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An Empty Promise? Digital Democracy in the Smart City

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An Empty Promise?
Digital Democracy in the Smart City

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Abstract

The digital transformation affects every part of our societies and everyday lives, including the processes and structures of our democracies. On the one hand, information and communication technologies have the potential to lower the threshold for political communication and participation. On the other hand, they can be used for large-scale data collection and surveillance, posing a risk to the public sphere. This thesis investigates the impact of digitization on the legitimacy of democracy. It first develops a novel framework based on the theories of participatory and deliberative democracy, drawing on recent work on deliberative systems. On this basis, digital democracy is examined as a system, consisting of different engagement spaces and actors within the smart city. The smart city is a particularly fruitful testbed for digital democracy as it is based on the promise of applying a high density of digital technologies to facilitate civic participation as well as better service delivery and governance. Through an in-depth case study of the smart city of Amsterdam, this thesis not only reveals the legitimacy dilemmas of digital democracy in the smart city, but also illustrates the limits of applying participatory-deliberative systems theory on a digital democracy ecosystem. The analysis demonstrates design conflicts between different online engagement platforms within the digital democracy system, as well as conflicting objectives among the actors behind them. The findings do not support the claim that digitization negatively impacts democracy's legitimacy in the smart city of Amsterdam through marketization, large-scale data collection, and surveillance, as some authors warn. However, a significant positive impact of digitization on democratic legitimacy, through higher levels of inclusiveness, empowerment, or civic influence, is also not confirmed. The findings show that digital technologies' promise of facilitating large-scale citizen participation and deliberation in the smart city does not live up to the normative ideal. The results from Amsterdam are exposed to smart city and digital democracy experts across the globe to test their generalizability, demonstrating that, despite its shortcomings, Amsterdam's extensive digital democracy system is far advanced in international comparison. What may appear a contradiction in fact illustrates that we are still in the early stages of development, with potential to enhance the legitimacy of digital democracy, both in the smart city of Amsterdam and beyond.

Table of contents

List of tables and figures

List of abbreviations

ABC	–	Attribute-Based Credentials
AEB	–	Amsterdam Economic Board
ADC	–	Agenda for the Digital City
AI	–	Artificial Intelligence
AIA	–	Ambitions and Implementation Agenda
ASC	–	Amsterdam Smart City
CA	–	Coalition Agreement
CCTV	–	Closed-Circuit Television
CMC	–	Computer-Mediated Communication
CoA	–	Gemeente Amsterdam (engl.: City of Amsterdam)
CPA	–	Amsterdam Personal Data Commission
CSAV	–	Computer-Supported Argument Visualization
CSO	–	Civil Society Organisation
CSS	–	Cascading Style Sheets
CTO	–	Chief Technology Officer
DC	–	Digital City
DCE	–	Digital Citizen Engagement
DD	–	Digital Democracy
DDG	–	Digital Democracy Guide
DDS	–	De Digitale Stad (engl.: The Digital City)
DECODE	–	Decentralized Citizen-Owned Data Ecosystems
DMA	–	Digital Markets Act
DPSD	–	Digital Public Service Delivery
DS	–	Data Strategy
DSA	–	Digital Services Act
EC	–	European Commission
EP	–	European Parliament
EU	–	European Union
GDPR	–	General Data Protection Regulation
GIS	–	Geographic Information Systems
GIZ	–	German Corporation for International Cooperation
GPS	–	Global Positioning Systems
ICT	–	Information and Communication Technology

IoT	–	Internet of Things
IRMA	–	I Reveal My Attributes
IVM	–	Institute for Environmental Studies
KPN	–	Dutch Telecommunications Company
NGO	–	Nongovernmental Organisation
NL SCS	–	Dutch National Smart City Strategy
NPG	–	New Public Governance
NPM	–	New Public Management
PB	–	Participatory Budgeting
PD	–	Participatory Democracy
PdZ	–	Pakhuis de Zwijger
PPGIS	–	Public Participation Geographical Information Systems
PPP	–	Public-Private Partnership
P2P	–	Peer-To-Peer
SC	–	Smart City
SME	–	Small and Medium-sized Enterprises
SNA	–	Social Network Analysis
SUD	–	Strategy for Urban Data
SvW	–	Stem van West (engl.: Voice of West)
UN	–	United Nations
VU	–	Vrije Universiteit Amsterdam
WB	–	West Begroot

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Author's declaration

I hereby confirm that this thesis is the product of my own work. All sources used are referenced.

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Rabea Willers

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1. Introduction: Digitization – blessing or curse for democracy?

The digital transformation affects every part of our society and everyday lives, including the processes and structures of our democracies. It creates and defines the structures of spaces for human development and challenges the fabric of our democracies (Schallbruch, 2018, 97-99). Considering these developments, the impact of information and communication technologies (ICT) on democracy has become one of the most pressing issues in academia and for policymakers alike. However, research on digital democracy has so far predominantly taken place outside of political science, mostly in communication and media studies, focusing on ICT's networking effects (Berg, Rakowski, and Thiel, 2020, 172; Hofmann, 2019, 2) – or as Benjamin Barber (2001, 42) put it: "Those who understand technology know little about democracy, and those who understand democracy are woefully ignorant about technology" (see also Fleuß, Schaal, and Helbig, 2019, 479). More than 20 years after Barber wrote these lines, the quote still represents an accurate picture – and points to a research gap to which this PhD thesis aims to contribute.

With the rise of the internet, and social media in particular, in the late 1990s and early 2000s, came along a promise to connect citizens on a global scale, to democratize communication by giving everyone low threshold opportunities to make themselves heard and by reducing barriers among government and the governed through establishing new ways of civic participation (Ess, 2018). Social media were said to have facilitated bottom-up social movements across the globe (Breuer, 2012; Etling and Faris, 2008), ranging from the Arab Spring and the Occupy movement, to the MeToo movement and Fridays for Future, by offering new, more direct modes of organizing. On online platforms like Change.org, Millions have supported petitions for political, societal, and sometimes individual causes, many of them successful (El Noshokaty, Shuyuan, and Kwak, 2016; Halpin et al., 2018). On the local level, online consultation platforms have become parts of governance structures in cities across the globe. And yet, all that glitters is not gold. While early contributors (e.g. Castells, 1996, Hauben and Hauben, 1997, or Turkle, 1995) focus on the possibilities the digital can bring for societal and individual development, more critical voices came to the fore in the early 2000s, exemplified by Evgeny Morozov's *The Net Delusion* (2011) in which the author warns that digital media, besides its democratizing effects, can also be used for surveillance, propaganda and suppression. Digitization's risks have increasingly received attention academia, but also in

popular media and literature. Zuboff (2019) prominently frames developments in which one's digital personal information is used for what she calls 'behavioural futures markets' as 'surveillance capitalism', pointing to their inherent challenges for democracy. Acclaimed writers like Dave Eggers develop a surveillance dystopia à la 1984 in the novel *The Circle* (2014), and information scientist and writer Jaron Lanier provides *Ten arguments for deleting your social media accounts right now* (2018). Thus, there seems to be a dialectical relationship of digitization with regards to democracy. Digitization's impact on democracy is not pre-determined or fixed but depends on the way digital tools are being used (Coleman, 2005, 2017). On the one hand, they may support more direct civic participation and communication between citizens and their government, thereby reviving democracy. On the other hand, they may undermine democracy's legitimacy by threatening a free and autonomous public sphere through a business model that is based on gathering extensive personal information, while algorithms significantly influence the flow of political and public communication (Steinicke and Witt, 2021). Moving away from these dichotomies of "technology as a utopian liberator versus technocratic dystopianism" (Coleman, 2005, 178), the aim of this thesis is to develop a reflective and dialectical understanding of the multifaceted and complex relations and tensions between democracy and digitization.

These tensions become explicit in the so called 'smart city'. By deploying ICT, the smart city aims to respond to challenges cities are facing in innovative and supposedly citizen-centric ways. The smart city has been acclaimed by political decision-makers, academics and international corporations alike as using the city's infrastructure more efficiently, improving the city's service delivery, leading towards environmental sustainability, engaging more inclusively with the local population, and supporting citizen participation in political decision-making processes (Anthopolous, 2015; Neirotti et al., 2014; Veeckman and van der Graf, 2015). The smart city represents a highly relevant space for examining the impact of digitization on democracy's legitimacy.

This thesis aims to analyse the impact of digitization on the legitimacy of democracy in a systemic manner, based on a solid framework embedded in democratic theory. To introduce the thesis' line of reasoning, this chapter firstly presents the underlying research questions. It then justifies the research project by situating it in current academic work. Lastly, the chapter highlights methodological challenges of this investigation, followed by a presentation of the thesis' structure.

1.1 Research questions

Across the globe, the model of liberal representative democracy is widely accepted as the framework for legitimate rule. Yet in more and more countries, the legitimacy of democratic structures and processes is openly questioned (Brown, 2012, 55-56; Hirst, 1988). Some of the most widely quoted democracy and freedom indices confirm that democracy is globally in decline. Freedom House (2022) states repeatedly that democracy is facing the worst crisis in centuries and titles its report for 2021 "Democracy under siege". Basic rights, such as the right to free elections, freedom of expression and minority rights are increasingly under attack and cut back. In the last 16 years, countries with declining scores in these areas have outnumbered those with rising scores. Against this background, the main question addressed in this thesis is whether digital technologies can help safeguard democracy or whether they accelerate the deterioration of democracy.

Cities are highly suitable test beds to examine the influence of digitization on democracy, both in terms of their innovative potential with regards to applying new forms of civic participation and deliberation, as well as with regards to their usage of digital technologies. They are increasingly gaining importance as a sphere for political and societal influence and transformation. According to the United Nations (2018), the global urbanization rate will increase from 55% in 2018 to 68% by 2050. With rapid urbanization and digitalization worldwide, the smart city (SC) has come to the fore. SC technologies form "a new digital layer of the city, in which citizens are not only invited to participate in the data collection (…), but also in the actual ideation and development process of the services" (Veeckman and van der Graf, 2015, 7). A study by the European Parliament (2014, 77) shows that to be successful, smart cities must involve citizens in the implementation of city policies. On the other hand, many academics and practitioners are skeptical that the smart city fulfills the promise of engaging citizens in a meaningful way. They claim that the smart city is rather a "neoliberal corporatization in disguise" (Araya and Arif, 2015, 2, see also Greenfield, 2013) than a space for genuine citizen participation.

A privatization and marketization of urban governance has the potential to further contribute to the post-democratic turn, as identified by Colin Crouch (2004). The economic-technological narrative of the smart city may rationalize digitally enhanced democratic transformations in a neo-liberal light (Söderström, Klauser, and Paasche, 2014; Gibbs,

Krueger, and MacLeod, 2013). The question is thus how to make sure that digital citizen participation tools in smart cities truly serve the purpose of citizens' self-governance and are not merely used to monitor or influence citizens' behavior. There is the risk that smart city initiatives use the terminology of citizen participation to counter criticism.

Against this background, the first research question of this PhD project is:

What is the impact of digitization on the legitimacy of democracy in the smart city?

The question of legitimacy is critical in understanding how, in a democracy, an individual can submit to political authority while maintaining autonomy and the ability to live a self-determined life. As a consequence of a perceived legitimacy loss in modern representative democracy, initiatives based on the model of participatory and deliberative democracy have emerged worldwide. At the core of participatory democracy is the direct involvement of citizens in policymaking. In deliberative democracy, the focus is on a discourse among equal citizens prior to policymaking. Participatory budgeting, citizen juries, assemblies and forums, crowdsourcing in policy and lawmaking, deliberative polling, open government initiatives, or online citizen monitoring, deliberation and consultation platforms are just a few examples. In many cases, these democracy innovations have successfully connected citizens with elected representatives and have created mechanisms to include the citizens' views and recommendations into political decision-making (Smith, 2009). The majority of democracy innovations has been most successful on a sub-national, city or municipal level (Dryzek, 2000, 2005; Fung and Wright, 2001), often using information technologies to improve democratic outreach, participation and deliberation, as well as transparency (Hauben and Hauben, 1997; Wright and Street, 2007). At the same time, the instrumentalization of initiatives for citizen participation by powerful actors has been criticized as "legitimating schemes" (Cammack, 2004, 190). Only by making sense of the power relations surrounding digital tools and platforms of political engagement, including the interrelation between the economic and political system as well as the public sphere, will it be possible to fully grasp their meaning for democratic development.

In this thesis, a novel normative legitimacy framework based on the theories of participatory and deliberative democracy is developed that is fit for the digital age. The model can reveal barriers for legitimate digital democracy in smart cities. Jürgen Habermas'

(1983, 1987a, b, c, 1992) theory of an emancipatory public sphere and deliberative politics is deemed particularly useful in this regard. Digital democracy is examined as a system within the smart city, consisting of a wide range of actors, organizations, and online engagement platforms. Therefore, recent research on deliberative systems is applied to the participatory-deliberative legitimacy framework and coupled with Habermas' earlier works on lifeworld and system to include digital democracy's economic dimension. This enables examining individual platforms and their connections and interlinkages within the wider ecology.

Importantly, the theoretical framework should not be seen as an instrument to measure legitimacy, but as a reflective tool to reveal power mechanisms and barriers for legitimate digital democracy. It must be clear that the empirical reality will never fully reach the ideal that is set out in the normative framework. On the other hand, this thesis follows the position that normative approaches should not stay in an abstract, theoretical realm, but should be made useful for everyday practice. Normative theory which cannot be tested through empirical evidence could be accused of pointless philosophical speculation. Limits and obstacles to participation and deliberation in digital democracy can be revealed in an empirical analysis to contribute to theory development. In line with Coleman (2017, 8), this thesis asks what kind of challenges democracy currently faces and how digital technologies are used to tackle them. Moreover, I follow Peisker's (2021) assumption that despite the immense structural transformations digital technologies facilitate, they do not undermine the relevance of existing normative frameworks to understand digitization's impact on democratic legitimacy. The affordances of democratic processes, on which their legitimacy is based, are still valid, e.g. the process of societal will formation, the quality of deliberation in the public sphere as well as the possibilities for civic participation (ibid., 26). Fleuß, Schaal, and Helbig (2019) argue, on the contrary, that an evaluation of democratic performance based on established analogue democracy frameworks is not possible. I agree with them in the sense that current theories of participatory and deliberative democracy are not capable to fully capture digitization's impact on democracy. However, instead of developing a completely new theory, I couple the theories of participatory and deliberative democracy with a systemic approach to digital democracy, thus contributing to the advancement of democratic theory.

The focus of this thesis is on processes of participation and deliberation because, first, digitization is presumed to have a major impact on how we communicate and participate in democracy. Second, research on representative democracy has demonstrated a loss of legitimacy of democracy's traditional institutions. Therefore, it seems more plausible to use participatory and deliberative democracy as a starting point. Hence, the thesis contributes to evaluating the potential of democratic innovations that aim to enhance civic participation and deliberation to fill this perceived legitimacy gap. The thesis also enriches the academic discussion on the usefulness of 'analogue' democracy frameworks to evaluate the legitimacy of digital democracy (Fleuß, Schaal, and Helbig, 2019; Peisker, 2021), hopefully identifying the benefits and flaws of a participatory-deliberative approach to digital democracy's legitimacy. Based on these reflections, the thesis attempts to answer a second research question:

To what extent can participatory-deliberative systems theory be applied to evaluate digital democracy's legitimacy?

To answer both research questions, an explorative single case study analyses how digital democracy is implemented in the smart city of Amsterdam. The case study does not only reveal the legitimacy dilemmas of digital democracy in the smart city, but also illustrates the limits of applying participatory-deliberative systems theory on the power-laden digital democracy context. For the Amsterdam case study, a web-based social network analysis helps to better understand the connections between platforms, actors, and institutions in Amsterdam's digital democracy system. 16 expert interviews with representatives from public administration, civil society, research, and business are conducted. Moreover, eight policy documents are analysed in depth and the affordances of eight online engagement platforms are evaluated in terms of their impact on digital democracy's legitimacy. As a single case study can only offer a highly contextual picture, the results for Amsterdam are discussed with 16 additional smart city and digital democracy experts across the globe, representing or working with local administrations, managing international smart city networks, working for civil society or in academia. The experts' institutions represent more than 300 cities around the world. The aim of this second round of semi-structured interviews is to analyse the extent to which the findings in Amsterdam are applicable to other digital democracy contexts in smart cities, hence evaluating the case study's generalizability. The expectation is that through this solid research framework, the thesis will be able to answer both research questions,

thereby not only contributing to advancing knowledge on the legitimacy of digital democracy in general, and in the smart city in particular, but also developing a novel normative framework to critically reflect the legitimacy of digital democracy in a systemic manner.

1.2 Justification

This thesis contributes to knowledge both from a theoretical and an empirical perspective. Detailed and systemic digital democracy case studies are scarce in current research (Veeckman and van der Graf, 2015), as most reflections on digital democracy remain in an abstract, theoretical realm. Moreover, "most of the relevant research so far comes from communication and media studies while contributions from political science remain rare" (Hofmann, 2019, 2). As there is currently no consistent analysis of digital technologies' influence on democracy,

> there is considerable need for comparative studies and for a broader perspective in order to overcome the proliferation of isolated and eclectic findings. Consequently, we still have little understanding of whether and how digital media influence democratic processes and, in particular, whether it has produced any perceptible improvement in the quality of democracy (Kneuer, 2016, 667-668).

