [9].



FIGURE 2.6: The Barcelona Smart City Conceptual Model [9]

The smart city model consists of three main pillars as shown in figure 2.6, infrastructure, human capital and information. Barcelona's focus on being proactive and engaging with public and private organizations has helped in the successful implementation and progress of their initiatives and services. This approach of the city has helped it the smart city project to maintain it's international position despite the economy situation in Spain. The city will continue to invest and focus on Smart City initiatives for the development of innovation, urban growth and improve the quality of life for it's citizens [9].

## 2.8 Hamburg Smart City

Hamburg, the second largest city in Germany with more than 1.8 million citizens is also a part of the UN-Habitat "People-Centered Smart Cities" flagship programme, Hamburg has initiatives set to strengthen their open government and citizen participation. In 2022, the city of Hamburg topped the list of Smartest German City for the fourth time in a row [1]. The city flourishes with the existence of the Port, it is not only seen as the

backbone of the city but also as a space that embraces change and innovation. Hamburg mainly focuses on mobility and society and it can be seen as the city has two focus areas namely 1) Intelligent Transport Systems (ITS), which consists of sustainable initiatives that focus on environmental pollution and climate change and 2) E-Governance and Citizen Services, the second focus suits more for this study and the city plans to improve citizen engagement, public security and etc., to make a citizen-friendly Hamburg with transparent and cost-effective administration [34]. One of the smart city projects by EU's Horizon 2020 programme called MySMARTLife in Hamburg has a main focus of shaping the digital ecosystem of the city [32]. The MySMARTLife initiative has three main activities: 1) "Inclusive Cities" 2) "Smart People" 3) "Smart Economy" where "Inclusive Cities" where a higher quality of life is offered to residents, "Smart People" is about citizen engagement in the city's development, "Smart Economy" focuses on economy-level where the main aim is to increase employment.

As smart cities are often seen as a rich endowment of a city, there has been not yet been a systematic and continuous collaboration with the municipality and small enterprises. This is due to the notion that smart city initiatives or experiments need to be fostered only through private investments and can only be mobilized by large organizations [47]. Lastly, The digital Strategy 2020 [44] sheds light on generating communication and knowledge offerings in a wide variety of forms and format, so that they can address new target groups with outreach strategies and provide digital information platforms. The city wants to tackle the challenges that marginalized groups face in terms of inclusive urban development [52]. they also have a advisory body with diverse stakeholders including expertise that account for vulnerable groups namely, people with disabilities and marginalized populations. The Figure 2.7 shows the city's digital city strategy model.

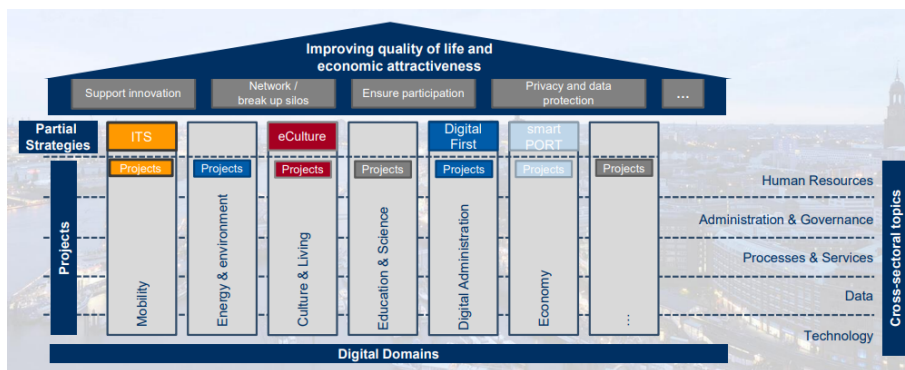


FIGURE 2.7: Hamburg Digital City Strategy Model [59]



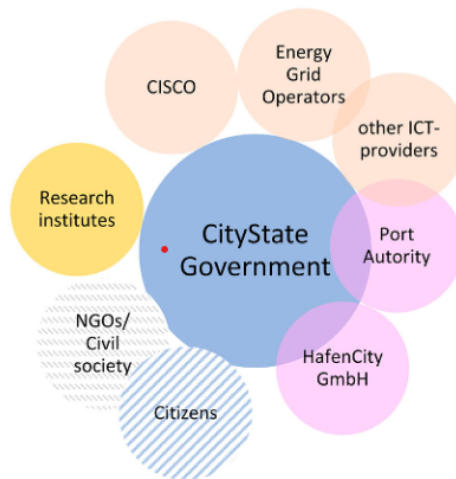


FIGURE 2.8: Hamburg’s actors in the smart city [47]

## 2.9 Reflection on the Existing Case Studies

### Digital Inclusion and Literacy:

In order to promote digital inclusive approaches to execute a strong digital capacity -building development to their smart city. Amsterdam has a citizen-centered way of approaching its smart city planning where there is significant focus on its Digital Inclusion and Literacy. They aim to ensure that the citizens are able to participate in society by emphasizing on training programs and digital participation tools. Authors Mora and Bolici in their smart city strategy, show a systematic five-phase decision-making process which provides a framework for continuous improvement and knowledge-sharing to ensure that the city is inclusive in their smart city [35]. This aligns with the literature as the National Digital Inclusion Alliance define digital inclusion as activities that equip individuals and communities including the disadvantaged with access to and use of Information and Communication Technologies [37].

### Social Inclusion:

The people-centered notion of smart cities can be fortified with supporting and prioritizing social inclusion. Author Reuter’s notion of smart cities and needing to serve people first in order to achieve an urban environment that involves marginalized communities [30]. Hence, taking a look into Barcelona’s smart city initiative with its human-centric aim and initiatives which prioritize social and gender equality. Their aim to create a sustainable environment that is inclusive and the city’s model highlights how it integrates the main focus of physical infrastructure, Knowledge Economy and Society. Barcelona is also known for its Smart City Expo World Congress [9] that has been held from 2011. Last year, the

inclusion section of the expo shed light on how ‘cities need to celebrate togetherness and operate in a polarized environment’ and that ‘private sectors can help make inclusive, equitable and just policies a reality with insights from data gathered’ [2]. The initiative of Barcelona’s smart city is observed as one where the importance is focused on connection and engagement of the citizens, governments and organizations in co-creating smart city solutions. This approach of Barcelona’s collaborative governance platform that encourages communication and knowledge exchange among diverse cities showcases how the role of ICTs can help transform public sector operations.

### **Citizen Participation and Governance:**

Hamburg’s smart city initiatives focus on enhancing citizen participation with the city’s involvement in the UN-Habitat "People-Centered Smart Cities" programme and the "MyS-MARTLife" project. These shed light on its commitment for an inclusive urban development. The decision to having a diverse advisory body with stakeholders from various sectors can help identify and understand the needs of marginalized groups in the planning process. The project aims to address the challenges faced by marginalized groups through outreach programmes and digital information platforms. This is aligned with (Cardullo and Kitchen, 2018) [13] as they note that citizen-centered smart cities empower and their multi-stakeholder model improves the participation of marginalized groups in the planning, development and implementation of inclusive governance. Thus, Hamburg with its smart city planning has taken in account of integrating citizen participation and decision-making where they can address the challenges that arise in urban development and hence contribute to being an inclusive smart city.

## Chapter 3

# Methodology

### 3.1 Research Design

The research design methodology used in this thesis follows the framework by (Robert Yin, 2009) as shown in figure 3.1 [66] and is drafted at the early stage because the major procedures for data collection and analysis should become a part of the case study process [66]. The multiple-case study approach allows cross-case analysis which can strengthen the findings given the limited number of cases. The four case studies will examine the four subjects for each of the city and through the comparison cross-case study analysis. The comparison can highlight how the various smart initiative strategies vary for each city depending on their governance frameworks. In the next chapter, following the Multiple-Case study Design and Report by (Yin, 2009), the results of the multiple-case study will be presented in separate sections about each of the cases individually alongside the cross-case analysis and results [66].

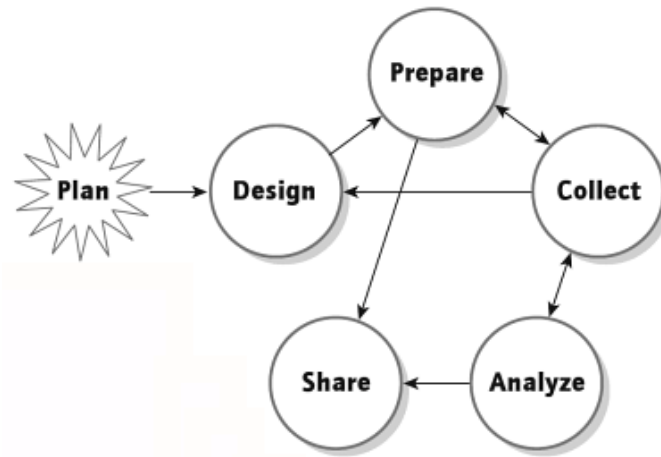


FIGURE 3.1: Case Study Methodology by Robert Yin [66]

## 3.2 Data Collection

There are several methods of data collection for the research study, (Johannesson & Perjons, 2014) state five of the most widely used data collection methods namely, questionnaires, interviews, focus groups, observation studies, and document studies. In a research project, one type of data collection is common but it is also common to use more than one type to increase the accuracy and ‘broaden the picture’ [29]. As for a case study research, it is possible for the evidence to come from many sources namely six of them: documentation, archival records, interviews, direct observation, participant-observation, and physical artifacts, as proposed by Yin [66]. The questionnaire used for the data collection of the case studies is shown in Table 3.1, the interview questions were structured around the four key subjects and obtained from the literature review. However, Robert Yin’s focused interview approach was implemented during the interview in order to get responses that would explore the topic further and gain the interviewee’s understanding and experience [66].

Furthermore, a combination of two types of data collection is used, interviews and documents.

- Interviews: This method of data collection is said to be one of the most important sources of case study information. Two types of case study interviews were incorporated in this final project. One type of interview is an *focused interview*, where the respondent is interviewed for a short period of time and the interviews are open-ended. This type allows the interviewer a level of flexibility to follow a set of questions they have prepared for the data collection. The type of interview followed is a ‘focused interview’ (Merton, Fiske, & Kendall, 1990) as referred in (Yin, 2009), where

the interview is held in a open-ended manner. The main purpose of conducting such interviews is to corroborate facts that have already been established. [66].

- *Documentation:* Additionally, a number of documentation were obtained during the data collection process including websites shared by the interviewees, publicly available project reports, new articles and documents.

### 3.3 Validation

The research conducted in the case study, should be validated and based upon multiple sources of evidence, and employ data triangulation, using both interviews and documentation [64] [66]. In order to strengthen the validation of the research methodology, the framework by (Yin, 2009) is utilized in this study. The test used here is 'Construct Validity', where the case study is conducted with the use of multiple sources of evidence. This approach allows a broader range of evidence to develop 'converging lines of inquire' by the process of data triangulation, where information from multiple sources is collected with the aim of corroborating facts or phenomenon. With data triangulation, the disadvantages of construct validity can be addressed as the multiple sources of evidence, in this case the documentations provide multiple measures of the same phenomenon.

The framework also employs multiple-case study design which allows the comparison cross-case analysis which strengthens the cases despite only 4 cases. The nature of the interviews being "focused interviews" also helps corroborate facts that have established in the research and provides significant insights despite the limited number of cases [66]. Thus, with the both the interview and the detailed case study analysis, the cases help form an empirical base for the cross-case analysis.

Section	Questions
<b>Digital Inclusion</b>	<ul style="list-style-type: none"> <li>● What are the main barriers for digital access and literacy/skills in your community?</li> <li>● How effective are the current digital inclusion initiatives in your city/community?</li> <li>● What kind of support is available for people to use digital tools effectively?</li> <li>● Can you describe the challenges that people in your community face to access digital services?</li> </ul>
<b>Social Inclusion</b>	<ul style="list-style-type: none"> <li>● How are marginalized groups currently engaged in smart city projects?</li> <li>● What social inclusion measures are most effective in your city?</li> <li>● How inclusive do you find the current smart city projects towards marginalized communities?</li> <li>● What can be improved to ensure that the marginalized groups are not left out in these projects?</li> </ul>
<b>Citizen Participation</b>	<ul style="list-style-type: none"> <li>● How can citizens participate in the planning and implementation of smart city initiatives?</li> <li>● What are the pros and cons of citizen participation?</li> <li>● What does the involvement of citizens in planning of smart city projects look like?</li> <li>● What prevents citizens from participating in these projects/initiatives?</li> </ul>
<b>Governance</b>	<ul style="list-style-type: none"> <li>● How are smart city policies developed and implemented in your city?</li> <li>● What role do local governments and other stakeholders play to ensure inclusive governance?</li> <li>● How do you feel about the current policies in governing smart city projects?</li> <li>● What primary changes are needed in policy or governance to support effective inclusion?</li> </ul>

TABLE 3.1: Interview Guide

# Chapter 4

## Case Study Analysis

This chapter consists of the findings from the cases, mainly focusing on the subjects of digital and social inclusion, citizen participation, and governance in the context of Smart Cities. The data was collected for the case studies was done through means

### 4.1 Summary of Respondents

The case study was conducted with a diverse set of participants working in different sectors of smart city projects. The respondents agreed to voluntarily participate and their personal information collected during the study is protected and the needed approval from the university's ethics committee were obtained.

<b>Respondent.</b>	<b>Job Title</b>	<b>Experience</b>	<b>Sector</b>
Respondent A	State Consultant	9 years	Digital Inclusion
Respondent B	Researcher	5 years	Social Inclusion
Respondent C	Researcher & Consultant	8 years	Citizen Participation
Respondent D	Research Professor	10 years	Governance

## 4.2 (Case A - Valencia, Spain)

### 4.2.1 Background

The third case study is about the city of Valencia, a coastal town in Spain with about 800,00 inhabitants, and also one of the first Spanish cities to deploy a Smart City Platform in 2013 [55]. The 'Smart Valencia', project implemented an Urban Platform to manage the data shared across multiple domains to support decision-making processes [4]. The city is also one of the first's to implement 'WiFi4EU', a European public network with free access to WiFi with nearly 600 access points in public spaces throughout their smart city [22].

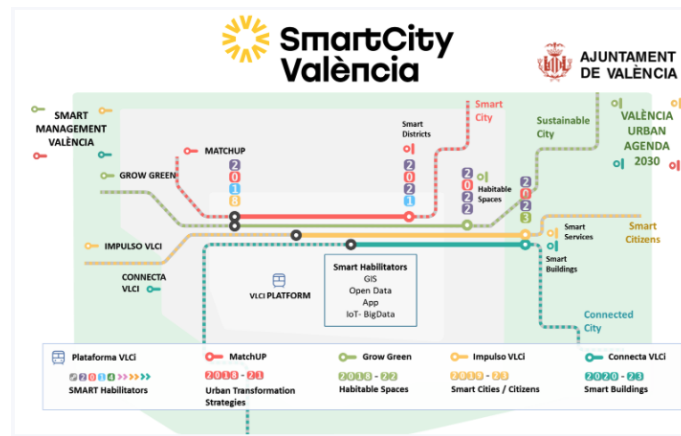


FIGURE 4.1: Smart City Valencia [55]

The Smart City of Valencia state that 'Technology, in their point of view is an essential tool that promotes social inclusion and the facilitation of mobility for the different groups' and that their projects are aligned with the 2030 Agenda and Sustainable Development Goals, especially the SDG 11, which we know 'the aim is to make cities and human settlements inclusive, resilient and sustainable'. Hence, Valencia has implemented a number of various smart projects that helps promote 'better governance, social inclusion, improved mobility' [55]



## 4.3 Interview Insights

### 4.3.1 Digital Inclusion

The third Respondent C shed light on the current scenario on the digital inclusion of Valencia, they stated that the main barriers to the digital access and literacy are namely: the economic gap, the lack of sufficient technological infrastructure and lack of digital skills in certain citizens. The above-mentioned factors vary depending on the region as some rural areas still face connectivity challenges and a certain demographic of the population namely the older people and migrant groups that lack basic digital skills have a limited ability to fully utilize the opportunities that arise with digitization. The Respondent mentions certain SC initiatives such as "Connecta't" and "School of Digital Citizenship" that have been key in providing the access and needed training for digital skills. One of the key factors in ensuring the effectiveness of these initiatives varies by demographic and as expected, the youth and young adults show rapid adaptation but the marginalized groups for example, the older groups face significant challenges.