Embedding empirical findings on digital democracy in latest research can fill this research gap. The role of citizen participation in smart cities has not yet been adequately addressed from the perspective of democratic theory. The thesis develops and applies a novel normative framework to an empirical problem, namely the issue of legitimacy in digital democracy. As such, it has a theory-building function. It combines the legitimacy concepts of participatory democracy, deliberative democracy, and deliberative systems into one normative framework. Moreover, the theoretical framework integrates the economic system into deliberative systems theory by including Habermas' work on the dichotomy between system and lifeworld – a perspective that has been widely ignored so far among scholars of deliberative systems theory. To study the digital democracy system empirically, a web-based social network analysis is coupled with an interpretivist approach, contributing to research on the empirical application of participatory-deliberative systems theory. The overall result is an analytical framework based on a normative account of democratic legitimacy that cannot only capture the dialectical impact of digitization on democratic legitimacy, but also provide guidance on how to increase the legitimacy of digital democracy. However, the thesis does not only settle for theory-

building but also reflects on the framework critically in the conclusion, illustrating both limits and benefits.

On an empirical level, the research reflects ways to improve the impact of citizen participation and deliberation in smart cities. It thus contributes to an evolution of digital democracy towards more participatory and deliberative structures. For this purpose, it offers a systematic overview of digital democracy platforms and applications using participation or deliberation as core elements. It then applies participatory-deliberative systems theory on a digital democracy system in a smart city for the first time in research, using an interpretivist analytical strategy. The case study offers an in-depth analysis of the democratic legitimacy of smart city's ICT-enhanced processes, structures, and platforms in the field of digital democracy. Lastly, this thesis derives conclusions with regards to the implementation of participatory and deliberative digital democracy applications and platforms in the smart city, based on the application of the normative framework, that may be used by practitioners and academics working in other smart city or digital democracy contexts.

1.3 Methodological challenges

Studying the normative concept of deliberative democracy empirically includes challenges. In real-world politics only an approximation to the normative ideal can be reached. The theory should therefore be seen as a framework for recommendations and space for reflection to reveal power dynamics in smart cities' digital democracy system and to review and revise citizen participation and democratic governance strategies. This study follows a qualitative and interpretivist approach to analyzing civic participation and deliberation. When it comes to deliberative systems, there are currently few examples of how they can be studied empirically. Bächtinger (2018, 661) suggests that researchers might need to develop new tools and concepts to analyze the quality of deliberation in deliberative systems. This thesis responds by to this challenge by offering a novel framework on how to evaluate the legitimacy of participatory-deliberative systems. However, since the approach is new, challenges in the design and application of the methodology may occur. For example, potential bias might emerge in the selection of interviewees as well as other data sources. This is ameliorated to some extent by a social network analysis (SNA) in addition to the interviews, to identify the most powerful actors in the smart city's digital democracy system, and by elaborating the specific reasons for source selection. A related criticism of qualitative social science research is

that the researcher's worldviews influence the outcome of the research. Therefore, the normative framework will structure the analysis. The advantage of qualitative research is that it can include these considerations in the analysis and reflect them in a transparent manner.

Second, the reliability and sufficiency of sources may be a problem (internal validity) as well as the generalizability of the findings (external validity). The first issue is tackled by implementing a mixed-methods design in which the analysis is not only based on one source but on different types of data (interviews, documents, online platforms, SNA). The second problem is indeed a serious issue, especially for in-depth single case studies. Therefore, the case study results are abstracted and discussed with key policymakers in smart cities across the globe with the aim to increase the findings' generalizability. The open nature of the research question aims to avoid potential bias of the researcher. Moreover, transparent research procedures, including the disclosure of interview guides (appendix two and three), contributes to higher levels of objectivity. As for the scope of this thesis, only the digital democracy pillar, hence platforms and actors with the specific goal of involving citizens in policymaking, of the smart city is examined in terms of its legitimacy. Due to the complexity of Amsterdam's digital democracy ecosystem, the focus of the investigation needs to be narrowed, being fully aware that critical areas that are highly interlinked with the ecosystem are not included. For instance, it is not possible to analyse the legitimacy of digital applications in other ecosystems, such as in the field of smart mobility or circular economy. Moreover, this thesis does not focus on offline engagement opportunities. The focus of this thesis is explicitly on the impact of digital technologies on democratic legitimacy in the smart city to be able to analyse the influence of digitization on the development of democracy. Offline engagement and other smart city areas may be included in future research to gain further knowledge on how they are linked to the digital democracy pillar in smart cities. Therefore, this thesis should also be regarded as a basis for further in-depth research on the legitimacy of digital democracy.

1.4 Structure of the thesis

Including this introduction, this thesis consists of nine chapters. Chapter two begins with an introduction to digital democracy, focusing on how new modes for participation and deliberation are understood in current research on digital democracy. It also analyses the academic debate on digital democracy's systemic dimension, referring to external

and internal pressures through interlinkages with the economic and political system. The section continues by elaborating the history and conceptualization of the smart city, illustrating how digital democracy is rationalized in the smart city and how this is perceived in research. The main findings are summarized and analysed in the chapter's conclusion by elaborating the overall impact of digitization on democratic processes and structures. The chapter's structure reflects that the academic literature on digital democracy and on the smart city are two relatively detached research domains and aims to build a bridge across these two areas.

Chapter three develops a normative theoretical framework to analyse democratic legitimacy in a digital age. The conceptualisation of legitimacy in participatory and deliberative democracy are coupled. This approach is comparable to Wright und Fung's (2001, 7) "empowered deliberative democracy". When merged, the theories of participatory and deliberative democracy capture two main features the digital potentially injects in democratic governance: more direct two-way communication channels between citizens and policymakers and lower thresholds for civic participation through easier access. The participatory-deliberative systems approach is set in a broader context of the entanglement between the economic, political, and public sphere that is implicit within the smart city. To date, no participatory-deliberative systems approach has been developed in academic literature, bridging the political, public, and economic sphere, to analyse the legitimacy of a digital democracy system in the smart city. Thus, the chapter contributes to theoretical reflections on participatory-deliberative systems and their empirical manifestations.

Chapter four introduces the methods applied for the empirical analysis of digital democracy in the smart city. Following an interpretivist approach, the normative ideal serves as an analytical framework to narratively assess the empirical reality, evaluating desirable developments as well as structures and practices in need of improvement.

In chapters five to seven, the analytical framework is applied to the analysis of the empirical realization of digital democracy in the smart city of Amsterdam. The explorative in-depth case study uses semi-structured interviews, document analysis and platform analysis. The smart city's systemic dimension is visualized and analysed by means of web-based SNA. The empirical section of this thesis is thus based on a mixed-methods research design. Qualitative research can not only reveal the possibilities and deficits of

digital democracy applications for the legitimacy of democratic processes and structures in smart cities, but also point to problems and shortcomings of applying the theory in the smart city context.

After the in-depth case study on digital democracy in the smart city of Amsterdam, the findings are abstracted and processed in semi-structured interviews with international digital democracy and smart city experts. This 'resonance space' in chapter eight is used to evaluate the findings' generalizability.

Chapter nine, the conclusion, sums up the thesis' main results, as well as their theoretical and policy implementations. It reflects on the limitations of the study and provides recommendations for further research.

2. Digital democracy in the smart city

What is digital democracy and what makes it different from analogue democracy? How to make sure that citizen participation and deliberation opportunities in smart cities (SCs), facilitated by information and communication technologies (ICT), serve the purpose of self-governance and are not merely tokenistic? Researchers have been struggling with these questions for a long time and still have not found a satisfactory response (Legard and Hovik, 2022; Lidén, 2015). According to Hofmann (2019, 1), "the relationship between digitalisation and democracy is subject of growing public attention". Yet, "the nature of this relationship is rarely addressed in a systematic manner." This chapter provides a literature review of the wide field of digital democracy and its specific application in smart cities, clustering the findings and drawing initial conclusions. The chapter begins with an introduction to digital democracy, focusing on the possibilities for participation and deliberation, as well as digital democracy's structural constraints and enablers. It continues by elaborating the history and conceptualization of the smart city, while offering a review on how digital democracy is rationalized in the SC. The main findings are summarized and analysed in the chapter's conclusion by elaborating the overall impact of digitization on democratic processes and structures in urban governance.

2.1 An introduction to digital democracy

Digital democracy in its broadest meaning can be defined as "the use of ICTs in political processes" (Lidén, 2015, 700). Hacker and van Dijk (2000, 1) refer to "a collection of attempts to practice democracy without the limits of time, space and other physical conditions". Depending on the perspective and academic field, numerous additional definitions of digital democracy can be found – all of them part of extensive academic debates. As both democracy and digital technologies develop rapidly, studying their relationship "can be akin to nailing several jellies to the wall" (Hofmann, 2019, 2). Accordingly, the line between analogue and digital democracy remains blurry. However, as this research project is dealing with the legitimacy of *digital* democracy, it must necessarily approach this question, despite the epistemological challenges. For this purpose, key concepts of digital democracy are introduced in what follows, elaborating on the multiple ways in which digitization and datafication are transforming democratic processes and structures and critically outlining their challenges and possibilities.

Research on digital democracy is multi-faceted and conducted in a variety of disciplines, including political science, sociology, language, media and communication studies,

information science, and law. With the rise of ICT, new disciplines have emerged, such as "critical data studies" and "new media studies" that focus on the dynamics of algorithms and digital platforms and their implications for society (Hofmann, 2017, 16). Accordingly, the academic literature on the subject is vast, examining digital democracy from multiple angles. This literature review does not attempt to cover the full range of knowledge on digital democracy but provides an overview on current academic debates. Hauben und Hauben (1997), Noveck (2009) and Shirky (2011) establish that digital communication technologies constitute a major shift in the history of citizen participation in democracy because they make it easier to organise and participate beyond time and space boundaries, join a political group and reach high numbers of citizens. Firmstone and Coleman (2015, 680) find that "digital media are beginning to play an important role in defining and reconfiguring the role of citizens within local governance", although they do not expect them to replace other forms of public participation. In simplified terms, there are two lines of thought among scholars in this field: those that are optimistic about ICT's potential to facilitate civic participation and deliberation in democracy (e.g. Hauben and Hauben, 1997; Noveck, 2009; Shirky, 2011) and those that examine the digitization's impact on democracy in a more critical light, warning for instance of platform capitalism or untransparent algorithms that erode the public sphere (Hofmann, 2019, 2; Fuchs, 2016, 2021). Fung and colleagues (2013, 30) bridge the two perspectives by developing six models on how digitization affects democratic governance: "the empowered public sphere, displacement of traditional organizations by new digitally self-organized groups, digitally direct democracy, truth-based advocacy, constituent mobilization, and crowd-sourced social monitoring".

The range and variety of platforms and apps for civic participation and deliberation has increased markedly in the last decade. One needs to differentiate between digital platforms that might form the basis of deliberation and participation and generic representation platforms. For this thesis, only the former platform types are examined. The focus is less on digital platforms associated with representative democracy, such as electronic voting support or transparency platforms, ranking or comparator platforms, online recommendations platforms giving voting advice, or whistleblowing and transparency reporting platforms, exposing information both from public and private organisations that is considered illegal or unethical. In research and practice, there are different attempts to categorize digital citizen engagement (DCE). The UN's e-participation index for example breaks down e-participation into e-information, e-consultation, and e-decision-

making with a focus on empowering and including citizens in political decision-making (United Nations, 2022). Kneuer (2016) differentiates between top-down and bottom-up participation in relation to e-monitoring, e-information, e-consultation, and e-decision-making. The World Bank (2016, 19) provides a helpful overview of typologies relevant to DCE, e.g. by outcome, by democratic model or function, or by stage in the policy cycle. The report also differentiates between high-tech DCE, middle-tech and low-tech, depending on the level of sophistication of the digital tool that is used (ibid., 21).

Figure one illustrates examples of platforms and apps for civic participation and deliberation that are implemented at each point of the policy cycle. The graphic, drafted by the author, is based on the literature review in this chapter and an online screening of digital engagement tools. It is by no means conclusive but offers an indicative picture of the variety of digital engagement tools. It also introduces some overarching issues that are associated with digital democracy, such as access, data protection, ownership, and storage as well as data analysis. They are discussed in more detail in the upcoming sections. The overview based on the classic policy cycle facilitates an introduction to digital democracy but is only one way to capture the diversity of practices.
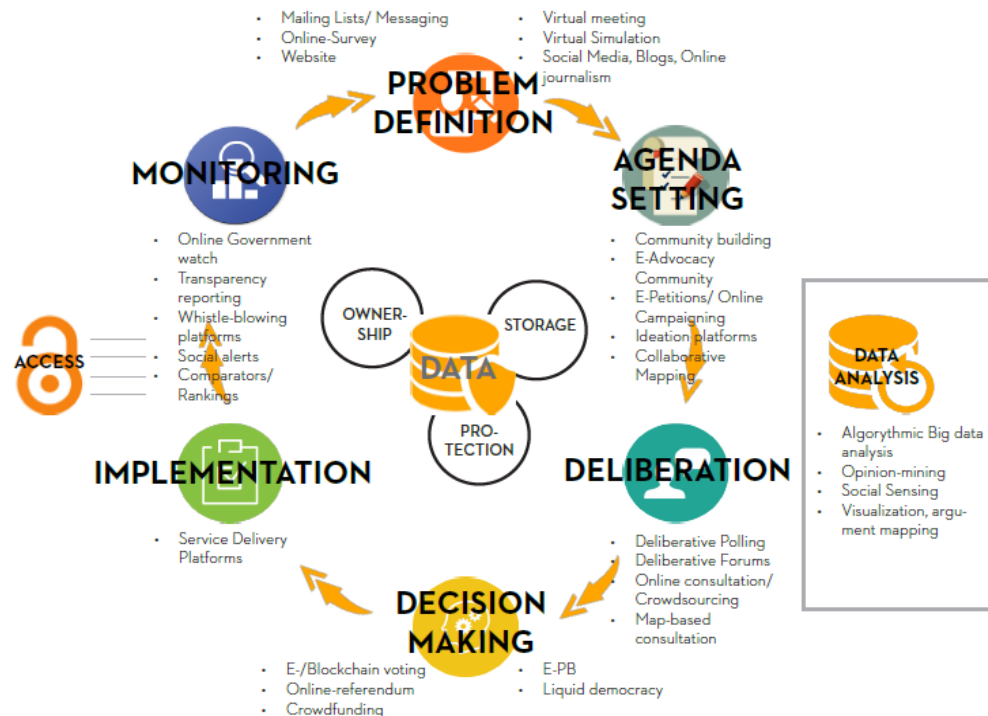
Figure 1: Overview of digital democracy tools along the stages of the policy cycle.

The next sections introduce how ICT can facilitate participation and deliberation in democracy. Moreover, the structural constraints of digital democracy are outlined. The section that follows introduces the smart city and how digital technologies can support participation and deliberation specifically on an urban level. In this regard, the physical dimension of urban space and its interrelation with the digital public sphere are introduced. The academic literature on digital democracy in a wider sense and the literature on the smart city are strikingly detached from another. Whereas contributions on digital democracy are mostly published in communication and media studies as well as social sciences, literature on the smart city largely originates in urban studies, urban planning, and architecture. Although this thesis aims to bridge the gap between the two schools of thought, the literature review can shed light on how the two paths have developed, and at what points they overlap and diverge.

2.1.1 Digital participation

To exercise political agency online, the subject needs access to the digital sphere, as well as resources and opportunities to act within it. This section introduces the current academic debate on digital participation.

Digital citizenship, identity, and empowerment

The digital citizen is perceived in this thesis "as an embodied subject of experience who acts through the Internet for making rights claims" (Isin and Ruppert, 2015, 8), thus as a subject exercising its civic and political rights in relation to its socio-technological environment. The concept of the digital citizen describes the relation between a citizen and the state mediated through online space. Drawing on Foucault, Isin and Ruppert (2015, 21-22, 38) argue that citizens are constituted through processes of subjectivation. They are subjects of power in sovereign, disciplinary, and control societies, capable of obedience, submission, and subversion vis à vis an authority. Against this background, Hintz and colleagues (2019) ask how to understand and exercise citizenship in a datafied society. Taking data and surveillance studies as starting points, the authors argue for a new understanding of digital citizenship that reflects both the empowering potential of digitization and the public sphere's increasing restrictions through surveillance and censorship (ibid., 21). Digital citizens are both self-constructed and created by an increasingly data-driven economy and state (ibid., 40). For citizenship to be enacted, media literacy, empowerment, and an informed use of ICT as well as a digital infrastructure built on the principle of 'privacy by design' are required in which freedom of expression

is protected through enabling regulatory frameworks (ibid., 41). In this thesis, digital civic participation is understood as a central element of digital citizenship, a perspective shared, for instance, by Mossberger and colleagues (2008). The self-creation of citizenship, or 'do-it-yourself citizenship' (Ratto and Boler, 2014), through digital tools can take different forms, ranging from citizen journalism to online community-building (Hintz, Dencik, and Wahl-Jorgensen, 2019, 21, 28-29). In this regard, citizenship is increasingly perceived as a process, an arena of contestation, and less as a status (ibid., 25). Accordingly, Coleman (2017, 28) evaluates digitization's impact on democracy based on the subjects' agency, referring to the extent to which it enables them to "develop capabilities that were less likely to be achieved in a pre-digital media ecology". These democratic acts need to be included in citizens' everyday lives, e.g. through gathering information, representing themselves, sharing content, joining networks or challenging dominant societal claims.

The notion of self-creation and empowerment online is closely related to the concept of digital identity, asking the question of "Who am I online?" (Feher, 2019, 1). Digital identity can be defined as "electronically captured and stored identity attributes that uniquely describe a person within a given context and are used for electronic transactions" (Tammpuu and Masso, 2019, 622). The number of publications on digital identity is steadily increasing (ibid.), including both social-cultural approaches and the discussion of technological solutions to ensure the security of the online self. Nagy and Koles (2014, 279) argue that although the virtual and real self are two segments of this question, they should not be seen as separate, but rather illustrating different traits of one's personality. When engaging online, users leave traces in two areas. First, they contribute to a data corpus based on coded systems like sensors, apps, platforms and online networks. Second, individuals share personal information in digital networks, e.g. by revealing their experiences, thoughts and social connections through photos and videos on Instagram or posts and links on Twitter (Feher, 2019, 2). The most widely spread form of such self-representation online is found on social media, such as on Instagram or Facebook, with about 50% of the global population using social media (Kwame Adjei et al., 2020, 2).

Through a lack of control of the platform's data handling, data leaks, or weak passwords the subject's digital identity is vulnerable. Feher (2019) finds that users thought they could control roughly 70% of their online representation. They assigned the remaining

uncontrolled 30% to data leaks, hacks, or tags and information posted by other users. Power, control, privacy, and the risks posed to autonomy by state and platform surveillance play a central role in research on digital identities (Feher, 2019; Goodell and Aste, 2019; Nagy and Koles, 2014; Lips, 2010). Trust in platforms is often perceived as a critical precondition to disclose information online (Kwame Adjei et al., 2020, 5; Nagy and Koles, 2014, 5, 7). According to Kwame Adjei and colleagues (2020, 8), "key factors for influencing personal information disclosure on social media are: competence, relatedness, autonomy, integrity and awareness of the risks and its consequence". When these are secured, Masiero and Bailur (2021) point to the possibilities of digital identities for empowerment and development, e.g. through better service provision for vulnerable groups, such as migrants or refugees. In ensuring secure online identification, Goodell and Aste (2019) suggest setting up secure processes of identification: establishing an identifier or a credential, authentication, verifying this credential, authorization, allowing access to the respective service, and auditing, monitoring, and evaluating authentication requests. The authors argue for unlinkable, multiple identities that are based on a decentralized blockchain system. Most researchers focus on identification, authentication, and authorization (e.g. Masiero and Bailur, 2021). Wolfond (2017) describes the values of blockchain technology for identity verification and authentication in Canada's public and private sector and Windley (2019) advocates a decentralized "multisource identity".

Structural barriers, often referred to as 'digital divide' and defined as a lack of access to and knowledge of ICT, still prevent large parts of society from actively participating online, both directly and indirectly (Cosgrave, 2013, 119; Legard and Hovik, 2022, 170; World Bank, 2016, 23). Without access to a computer, one will not be able to participate online. A sensor that may inform policymaking will not be able to detect you if you do not own a smart phone, what may lead to a distorted mirror of reality (Kingston, 2007, 143; Min, 2010). There is a digital divide both within countries and on a global scale, characterized by variables such as education and skills, age, geography (rural versus urban), wealth and motivation. Min (2010) addresses a 'second-level digital divide' in which citizens with better ICT skills and higher levels of political interests have higher rates of civic and political engagement online. To prevent a "self-selection bias" (Hartz-Karp and Sullivan, 2014, 2) on online platforms, Dahlberg (2007, 143) concludes that most effort must be made to support disadvantaged or underprivileged groups with the aim to facilitate marginalized and counter-discourses.

Involving citizens through digital participation

How does digital citizen engagement take shape? It can be organized both top-down, by the local or national government, and bottom-up, by citizens themselves. Besides facilitating the creation of "invited participation" (Kersting, 2013, 270), ICT can also support "invented participation" by civil society (ibid.). Farías and Blok (2016, 542) differentiate between "'diffuse' and 'commissioned'" spaces for participation, with the former being a controversy emerging on social media or blogs, for instance, and the latter being organized in a specific framework and linked to institutionalized decision-making. Digital tools can help people to connect without a formal institution or leadership (Bennett and Segerberg, 2012; Coleman, 2017).

Widely researched and cited examples are the role of social media in social movements and societal uprisings across the globe. Social media have written a remarkable success story since emerging in the 1990s. The list of the world's most popular social media platforms by number of users is headed by Facebook (2.74 billion), YouTube (2.29 billion), WhatsApp (2 billion), and Instagram (1.22 billion) (Statista, 2021). Social media are thus integrated into the everyday lives of most people. They are user centred platforms that facilitate communication and collaboration online, promoting "connectedness as a social value" (van Dijck, 2013, 11). Through social media, the internet has become "more of a system of co-operative work and community formation (…). These media are social because they enable and are means of sharing, communication, community and collaboration" (Fuchs, 2016, 113). Besides their potential for low-threshold communication and citizen mobilization, social media are criticized strongly, e.g. for the creation of filter bubbles of the likeminded (Bozdag and van den Hoven, 2015; Seargent and Tagg, 2019), hate speech (Malmasi and Zampieri 2017; Mondal, Araújo Silva, and Benevenuto, 2017; Mathew et al. 2019) or surveillance (Duffy and Chan, 2019).

Nevertheless, social media are an important tool for citizens to gather information (Boulianne, 2015; Towner, 2013; Pasek, More, and Romer, 2009; Tang and Lee, 2013; Xenos, Vromen, and Loader, 2014) – although they can also lead to information overload (Coleman, 2017, 36) – and to facilitate citizen mobilization for a social cause (Brown et al., 2017; Cammaerts, 2015; Murthy, 2018). This "counter-publics position emphasizes the role of digital media in political group formation, activism, and

contestation" (Dahlberg, 2011, 6-7).[1] In the public sphere, hegemonic discourses are challenged, and counter-narratives are introduced through social media, citizen journalism and blogging. Etling and Faris (2008), for instance, examine how the internet was almost entirely taken down in Burma for two weeks in 2007 by the government to hinder mobilization for the 'Saffron Revolution'. Breuer (2012) finds that social media played a critical role in forming networks in the Tunisian revolution in 2010/2011, while providing information outside traditional media, supporting collective action, and facilitating the development of a collective identity (see also Rhue and Sundararajan, 2013, 4). According to Fung and colleagues (2013, 34), social media are particularly helpful in strengthening the public sphere in nondemocratic countries, as "authoritarians seem to have a more difficult time controlling political discussion on the Internet than they do controlling radio and television". Social media thus offer new possibilities for activists and citizens to organize around a cause. They also provide the individual with new spheres to express him or herself. These spheres are not only used by so called influencers, but also private posts by individuals can contribute to everyday politics: "for example when fathers talk about their parental leave, mothers publish photos of themselves breast-feeding or non-heterosexual persons document their relationships online. In this way new forms of democratic participation are created" (Steinicke and Witt, 2021, 29).

Another possibility to influence politics are petitions that have achieved a new significance with the rise of digital technologies (Aragon et al., 2018; Christensen, 2012; Panagiotopoulos and Al-Debei, 2010). The online petition platform Avaaz, for instance, has almost 70 million members worldwide in 2022 (Avaaz, 2022). Relatively high levels of participation indicate that there is a desire for people to engage in specific topics in a simple and flexible manner and to participate in political protests, without binding themselves firmly to an organization (Voss, 2014, 154). With online petitions, citizens do not have to be a member of an organization to join a political campaign or support a cause (Dumas et al., 2015, 5), decreasing the reliance on intermediaries, such as political parties, unions, or NGOs, while providing direct access to political decision-making (Wright, 2015). Chadwick (2007, 287) argues that the internet facilitates "organizational

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[1] Dahlberg (2011, 1) distinguishes four positions that can be found in the literature to develop an understanding how digital citizen participation is exercised in democracy and what it means for democratic development. The four positions are defined "as liberal-individualist, deliberative, counter-publics, and autonomist Marxist" and are related "to three elements, the democratic subject assumed, the related conception of democracy promoted, and the associated democratic affordances of digital media technology."

hybridity" as a characteristic of modern political mobilization. New "hybrid mobilization movements" (ibid., 283) make use of a mix of techniques, associated with social movements, lobby groups and political parties, while switching easily between the online and offline domain. Providing citizens with a set of different techniques and methods they can choose for their engagement, offers them new possibilities for customizing and individualizing their preferred model of engagement, as outlined by Bennett and Segerberg (2012). The authors examine personalized digital networks and mobilization, finding, for instance, that traditional, hierarchical modes of collective action are increasingly replaced by more decentralized, dispersed groups, organized around a shared cause.

To attract more users and to facilitate public engagement, reward-based gamification has found its way into online participation practices in recent years. Gamification is defined by the addition of game attributes to 'non-game' situations (Deterding et al., 2011). It does not necessarily involve fully developed games, but rather implements the logic of a game in a serious task with the aim of engaging more users and improving their experience (Hassan, 2017, 252-254). Game elements involve points and scores based on the users' actions, missions (a set of tasks the participants need to accomplish), badges (symbols for the user's achievements) or leader boards (the ranking of participants) (ibid.). Empirical studies show varying results for gamified platforms. On the one hand, increased participation and output quality as well as a stronger enjoyment of the task are reported. Furthermore, gamification sometimes includes social features, allowing "for empathy and community building" (Thiel et al., 2016, 36). On the other hand, gamification "has been criticized as merely providing an artificial add-on layer that is not always able to materialize hypothesized benefits of gamification such as user enjoyment, increased engagement and user retention" (Hassan, 2017, 252). Most gamification on online engagement platforms is reward-based, relying on a continuous support of extrinsic motivation unless the behaviour is internalized – a method which might result in short-time effects and may adversely affect a more sustainable intrinsic motivation (Hassan, 2017, 254; Thiel et al., 2016, 32).

Although much research has shown the positive effects of digital technologies on democratic governance and participation, the academic debate is equivocal as to their causal connection to political participation (Fung, Russon Gilman, and Shkabatur, 2013, 30). Boulianne's (2015, 1) meta-analysis on the relation between civic participation and

social media use suggests "that social media use has minimal impact on participation in election campaigns". Other studies indicate that mostly subjects who are already engaged use social media for political participation (Gil de Zúñiga, Jung, and Valenzuela, 2012; Vitak et al., 2011, see also Xenos et al., 2014). Conroy and colleagues (2012) conclude that Facebook groups have a small effect on political engagement and knowledge because of the poor quality of their content. Thus, although ICT radically lower the costs of participation in democratic processes and enable many citizens to engage in politics (*quantity*), questions remain around the *quality* of participation, hence their usefulness for meaningfully connecting citizens with political decision-makers (Aragon et al., 2018). A related criticism of low threshold engagement is that it supports slacktivism or clicktivism, a quick and direct means of political participation, lacking any measurable impact on real-life politics, while enhancing a feel-good sentiment for the users in a way that they think their contribution constitutes a political act (ibid.). According to Morozov (2009), 'slacktivism' is activism for lazy people. He fears that the internet may cause the subject to substitute conventional (and successful) offline activism with quick online engagement, while destroying the foundation of more effective offline campaigning, activism, or civil disobedience (see also Christensen, 2012, 5).

Creating impact in digital citizen participation

The impact of digital technologies on democratic governance depends on how ICT are enacted (Legard and Hovik, 2022, 171). To generate impact on political decision-making, ICT-enabled citizen participation should be linked to democracy's institutions and processes. From South-Korea to the USA, from Namibia to Sweden, governments experiment with digital public service delivery (DPSD) to enhance civic participation and improve the performance and efficiency of public administration (Lember, 2018; Peixoto and Fox, 2017, 51, 54). Driven by comparisons to the private sector as well as austerity paradigms, governments have increased their efforts to lower the costs of public service delivery in recent years (Roy, 2017). Studies have shown that ICT can decrease the costs of the service delivery systems up to 90% (Lember, 2018). On a more normative level, digital public service delivery is related to four movements in democratic governance: open government (the idea that citizens have the right to information about the government's proceedings), open data (data should be publicly available), anti-corruption (combatting corruption through higher levels of transparency) and social accountability (building accountability through civic engagement) (Peixoto and Fox,

2017, 55). Even consulting firms such as Accenture have changed their methodologies from linear metrics of client satisfaction to involving citizens through online platforms in service design (Roy, 2017, 544), indicating a paradigm shift towards more citizen involvement with the goal of increasing public service delivery's efficiency and accountability (see also Moon, 2018, 295),

The theories of New Public Management (NPM), New Public Governance (NPG) – an advancement of NPM – and Co-Production have been used to explain the recent rise of DPSD (Bovaird, 2007; Granier and Kudo, 2016). In general, "[g]overnance involves collaboration and empowerment more than hierarchy and control" and "is a political but nonpartisan process of negotiating diverse interests and views to solve public problems and create public value" (Boyte, 2005, 537). In the framework of NPM, efficiency and costumer-oriented approaches are introduced to policymaking, inspired by the private sector. Today, the "use of ICT to improve managerial processes and to enhance communication to and with citizens is a key factor for a successful e-Government policy. Subsequently, attentions on public service delivery and the role of citizens in its process led to New Public Governance" (Granier and Kudo, 2016, 63). NPG postulates that service delivery should not be separated from service design. Citizens should be included in both phases, leading to co-production processes between service providers and service users.

According to Bovaird (2007, 847), co-production is defined as "the provision of services through regular, long-term relationships between professionalized service providers (in any sector) and service users or other members of the community, where all parties make substantial resource contributions." Pollitt and colleagues (2006) differentiate four phases of co-production: co-planning, co-design, co-delivery, and co-evaluation. Lember (2018, 122-123) argues that technology-facilitated co-production leads to a change in government tasks:

> Rather than being a service provider (traditional public administration paradigm) or purchaser (New Public Management paradigm), the government's core tasks would include those closer to a mediator (New Public Governance): it becomes a framer, sponsor, mobilizer, monitorer and provider of the last resort (Linders, 2012, see also Townsend, 2013). The idea of government as a platform best epitomizes this claim, where government is expected to be mainly responsible for developing and providing access to its e-infrastructure and data, and where the role of citizens is to develop services based on this

infrastructure (e.g. by developing community maps or apps for public transportation time-tables).

This has severe implications for our understanding of government in which a hierarchical model is increasingly replaced by more hybrid configurations (Swyngedouw, 2005), sharing policymaking power with the private sector, civil society, and citizens. The government is increasingly seen as a platform or facilitator of these multi-stakeholder connections. Referring to Elinor Ostrom, Boyte (2005, 543-544) outlines how citizen-centred, decentralized governance systems have the advantages of sustainability, efficiency and equity, e.g. through "the incorporation of local knowledge; greater involvement of those who are trustworthy and respect principles of reciprocity; feedback on subtle changes in the resource". Disadvantages include

> the uneven involvement by local users; the possibility for "local tyrannies" and discrimination; lack of innovation and access to scientific knowledge; and the inability to cope with large common pool resources. Ostrom and others argue persuasively for a mix of decentralized and general governance, what she calls "polycentric governance systems" (ibid.)

Co-production emphasizes the *co-creation* and *co-delivery* of products and services. ICT facilitate co-creation and the creation of collaborative online tools, such as mapping, sensing, and other applications, allowing for decentralized production modes while inviting citizens to participate as co-providers. Despite plentiful examples for online tools for public service delivery, "there is a dearth of literature on the theories and practices of web-based co-production of services beyond e-reporting" (Moon, 2018, 295). Moon (2018, 301-305) proposes four types of digital co-production based on the roles of citizens and governments in service delivery and design: "crowdsourcing co-design", "crowdsourcing design and government delivery", "government design and crowdsourcing delivery, and "government and citizens co-delivery". The strongest criticism on co-production "is that it may dilute public accountability, blurring the boundaries between the public, private, and voluntary sectors" (Boivard, 2007, 856). There is a risk that government services may be 'outsourced' to citizens, shifting responsibilities to the poor and powerless, while disadvantaging vulnerable communities (ibid.).