The support offered by the public libraries and civic centres offer free access to not only the internet and internet devices but also with digital literacy workshops. As seen in the cases above, Valencia also is seen collaborating with the local government and NGO's in order to provide courses and personalized assistance for the marginalized groups so that they can equip themselves with the needed digital skills to improve their quality of life and access essential services.

### 4.3.2 Social Inclusion

Respondent C noted that the current SC projects in Valencia are inclusive to a certain extent but there's room for improvement. Despite the engagement of marginalized communities, implementation of these projects still lacks to ensure that they are fully inclusive. This can be narrowed down to inadequate representation and insufficient resources. Once again, the inclusion of the marginalized groups in SC projects is necessary to increase community participation from the initial planning phases to the implementation phase is noted and the Respondent mentions the 'creation of accessible consultation platforms and the provision of specific resources for the training and empowering these groups'. Lastly, representing this group in decision-making bodies and ensuring that a dedicated budget is allocated to inclusion initiatives can facilitate social inclusion and meet the needs of the community. Examples of such initiatives in Valencia are namely "Barrio La Luz" where young people are trained to help them acquire skills and improve their chances of employment and "Citizenship Classrooms" which provide a space for residents to learn about their rights and help them to equip and participate in civic life.

### 4.3.3 Citizen Participation

The city of Valencia promotes citizen participation in the planning and implementation phases of SC initiatives through means of various platforms and mechanisms such as 'public consultations, participatory workshops and online platforms namely "DecidimVLC" where it is even possible for citizens to propose ideas, and to vote and discuss projects. Additionally, some SC initiatives allow for collaboration with universities and research centres, by involving residents and letting them interact directly with those responsible for the project, allowing room for their opinions and suggestions. Respondent C mentioned a bit about the pros and cons of the citizen participation in Valencia:

- **PROS OF CITIZEN PARTICIPATION:** Firstly, the transparency in the public management in the city of Valencia is that it is transparent in public management, which empowers the community and leads to the development of projects that meet the needs of the locals. Next, this leads to innovative solutions with have a higher rate of success and acceptance in the implementation of the SC projects.
- **CONS OF CITIZEN PARTICIPATION:** The decision-making process becomes lengthy due to the need for consensus and this comes with a high possibility that not all groups are represented in this process. Additionally, not only is this time-intensive, effective participation requires resources and training, which tends to be logistically and financially challenging.

The Respondent C also mentions that some of the notable SC initiatives such as workshops and participation forums that provide space for debate and co-creation has led to the remodeling of public spaces and the implementation of sustainable mobility solutions. However, the gap between the involvement of citizens and effective participation where achieving equal representation of all demographic groups. Lastly, when it comes to stating factors that prevent citizens from being able to participate in the SC initiatives are namely:

- The lack of information and easier ways to participate.
- The lack of trust that the citizen's input will be taken into account.
- The lack of time and resources can discourage the stakeholders in reaching out to citizens.
- The lack of digital skills can limit the ability of citizens to engage with the SC projects.

### 4.3.4 Governance

The development and implementation of SC policies are through means of a collaborative process according to the Respondent. They mention that this participation involves the City Council, academic institutions, private companies and lastly the citizens. Where the Council leads the strategic planning and public consultations to collect input from the various sectors in order to ensure that policies are inclusive and reflect the needs of the citizens. As local governments play a significant role in the inclusive governance, where they not only act as coordinators but also facilitators in order to ensure the participation of all relevant stakeholders. This welcomes various perspectives and knowledge and help achieve more inclusive and effective SC governance. When asked about the current policies, the respondent gave an overall positive take on the current policies and mentioned that "they show a commitment to innovation and sustainability". Although there is room for improvement regarding effective participation for all the segments of the population. The current policies have made significant progress in modernizing the urban infrastructure and public services.

On an ending note, the respondent states that in order to support effective inclusion policies, it is quite necessary to introduce policy and governance changes that can promote greater citizen participation. This ultimately means that there has to be accessible and transparent consultation mechanisms, to strengthen digital education and allocate specific resources for the marginalized groups. Additionally to promote inter sectoral collaboration and to have inclusion indicators and to continuously evaluate the projects and implement adjustments that can help respond to the real needs of the population.

## 4.4 (Case B - Rotterdam, Netherlands)

### 4.4.1 Background

Rotterdam, a city in the southern part of the Netherlands is a port city of 650,000 citizens with a socio-economically diverse population. The city has been developing and implementing smart solutions to improve city services namely the energy and the mobility sector [21]. With the idea of creating an "Open Urban Platform" in 2019 to leverage the data across the city services and systems [18]. This pilot project aims to harness the advantages of incorporating a 'digital twin', this offers the possibility of having a model of Rotterdam with real-time data which can aid in describing the functioning of the city.



Exhibit 1. Three dimensions of Digital City Rotterdam

FIGURE 4.2: Digital City Rotterdam [21]

The city's primary aim is to improve the efficiency of city services with the creating of a digital environment that can 'facilitate the exchange and reuse of data, and interoperable interactions between various city applications' [21]. The municipality of Rotterdam stated that "mutual trust between the public and private sectors is needed to develop the platform and to engage with all stakeholders in the ecosystem [...] and to improve the integrity of the private sector through accountability and inclusion [...] and contribution to society" [21].

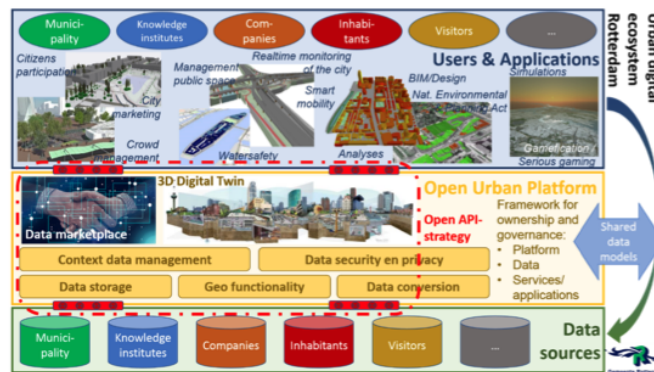


FIGURE 4.3: Architecture of the Open Urban Platform Ecosystem [21]

## 4.5 Interview Insights

### 4.5.1 Digital Inclusion

Respondent B stated that there is a main barrier when it comes to talking about challenges in digital inclusion in the Netherlands despite it's advanced digital infrastructure

and available access to the internet. They mention that digital skills is the main hindrance and with the existing literature, we call this a lack of digital literacy. According to their research, some of the main factors that play a significant role is age, low-income or no-income people.

The respondent sheds light on the existence of digital programs and initiatives for empowering digital citizenship, especially for seniors, youth and low-income people. The libraries in collaboration with social organizations in the Netherlands conduct workshops and free training for the citizens in need. Additionally, the local governments are also in the stage of trial and exploring new digital inclusion initiatives by actively collaborating with the NGOs, Research institutes and social organizations.

### **4.5.2 Social Inclusion**

During the interview, Respondent B mentioned that workshops and programs in SC projects are conducted in a way that is general to all citizens and not specific target groups. Since, recent attention and critiques have been talking about the inclusion aspect of smart city development. It is quite evident that this aspect of SC development shows that they are not designed for everyone and that in order to ensure that the voices of the marginalized citizens are heard, their participation in a SC project is key to its success. To be more precise, the marginalized citizens need to be involved from the beginning of any SC project, mainly in the design and implementation stage in order to define inclusive design principals for smart city solutions.

### **4.5.3 Citizen Participation**

Respondent B reiterates on designing specific participation programs for the various target groups of citizens in order to bring to light their needs and interests. However, if they don't see any signs that their input is being taken into account, this can lead to preventing them from participating in further projects and initiatives. Lastly, an example that they shared was the '3D Modelling Approach that has been previously used in (Helsinki) and Estonia (Tallinn) and recently has been adopted by Rotterdam as a good practice' [18].

### **4.5.4 Governance**

When asked about what the SC governance looks like in Rotterdam, the Respondent B mentions that 'SC policies are mainly developed by the local government in alignment with national policy'. Although, in the policy development process, there is no

involvement from citizens, however, collaboration or consultation with research institutes is done. Next, since the government plays the role of funder, since the infrastructure and projects are funded by them, they play a significant role as a coordinator and can bring different stakeholders together.

Regarding the current policies in the SC projects, the Respondent stated that SC policies suffer from a lack of alignment between the intergovernmental sectors and the public + private stakeholders. Hence, 'at the policy level, they are messy, disconnected and lacks cohesion'. This can be solved by 'co-developing a clear inclusion policy and essential a digital policy in collaboration with the above mentioned stakeholder so that a common ground can be found and lastly to transfer the policies into action plans while also simultaneously considering an evaluation mechanism for improvement.

## 4.6 (Case C - Achterhoek, the Netherlands)

### 4.6.1 Background

This Easternmost province in the Netherlands, De Achterhoek is a rural region with a number of villages, hamlets and small towns. In the past few years, this region has stopped growing in terms of the number of inhabitants and the regional economy mostly driven by agriculture and small manufacturing industries has been under performing [33].

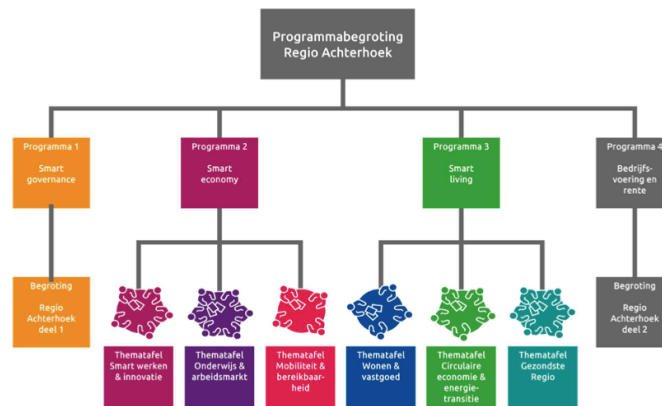


FIGURE 4.4: Achterhoek Program 2024-2027 [19]

However, De Achterhoek, is leading this paradigm shift from this top-down narrative of government-initiated planning to a government-facilitated planning, where the citizens play an important role. This drives the shift towards a more 'participatory governance' and the policy-makers and citizens collaborate with each other, thus evolving into a bottom-up and community-led institutional change [33]. The 'Programmabegroting'

reiterates this with Figure 4.6 and shows us the various sectors that collaborate and cooperate with each other in De Achterhoek [19].

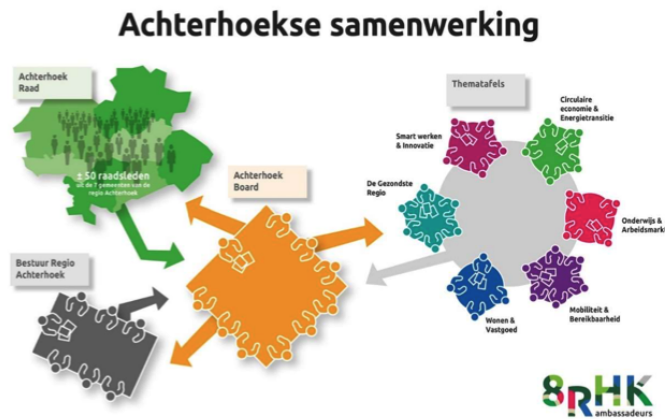


FIGURE 4.5: Achterhoek Co-operation [19]

## 4.7 Interview Insights

### 4.7.1 Digital Inclusion

The Respondent D worked on the 'Gaon' project in De Achterhoek and gave insights on the technological development aimed at the 'mobility poverty' that exists in the region due to the limited public transport available. The Gaon app is one that aids the residents and visitors of Achterhoek to share rides (bicycles and cars). They can plan, book, and pay for the ride from points A and B with the use of the Gaon Application [19] [25].

During the design process of the application, it made use of a 'virtual currency' where citizens could interact with the application and vote for the digital features. This was to ensure that the software was accessible and easy to use for the marginalized citizens namely the elderly in this case. Later, when the software was ready, the people tested it out in a lab situation and hence, citizens were involved in the development of this initiative from the beginning until the last phase.

### 4.7.2 Social Inclusion

This project as mentioned by the Respondent, showcased the efforts that the project made in obtaining the needs of the residents. The inclusion of the marginalized groups in this region such as the elderly and the young people who can't drive or don't have access to a vehicle. However, when it came to the young people, safety was a concern from the parents due to curfews and traveling late at night. And for the elderly, their family was

worried despite the benefits of the ride-sharing as some of them have walking aids which might inconvenience the person offering the ride as they have to wait patiently. Hence, some residents felt comfortable paying them as they felt bad if they couldn't compensate for the help they received.

### **4.7.3 Citizen Participation**

One of the main reasons that this Gaon initiative was a success is due to the involvement of the citizens through every phase in the development of the application. From the design process to the testing where even the stakeholders from the mobility sector were included to discuss the accessibility to villages that did not have grocery stores. Hence, with the collaboration and the involvement of the citizens from the beginning to the last phase, the project was successful in engaging with the citizens and ensuring that they participate.

### **4.7.4 Governance**

As seen the Gaon project has a bottom-up governance approach that is also collaborative with various stakeholders. The regional governance structures ensured the support and collaboration between the citizens and the local government for the overall development of Achterhoek. Since the initiatives are community-led, there is trust, and accountability with how the initiatives are being implemented.

## **4.8 (Case D - Tamil Nadu, India)**

### **4.8.1 Background**

The Global South often struggle with the lack of infrastructure and governance capabilities due to the rapid urbanization challenges. In order to mitigate this, the Government of India first launched the Smart Cities Mission (SCM) in 2015 with the objective to develop 100 Smart Cities in the country, originally meant to be completed in 2020, was then given a deadline of March 2025 which allows the cities to complete its ongoing projects [3]. The government sought to have an innovative approach through area-based development, with a focus on ICT and digital technologies [45]. Moreover, the SCM aspired to 'promote cities that provide core infrastructure and quality of life to its citizens, a clean and sustainable environment with the application of 'Smart' Solutions', which subsequently leads to the development of "inclusive cities" [41]. As shown in the figure 4.1, the SCM includes a list



of the subjects in their 'smart' solutions plan but gives the cities the flexibility to add new applications.

The state of Tamil Nadu was granted the funds for 11 cities to be developed into 'Smart' Cities. Additionally, the implementation of the Information Communication Technology Policy in 2018 was introduced by the state for the development with certain objectives namely to "incentivize investment, employment and intellectual capital creation" and to "focus on start-ups and employment of women" [26].



FIGURE 4.6: Smart Solutions as listed by the SCM [41]

## 4.9 Interview Insights

### 4.9.1 Digital Inclusion

Respondent A names that the primary barriers to digital access and digital literacy in the community is 'mainly hindered by economic status', 'lack of awareness' and 'accessibility'. Despite the state of Tamil Nadu being on the higher side with a literacy rate of 80%, respondent A mentioned that due to the issue of affordability, many citizens in rural areas are affected in the current digitalized society. A few examples mentioned were the lack of digital resources for students during the COVID-19 pandemic and the small business vendors lacking the digital skills needed to keep up with the sudden transition to digital payment.

According to Respondent A, the Government of Tamil Nadu is making efforts to promote digital inclusion. Firstly, by regulating internet service providers and ensuring affordable internet services. Next, the availability of affordable internet enabled devices and conducting capacity-building interventions. Lastly, making conscious efforts to develop user

friendly apps. Respondent A mentioned that the State-run E-Service Centres/Common Service Centres are IT enabled services that helps reach out to the citizens living in rural villages.

#### **4.9.2 Social Inclusion**

Respondent A states that when it comes to curbing the challenges faced by marginalized groups in the SCM in Tamil Nadu, multiple activist groups and NGOs are taking efforts to represent them. Due to the top-down nature of the SCM in India, the Respondent reiterates that these SC projects are only further excluding the marginalized communities. Hence solely the efforts of Activist groups are effective and the government measures are still only on paper.

#### **4.9.3 Citizen Participation**

When asked about the current state of involvement of citizens, Respondent A mentioned that there was a lack of awareness and active participation as the citizen is not "informed" and hence their participation is done for just namesake. Existing literature also talks about giving citizens the 'power to decide whether and how to participate in the implementation of smart city initiatives' can foster informed and educated citizens [14].

#### **4.9.4 Governance**

Respondent A mentioned that the SCM in India is very top-down, without 'adequate input from local communities' and merely agree with the policymakers on top without ensuring that the needs of the citizens are being met. This critique is supported by existing literature which states the limitation due to the top-down nature of the government. [46] However, there are many approaches taken to improve the current state of governance in the SCM and Respondent A mentions that shifting this narrative to a more citizen-centric governance and following a "Right-Based Approach" [43] can follow through on ensuring that the citizens have equitable access. Lastly, the state needs to have regular consultation meetings with citizens to gather feedback and make the needed additions or changes to their projects.