On the other hand, digitized co-production in public service delivery offers a range of advantages as compared to conventional public service delivery. First, "the growth of

peer-to-peer (P2P) networks that augment next-generation communication, data sharing, and value creation have in fact opened a wide array of new opportunities for bottom-up civic engagement across a range of public services" (Araya, 2015, 14). It provides new possibilities for citizens to bypass intermediaries and have a direct influence on policymaking (World Bank, 2016, 23). Using technologies such as digital maps, sensors or apps makes it easier for citizens to participate and lowers the costs and thus the threshold for civic engagement. For example, "[b]y providing access to on-line interactive planning documents, the public can interrogate policies at particular locations rather than wade through a lengthy document" (Kingston, 2007, 139). Lember (2018) finds that replacing human-centric co-production with automated processes can potentially help millions of citizens around the world enjoy a better quality of life and empower them. Second, the government profits from the diverse set of citizens' competences and qualifications, increasing the quality of political outcomes (Kingston, 2007, 143; Noveck, 2009, 17-19). Moreover, civic oversight and transparency of government processes can be enhanced (Araya 2015, 14). "ICT platforms can bolster upwards accountability if they link citizen voice to policymaker capacity to see and respond to service delivery problems" (Peixoto and Fox, 2017, 90). The ability to respond to citizens' concerns more quickly increases the efficiency and responsiveness of public service delivery (Hassan, Cole, and Cole, 2015, 179), as ICT facilitate real-time feedback. Peixoto and Sifry (2017, 32) find a high level of responsiveness in cases in which "the government is either leading the process or playing the role of a partner."

Digital tools to support public service mainly alter the modes of communication and information flow. The organisation making the decision remains the same, either using citizens' input or not, no matter if information is submitted through sensors or online platforms, by phone or by letter (Kingston, 2007, 143). In 2017, a group of researchers examined in 23 case studies digital platforms to support public service delivery through citizen participation (Noveck, 2017; Peixoto and Sifry, 2017) and came to the disappointing result that the "so-called 'civic tech' in most cases is not producing changes in governing outcomes any more than old-fashioned dialogues in a church basement" (Noveck, 2017, 13).

> [O]ne of the most noticeable patterns is the existence of numerous digital engagement
> initiatives that meet dead ends despite different pathways—at least in the short run. The
> majority of the twenty-three cases studied led to low levels of institutional responsiveness,

with eleven reporting medium to high levels (defined conservatively as leading to at least 20 percent response rates). (Peixoto and Sifry, 2017, 82)

One of the reasons is that public authorities have little experience on how to analyse, weigh and use citizen input versus their own ideas and expertise (Hassan, Cole, and Cole, 2015, 193; Noveck, 2009, 34). Often, the levels of resources and capabilities within public administration are not increased with increased digital opportunities for participation (Peixoto and Sifry, 2017, 46), especially when these opportunities take place outside of conventional decision-making processes. When analysing the reporting platform Fix My Street, King and Brown (2007) find local government officials complaining about a duplication of already existing websites, the inability to manage the expectations of users with respect to service delivery performance, and the lack of an online community, supporting problem resolution. Furthermore, high amounts of data do not come hand in hand with a high quality of data. And even if data is processed and analysed effectively, and it is of good quality, it needs to be placed at the right time at the right place in the policy-making circle to lead to political change (World Bank, 2016, 23).

Summarizing, this section provided a first overview of how ICT-facilitated citizen participation is realized in digital democracy, both bottom-up and top-down, and how it is discussed in current research. The next section follows the same logic for online deliberation in digital democracy.

2.1.2 Digital deliberation

Since the late 1990s, deliberation on online platforms has become increasingly popular both in academia and in practice. Researchers such as Coleman and Moss (2012), Davies and Gangadharan (2009), Esau and colleagues (2016, 2020), Friess and Eilders (2015), Janssen and Kies (2005), Kies (2010), and Price (2009) have analysed the internet as a platform for citizen deliberation, that may result in the formation of an online public sphere. The internet, some argue, has the potential to support communicative action between citizens and to foster a critically informed public sphere with the capacity of holding to account and influencing institutionalized decision-making in democracy. Price (2009, 37), for example, states that "reduced social cues, relative anonymity of participants, and a reliance on text-based exchanges lacking non-verbal, facial and vocal cues" may facilitate political deliberations. Not only in research but also in political life, online consultations and agenda-setting platforms have become widespread, initiated by

government and public administration, as well as by civil society organisations (Kies, 2010). Some online platforms are linked to the policy-making process, while others are less institutionalized and take place in relatively autonomous online public spaces (Dahlberg, 2011; Dahlgren 2005). Online communication and deliberation can take various forms, but not all forms of digital communication or participation imply deliberation. Researchers have referred to three levels to be considered in the analysis of online deliberative processes that matter for the quality of deliberation (e. g. Friess and Eilders, 2015; Kies, 2010; Kies and Janssen, 2005): "the institutional design that enables and fosters deliberation (institutional input, "design"), the quality of the communication process (communicative throughput, "process"), and the expected results of deliberation (productive outcome, "results")" (Friess and Eilders, 2015, 320). The set-up of the online platform thus matters significantly to facilitate deliberation (Davies and Chandler, 2012; Esau, Fleuß, and Nienhaus, 2020; Esterling, 2018; Hartz-Karp and Briand, 2009): "it is not possible to develop a deliberative space if its structure and organization are not carefully designed for deliberative purposes" (Borge and Santamarina, 2015, 6). Empirical research, however, produces mixed results on the practical implementation of the normative ideal. In what follows, online deliberation and online platforms' affordances are introduced and critically evaluated based on current literature.

Deliberation on social media platforms

Of all online engagement platforms, social media are best integrated in citizens' everyday lives, as outlined in the previous section. The way in which they contribute to communication in the public sphere is highly controversial, however. As outlined, it has been criticized that the algorithmic architecture of social media platforms may negatively impact discourses in the online public sphere. Helbig (2018, 351) claims that algorithms foster an informational path dependency. Since providers want to keep users on their websites for as long as possible, their algorithms primarily present posts and information that fit the users' worldview and preferences, while reducing their information basis and increasing the homogeneity of arguments. As such, the discourse is pre-structured based on invisible criteria and objective information is not provided. Moreover, the large amount of information may overwhelm users, "as it exceeds the limited cognitive capacity of people to process numerous pieces of information at the same time" (Steinicke and Witt, 2021, 25). This mental overload limits digitization's benefits in terms of increasing the accessibility of information. Similarly, Smith and colleagues (2014, 1) point to the polarization in social media discussions, e.g. on

26

Twitter: "If a topic is political, it is common to see two separate, polarized crowds take shape. They form two distinct discussion groups that mostly do not interact with each other." Thus, the "encounter with difference, indeed, the capacity to meet others with coherent arguments, seems on the wane in some corners of the web, which erodes the basic idea of dynamic public spheres" (Dahlgren, 2014, 198).

Research has shown that emotionally negatively charged posts on Facebook provoke more reactions than those that are not emotionally charged (Stöcker and Lischka, 2018, 377). Halpern and Gibbs (2012, 6) find in a quantitative study, analysing 7230 messages on Facebook and YouTube that "64.9% of posts in Facebook employed unfounded arguments or claims without any kind of validation, whereas 71.1% of YouTube posts were not justified." Although social media platforms such as Facebook now monitor hate speech and users can report unethical behaviour, a lack of fact checking and harassment online remain major problems (Ben-David and Matamoros-Fernandez, 2016; Waseem and Hovy, 2016). With regards to Facebook, Ben-David and Matamoros-Fernandez (2016, 1167) argue that "discriminatory practices are not only explained by users' motivations and actions but are also formed by a network of ties between the platform's policy, its technological affordances, and the communicative acts of its users." Additionally, there are strong imbalances of power in discourses on social media platforms when famous people or large brands have a lot more followers than the normal citizen and therefore much more influence in a debate (Fuchs, 2016, 137). Some actors may use social bots, automated systems that simulate human user behavior, for commercial purposes or propaganda (Stöcker and Lischka, 2018, 380-381). Moreover, social media platforms such as Facebook or Instagram are criticized for transforming the subject's habitus and political agency, with a strong focus on self-expression and self-promotion. This has important consequences for democratic participation and the public sphere, which relies on citizen collaboration and social values such as solidarity and empathy (Papacharissi, 2010, 74, 158). Dahlgren (2014, 198) points out that social media reduces the political subject to a consumer and spectator, while "putting the question of political participation at a competitive disadvantage." Fuchs (2021, 15) warns that "a social space that offers enough time for discussion is not yet a guarantee for a committed, critical, and dialectical discussion that transcends one-dimensionality, penetrates into the depths of a topic and highlights the similarities and differences of different positions." He therefore argues for "[u]nlimited space, a dialectically controversial and

intellectually challenging space, and intelligent organisation" (ibid.) to facilitate deliberation in the digital public sphere.

Deliberation on online consultation platforms

Online deliberation does not only take place on social media platforms. In the last years, online consultation platforms have become a common way for citizens to communicate with their elected officials. Online consultations are defined as an exchange between government and citizens, typically in a way in which the government is asking for citizens' advice or opinion on a given topic. According to Fuller (2015, 319), online deliberation should take place prior to voting for ideas or proposals to "work against the influence of mass media and channels of misinformation". The consultations' results are usually not politically binding but intended to influence policy-making processes (Shane, 2009). Examples for online deliberation platforms and tools are Decidim[2], Pol.is[3], Discourse[4], DemocraciaOS[5], or Loomio[6]. Pol.is, for instance, enables participants to post comments on policy proposals. Through machine learning, the platform examines comments and votes, creating a map of opinions and like-minded users in relation to other participants, while indicating spaces of agreement and disagreement. It is argued that the algorithm facilitates consensus seeking, as users are likely to post arguments that attract positive likes (Tang, 2019). Similarly, on ideation and agenda-setting platforms, citizens are invited to generate innovative ideas for pressing social problems. Challenge and prize competitions can be tools to collect ideas from the population and to drive innovation. Ideas can include action plans, policy proposals, designs or other solutions in graphic or written form. In Finland, for example, a 'crowdsourcing' experiment enabled citizens to participate within a structured, virtual sphere for deliberation to develop a new law on off-road traffic (Aitamurto, 2012; Aitamurto and Landemore, 2015).

Online deliberation is defined by several attributes that are distinct from or have distinctive effects compared to face-to-face deliberation, for example the question of anonymity (Asenbaum, 2017, 2018; Moore, 2018), the mode of moderation, the distribution of

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[2] https://decidim.org/, accessed 5 December 2021.
[3] https://pol.is/home, accessed 5 December 2021.
[4] https://www.discourse.org/, accessed 5 December 2021.
[5] https://democraciaos.org/en/, accessed 5 December 2021.
[6] https://www.loomio.com/, accessed 5 December 2021.

information, the visualization of arguments (Benn and Macintosh, 2012) and gamification (Hassan, 2017; see also Friess and Eilders, 2015). Coleman and Moss (2012, 8) "refer to these as technologies of discursive order" that "produce forms of communicative interaction consistent with norms of deliberative quality." However, these techniques are highly contested among researchers.

First, online spaces for deliberation should provide relevant information or encourage people to post adequate information because "relevant information helps participants to find rational solutions" (Friess and Eilders, 2015, 328). Experiments have shown that strict identification mechanisms on online platforms may decrease participation and diversity (Moore, 2018). Clark, Bordwell and Every (2015) find in a study comparing debate groups with anonymous versus identifiable participants that anonymity leads to more participation and that participants express their opinion more freely. The number of spoken words among participants is distributed more evenly under the conditions of anonymity. The traceability of 'real-name' communication can constrain communication by creating the risk of retribution for statements that might offend powerful actors, such as private companies or repressive political regimes (Asenbaum, 2017). Lastly, anonymity enables arguments in deliberation to stand on their own, irrespective of the subject's characteristics or social position (Moore, 2018). While there are good reasons for anonymity in online deliberations, there are also good reasons to advocate for the use of real names on online platforms. Problems related to the traceability of online identities appear in another light in cases of threats, lying, and bullying, abuse and hate speech (ibid., 8-10). Anonymity can be a means to prevent taking accountability for one's actions. Nussbaum (2010) for example criticises anonymity online for facilitating the objectification of women and misogyny. Moore (2018, 21) underlines that reasonable deliberation requires agents with durable identities online, as every deliberation needs communicative accountability.

Just as there are two sides to anonymity online, there are advantages and disadvantages to a moderated deliberation:

> The moderator can be a 'censor'- for example, by removing opinions that are at odds with the main ideology of the discussion space - or he can be 'promoter of deliberation' by, for example, implementing a system of synthesis of debate, by giving more visibility to minority opinions, by offering background information related to the topics etc. (Janssen and Kies, 2005, 321-322).

Most researchers on online deliberation conclude that moderation in deliberative processes should be used – following the principle of sufficiency – just as much as needed to ensure a respectful, inclusive, and rational deliberation online (Friess and Eilders, 2015; Kies, 2010).

In large-scale online deliberation, it is challenging for participants and the moderators to keep track of the debate and derive a meaningful outcome. Shin and Rask (2021) suggest coupling network analysis and time-series analysis to evaluate the quality of online deliberation. They develop six indicators to study deliberation on an online participatory budgeting platform in Finland: commitment, inter-linkedness, responsiveness, continuity, activeness, and participation rate. Others apply computer-supported argument visualization (CSAV) to "allow various stakeholders navigate the complex issues in a policy-consultation" (Benn and Macintosh, 2012, 61). Such tools can make even complex discussions more systematic. All perspectives on an issue are co-located in the argument map, working against tendencies of balkanization (Klein and Iandoli, 2008, 2). Many different CSAV applications are available, providing a mix of network visualizations and threaded renderings (De Liddo and Buckingham Shum, 2013). There are several challenges related to CSAV. Depending on the code, the deliberation might be pictured in certain ways. Transparency with respect to the source code is therefore indispensable. Moreover, the visualisation must be easily understandable. Lastly, CSAV systems for large-scale deliberations require a lot of skill and care to produce meaningful results (Benn and Macintosh, 2012, 67; Klein and Iandoli, 2008, 2). Janssen and Kies (2005, 321) suggest that online deliberation spaces need to be asynchronous to give participants time to reflect and justify their argumentation. In contrast, real-time discussion spaces attract more 'small talk', according to the authors. "Online tools here facilitate a reflexive attitude towards one's positions, as the writer has time to build up a proper argumentation" (Monnoyer-Smith and Wojcek, 2012, 41). Hartz-Karp and Sullivan (2014, 2) disagree and find that

> [t]he inherent nature of online deliberation, with its typically asynchronous environment, is not conducive to intensive, empathetic, collaborative discourse. Rather, it is conducive to direct democracy that merely aggregates the unreflective opinions of self-selected voters, conveniently weighing in on every issue.

The degree of institutionalization refers to the inclusion of online deliberative processes into the legal framework of political decision-making (Hartz-Karp and Briand, 2009, 128). There can be benefits both to online deliberation and participation with close links to institutionalized decision-making (e.g. a higher impact on policy-making) and to platforms that are detached from institutionalized decision-making (e.g. social media that are used for the formation of a counter public) (Dahlberg, 2011). In the digital age, initiatives through which citizens can be consulted are not only initiated by the government, but, due to the low threshold that ICT offers, increasingly started by citizens themselves. Autonomous online deliberation platforms can facilitate the construction of 'participative-deliberative' public spheres with an emancipatory potential in line with the requirements of radical democracy (Downey, 2007, 110-111). Online deliberation and consultation platforms can help marginalized groups create their own discourses and forums, subsequently linking them with mainstream political debates and practices.

Summarizing, research suggests that some affordances of online engagement platforms have a positive effect on digital deliberation (continuity of identities of interlocutors or moderation based on the principle of sufficiency). For other attributes, the results of the literature review were less clear and context-dependent (CSAV, the possibilities for providing information and synchronous vs. asynchronous communication). It needs to be kept in mind that "the concept of online deliberation is not only contingent and contested, but inevitably constructed by those who facilitate and evaluate it" (Coleman and Moss 2012, 9). In an empirical analysis, the effects of the platform attributes need to be critically assessed in these regards.

2.1.3 The structural dimensions of digital democracy

Just like analogue democracy, digital democracy does not take place in a vacuum, but is embedded in its social, economic, and legal environment. In what follows, the social, economic, and legal – hence the structural – dimension of digital democracy is introduced with a focus on the challenges revolving around social media platforms where the tensions become most visible.

Social dimension

The development of digital technologies has led to a structural transformation of the public sphere. Stöcker and Lischka (2018, 375-376) see central aspects for this structural change, for instance, in lower thresholds for publishing content and a potentially higher

reach of individual posts, a higher degree of personalization in terms of how we receive and consume information, a greater influence of the audience through the possibility of liking and sharing posts, and a higher centralization of platform providers compared to traditional media outlets. Fleuß and colleagues (2019, 471-472) consider the intransparency of algorithms and code, the dissolution of the agency dimension of power through machine learning, the imputability of political actions, and the illusion of algorithms' neutrality as important drivers of this transformation. According to Lenk (2018, 231), algorithmic governance is ruling and control by means of machines, despite their appearance of objectivity and independence. He claims that extensive regulation by code leads to an automated society whose organizational principles are carved into technology (ibid., 243). Social media platforms such as Facebook, Twitter and YouTube are embedded in certain production structures which are not as 'social' as their name suggests (Fuchs, 2016, 122; Sandoval, 2014, 144). Operating in a liberal economic system, social media reflect a logic of individualism, consumption, and private property.

> On corporate social media, the relationship of the individual and the social is highly antagonistic: social media exist only through social relationships that enable sharing, communication, collaboration, and community. But these social relations are today at the heart of the realisation of neoliberal performance principles that render social media platforms perfect tools for individual self-presentation, individualistic competition, and the individual accumulation of reputation and contacts (Fuchs, 2016, 122).

Sandoval (2014, 159) adds that "truly social media on the contrary are media that are socially owned (economy), socially controlled (politics) and are based on socially inclusive values (culture). They benefit all members of society rather than serving private profit interests."

Fuchs (2016) highlights the risk of a colonisation of an online public sphere through consumption culture in the sense that users can access social media platforms free of charge while providing large amounts of personal information, ranging from demographic information, consumption patterns to the content of messages (see also Sandoval, 2014, 147). So called 'influencers' often use social media's algorithm and business model for economic gains (Steinicke and Witt, 2021, 29). This way, the line between the private individual, showing personal pictures and sharing stories on social media, and the economic subject becomes increasingly blurry. At a macro level, the division of the digital public sphere into fragmented sub-spheres challenges the plurality of our

societies. According to Hofmann (2019, 10), "the idea of a common public sphere framed by mass media and characterized by shared reference points can no longer be taken for granted." Digitization reinforces this societal fragmentation by highlighting like-minded users and information that corresponds to ones' interests and beliefs.

Economic dimension

Fuchs (2021, 9) claims that "[c]apitalism colonises and commodifies the (digital) commons and the (digital) public sphere" (see also section 3.2.2). He identifies ten main problems associated with digital capitalism, among them an "individualistic digital culture", a "surveillance-industrial complex", "fragmented digital public spheres", the power of "influencers" and hidden advertising, "digital acceleration" and "post-factual politics" (ibid., 12). Social media's business model is to turn the subject's information, the 21st century's currency, into a commodity, selling it to other companies for advertising purposes. Major platforms such as Facebook, Instagram and Twitter benefit from market concentration effects that reinforce the platform's dominance. These network effects do not only lead to a monopolization but also to a high amount of personal data controlled by a small number of platforms (Steinicke and Witt, 2021, 18). This powerful amount of information and its handling are mostly not democratically controlled. Shoshana Zuboff (2019, 8) argues that the mass acquisition of personal data leads to "surveillance capitalism" which

> unilaterally claims human experience as free raw material for translation into behavioural data. Although some of these data are applied to service improvement, the rest are declared as a proprietary *behavioural surplus*, fed into advanced manufacturing processes known as 'machine intelligence', and fabricated into *prediction products* that anticipate what you will do now, soon, and later. Finally, these prediction products are traded in a new kind of marketplace that I call behavioural futures markets.

Consequently, recent debates focus on the issues of data sovereignty and data security. On the micro level, there are risks related to self-quantification, referring to the individual's tracking of personal data to improve ones' daily functioning. Gutiérrez and colleagues (2014, 185) highlight the importance for users "to know how to access the option enabled/disabled data sharing, and to be confident that data will be processed in a disaggregated manner, preventing personal information from being bound to retrieved data." On a macro level, issues associated with data colonialism are debated in literature,

criticizing the approbation of big data for economic gain (Couldry and Mejias, 2019; see section 2.2.3 for further details on datafication).

Furthermore, micro-targeting, exerting influence on someone through personalized advertising measures, has become a major industry and a threat for the digital political sphere. Whereas microtargeting for commercial purposes can also lead to better services (if done transparently), micro-targeting in election campaigns harms the democratic process, as seen in the Brexit referendum in 2016 and the US election in 2015 (Steinicke and Witt, 2021, 40). As a result, Twitter and other major platforms have now banned political advertisement. Unlike democratically elected governments and their administrations, however, platform operators are private institutions that are not under the same pressure to publicly justify their actions (ibid., 22).

Legal dimension

As demonstrated, digital platforms mostly do not follow the aim of facilitating constructive democratic debate and participation in the digital public sphere. According to many analysts, self-regulation is not sufficient for dealing with the dangers posed by major online platforms (Furnémont and Rokša-Zubčević, 2021). The "challenge therefore lies in controlling and regulating the power of platforms on the basis of rule of law principles in such a way that the democratic public sphere is strengthened" (Steinicke and Witt, 2021, 22). If the public sphere's infrastructure is significantly shaped by private companies, there need to be accountability and transparency mechanisms in place vis à vis the government and the governed. Regulatory and legal frameworks can steer the development of online platforms in the commonly acceptable direction. The market-dominating gatekeeper position of digital platforms and their underlying algorithms significantly impact the functioning of the online public sphere, leading the EU to enforce higher transparency standards, stronger legal enforcement of existing obligations, and a fair competition on the market with the *Digital Services Act* (DSA) and *Digital Markets Act* (DMA), proposed in 2020 by the European Commission (EC). The DSA aims to "set higher standards of transparency and accountability to govern the way platform service providers moderate content, on advertising and on algorithmic processes" (Madiega, 2021, 1). The DMA complements existing competition policy tools to prevent designated gatekeeper platforms' anti-competitive behaviour, e.g. through new ways of self-preferencing and online advertising (Cabral et al., 2021). Another important regulation is the EU's General Data Protection Regulation (GDPR) that was put into effect in 2018

(Steinicke and Witt 2021, 19). On a state level, national legislation binds platform operators to check and delete illegal content.

Summarizing, this review of the broad literature demonstrates the ambivalences in the realization of digital democracy. On the one hand, the digitization of democratic structures and procedures offers the potential to increase democratic legitimacy, such as by reducing barriers to participation and deliberation and establishing more direct communication channels between government and the governed. On the other hand, new issues related to data protection, surveillance and the subject's autonomy emerge. While there is extensive research on *individual* platform types (social media, online consultations, e-petitions etc.) and their impact on democracy, a structured examination of an entire digital democracy *system* is missing. Following Berg and colleagues (2020, 175), it can be said that the political science discussion of digitization often reduces it to singular communication and information technologies, focusing mainly on the interface between the deliberative public and representative democracy, while neglecting emerging trends such as IoT, machine learning and artificial intelligence as well as their systemic effects on democracy. The smart city, introduced in the next section, offers a starting point for such a systemic approach to digital democracy.

2.2 The realization of digital democracy in the smart city

ICT development does not only have a significant impact on democracy but also on the social and structural fabric of the city. The smart city (SC) thus offers a highly suitable testbed to evaluate digital democracy's empirical implications systematically.

Although the history of the city and technology is much longer, it was only in the 1990s that a more elaborate conceptualisation was established to make sense of highly technologized urbanity (Willis and Aurigi, 2017, 3), introducing the liveable city (Antonescu, 2017; Girardet, 2004), digital city (Aurigi, 2012; Tang et al., 2011), eco-city (Bunning, 2014; Hu et al., 2016), ubiquitous city (Ilhan, Möhlmann, and Stock, 2015), or cyber city (Willis and Aurigi, 2017, 3). Gibson, Kozmetsky, and Smilor coined the term smart city (SC) in the book *The Technopolis Phenomenon: Smart Cities, Fast Systems, Global Networks* (1992). The idea was also picked up by Graham and Marvin in *Telecommunications and the City* (1996), offering a comprehensive analysis of the relation between urban governance and ICT (see also Mora, Bolici, and Deakin, 2017, 4). Beyond theory, one of the first digital city projects was implemented in Amsterdam in 1994

(Willis and Aurigi, 2017, 12-13). The goal was to facilitate communication and the flow of information between local authorities and citizens on an online platform. Today, the SC has gained attention globally. In India, for instance, 100 SCs were created as part of the government's promises on economic growth and good governance (Bria and Morozov, 2018, 9; Datta, 2018). In Singapore, the National Research Foundation and Dassault Systems launched a partnership in 2016 to create a "three-dimensional (3D) city model and collaborative data platform", thus a "Virtual Singapore" (Laurent and Pontille, 2019, 90). In South America, Medellin was turned into an "urban laboratory for the Global South" (Talvard, 2019, 62). Moreover, there are several SC indexes, such as the European Smart City index by Giffinger and colleagues, the global Smart City Ranking of the consulting firm Roland Berger, or Bitkom's smart city ranking for German cities. Mora, Bolici and Deakin (2017, 7) show in their analysis of two decades of SC research (1992-2012) that the domain "established itself as a new area of scientific enquiry in 2009, and since then, it has been fast-growing", with a rapid increase of publications between 2010 and 2012. Early research and empirical experiments on the SC were enthusiastic with respect to the liberating potential of technology for better governance, more efficiency in city administration, and more environmentally sustainable policies. Consequently, the smart city has become a buzzword in the last decade, both in the commercial and academic field (Willis and Aurigi, 2017, 15). It could "provide a transformative panacea for urban development. They [technologists] argue that ubiquitous urban sensing, big data and analytics will help us to better understand the real time functioning of our cities, as well as inform longer term planning and policy decisions" (Cosgrave, 2013, 21).

The following section gives an overview on SC research with an emphasis on the challenges and possibilities for digital democracy. It conceptualizes the smart city, where digital technologies are implemented in a concentrated manner, both in practice and in research. It then goes on to finding a smart city definition, studies the SC as a contested space of democratic governance, and lastly elaborates digital participatory governance in the SC.

2.2.1 Conceptualizing the smart city

Finding a common definition for the smart city in academic literature is a difficult undertaking due to the diversity of angles from which the SC is being analysed (Araya,

2015, 11; Cosgrave, 2013, 51; Hollands, 2008; Sadowski and Pasquale, 2015, 2).[7] "Divergence, lack of cohesion, and limited intellectual exchange among researchers become (…) evident when trying to find out a commonly accepted interpretation of smart cities, which is missing" (Mora, Bolici, and Deakin, 2017, 11). The concept is also contested among practitioners:

> Ask an IBM engineer and he will tell you about the potential for efficiency and optimization. Ask an app developer and she will paint a vision of novel social interactions and experiences in public places. Ask a mayor and it's all about participation and democracy (Townsend, 2013, 15; see also Wadhwa, 2015, 126).

Hollands (2008, 303) warns that there is little knowledge on what the 'label' smart city entails. The use of this label, he says, is often politically motivated as part of city marketing or industry development. It is associated with SC campaigns by large companies, such as IBM, Siemens, or Cisco, e.g. as part of IBM's 2008 Smarter Planet initiative, in which there was a significant role for start-ups and the IT industry (Osella, Ferro, and Pautasso, 2016, 131). Besides, technology and social norms are both highly dynamic and constantly changing, just like the research subject (Cosgrave, 2013, 47). Chourabi and colleagues (2012) highlight eight factors of SC initiatives: natural environment, management and organization, governance, technology, people and communities, policy context, economy and built infrastructure. Among the most cited features of SCs are Giffinger and colleagues' (2007, 10) six dimensions of smart economy, smart governance, smart people, smart environment, smart mobility, and smart living. According to the authors, the SC "is a city well performing in a forward-looking way in these six characteristics, built on the "smart" combination of endowments and activities of self-decisive, independent, and aware citizens" (ibid., 11). The three most common elements in all SC conceptualisations are smart technology, collaboration and community and smart people (Nam and Pardo, 2011; Willis and Aurigi, 2017). Moreover, the question of smart democratic governance is almost always addressed (Cosgrave, 2013, 79).

This thesis applies the SC concept by Caragliu and colleagues (2011) because it acknowledges the SC's constant and dynamic change. Besides, it is among the most widely accepted SC definitions (Mora, Bolici, and Deakin, 2017, 10), offers adequate

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[7] Most research articles on the smart city are produced in Europe (52%), so the view on the SC is quite Eurocentric (Mora, Bolici, and Deakin, 2017, 16; see also Ojo, Dzhusupova, and Curry, 2016, for an overview of the smart city research landscape).

conceptual flexibility and best covers all dimensions of the smart city, including partic-ipatory governance. The authors "believe a city to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infra-structure fuel sustainable economic growth and a high quality of life, with a wise man-agement of natural resources, through participatory governance" (Caragliu, Del Bo, and Nijkamp, 2011, 70). Participatory governance can be understood as "a variant or subset of governance theory which puts emphasis on democratic engagement, in particular through deliberative practices" (Fischer, 2012, 1), thus involving both participation and deliberation. Participatory governance in the SC is a broad concept, encompassing a diverse set of governance arrangements, such as multi-stakeholder processes, public-private partnerships, and co-production. The focus of this thesis is on the role of citizens in these arrangements.

As disputed the term 'smart city' is, much of the literature uses the words smart, digital, intelligent, liveable, ubiquitous, playful, or eco-city, to describe different, but themati-cally overlapping city structures and processes (De Jong et al., 2015, 2). Major compa-nies such as Google increasingly avoid the term "with the head of its city unit explicitly stating that he rejects the term 'smart city', as cities have always been smart" (Bria and Morozov, 2018, 3). To illustrate these frictions, the debate on the smart versus the digital city (DC) is exemplarily drawing on Dameri's (2014)[8] comparison between smart and digital city policies in Amsterdam and Genoa. According to Dameri, the SC focuses on a variety of technologies for improving city infrastructure and reducing urban environ-mental hazards (ibid., 52-54). Citizens assume the passive role of policy addressees in this framework, while the local government is the main actor in SC projects. In compar-ison, the main driver behind DC implementation is the instalment of ICT infrastructure based on broadband (ibid., 54-56). Citizens take a more proactive role, as "they should take part in communication, data processing, information use and e-service enjoyment" (ibid., 56). Dameri summarizes the differences as outlined in table one.

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[8] This comparison is particularly useful because the terminological tension between the digital and the smart city will re-occur in the Amsterdam case study (chapters five to seven).

	Digital city	Smart city
Year	1990s	2009 until today
Technology	ICT	Ubiquitous, "hard technology"
Focus	Communication and information through digital technologies	Environmental policies
Process	Bottom-up	Top-down
Citizens	Actively involved	Level of involvement depends on action or project
Governance	No formal governance structure	Different governance structures, driven by public authorities

Table 1: Comparison of the smart and digital city (based on Dameri, 2014, 86, Table 7).

While DC initiatives require strong digital literacy skills of citizens and a digital maturity of both people and infrastructure to ensure participation, SC initiatives are based on investments in facilities and infrastructure, participation of the private sector and strong economic plans, according to Dameri (ibid., 58).

On an abstract level, there are two main angles on the smart city in research, the technological and the sociological perspective (Allwinkle and Cruickshank, 2011; Willis and Aurigi, 2017). Authors analysing the smart city from a technological perspective see urban space as a physical infrastructure connected through ICT in which problems can be solved through techno-spatial solutions (ibid.; see also Dirks and Keeling, 2009).

> In the early days of smart city development, a large number of sensors have been deployed for the typical Smart X application, e.g. smart parking, smart irrigation or smart transportation (…), and numerous IT infrastructures have been built. Some people have marked this "first wave" of smart cities as "smart city classic" (Steenbock Vestergaard, Fernandes, and Presser, 2015, 40).

Four interconnected technological developments receive a lot of attention: distributed sensors, IoT, P2P infrastructure and big data or datafication. The political science literature on digital democracy often neglects these areas (Berg, Rakowski, and Thiel, 2020, 175). Bringing these two research areas more strongly together may therefore create significant synergy effects.

Cisco is one of the major companies that provide SC infrastructure like "sensors, solutions, applications, platforms, and analytics to manage urban services. Cisco's Command and Control Centre has already been implemented in Dubai, Kansas City, Adelaide, Hamburg, and Bangalore to manage a variety of urban services" (Bria and Morozov, 2018, 7). Kostakis, Bauwens, and Niaros (2015, 116) argue that P2P infrastructure, referring to "permission-less interlinking of human cooperators and their technological aids (…) is becoming the general condition of work, life, and society" in the smart city. Researchers focusing on smart city technology increasingly employ the term ubiquitous city, or U-city, to depict the integration of IoT in all city spaces (Ilhan, Möhlmann, and Stock, 2015, 215). A prototypical ubiquitous city is Songdo in South Korea. In Google's Sidewalk Labs project in Toronto, the project "solves problems based on computational logic since its poses its own question of 'What would a city look like if you started from scratch in the internet era" (Willis, 2020, 419).

Although "the take up of smart cities in the global South has been at a faster rate than in the West" (Datta, 2018, 406), research on the SC focuses strongly on Europe, North America, and Canada, whereas research on SCs in the Global South is slim. According to Odendaal and Aurigi (2020, 93), the image and narrative of the smart city is accepted globally as part of a "decontextualised visual language" that "represents the city in an orderly, 'tidy', idealised future, free of pollution, informality, unplanned neighbourhoods and crime." In the Global South, India's national Smart Cities mission, a development program for urban regeneration investment in 100 Indian cities that ran from 2016 until 2021 (Willis, 2019, 32), is among the most researched SC projects. For this program, the national state provided budget of approximately £11 million for the 100 participating cities, while expecting the regional states to add comparable funds. The cities then competed for the money (Datta 2018, 410). Willis (2019) examined the SC mission's impact on marginalized and informal communities in Chennai. She, as well as other authors researching the SC in postcolonial contexts (Datta, 2018; Odendaal and Aurigi, 2020), come to the conclusion that "there is a need to recognize the value of a range of everyday, small- scale ways in which citizens employ technologies and data that meet their needs in a social and spatially embedded context" (Willis, 2019, 27), thus emphasizing the value of everyday practices and their situatedness in physical space. The digital and the analogue world should be seen as reciprocal instead of binary (Odeendaal and Aurigi, 2020, 94). The tensions and debates around the smart city are

hence not limited to specific regions of the world, but have a global range, albeit with different expressions.