## 4.10 Comparison Cross-Case Study

This comparison analysis of the smart city initiatives in Valencia and Rotterdam and then Chennai and Achterhoek, showcases the various smart initiative strategies between the four culturally and economically diverse cities and region.

### Valencia and Rotterdam

Category	Valencia	Rotterdam
<b>Digital Inclusion</b>	"Connecta't" and "School of Digital Citizenship" are some of the digital literacy programs that target the marginalized groups, however the younger people benefit more out of it than the elderly. And the internet access is not always available in rural areas.	Digital infrastructure is strong but however there are challenges when it comes to the digital literacy skills for the older generation and low-income groups. Concerns over data privacy also seems to hinder successful digital inclusion initiatives.
<b>Social Inclusion</b>	There are on-going initiatives that include the marginalized communities, mainly through means educational and job training programs for the younger people. However, the allocation of resources seems to be a challenge.	Generalized workshops are conducted that are not tailored for specific target groups, hence not effectively addressing certain marginalized groups .
<b>Citizen Participation</b>	The existence of certain platforms like "DecidimVLC", aim to increase citizen participation, but ensuring effective representation seems to be a hurdle.	The employment of 3D modeling tools and digital twins to increase participation are noted, however this leads increase in resources such as time and costs which can hinder .
<b>Governance</b>	The governance is collaborative through means of public consultations and public-private partnerships, however to support effective inclusion, there needs to be 'smart' policies that can promote citizen participation.	Governance follows national strategies, with limited citizen involvement. The lack of alignment between intergovernmental sectors and public-private stakeholders has led to a disconnected and lack of cohesion at the policy level.

TABLE 4.1: Cross-Case Analysis between Valencia vs. Rotterdam

## Achterhoek and Chennai

Category	Achterhoek	Chennai
<b>Digital Inclusion</b>	The smart applications are designed with higher levels of input from the citizen, with representatives of the marginalized groups namely the elderly and the younger adults. They were involved in design and testing phases through means of gamification.	The government digital literacy programs that exist are not effective as they are limited by cultural barriers and poor implementation.
<b>Social Inclusion</b>	The bottom-up approach of the smart initiatives in the region promotes inclusion by addressing mobility needs of the marginalized, although there are concerns regarding the safety of the young adults and elderly with mobility aids remain.	The top-down nature of the Smart Cities Mission (SCM) only add on to the social inequalities that are present. The representation of the marginalized groups are done by the NGOs and the activists due to lack of government support.
<b>Citizen Participation</b>	The region showed high levels of citizen participation in the "Gaon" project, at every stage, from the planning to design and testing with high levels or incorporating feedback.	The level of citizen participation is pretty low through due to a lack of awareness and the participation is done out of sheer namesake. Mainly due to the existence of a top-down governance which can suppress active involvement.
<b>Governance</b>	The governance is mostly bottom-up and collaborative. With the support of the local government as it encourages innovative community-driven initiatives that align with citizen needs.	The top-down governance hinders active citizen engagement with not much input from the citizens, there is a lack of alignment between government policies and community needs.

TABLE 4.2: Cross-Case Analysis between Achterhoek vs. Chennai

## 4.11 Linking Theory to Practice

The literature review and the theoretical insights gained from it, aided in narrowing down the key subjects and explored the subjects, digital inclusion, social inclusion, citizen participation and smart governance.

### 4.11.1 Digital Inclusion

The significance of digital inclusion and equipping citizens with the digital literacy skills, were seen most effective in Valencia and Rotterdam, and align with the theoretical emphasis on the significance of digital literacy as a core component of inclusion [48] [37]. The case of Chennai showed infrastructural and socio-economic challenges, being a significant challenge in achieving digital inclusion, Achterhoek's design process demonstrated high levels of citizen involvement in making the design process of the application more accessible and easy to use [50].

### 4.11.2 Social Inclusion

The literature valued the notion of smart cities serving people to achieve a human-centered environment and enhancing citizens and multi-stakeholder involvement in platforms [30] and can be seen in multi-stakeholder model in Achterhoek's case study, this aligns with the theoretical research, that involving the community in planning processes can be the key factor in contributing to social inclusion [8].

The case study of Chennai showed lack of social inclusion due to the top-down governance frameworks and correlates with the research, where it explicitly states that technological solutions alone would not be enough in a smart city environment [36]. However, Valencia and Rotterdam despite its many efforts and tailored digital workshops, still face barriers with under representation and poor resource allocation [38].

### 4.11.3 Citizen Participation

The Achterhoek case study showed how involving citizens in the designing and testing phases through innovative means, highlighted the value of collaboration and engagement with the communities to ensure that their initiative is accessible and inclusive to its users [13].

The low levels of citizen participation in Chennai aligns with the 'Absent Citizen' theory where citizens are taken for granted in the planning of smart cities [53]. Whereas, Valencia and Rotterdam showcased increased levels of participation but at the cost of increase in resources and ineffective representation [8].

#### 4.11.4 Governance

Alongside with policies that can promote the availability of affordable internet and devices that can reduce the gap when it comes to ensuring that the marginalized groups are able to participate. Achterheek's governance models aligns with 'Inclusion in Collaborative Governance' framework and showcases its bottom-up approach to the smart city project [7]. Whereas, Chennai's top-down governance showed significant disadvantages when it comes to achieving inclusion [38] and can benefit from bottom-up approaches that foster collaboration and engage citizens in decision-making processes [56] .

Valencia, despite its collaborative approach falls short due to it's lack of smart policies and Rotterdam exhibits disconnect and lack of alignment of stakeholders [7].

The findings showcase the various strengths and weakness from each of the cases, Chennai's smart city inability to achieve inclusion is mainly due to it's top-down governance structures and can learn from Achterheek, where the case shows high levels of citizen participation and inclusion. Rotterdam and Valencia exhibit increasing digital infrastructure solutions and innovative participation ideas but fall short as they lack alignment in their governance structure and lack representation of certain marginalized groups.

# Chapter 5

## Results

In this chapter, the findings of the research are addressed and the research questions are answered through the insights through a mix of literature review and theoretical analysis with the practical recommendations from the case studies.

**"How can smart cities adopt collaborative governance frameworks that improve their digital and social inclusion initiatives for marginalized communities?"**

The research showed a recurring theme starting from the literature review, where the top-down governance structures in smart city initiatives were shown as a disadvantage on an inclusion basis. As it can be seen that it fails to listen to the needs of the citizens and not address certain marginalized communities. Both the theoretical insights and the cases explicitly mentioned that shifting away from top-down governance models to citizen-centric ones can aid in governance frameworks that are inclusive [38] [13] [46].

The adoption of collaborative governance frameworks to improve digital and social inclusion for marginalized communities can undertake certain strategies:

- The literature and cases highlighted the need for a shift from top-down to bottom down citizen-centric governance models that includes marginalized groups to.
- The inclusion of the marginalized communities in the planning and design phases and decision-making processes of smart city projects to obtain inclusive technological services that aid them.
- Implementation of effective digital literacy workshops and toolkit that are tailored for marginalized groups to improve their digital skills in order to benefit from the smart city services.

- Equitable digital access and implementation of policies that ensure affordability and access of internet-enabled devices to all the citizens.
- The multi-stakeholder model that involves the local government, private sector, with the representation of the marginalized groups to collaborate and develop effective smart city solutions .
- Improving citizen engagement and participation by designing and shaping inclusive policies that are transparent and encourage involvement of the citizens.

***RQ1: What measures can be implemented to improve both digital and social inclusion in the planning of smart city projects?***

The key measures identified by the research in order to improve the current state of inclusion in Smart Cities are:

- Multi-Stakeholder Model: One of the key measures that was a recurring theme in both the literature and case studies was the implementation of a collaboration between multiple stakeholders, alongside the local government, private firms, representatives of the marginalized groups and NGOs. The collaboration of various sectors led to effective inclusion initiatives, where the involvement of citizens from the design and implementation phase of smart city projects and incorporating their feedback to continuously improve the project led to inclusivity in the smart city [13] [30].
- Digital Literacy Programs: The availability of digital literacy programs and workshops led to improved digital skills and gave the marginalized groups a means of utilizing the digital services that smart cities have to offer and improve their way of living. This is supported by accessible smart city services with easy to use applications catered for the marginalized groups in the smart city [31] [50].