2.2.2 Digital participation and deliberation in the smart city

This section focuses on the urban dimension of ICT-facilitated participation and deliberation in the smart city, emphasising SC specific features such as IoT infrastructure or sensors, while considering governance processes. Both are more frequently discussed in the literature on smart cities than in the digital democracy literature. While deliberation is prominently discussed in the general literature on digital democracy, there is little literature on deliberation in smart cities, especially compared to the literature on participation and governance processes. This leads to the assumption that deliberation may play a subordinate role in smart city research and practice (see also Legard and Hovik, 2022, 179) – the latter needs to be confirmed through the empirical research to follow.

Governance processes in the smart city's ecosystem

Focusing on the human or sociological side of smart cities, researchers have increasingly analysed how technology may lead to smarter citizens or to better governance. Sadowski (2019a, 21) argues that although "analysing the features and effects of smart technologies is crucial, however, they should be understood as part of governance regimes". According to Rodríguez Bolívar (2016, 65), although still "rudimentarily developed", research on smart city governance is maturing. In smart city research, about 17% of the publications focus on governance (Ojo, Dzhusupova, and Curry, 2016, 44). Governance issues encompass "reform, integration, policy and strategy, measurement, standards and regulation, public engagement, and partnership." (ibid.). According to Meijer (2016, 73), "[s]mart city governance is about using new technologies to develop innovative governance arrangements."

A good overview on democratic governance in the smart city is provided by Araya (2015a) in *Smart Cities as Democratic Ecologies* and most recently by Hovik and colleagues (2022) in *Citizen Participation in the Information Society - Comparing Participatory Channels in Urban Development.* Other contributions have been published by Baccarne et al. (2014), Cosgrave (2013), Ertiö (2015), Goldsmith and Crawford (2014), Kudo and Granier (2016), Wiklund (2005), and Kitchin, Cardullo, and Feliciantonio (2019). De Mello Miranda and colleagues (2016) examine e-participation in smart cities in developing countries and Berntzen and Rohde Johannessen draw lessons learned from

citizen participation in Norwegian smart cities (2016). Komninos (2006) says that a city is smart if it generates new knowledge to solve urban issues by using social, cultural, human, and technological capital (see also Mora, Bolici, and Deakin, 2017, 12; Nam and Pardo, 2011). Garcia Alonso and Lippez-De Castro (2016) develop a smart city governance framework based on Habermas' conception of deliberative democracy, in which they adapt the framework of Chourabi and colleagues (2012). The authors argue that the success of SC governance depends as much on the city's technological infrastructure as on its capacity of involving citizens and communities in governance processes (Garcia Alonso and Lippez-De Castro, 2016, 334).

Few authors discuss the democratic legitimacy of these processes, however. While technological advances in the SC are important to analyse, they also redirect attention "away from what is really at stake with the smart city movement: The transformation of how cities are governed" (Sadowski, 2019a, 21). One result is that local governance is more and more based on data and information, generated based on the city's 'smartness'. Local governments are increasingly turning into a facilitator and connector between different actors and services on the smart city platform. The aims and motivations behind smart city governance are diverse. They include enhancing the effectiveness of public administration's internal processes, supporting multi-stakeholder alliances, or promoting more inclusive governance (Misuraca, Ferro, and Caroleo, 2010; see also Willis and Aurigi, 2017). ICT is meant to support citizen participation in governance processes, increasing citizens' impact on political decision-making.

Civic participation and governance have become important components of SCs, rendering them laboratories for new forms of collaboration: "Many ongoing initiatives for smart cities in practice are rooted in collaborative approaches and grassroots democracy based on communities" (Gil-Garcia, Pardo, and Nam, 2016, 7; see also Chourabi et al., 2012, 2292). Smart city supporters have deliberately repositioned their solutions towards being more democracy- or citizen-centred. For instance, the EU has included a citizen-centric line in its funding for smart cities. Cisco and IBM describe their initiatives as citizen-focused (Cardullo and Kitchin, 2017, 5). In this "neo smart city paradigm, one of the main points is citizen empowerment – how do we make cities better for citizens on their terms" (Steenbock Vestergaard, Fernandes, and Presser, 2015, 40; see also Castelnovo, Misuraca, and Savoldelli, 2015, 3). A growing body of literature emphasizes the importance of community and citizen-centred approaches in which the

value of the SC is increasingly judged in terms of the city's ability to promote collaboration and participation (Araya, 2015, 14; Gutiérrez et al., 2014, 173; Morozov and Bria, 2018). At the same time, Cardullo and Kitchin (2017, 19) emphasize "that there is significant normative work to be done to rethink 'smart citizens' and 'smart citizenship'" and that despite the "attempts to conceive and enact more 'citizen-centric' smart city initiatives (…), there has been little attempt to systematically unpack conceptually the diverse ways citizen participation is being conceived and enacted in the smart city" (Cardullo and Kitchin, 2017, 5; see also Cano, Hernández, and Ros, 2014; Meijer and Rodríguez-Bolívar, 2016). This thesis' case study on Amsterdam aims to fill this gap in the literature.

Digital civic engagement in the smart city

Some authors argue that there has been a shift "from the 'Internet of Things' to the 'Internet of People'" (Khanna and Khanna, 2015, 40), perceiving the city as a social construct that is defined by its residents' activities and practices.

> In fact, the Smart City is about more than technology. It is about balancing resilient communities with competitive industry in the process of making better-informed decisions. More than this, it is about moving decision making into the hands of residents so that they might contribute and apply their understanding to creating cities that are humane and just. (Jacob, 2015, xi).

On the most basic level of ICT-facilitated civic involvement, the subject is a recipient of uni-directional government information and services, for example through government websites. Lambiase (2018) has analysed 200 local government websites in terms of how they foster citizen participation, as websites still represent the most used tool to connect to citizens. She shows that although most websites have customer service contact opportunities, there are limited possibilities for citizen deliberation and few spaces for citizen projects or other opportunities for including citizens in policymaking. This reflects Firmstone and Coleman's (2015, 684) finding that the use of digital media in local government is mostly "restricted to informational modes of engagement."

On a more technologically advanced, yet *indirect* level of citizen participation in the smart city, subjects act as a sensor or as data point:

> Using geolocation, the citizen-sensors component collects information that data mining techniques can exploit to determine the context of citizen opinion. In a smart city, citizens

are the sensors of political opinion, and their ubiquitous technology gives their opinions more weight, enabling them to create initiatives and directly influence policymaking. (Cano, Hernández, and Ros, 2014, 67-68)

In participatory or social sensing, big data generates information from people's devices to mirror the physical world (Gutiérrez et al., 2014; Geijer, Larsson, Stigelind, 2014). Social sensing makes use of data mining, network science and statistics. The crowd turns into a distributed network of social sensors that allows policymakers to gather important information on the citizen's habits. Most sensors are vehicular (e.g. in cars) or handheld (e.g. in mobile phones). By means of global positioning systems (GPS), location-based services generate large amounts of data related to the precise location of the user. "A spatial analysis of the aggregate activity generated by such networks can show us how social activity in a city is distributed, revealing fine-grained spatial patterns evident in the social life of cities" (Bawa-Cavia, 2011, 1). Social sensing relies on the ubiquity of networked devices. This form of participation can be called indirect, as citizens often act as information providers and are sometimes not aware that their data is collected for the purpose of political policymaking (Castelnovo, 2016). The mobile app 'Street Bump', for instance, collects real-time data about the road condition while the user drives to provide the city with information to fix the problem (Cosgrave, 2013). Social alert apps (e.g. Adopt-A-Hydrant, See Click Fix, Maji Voice) that help residents improve their communities through reporting problems through a mobile app, function similarly. The data provides the government with real-time information to fix problems and to plan long term investments. Citizens can track the government's resolution to the problem (Baykurt, 2011; Belcher et al., 2017; Berdou et al., 2017; Khanna and Khanna, 2015). Citizen science projects can enable citizens to contribute with their knowledge to research projects whose findings may be used to inform governance processes and political decision-making, if channelled into transformative action (Kinchy, 2017).

Another example for DCE in the SC are collaborative mapping geographic information systems (GIS) for the management of infrastructure. Citizens are invited to identify places of interest and to provide specific insights about them. In this way, policymakers gain information on resident's commuting habits, collect data on different locations, and map community assets. The data serves as a basis for future policy decisions. Based on mapping interfaces, citizens

discuss new proposals or identify issues relating to space and place regeneration within their community. Users start discussions and debate issues and thereby, in a sense, create their own geo-referenced community database. Users can navigate the map by zooming and panning into an appropriate location and turning relevant map layers on or off in relation to spatial policies and querying these layers for relevant attribute information. (Kingston, 2007, 142)

In these public participation geographical information systems (PPGIS), spatial sets of information systems are used with the aim to "provide equal access to data and information for all sectors of the community; empower the community (…); and establish and maintain a high degree of trust and transparency within the public realm" (McGinley and Nakata, 2015, 234). However, data can be inaccurate, as it is susceptible to information overload, signal errors, and confirmation bias. The latter refers to a situation in which citizens or policy makers interpret data in ways that confirms their own view (Choenni et al., 2016). Data analysis based on AI and self-learning algorithms can quickly create accountability problems as the code is difficult to reconstruct.

Open data initiatives are meant to provide the foundation for civic empowerment in the SC (Ojo, Dzhusupova, and Curry, 2016, 42; Meijer and Rodríguez-Bolívar, 2016, 402; Johnson and Robinson, 2014, 353). Citizens contribute with their own experiences and competences to city strategies (Berntzen and Rohde Johannessen, 2016, 300), for example in participatory planning. These "'hackable', sharing and open source cities are recognized as having the potential to enable people to become active in shaping their urban environment" (Willis and Aurigi, 2020, 9). Gamification or urban data games can contribute to digital and data literacy. Technology may help citizens to identify problems and solutions in the city or to develop a community. It is argued that a more commons-oriented smart city is needed "that will provide the capacity for open participation and democratic problem-solving practices" (Kostakis, Bauwens, and Niaros, 2015, 124). Barcelona and Amsterdam are following the approach of a data commons, in which data governance preserves the citizens' fundamental rights. Through the EU-funded DE-CODE project, the cities aim to install an open-source decentralized data architecture to support civic data control and ownership (Bria and Morozov, 2018, 27, 31). This is embedded in a wider post-industrial development in which knowledge and information are the main assets for innovations. A smart city in the 'knowledge economy' or 'information society' provides spaces for knowledge transfer and creation with little

bureaucratic barriers. Through open-source technology and open data initiatives, the goal is to produce social innovations or public goods as part of citizens' everyday life in collaborative spaces and set free an entrepreneurial spirit (Johnson and Robinson, 2014, 353; Kostakis, Bauwens, and Niaros, 2015, 123). In hackathons, based on cities' open data initiatives or digital art events, such as Playable City in Bristol, UK, knowledgeable citizens create new tools and platforms for better service delivery and civic engagement (Mainka et al., 2015, 210), while allowing for bottom-up interaction and informal play in the city and countering deterministic technological approaches (Willis and Aurigi, 2017, 56). However, one "must consider if these events also serve a form of procurement, one that takes place outside of traditional government purchasing procedures" (Johnson and Robinson, 2014, 349).

Besides open data initiatives and hackathons, there are several other ways in which smart cities try to support an open learning environment (Dvir and Pasher, 2004). In Dublin, for example, city authorities organized workshops or hackathons to educate citizens on smart city policies and processes (Cardullo and Kitchin, 2017). Han and Hawken (2018) advocate for more face-to-face exchanges and collaboration among citizens and policymakers, for example in living labs. Living labs typically have the goal of supporting innovation and product development. They can be initiated by city administrations, private companies, research institutes or a combination of the three. As such, they often have pre-defined outcomes, targes and project boundaries (Cardullo and Kitchin, 2017, 16; Cosgrave, 2013, 37). Living labs use

> the city quite literally as the platform for interaction, (…) re-purposed as a prototyping platform where citizens can have multiple roles; ranging from a mere informant to tester as well as contributor and co-creator in the development process. The role of the city can be described here as the 'enabler' or 'mediator' in the ecosystem (Willis and Aurigi, 2017, 207-208).

In Maker Cities or FabCity initiatives, several cities across the globe try to use urban manufacturing for sustainable production and developing the circular city (Morozov and Bria, 2018, 45). However, Angelidou (2016, 23) finds that „most smart city programs include minimal education and training activities for individuals, mostly confined to the use of selected 'smart' devices rather than extending the population's digital skills over the broad spectrum of smart city capabilities and closing the skills gap." Moreover, digital and social inclusion are major shortcomings in most smart city initiatives (ibid., 24).

Local governments in the smart city can use different channels for more developed communication and debate, including social media, blogs, petitions, and online consultations (Mahou-Lago and Varela-Álvarez, 2016; Cardullo and Kitchin, 2017, 13). Online platforms to connect neighbours focus on facilitating collaboration among residents in a geographically limited area in an accessible and participatory manner. These platforms come in a range of different formats, from brainstorming and project ideation software or online consultation platforms to private social networks for neighbours. Online activities on these platforms usually triggers offline interaction. Similarly, on online public service delivery platforms, citizens claim responsibility for the implementation of a certain policy. In some cases, they provide citizens with opportunities to collaborate to solve different problems in a city or neighbourhood. The most comprehensive level of digital democracy in the smart city is when the local government has structurally implemented digital opportunities for participation and deliberation in all policy fields (Meijer and Rodríguez-Bolívar, 2016, 393). In India's Smart City mission, 15.2 million citizens took part in the various SC projects, often through online consultations, with the aim of transforming them from "cityzens" to "netizens" (Datta, 2018, 411).

Opportunities and challenges

ICT-enabled participatory governance thus brings about opportunities and challenges in the smart city (see e.g. Garcia Alonso and Lippez-De Castro, 2016; Berntzen and Rohde Johannessen, 2016; Cano, Hernández, and Ros, 2014, Meijer and Rodríguez-Bolívar, 2016; Stortone and De Cindio, 2015, Willis and Aurigi, 2017). According to Legard and Hovik (2022, 185), while ICT can help cities involve more citizens in policymaking,

> these technologies often reinforce existing inequalities, and that high-quality deliberation is difficult to achieve in digital spaces. The impact of digital participatory processes is, furthermore, ultimately dependent on the willingness of politicians and civil servants to share power, and on the scope of authority they can share.

Examining DCE in the cities of Madrid, Oslo, and Melbourne, the authors (ibid.) find that digital technologies have a small impact on giving citizens more power in policy-making. Their findings suggest that while ICT can mobilize citizens, they also reproduce existing political inequalities, as mostly the 'usual suspects' participate (ibid., 184) – white, middle-class men, who are online often younger than offline (ibid., 170).

On a structural level, some authors fear that multi-stakeholder governance in the smart city creates risks for democratic accountability and transparency because "governance implies that decisions are taking place outside the traditional institutions of liberal democracy" (Garcia Alonso and Lippez-De Castro, 2016, 337). These hybrid configurations of the private sector, civil society, public administration, and the government can hinder transparent processes due to a lack of political oversight (Cardullo and Kitchin, 2017, 10; Swyngedouw, 2005, 1992). There are several other challenges a government faces with respect to the effective implementation of digital participation policies. These are for example the challenge of human resources, as highly technical and diverse skill sets are required for government employees, of broad technological infrastructure, and of financial shortcomings (Mainka et al., 2015, 204-205). Moreover, the legal, cultural, institutional, economic, and societal conditions of the city matter. Legal frameworks, for instance, "may support open government data practices that can stimulate collective learning around problem-areas, but existing laws may also limit the possibilities" (Meijer, 2016, 82; see section 2.1.3).

Other social scientists have identified threats to democratic legitimacy, such as surveillance through the state or private corporations (Araya, 2015, 3) (see also next section). When sensors or large internet companies, such as Google or Facebook collect citizens' data on their webpages and online services, Moon (2018, 299) speaks of a "forced co-production" that is threatening the autonomy of the subject. Besides, political decisions based on abstract algorithms can lead to discriminatory practices, such as in predictive policing (Lember, 2018, 118; O'Neil, 2016). A solutionist or deterministic perspective on urban governance that focuses on fixing problems in the city with technology and produces predictable and clearly definable effects to deliver on the promise of "greater efficiency" (Townsend, 2013, 31) arguably leaves little space for citizens to engage or for alternative views and practices (Chourabi et al., 2012, 32; Willis and Aurigi, 2017). The question, as raised by Greenfield (2013), is to whose benefit greater efficiency serves and toward what end. The citizen in such a setting is perceived both as a consumer of services or products and as a commodity, in the sense that the subject provides valuable, monetizable information and data in digital spaces (Sadowski, 2019). As Cardullo and Kitchin (2017, 12) argue:

> Using a locative media app generates highly granular data about a person's movements and the places they visit; using a public wifi point generates data about browsing habits (…). Indeed, all smart city technologies, whether engaged with passively (such as being

monitored by an automatic number plate recognition camera) or actively (e.g., using a service), produce data that can be mined for insights, traded with and between data brokers, and conjoined with other data for the purposes of social sorting, predictive profiling, micro-marketing, and anticipatory governance.