**RQ2: How can policies and governance frameworks be improved to support inclusion in smart cities?**

To answer this research sub-question, the findings suggest that cities need policy frameworks that solely focus on incorporating inclusion strategies in smart cities and to ensure that certain citizens namely the marginalized groups are given equal access to the digital services that smart cities provide. Secondly, smart city governance should encourage the collaboration between the local government, private sector, civic organizations/NGOs to create effective integrated solutions. Lastly, the transparency and accountability in governance processes can engage citizens to make use of the open data platforms and take part in contributing solutions and working together for the development of the smart city.

- Shifting the Top-down narrative: The most critiqued existing smart governance structure is the top-down governance structure, multiple researchers and the case study



has given evidence that this does not work in incorporating inclusion initiatives effectively. The call for a shift towards collaborative governance models that learn the needs of the citizen and design solutions that can instead empower them with the many benefits that smart cities offer [13] [56].

- Collaborative Governance: Since, there is a lack of a robust governance framework that is mainly about inclusion, smart cities can benefit from a comprehensive framework that can integrate inclusion strategies into the core of smart city development. This can provide the citizens the support needed as the inclusion frameworks can ensure digital access for all citizens even the marginalized [7] [31].

### **RQ3: What barriers do marginalized groups face in accessing the smart city initiatives?**

The study revealed the primary barriers that marginalized groups face in accessing smart city initiatives. Namely, the lack of digital literacy, low income or the affordability, limited access to digital devices. Additionally, when certain marginalized communities are excluded in the decision-making processes, this leads to digital services that do not address their specific needs and create a divide. The lack of digital infrastructure in under-served areas also contributes to this digital divide, and make the existence of digital platforms and services harder for certain users to navigate.

- Accessibility of Technology: There are a number of reasons as to why certain citizens lack digital devices or access to internet services. This limited access to available affordable technology can inadvertently create a divide. When there is availability of accessible technologies and cheap connectivity, smart technologies can benefit the marginalized groups in their shortcomings and aid them [50] [28].
- Lack of Representation: One of the main barriers when it comes to making sure that certain groups' needs are heard is the lack of representation of their voices. If certain initiatives don't meaningfully involve the marginalized groups in their planning and implementation phases, the end result of their services can fail to consider their needs and can further heighten the gap of including them into the smart city [30] [53].

The study looked into the importance of taking a wider perspective on the smart city ecosystem and emphasizing the significance of taking a step back from the narrative that is only focused on the various technological advancements. Smart cities can be much more beneficial when its citizens are included and the services provided by the smart city can be accessed by all of its citizens.

# Chapter 6

## Discussion

This section focuses on the framework obtained from the study from the literature review, case studies and the cross-case study analysis, in order to show and compare the current state of smart city initiatives when it comes to the implementing inclusion strategies. Figure 6.1 shows a Smart governance framework and how it aids in the creation of a citizen-centric smart city, by means of prioritizing the key subjects, digital & social inclusion and framework & policy.

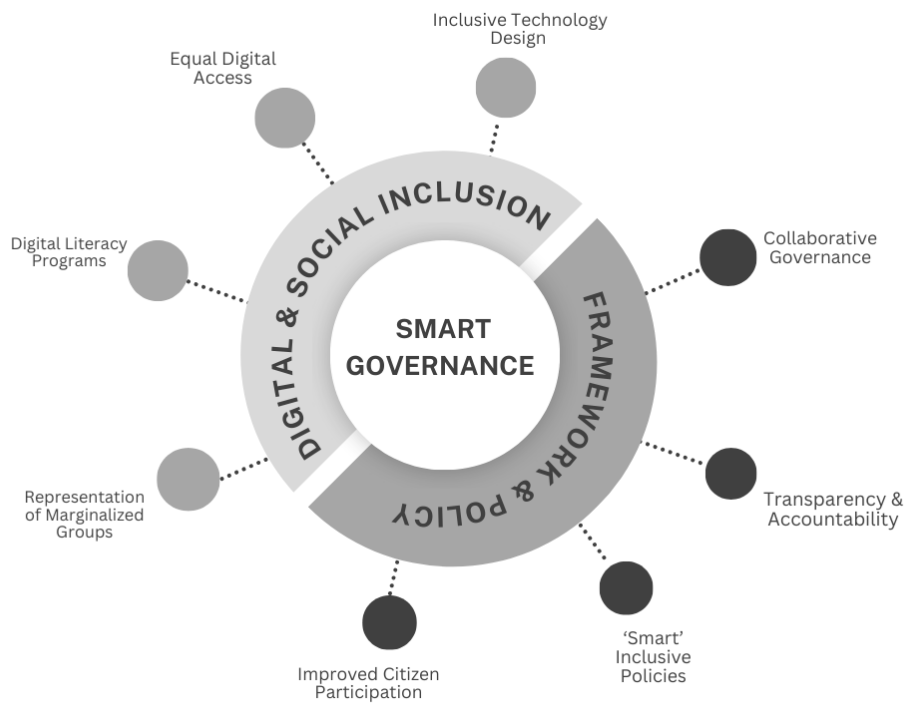


FIGURE 6.1: Framework for Smart Governance

- ***Digital & Social Inclusion:***

From the study it is now quite evident that a one solution-fits-all approach doesn't quite work as certain initiatives fail to take in the needs of marginalized groups into consideration. The involvement of these groups from the early phases of the projects can ensure that in the creation of inclusive design. As policymakers oftentimes fail to consider this, hence why the collaborative governance approach within the human rights framework of the city can be an important first step [30].

Figure 6.1 showcases 4 key components, namely inclusive technological design, equal digital access, digital literacy programs and Representation of the marginalized groups. This integrated design originated from the research due to the emphasis pertaining to the on the diverse needs of the citizens being met, and reducing the inequalities when it comes to accessing the digital infrastructures in the smart city. Lastly, enhancing the digital literacy of the marginalized citizens with the workshops is necessary to equip them in the advancing smart city environment and shedding light on the representation of the marginalized groups, in order for their needs to be met and reduce the challenges they face in the society [31][36] [48].

- ***Framework & Policy:***

Improving citizen participation and developing inclusive policies, so as to create an inclusive community of participation by bringing people with different perspectives to work together to address problems [23]. The collaboration among various sectors such as government, business, academic, non-profit and voluntary organizations have been led to the development of successful smart cities and that the multi-stakeholder model improves the participation of marginalized groups not only in the planning stage but also the development and implementation of inclusive governance and being transparent as it is indispensable in smart governance [33][36] [13]. ‘

## 6.1 Theoretical Contributions and Future Research

The research emphasizes the interconnection of the key subjects for improving inclusivity in smart city strategies and the visualization of how digital and social inclusion is integrated with policy and framework aspects. The study identified eight factors that can be address in order to have an effective smart governance as shown in figure 6.1, thereby recognizing that collaborative governance frameworks can improve and promote inclusion by encouraging citizen participation or engagement, multiple stakeholders, equitable digital access and inclusive digital design that serves the marginalized.

Future studies can incorporate quantitative data that could strengthen these findings in order to have measurable outputs of the impact of inclusive smart city projects. Furthermore, by expanding the studies to incorporate diverse cities from various regions with different economic backgrounds in order to gain a more comprehensive point of view. A more detailed look into the benefits and challenges of implementing inclusive smart cities can give pragmatic insights that policymakers can implement.

## Chapter 7

# Conclusion

The thesis explores governance frameworks in the smart city environment and their significance in improving inclusion strategies and practices. From the research, the shift of technology-centered solutions to adopting collaborative and multi-stakeholder models where the needs of the community are addressed from the initial phases, such as the planning and design phases, keeping in mind that the marginalized groups are represented. Successful inclusive strategies integrate digital and social inclusion at their core and address the barriers as found in the research, such as limited literacy and digital skills, and affordability. The significance of the citizen's is stated oftentimes, being instrumental in the success of smart city initiatives. Thus, highlighting the need for governance models that involves local governments, private sector, NGOs and fundamentally, the citizens. This collaborative approach can address the challenges faced by the citizens in the smart city environment and contribute in innovative and inclusive technical solutions.

Overall, the research signifies the need for improved digital and social inclusion strategies that can align the smart city projects, not with technologies but with citizen-centered solutions. Thereby, creating a smart city environment where citizens not only participate but also engage and come together to create solutions that address the barriers faced by underrepresented groups. Hence, leading to successful smart cities that collaborate with its citizens and are inclusive in their approach.

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Question	Response
What are the main barriers for digital access and literacy/skills in your community?	<b>Respondent 3:</b> Accessibility to digital facilities is primarily hindered by economic status and literacy and one's ability to operate. In Tamil Nadu, where I am a part, the literacy rate is reasonably high at about 80 percent. However, the issue is affordability. For instance, during COVID-19, most school-going children in villages in Tamil Nadu could not attend online formal education classes, as did children living in slums in Chennai City. Recently, I met some pavement vendors in Chennai and asked about their 'petty business prospects'. Many pavement vendors expressed insecure emotions, stating, "Nowadays customers are asking us to have Google Pay facilities, for which we need to buy a smartphone. Even if we buy a smartphone, we cannot operate it. The Google Pay trend has affected our livelihood a lot." Families trapped in the 'vicious circle of poverty' are severely affected by these challenges and constraints in achieving inclusion in the current digitalized society.
How effective are the current digital inclusion initiatives in your city/community?	<b>Respondent 3:</b> The Government of Tamil Nadu is making conscious and concerted efforts to ensure digital inclusion. These efforts include: <ul style="list-style-type: none"> <li>• Making efforts to ensure affordable internet services by regulating internet service providers.</li> <li>• Providing affordable internet-enabled devices.</li> <li>• Conducting capacity-building/training interventions at regular intervals at no cost.</li> <li>• Developing user-friendly apps.</li> </ul> Change is not possible overnight, and there are also cultural barriers.
What kind of support is available for people to use digital tools effectively?	<b>Respondent 3:</b> There are several service providers (both public and private). The Government operates E-Service Centers/Common Service Centres (CSCs) at several places (there are about 10,500 such centres in the State). Some of these centres are directly run by the State Government, and some are run through Public-Private Partnership mode. CSCs are IT-enabled service providers with the objective of reaching common people in the villages.
Can you describe the challenges that people in your community face in accessing digital services?	<b>Respondent 3:</b> Lack of awareness, cultural barriers (acceptability), and affordability.
How are marginalized groups currently engaged in smart city projects?	<b>Respondent 3:</b> Consultation meetings are happening to engage the public for getting their views/feedback on smart city concepts and objectives. The participation of marginalized communities is very minimal. NGOs/CSOs/activist groups are trying to represent the voices of marginalized communities. Mass media and print media are to some extent representing the voices of the marginalized. People are voicing their dissent through YouTube channels.
What social inclusion measures are most effective in your city?	<b>Respondent 3:</b> The efforts of activist groups are effective. Government measures are still only on paper. Visual media and print media often take sides with ruling political parties and neglect the voices of the marginalized.
How inclusive do you find the current smart city projects towards marginalized communities?	<b>Respondent 3:</b> As far as my observation goes, Smart City Projects are further excluding marginalized communities.
What can be improved to ensure that marginalized groups are not left out of these projects?	<b>Respondent 3:</b> A strong will and commitment of the policymakers is the need of the hour. It has to be a bottom-up approach. Unfortunately, Smart City Projects are top-down, not people-centric.
How can citizens participate in the planning and implementation of smart city initiatives?	<b>Respondent 3:</b> It has to be the responsibility of the state to engage citizens by listening to their voices. But it is not happening as it should. Each locality (Ward) has 'Area Sabhas'. Citizens can participate through Area Sabhas to express their voices at the planning and implementation stages of Smart City Initiatives.
What are the pros and cons of citizen participation?	<b>Respondent 3:</b> There are more advantages than disadvantages. Smart City Initiatives will become more 'citizen-centric' and will ensure that the benefits reach the most disadvantaged. Citizen participation will also inculcate a sense of ownership, which is highly important for the success and sustainability of the project.
What does the involvement of citizens in the planning of smart city projects look like?	<b>Respondent 3:</b> Smart city projects would certainly fail if citizens do not actively participate in all stages. Most importantly, their participation should be there at the planning stage. Now it is happening just for namesake. It does not look promising, and it does not augur well for future generations.
What prevents citizens from participating in these projects/initiatives?	<b>Respondent 3:</b> Participation has to be 'informed participation,' not just for the sake of participation. To be an 'informed participant,' one needs to be aware of the intentions of smart city projects and what they are aimed at. Only a few are taking the time to read smart city projects and trying to be informed participants. The state has to ensure that citizens participate as 'informed participants,' participating as subjects, not as mere objects.
How are smart city policies developed and implemented in your city?	<b>Respondent 3:</b> Governance, as usual, is 'top-down'. What people at the bottom need is decided by the very people at the top.
What role do local governments and other stakeholders play to ensure inclusive governance?	<b>Respondent 3:</b> Not so significant, just say yes to policymakers who are at the top. Corruption is a huge problem.
How do you feel about the current policies governing smart city projects?	<b>Respondent 3:</b> Anguish. Not happy.
What primary changes are needed in policy or governance to support effective inclusion?	<b>Respondent 3:</b> <ul style="list-style-type: none"> <li>• 'Rights-Based Approach' for ensuring equitable access can work well.</li> <li>• There is a need to recognize the customary rights of local people.</li> <li>• It has to be a citizen-centric approach.</li> <li>• The state has to create an enabling environment for ensuring 'informed participation' of citizens, particularly marginalized sections.</li> <li>• Local bodies need to be empowered to ensure citizen engagement/participation.</li> <li>• Ensuring social justice through reaching the unreached with information pertaining to the concept and components of smart city projects.</li> <li>• Consultation meetings with citizens at regular intervals.</li> <li>• Citizen monitoring groups (similar to that of Watchdog groups in the USA).</li> </ul>

TABLE 1: Interview Response: Respondent A

Question	Response
What are the main barriers for digital access and literacy/skills in your community?	<b>Respondent 2:</b> First of all, I am not sure which community we are talking about. There are several criteria to distinguish a community for this discourse, such as age, education, region, physical abilities/impairments, and perhaps gender. But in a more general sense, I would say that these two pillars of digital inclusion/exclusion are strongly intertwined. In the Netherlands, with access to digital infrastructure and internet everywhere, the most important digital access barrier is digital skill. From my own research, age plays a significant role in digital literacy. For the group of low-income or no-income people, the main issue is the affordability of internet tariffs and digital devices.
How effective are the current digital inclusion initiatives in your city/community?	<b>Respondent 2:</b> Here in the Netherlands, most cities have digital programs and initiatives for empowering digital citizenship, especially for seniors, youth, and low-income people. Regarding effectiveness, local governments are still in the stage of trial and exploring new digital inclusion initiatives by collaborating with NGOs, research institutes, and social organizations.
What kind of support is available for people to use digital tools effectively?	<b>Respondent 2:</b> Workshops and free trainings for citizens mostly in collaboration with libraries and social organizations.
Can you describe the challenges that people in your community face to access digital services?	<b>Respondent 2:</b> Beside the abovementioned, another challenge here in the Netherlands is the people's concern about digital safety and privacy.
How are marginalized groups currently engaged in smart city projects?	<b>Respondent 2:</b> There are workshops and programs for citizen involvement in the smart city project like the one organized by GOV tech NL in the Hague and open house program by Amsterdam smart city but they are general for all citizens and not specific target groups.
What social inclusion measures are most effective in your city?	<b>Respondent 2:</b> I am not sure about the meaning of this question, but social inclusion programs here are mainly related to citizen participation.
How inclusive do you find the current smart city projects towards marginalized communities?	<b>Respondent 2:</b> It's quite a very general question again, but the recent attention and criticism to the inclusion aspect of smart city development shows that they were not designed for everyone.
What can be improved to ensure that marginalized groups are not left out of these projects?	<b>Respondent 2:</b> Participation of marginalized groups from the early stage of the smart city project, specifically at the design and development stage, to make the design inclusive and define inclusive design principles for smart city solutions.
How can citizens participate in the planning and implementation of smart city initiatives?	<b>Respondent 2:</b> 3D modeling is an approach that has been used in Finland (Helsinki) and Estonia (Tallinn) and recently has been adopted by other cities like Rotterdam as a good practice. Another important aspect is designing specific participation programs for specific target groups of citizens based on their needs and interests.
What are the pros and cons of citizen participation?	<b>Respondent 2:</b> <ul style="list-style-type: none"> <li>• Pros: Citizen adoption of smart solutions and their satisfaction with the usefulness of these solutions.</li> <li>• Cons: It's costly and requires a lot of resources and effort from local governments.</li> </ul>
What does the involvement of citizens in planning of smart city projects look like?	<b>Respondent 2:</b> No detailed information provided.
What prevents citizens from participating in these projects/initiatives?	<b>Respondent 2:</b> If they don't see any signs that their input is being taken into account in future plans.
How are smart city policies developed and implemented in your city?	<b>Respondent 2:</b> In Rotterdam, smart city policies are mainly developed by the local government in alignment with national policy. In the policy development process, there is no involvement from citizens, but sometimes there is collaboration or consultation with research institutes.
What role do local governments and other stakeholders play to ensure inclusive governance?	<b>Respondent 2:</b> Government mostly plays the role of funder, which consists of funding infrastructure and demonstrator projects and sometimes playing the role of coordinator and bringing different interests and stakeholders together.
How do you feel about the current policies in governing smart city projects?	<b>Respondent 2:</b> Currently, smart city policies are suffering from a lack of alignment between intergovernmental sectors and the interests of public and private stakeholders. At the policy level, they are messy, disconnected, and lacking cohesion.
What primary changes are needed in policy or governance to support effective inclusion?	<b>Respondent 2:</b> Co-creating and co-developing a clear inclusion policy and more importantly digital policy in collaboration with stakeholders to establish a common ground, transforming the policies into action plans while considering an evaluation mechanism for improvement and adjustment.