Summarizing, this section has introduced different possibilities of ICT-enabled civic engagement in the smart city, while hinting at a lack of literature on deliberative processes in the smart city. In the field of civic participation, the academic debates revolve around governance in the SC, perceiving local governments increasingly as a platform and mediator, and ICT-enabled citizen participation in these governance processes.

2.2.3 The smart city's structural dimensions

The smart city as a social construct is, just like digital democracy in general, determined by the cultural, economic, political, legal, and social environment it is embedded in, but also by the relation between the materiality of the city and its digital public sphere. This section analyses the literature on the structural dimension of the smart city by focusing, first, on the tension between the city's digitality and its materiality, second, on the economic pressure the smart city is subject to, and third, on living in a datafied city.

Digital spaces and the materiality of the city

Saskia Sassen (2017) points out that cities are complex and incomplete systems. The possibilities of shaping or 'hacking' the city lie in that incompleteness, opening spaces for citizens to reclaim power (Willis and Aurigi, 2017). These spaces take shape in the public sphere which may be described in the SC context as (digital) platforms, bringing citizens and stakeholders together. The concept of space in the city, which used to be associated with physical space, thus receives a new meaning. The affordances of digital space in the smart city, such as sensors, IoT or online participation platforms, structure the conditions for its social and discursive dimension. The digital layer of the city leads to new digital formations in terms of interaction, organization, and spatialization, as well as to a "death of distance" (ibid., 32), inverting one of the city's defining features. Offline and online networks can build a new form of public space which can be called "networked publics" (ibid., 92), contributing to a change in urban space, e.g. through the introduction of Wifi access. Thereby, digital spaces create new mechanisms of inclusion and exclusion. Borja and Castells (1997, 102) see a

> domination of the space of the flows, structured in electronic circuits that link together, globally, strategic nodes of production and management (Castells, 1996a). But that logic

is not the only spatial form in our societies, just the dominant one. In contrast with it we still find, as was the general rule throughout history, the space of places, as the territorial form of organization of everyday living and the form experienced by the great majority of human beings. Yet while the flow space is globally integrated, the place space is locally fragmented. One of the essential mechanisms for dominance in our historical time is the dominance of flow space over place space (…).

The digital was long perceived as 'anti-urban' in the sense that it was opposed to the materiality of the city. One of the main functions of early cities was to bring people physically together and to facilitate communication between them (Willis and Aurigi, 2017, 36). As such, the rise of digital technologies challenges this meaning of the city. Space in the smart city is socially constructed by citizens, as they adjust and use ICT according to their needs to undertake activities, creating more fluid boundaries between online and offline spaces. For example, with the support of digital means, the physical space of an artist's gallery can easily become an art-network that transcends this space. Places thus provide the context for digital spaces (ibid., 53). As it becomes easier to communicate beyond space boundaries, formerly fragmented communities integrate more easily with digital means, enabling communities to form not only around places, but also around interests or political issues. The digital space can hence have positive effects on the local space (Hampton, 2007). On the other hand, the ownership of online spaces for participation in the smart city may belong to private corporations, questioning the 'publicness' of these spaces while 'privatizing' the public sphere (Mejias, 2013, 5). To better understand these dynamics, according to Aurigi and Odendaal (2020, 106), one needs to examine the construction and maintenance of networks and their interplay with technology in smart cities, moving towards a networking approach that "emphasises facilitation over simple provision of services or products."

According to Mejias (2013, 9-11), digital networks contribute to nodocentrism, meaning that everything that is not a node in the system is automatically excluded and becomes invisible. Drawing on Castells, he claims that networks can only establish links between nodes, while being unable to engage with anything outside the network. As such, they provide an incomplete picture of reality. The author does not reject the network as an organizing model of the digital sphere but raises awareness for realities and thoughts outside of the network that cannot be grasped by its logic. Coleman (2005, 192) sees "a need for spaces of informal representation, reflecting aspects of the personal that are

intimately associated with power, but not with formal governance." However, it is often difficult to connect these informal spaces to institutionalized governance processes.

As outlined, the digital divide as well as other societal divides, in terms of education, age, or gender, prevent some parts of society from actively becoming engaged in urban digital spaces. Willis (2019, 28) argues that India's Smart City Mission enabled 'enclave' development. People were denied their right to the smart city by, first, a crowding out of low paid and informal labour through the privatization, automation, centralization, and optimization of city services, and second, through the expulsion of the informal economy and informality in general from the urban space. She argues for acknowledging the innovation that lies at the margins, while "learning how urban informality adopts and works with technologies" (ibid., 39). Odendaal and Aurigi (2020, 105) suggest to "consider cities as socio-technical systems that incorporate human ingenuity, reinvention at the margins and, more than anything, to recognise that urban change is iterative and experimental."

The economic dimension of the smart city
Conflicts around the 'privatization' of the city date back long before the digitization of society. In the late 1960s, the field of critical urban studies developed, based on work by Henri Lefebvre, introducing the 'right to the city' (1996 [1968]) and Manuel Castells who developed a Marxist approach to the 'urban question' (1977 [1972]) and addressed 'city, class and power' (Brenner, Marcuse, and Mayer, 2009, 177). These authors shaped the idea that cities are crucial spaces for the "production, circulation and consumption of commodities, and [that] their evolving internal sociospatial organization, governance systems and patterns of sociopolitical conflict must be understood in relation to this role" (ibid., 178). The commodification of the smart city is one of the main criticisms in SC research today. In his pamphlet *Against the Smart City*, Adam Greenfield (2013) argues that it is difficult to think of the SC outside of a neoliberal paradigm. He criticises the privatization of public services, deregulation, and decreased public oversight of business activities as well as a reduction of tariffs and taxes. The social and democratic system in the SC is highly interwoven with the logic of the economic system it is embedded in. The city, according to Sassen (1996, 206), has emerged as a space for claims both "by global capital which uses the city as an 'organizational commodity'", and by disadvantaged, yet internationally connected groups. With increased competition for capital, local governments try to get ahead of their competitors with technology,

'branding' their cities as efficient, collaborative, participatory, liveable, and sustainable (Wadhwa, 2015, 125). While urban stakeholders develop "new urban development imaginaries" that claim to facilitate collaboration in SC governance, "a discourse of market triumphalism has been continuing to sweep its way through different spatial scales of government" (Gibbs, Krueger, and MacLeod, 2013, 2151).

> Indeed, even when citizens perform roles such as participants, co-creators, decision-makers, or owners, they are largely still cast within a neoliberal logic of choice, consumption and individual autonomy framed by state and corporate defined and legitimized constraints which prioritize market-led solutions to urban issues (Cardullo and Kitchin, 2017, 17).

Accordingly, technology companies are said to perceive the SC as a market, either through building cities from scratch (like Songdo) or offering established cities digital infrastructure and services. Kitchin (2014, 14) associates three problems with this development: first, public services increasingly serve private profits; second, cities become dependent on technological solutions provided by large technology companies; and third, generic smart city solutions leave little room for the uniqueness of a city and its inhabitants.

Technological solutions are closely related to investment opportunities and pressure on city councils to increase the pace of innovation (Cosgrave, 2013, 21-22). Often associated with the SC, the 'knowledge economy' or 'creative economy' stand for a general discursive shift towards a networked, competitive, smart, creative, and highly skilled workforce (Aurigi and Willis, 2020, 5) that is needed for the smart city multi-billion Dollar market (Wadhwa, 2015, 127). "The McKinsey Global Institute, for example, estimates the potential economic impact of new Internet of Things (IoT) applications and products to be as much as US\$3.9–\$11.1 trillion by 2025" (Bria and Morozov, 2018, 6). According to Kitchin (2014, 2), it is

> no surprise that some of the strongest advocates for smart city development are big business (e.g., IBM, CISCO, Microsoft, Intel, Siemens, Oracle, SAP) that, on the one hand, are pushing for the adoption of their new technologies and services by cities and states and, on the other, are seeking deregulation, privatisation and more open economies that enable more efficient capital accumulation.

Other important actors are consulting firms (e.g. Accenture, KPMG, Deloitte), "many of which now double as technology providers, investing heavily in technologies like

blockchain and Big Data" (Bria and Morozov, 2018, 10). Public-private partnerships (PPPs), defined as "a long-term contract between a private party and a government agency, for providing a public asset or service" (World Bank Institute, 2012, 11, quoted in Roehrich, Lewis, and George, 2014, 110), are often a subject of controversy in academic literature. On a positive note, PPPs are advocated for "the adoption of private sector techniques and market competition; stronger contracts; better performance measurements; formalized objectives; detailed output specifications, and an outcomes focus" (Hodge, Greve, and Biygautane, 2018, 1109). On the other hand, Flinders (2005) and Willems and van Dooren (2011) argue that PPPs lead to an accountability paradox. Although there are theoretically more accountability tools available, accountability in PPPs can be problematic because traditional principal/ agent roles become increasingly hybrid, mixing private and public tasks while decreasing possibilities of political control.

Life in a datafied public sphere

As outlined, much of the SC's promise is based on datafication for efficiency and better service delivery. Datafication in the SC refers to "the transformation of social action into online quantified data, thus allowing for real-time tracking and predictive analysis" (Mayer-Schönberger and Cukier, 2013, 198). Increasingly, handling and managing data in the SC is not with the democratically elected government but with private companies. Couldry and Mejias (2019) describe the dynamics of datafication as a new form of colonization (see also section 3.2.2). Data colonization reflects "an emerging order for appropriating and extracting social resources for profit through data" (ibid., 33), while encompassing all areas of human life in which we constantly produce data for capitalists to exploit. The authors suggest decolonizing data by boycotting large platforms, engaging in civic activism, investing in data literacy programs, or passing legislation for data protection and sovereignty, such as the GDPR in Europe.

Data protection and democratic control over data governance are essential (Gutiérrez et al., 2014, 185; see also Choenni et al., 2016, 349-351; Murphy, 2019, 183). Fuchs (2021, 19) argues for a digital commons, referring to "digital resources that are commonly controlled by humans". Examples for the digital commons range from non-profit platform cooperatives that are governed and owned by a community to free and open source software. From an autonomist, Marxist perspective, the "'commons' is constituted through a decentralized, networked, open source intelligence, the 'general intellect' of 'the multitude'" (Dahlberg, 2011, 9). Similarly, Davies (2020, 78) asks for more participation in

data use, production, and design. Sassen (2013) warns that although the first phase of a smart city can be promising, the *sensored* city can turn quickly into a *censored* city (quoted in Willis and Aurigi, 2017, 217). With sensors, the data flow of mobile phones and CCTV cameras, the smart city may capture the moves and traces of its residents, often without their explicit knowledge or permission. What Kitchin (2015) calls 'geo-surveillance' has serious implications for citizens' behaviour. It can support algorithmic governance that may discipline or control citizens (Cardullo and Kitchin, 2017, 4), while enabling companies to optimize their AI with increasing amounts of data (Bria and Morozov, 2018, 18). Greenfield (2013) and Chourabi et al. (2012) warn of the deterministic and positivist logic underpinning the digitization and datafication of cities in their continuous quest for more efficiency, supporting a technocratic governance model based on technological solutions. However, data and information are never complete, and algorithms are never purely objective (O'Neil, 2016).

The omnipresence of citizens' data floating in the smart city's digital infrastructure has implications for the subject's privacy (Choenni et al., 2016, 350). Wadhwa (2015, 129) criticises 'smart lights', consisting of sensors and cameras to monitor foot traffic, as "using the language of environmentalism to justify an expansion of surveillance" with the goal of analysing the subject's intentions, behaviour, and emotions (ibid., 137). He claims that "[l]iving in a smart city means existing in a state of normalized surveillance" (Wadhwa, 2015, 139). Rhue and Sundararajan (2013, 3) agree that "governments may well be monitoring citizens while citizens believe they are monitoring the government." Centralised data control raises "the spectre of a Big Brother society based on a combination of surveillance (gazing at the world) and dataveillance (trawling through and interconnecting datasets)" (Kitchin, 2014, 11). The manifestation of ostensible predictability becomes evident in the smart city's control or operation room, where data feeds are managed, visualized, and interpreted (Bria and Morozov, 2018, 8), e. g. in Rio de Janeiro. As citizens rarely know what information is being collected and how, there is a risk to decrease trust and transparency in democratic societies (Araya and Hassan, 2015). Even if collected data is anonymized and cannot be traced back to a single individual, already the subjective feeling of being monitored can lead to changed patterns of behaviour (Wadhwa, 2015, 137). Araya (2015, 12) adds that "the central feature of the discourse on smart urbanization is the desirability of technologies to monitor and guide human behavior." Cardullo and Kitchin (2017, 9) agree that "the citizen is steered and controlled by way of nudging, that is, gently persuaded of how to conduct a way of

life contained within optimal or ideal targets" – or what Greenfield (2013) calls a 'Singapore-style paternalism'. He also notes a particularly passive form of citizenship in the smart city. Even if citizens are involved in the creation of platform or services, it is often through feedback loops as part of customer service. Jameson and colleagues (2019, 15) suggest providing citizens with opportunities to facilitate engagement with the smart city ecosystem. In their study, residents of Amsterdam were concerned about the data they provided knowingly or unknowingly but had little exact knowledge on how their data is being used, "perhaps more hoping than trusting in the objectivity that data can inject into decision-making" (ibid.). In these scenarios, 'participation' does not lead to the subject's emancipation but may lead to subtle forms of control. Datta (2018, 414) adds that postcolonial citizenship in the SC "legitimises the surveillance of those on the margins of social power net-works by the "practices of democracy" by an elite civil society further empowered by digital citizenship." Accordingly, the market may set the framework for the delivery of public goods, arguably leading to both a technocratic and paternalistic governance model.

This reconfiguration of citizenship may lead to new "patterns of exclusion for marginalized groups" (Willis, 2019, 27), as there is little room for people who are not able or not willing to adapt to the SC, such as poorer or less educated parts of the population (ibid., 31). In India, for example, "80% of its citizens are currently outside the digital divide" (Datta, 2018, 406). According to Odendaal and Aurigi (2020, 99), "creating territorial exclusion, or exclusive enclaves of regeneration, and constructing the 'smart' citizen as a high middle-class dweller and user of services and infrastructure-rich areas offering specific lifestyle advantages, add up to make emergent smart city models." Willis (2019, 39) and Datta (2018) recommend acknowledging existing local knowledge, recognizing how cities and their citizens are already smart in their own way, and embracing the possibilities for participation brought about by the messiness of cities.

2.3 Conclusion: the dialectical relation of digitization and democracy

This literature review shows how perceptions of digital democracy in the smart city can range from progressive citizen-centred governance all the way to the Orwellian dystopia of 1984. It is demonstrated that the threshold for democratic participation has never been as low as today, as ICT make it easier to participate from home, only a click away from political participation (e.g. in online petitions) and discussion (e.g. on social media). The self-creation of citizenship through digital tools can take different forms, ranging from

citizen journalism to online community-building. Online deliberation forums are defined by several attributes that are distinct from analogue deliberation, for example the question of anonymity (Asenbaum, 2017, 2018; Moore, 2018), the mode of moderation, the distribution of information, the visualization of arguments (Benn and Macintosh, 2012) and gamification (Hassan, 2017; see also Friess and Eilders, 2015). In the smart city, information gathered through sensors may inform policy-making, leading some researchers to warn of threats to democratic legitimacy, such as surveillance through the state or private corporations (Araya, 2015, 3). However, these forms of governance also offer opportunities for innovative forms of citizen participation and deliberation. Through DCE in multi-stakeholder processes, co-production, and public-private partnerships the boundaries between the private sector, the public sphere, and the government become increasingly blurred (Rodríguez Bolívar, 2016, 59; Mainka et al., 2015). It is fair to say that the smart city provides unprecedented possibilities for citizens to become engaged, both in terms of format of participation and with regards to the topic. Figure two summarizes some ways in which the digital is influencing democracy.

Hybridization
- Less time and space boundaries
- Offline and online engagement
- Changed role of intermediary organisations
- Multi-stakeholder governance
- Direct vs. indirect participation

Individualization
- Wide choice of engagement opportunities
- Focus on self-responsibility
- Subject-centred information
- New possibilites for self-representation and identity-formation

Liberalization
- Information and data as commodity
- Market-driven solutions
- Open data and open source
- Blurring of private and public

Figure 2: Hybridization, individualization, and liberalization as materialization of digital democracy.

Importantly, the developments resulting from the digitization of democracy have broader societal implications and are in turn influenced by the overall societal changes in a digital age. As such, hybridization, individualization, and liberalization do not only matter for the digitization of *democracy*, but for societal development in general. Moreover, the three trends are closely interlinked and partly overlap. One might say that the digital acts as an accelerator of these developments at the interface of economy, the

public sphere, and politics. They therefore provide a potential answer to the differences between analogue and digital democracy, albeit inconclusive. There seems to be a dialectical relation of the 'digital' with democracy (see also Coleman, 2017, 15) – it can lead to empowerment or new vulnerabilities; it can lower the threshold of participation or create new mechanisms of inclusion and exclusion. Depending on how digital tools are used and implemented, they can thus both have a positive and a negative effect on democratic legitimacy. But what exactly is considered positive or negative? To better understand these effects, a normative framework is needed which can make sense of digital democracy's development. It has been shown that while rich work exists on individual platform types and functions in digital democracy, a more systemic approach which can grasp both the political and economic dimension as well as the interconnections between different digital engagement platforms is lacking. Therefore, the following chapter develops a systemic normative framework to capture the legitimacy of digital democracy.