TABLE 2: Interview Response: Respondent b

Topic	Question	Response
<b>Digital Inclusion</b>	1. What are the main barriers to digital access and literacy/skills in Valencia?	The main barriers include economic gaps, inadequate technological infrastructure in some areas, and a lack of basic digital skills in certain groups, such as older people and migrant communities. Rural and peripheral areas still face connectivity challenges.
	2. How effective are the current digital inclusion initiatives in Valencia?	Programs like "Connecta't" and "School of Digital Citizenship" have had moderate success, benefiting younger people more. Older people and marginalized communities face more challenges, and there's a need for further investment and sustainable focus.
	3. What support is available for people to use digital tools effectively?	Support includes public libraries, civic centers offering free internet, digital literacy workshops, and programs like "Valencia Conectada" that provide technical assistance. NGOs and neighborhood associations also play a role in providing personalized help to vulnerable groups.
	4. Can you describe the challenges that Valencians face in accessing digital services?	Challenges include lack of digital skills, economic barriers, and inequality in infrastructure distribution. Older people and less-educated groups struggle with online services, while many families face affordability issues. Rural areas still suffer from poor infrastructure, limiting access to digital services.
<b>Social Inclusion</b>	1. How are marginalized groups currently participating in smart city projects?	Participation is growing but still limited. Projects like "Valencia Smart City" are beginning to incorporate more inclusive participation mechanisms, but effective representation remains a challenge. NGOs and neighborhood associations facilitate inclusion, but more resources are needed.
	2. What social inclusion measures are most effective in Valencia?	Effective measures include educational and job training programs like "Barrio La Luz" for vulnerable youth, and "Citizenship Classrooms," which promote community integration and civic engagement.
	3. How inclusive do you consider current smart city projects towards marginalized communities?	Current smart city projects in Valencia are somewhat inclusive, but not fully. There is an effort to involve marginalized communities, but challenges like limited representation and insufficient resources hinder effective participation.
	4. What can be improved to ensure that marginalized groups are not excluded from these projects?	Increased community participation from the planning phases, providing specific resources for training marginalized groups, and ensuring their representation in decision-making bodies are key improvements needed.
<b>Citizen Participation</b>	1. How can citizens participate in the planning and implementation of smart city initiatives?	Citizens can participate through public consultations, participatory workshops, and online platforms like "DecidimVLC". There are also events and forums that allow residents to directly interact with city officials.
	2. What are the pros and cons of citizen participation in Valencia?	Pros include greater transparency, community empowerment, and solutions that reflect local needs. Cons include slow decision-making, unequal representation, and the financial resources needed for effective participation.
	3. How is the involvement of citizens in the planning of smart city projects in Valencia?	Citizen involvement is expanding through platforms like "DecidimVLC" and workshops. However, there is still a gap between intentions and effective participation, especially in achieving equitable representation.
	4. What prevents citizens from participating in these projects/initiatives?	Barriers include lack of information, lack of trust that their input will be considered, limited time and resources, and technical complexity. Digital skills gaps also hinder participation.
<b>Governance</b>	1. How are smart city policies developed and implemented in Valencia?	Smart city policies in Valencia are developed through collaboration between the City Council, academic institutions, private companies, and citizens. Public consultations help ensure inclusivity, and implementation is coordinated by municipal departments with the help of associations and tech companies.
	2. What role do local governments and other stakeholders play in ensuring inclusive governance in Valencia?	Local governments act as coordinators, facilitating collaboration between academic institutions, NGOs, companies, and citizens. Participation forums and public-private alliances are key mechanisms.
	3. What do you think of the current policies governing smart city projects?	Current policies are generally positive but need improvement in terms of inclusivity and ensuring equitable distribution of benefits across all population segments. Policies are progressive but lack flexibility to respond to emerging citizen needs and rapid technological changes.
	4. What major policy or governance changes are needed to support effective inclusion?	Policy changes must promote greater citizen participation, provide resources for marginalized groups, and enhance digital education. Stronger intersectoral collaboration and continuous project evaluation are also essential to ensure policies meet real community needs.

TABLE 3: Interview Response: Respondent C

Subject	Case Study 4 Interview Transcript
<p><b>Digital Inclusion</b></p>	<ul style="list-style-type: none"> <li>• Respondent 4 mentions that lots of former bus connections, got taken away. And so there was transportation poverty, but mainly for the young people and the elderly people that can't or don't drive.</li> <li>• "We developed technical solutions based on these stories, and then, when it came time to build the platform, we used a method called "buy a feature." People were given virtual money to spend on the features they valued most in the software. The most popular features were the ones we built first."</li> <li>• "Compared to Nordic countries like Sweden and Finland, we do things quite similarly, involving citizens in democratic processes. Sweden, for instance, experimented with Mobility as a Service in rural areas before we did. However, in the Netherlands, our project stood out because we consistently involved citizens throughout the four years. We spoke to people monthly, which required a lot of resources and commitment. In contrast, some other Mobility as a Service projects in the Netherlands didn't succeed because they didn't involve the community as much."</li> </ul>
<p><b>Social Inclusion</b></p>	<ul style="list-style-type: none"> <li>• The respondent mentioned that due to the lack of public transportation in the region, the elderly, disabled and young people don't have easy access to transportation. Hence, the region and the Gaon project involved citizens in a large survey questionnaire where 500 people participated to find out their needs, that needed to be solved and then later began the designing process with the participation of the citizens.</li> <li>• Despite this being a time-consuming process, it is crucial in making sure that the product is designed in a way that suits the end-user. Otherwise, you end up with a product that no one wants to use</li> </ul>
<p><b>Citizen Participation</b></p>	<ul style="list-style-type: none"> <li>• Respondent 4 stated that "We partnered with a local company, and the platform we developed is still being used in the Achterhoek region. The project was considered successful because we actively involved citizens from the beginning, and even now, the Ministry of Transportation is learning from our case."</li> </ul>
<p><b>Governance</b></p>	<ul style="list-style-type: none"> <li>• "A new law that should've been introduced 6 or 7 years ago called the <b>Omgevingswet</b>- Environment and Planning Act. It was officially introduced at the beginning of this year, but there are still challenges in its implementation. However, it's really served as a catalyst for the importance of citizen participation. Now that it's organized by law, people are expected to participate in a certain way, and many are actively seeking opportunities to do so. This whole idea of "building bridges for inclusive participation" ties into that, as we're trying to make participation genuinely inclusive".</li> <li>• 'Autoriteit Persoonsgegevens' is another law where technology is used to help citizens or even government bodies or companies become more efficient. For instance, there's a governmental body that checks if the solutions are handling personal data properly. They can tell you if your solution is compliant or if it misuses information.</li> </ul>

TABLE 4: Interview Response: Respondent D