3. Towards a normative framework for democratic legitimacy in the digital age

Democratic innovations that embody forms of participatory and deliberative democracy are emerging worldwide (Smith, 2009), increasingly using ICT to connect to citizens (Firmstone and Coleman, 2015; World Bank, 2016, 7; Wright and Street, 2007). Yet, the academic debate, research, and literature lag behind the rapidly evolving digital transformation of democracy. Moreover, theory and practice are often insufficiently connected as academics "have a poor track record at going beyond theory to practice" (Noveck, 2009, 188). This is problematic because it is crucial to examine the societal and political implications of ICT implementation in democratic structures, and most importantly their impact on democratic legitimacy. The question of legitimacy is critical in understanding how, in a democracy, individuals can submit to political power while keeping their autonomy and ability to live a self-determined and emancipated life. The original meaning of autonomy, which is inferred from the Greek 'auto' (self) and 'nomos' (law), is that someone is himself living by and giving his own laws (Swaine, 2016, 217). To understand and evaluate the implications of the transformation of democracy and civic participation in the digital age, a broader theoretical framework for the study of democratic legitimacy needs to be developed. Agreeing with Coleman and Moss (2012, 1), "online deliberative research and practice" should be "normatively driven". Only by making sense of the power relations surrounding digital tools and platforms for citizen participation and deliberation, including the interrelation between the economic and political system as well as the public sphere, will we be able to fully grasp their meaning for democratic development.

The goal of this chapter is therefore to develop a framework for the evaluation of the legitimacy of ICT-enabled democratic participation and deliberation in the smart city. To make sense of hybrid and complex processes and structures of digital democracy, the concepts of legitimacy drawn from participatory and deliberative democracy are coupled, emphasizing the importance of regular and egalitarian participation by all citizens that is structured by reasonable deliberation. This approach is comparable to Fung and Wright's (2001, 7) "empowered deliberative democracy". When merged, the theories of participatory and deliberative democracy capture the two main features of digitization for democratic governance: more direct two-way communication channels and lower thresholds for civic participation through easier access. Due to the strong interrelation between the political, civic, and economic life in the smart city, a participatory-deliberative *systems* approach is established in this thesis and set in a broader context of

the entanglement between the economic, political, and public sphere. The result is a framework of democratic legitimacy that is fit for the digital age. So far, there is no participatory-deliberative systems approach in academic literature to analyse the legitimacy of digitalized democratic processes in smart cities. Therefore, this chapter contributes to theoretical reflections on participatory-deliberative systems and their empirical implementation. Throughout the thesis, however, readers should keep in mind that "democratic theories or models tend to be incomplete, and, by their nature, their principles and rules drastically oversimplify the complexity of democratic practice" (Smith, 2009, 10).

3.1 A participatory-deliberative approach to democratic legitimacy

In academia, the number of critical voices has increased, claiming that democracy is losing its substance and that there is a need to revitalize the ideal of "government for the people, by the people and through the people" (Benhabib, 1997, 725). These authors (e.g. Agamben, 2012; Badiou, 2012; Bensaid, 2012; Crouch, 2004; Nancy, 2012) state that the current model of democracy is hollowed out in the sense that its institutions and processes keep up the appearance of a democracy, e.g. through regular elections, but that there is no democratic culture, indicated by a loss of civic participation and a decay of political communication. According to these critics, the roots for representative democracy's legitimacy crisis are twofold: firstly, inherent to the system of representative democracy (e.g. the structure and functioning of its institutions) and secondly, triggered by exogenous rationalities (e.g. neo-liberal policies of the past and the contradictions of capitalist markets).[9] The following section shows how political science and practice have reacted to the legitimacy crisis of representative democracy by introducing the concepts of participatory and deliberative democracy in theory and practice.[10]

3.1.1 Legitimacy in participatory democracy

The aim of this section is to outline a brief history of participatory democracy (PD) and to introduce its concept of legitimacy. The "participatory turn" in democratic theory is associated with a revaluation of the public sphere and the necessity to radicalize democratic practices (Bherer, Dufour, and Montambeault, 2016, 225). Fundamentally,

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[9] Alternative formulations of the roots of problems with regards to legitimacy are associated with more conservative thinkers, such as Crozier, Huntington, and Watanuki (1975) who argue that the crisis of democracy results in a decrease of government authority and an overload of demands and participants.

[10] Participatory and deliberative democracy are not the only ways political science and practice have reacted to problems associated with the legitimacy of representative democracy. However, these democracy theories are most widely cited and implemented in practice which is among the reasons for this thesis focusing on them.

"[p]articipatory democratic theory envisions the maximum participation of citizens in their self-governance" (Hilmer, 2010, 43). Menser (2018, 38) identifies three waves of PD. The first wave ranges from the 1800s to 1959 and includes authors like Rousseau or Mill, with a focus on participation in worker cooperatives and federations. The second wave is from the 1960s to the 1980s, involving e.g. Pateman (1970) and Barber (1984), with the former examining participation in workers cooperatives and the latter emphasizing the importance of communities. The third wave lasts from 1989 until today and analyses democratic innovations such as participatory budgeting (Cabannes, 2004), as well as environmental and global justice movements (Gould, 2014), post-Marxist thinkers and feminists (Fraser, 1990; Young, 1996). Until today, PD thus includes a vast array of normative and practical approaches to civic participation. Central to the theory is a distinction between sectors and modes of participation. A sector is the space of participation, for example a neighbourhood or workplace, at local, regional, or national government level. The mode is the form of participation (Hilmer, 2010, 46). It can be expressed in citizen consultations and councils, participatory planning, participatory budgeting, or citizens juries. NGOs, community organizations, associations and the private sector have increasingly included participatory practices in their organisational structures (Bherer, Dufour, and Montambeault, 2016). Smith (2005) groups these democratic innovations into six categories: e-democracy innovations, direct democracy innovations, deliberative democracy innovations, co-governance innovations, consultation innovations, and electoral innovations.

Major breakthroughs for civic participation in democratic theory came with Arnstein's "Ladder of Citizen Participation" (1969) and Pateman's influential book *Participation and Democratic Theory* (1970), in which she not only empirically shows the benefits of broad participation in political decision-making, but also dispels a range of myths associated with the role of civic participation in some political science classics. Rosseau and Mill influenced Pateman's (1970) thinking on participatory democracy, as these theorists introduced three central features for the study of democratic legitimacy: the focus on the individual, the importance of local realities, and the emancipatory potential of participation (Menser, 2018, 31). Participatory democracy theorists emphasize that it is important for democracy to be inclusive, that participation is effective, i. e. that it has an impact, and that it has an emancipatory effect. These features are outlined in what follows.

Inclusiveness

In participatory democracy, every individual citizen should be able to participate in political decision-making. This does not necessarily mean that individuals must take part in every policy-making process, but rather that they should have the possibility and the means to do so. Whereas Pateman (1970) mainly focuses on participation at work, Benjamin Barber (1984) widens the concept of participatory democracy to encompass all levels of society and the state. For maximum input, participation opportunities should both be embedded in citizens' everyday life as well as politically institutionalized. Citizens' expertise, interest, and knowledge should be applied to solve political problems. Fung and Wright (2001, 18) identify two main reasons for the turn towards broad participation:

> First, effective solutions to certain kinds of novel and fluid public problems may require the variety of experience and knowledge offered more by diverse, relatively more open-minded citizens and field operatives than by distant and narrowly trained experts. (…) Second, direct participation of grassroots operators increases accountability and reduces the length of the chain of agency that accompanies political parties and their bureaucratic apparatus.

In this way, new channels for citizen voice on matters in the citizens' interest are created with the prospect of exercising political power.

Empowerment

One of the central functions of citizen participation is its educative character. According to Pateman (1970, 43),

> the justification for a democratic system (...) rests primarily on the human results that accrue from the participatory process. One might characterise the participatory model as one where maximum input (participation) is required and where output includes not just policies (decisions) but also the development of the social and political capacities of each individual, so that there is 'feedback' from output to input.

Pateman thus emphasizes the educative function of participation, referring to the exercise of democratic skills and the psychological effects civic engagement can have. Citizens participating in political governance are assumed to gain higher levels of perceived agency and self-efficacy. They become empowered by the experience of autonomy and control over the social and political situation that affects them (Helmer, 2010, 56; see also Pateman, 1970, 24). "Individuals learn to participate by participating (...). Thus,

individuals need to interact within democratic authority structures that make participation possible" (Pateman, 2012, 10). Through these learning experiences the political astuteness of the subject increases (Hilmer, 2010). Political participation supports the acquisition of competences and skills based on everyday experiences. Following current education and cognition theory, Fung and Wright (2001, 29) "expect that many, perhaps most, individuals develop skills and competencies more easily when those skills are integrated with actual experiences and observable effects". Accordingly, participation "is an independent desideratum of democratic politics" (ibid., 28).

Effectiveness

Central to participatory democracy is the question of a redistribution of power towards citizens (Menser, 2018, 11): "citizen participation is a categorical term for citizen power. It is the redistribution of power that enables the have-not citizens, presently excluded from the political and economic processes, to be deliberately included in the future" (Arnstein, 1969, 1). Fuller (2015, 23) agrees that "[d]emocracy should be measured along the question "who holds political power"?" Although not all participation or deliberation must re-direct power to citizens for them to make political decisions, "it is generally agreed that democracy is essentially a way of making binding collective decisions in such a way that it connects those decisions to the judgments and interests of those whose conduct is supposed to be regulated by them" (Erman, 2016, 269).

When asked about the distinctive features of participatory democracy, Pateman points to the theory's emphasis on challenging authority and institutional structures. She suggests to "consider questions of power (public and private), of authority structures, of how things are organized, of structural and institutional change" (Pateman and Smith, 2019, 117). Arnstein (1969, 217) offers a practical perspective on how power can be conceptualised in participatory democracy by drawing on the metaphor of a ladder to differentiate eight levels of a redistribution of political power to citizens through civic participation. The ladder ranges from manipulation and therapy (rung one and two) in the beginning to informing (three), consultation (four) and placation (five). Higher in the ladder are degrees of citizen participation with more decision-making power. When citizens enter a partnership (six) with elected representatives, power is redistributed through negotiation and decision-making is shared. Partnerships can for example take the form of multi-stakeholder policies or planning committees with citizens (ibid., 224). Level seven, delegated power, goes one step further by giving citizens authority over

decision-making in the context of a political programme. At this stage, citizens may have the majority of seats in policy boards and elected representatives start bargaining with the citizens – not the other way around. The last step in Arnstein's ladder is citizen control (eight), describing a stage at which citizens autonomously govern an institution or a policy programme with no intermediaries (e.g. community schools) (ibid., 226). Although this stage involves the highest level of citizen power, this does not necessarily mean that it is the one most worthy to achieve. Full citizen control might lead to separatism between different communities (economic or socio-ethnic segmentation), leading to a situation in which poor communities oversee their own policies and programmes, but do not have the financial resources to support them (ibid., 228). Moreover, it might decrease the efficiency of policy implementation.

Despite the criticism on full citizen control, an important feature of participatory democracy is its emphasis on extending the subject's influence and control of democratic institutions and processes. After all, decision-making power must be distributed in a way that good outcomes are produced by reaching the objectives that citizens care about and have set (Scharpf, 1997, 19). PD imagines "democratic institutions that are at once more participatory and effective than the familiar configuration of political representation and bureaucratic administration" (Fung and Wright, 2001, 17). The structural implementation of participation is successful when citizens no longer need to fight for their right be involved. They are included from the beginning of the policy-making processes and participation goes beyond ad hoc campaign-based engagement (ibid., 23). Citizen input should thus have an impact on the policy at stake. If proposals by citizens in a participatory process are not implemented by the respective authority, a justification should be provided to mitigate the legitimacy deficit generated by a lack of implementation (Fernández-Martínez, Font, and Smith, forthcoming).

Participatory democracy and its critics
A frequently expressed criticism regarding participatory democracy is that it is based on the rather naïve assumption that citizens are capable of and have the desire to participate in political affairs (Warren, 1996). Meaningful participation, it is said, is complex and takes time and effort. Few citizens are willing to spend resources on it. Moreover, the educative character of participation is difficult to prove empirically (Hilmer, 2010, 56-57). Arnstein's critics say that the eight rungs of the ladder are not enough to cover the vast range of possibilities of civic involvement (Connor, 1988, 250). Tritter and

McCallum (2006) criticise the hierarchical nature of Arnstein's model, as not all citizens perceive 'citizen control' as the best possible outcome of participation and have different intentions with regards to participation. For Choguill (1996) 'citizen control' even represents the first rung of the ladder, as it indicates that the state does not provide citizens with adequate support or infrastructure, so that they are forced to rely on self-management. Collins and Ison (2006) add that participation should rather be conceptualised as social learning than as a redistribution of power, while Bishop and Davis (2006) emphasize that policy problems rarely remain constant, requiring different approaches of participation to solve them. Therefore, Arnstein is arguably too rigid to deal with multi-layered political problems. The critique's essence is that political decision-making is too complex and requires different approaches and a more differentiated view on political participation than provided by Arnstein's simplistic ladder. By emphasizing the inclusion of marginalized groups in decision-making, such as the poorest, radical theorists aim to prevent that seemingly emancipatory narratives of participation are transformed "into new 'tyrannies'" (Pearce, 2010, 15). According to Coleman and Moss (2012, 3), "there is a growing sense that inviting citizens to 'get involved,' without offering them opportunities to determine and discuss the terms of their engagement, is something less than democratic." Therefore, scholars turn towards deliberative democratic theory to address citizen-centred policy-making based on the exchange of arguments.

Concluding, according to Dean (2016, 81), frameworks for the evaluation of participatory democracy usually go down one of two roads: either they define a normative ideal and then build a continuum from least to most legitimate or they create institutional design features.[11] The approach taken here draws upon both approaches. Legitimacy in participatory democracy is applied as a normative ideal in the sense that participation should be effective, it should be empowering, and it should be inclusive (see also Bachrach and Botwinick, 1992; Kneuer, 2016, 667). Hence, participatory democracy should be judged by the extent to which it realizes inclusiveness, empowerment, and effectiveness.

3.1.2 Legitimacy in deliberative democracy
In the last twenty years, deliberative democracy has written a remarkable success story in political science. The concept is strongly influenced and was advanced by thinkers such as Jürgen Habermas (1987b, 1987c, 1992), Seyla Benhabib (1996), James Bohman

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[11] Dean (2016) instead proposes four modes of participation: knowledge transfer, choice and voice, collective-decision-making and arbitration, and oversight.

and William Rehg (1997), Joshua Cohen (1997), John Dryzek (2000), James Fishkin (1993) as well as Amy Gutmann and Dennis Thompson (2004). Deliberative democracy denotes a political system in which legitimate decision- and law-making are based on a reasonable discourse among equals: "legitimacy in complex democratic societies must be thought to result from the free and unconstrained public deliberation of all about matters of common concern" (Benhabib, 1996, 68). The ideal legitimate political order needs to be able to justify the presumption that its institutions and decisions represent the informed consent of all citizens concerned if they hypothetically had the possibility to participate as free and equal people in a discursive decision-making process. This thesis argues that only when reasonable deliberation based on communicative action is coupled with an active, participating citizenry and an institutional framework that enables citizens' everyday political participation, deliberative democracy can be fully developed.

The following sections set the normative framework of democratic legitimacy for the empirical analysis that follows, postulating that the normative framework of deliberative democracy necessarily requires a strong participatory foundation (see also Fung and Cohen, 2004). The "deliberative turn" (Dryzek, 2000, 1) in political theory establishes that the essence of democracy is deliberation. The theory of deliberative democracy described in this thesis focuses strongly on the early and late Habermas in an attempt to reconcile his earlier works in the context of critical theory with his later, more liberal thoughts. In "The Public Sphere", Habermas (1974) develops an understanding of an independent public sphere in which public opinion is formed and in "Legitimationsprobleme im modernen Staat" (1976, engl.: 'Problems of legitimacy in the modern state'), he introduces a notion of reconstructive legitimacy that builds the foundation for his influential theory of communicative action (1987b, c). In "The normative content of modernity" (1987a), Habermas differentiates between lifeworld and system. Habermas' later work *Faktizität und Geltung* (1992, engl.: 'Between Facts and Norms') significantly influences our understanding of deliberative democracy. Habermas is complemented by other scholars, particularly within the context of the deliberative system approach.

According to Habermas (2006, 412), modern democracies are based on three elements:

> first, the private autonomy of citizens, each of whom pursues a life of his or her own;
> second, democratic citizenship, that is, the inclusion of free and equal citizens in the

political community; and third, the independence of a public sphere that operates as an intermediary system between state and society.

Democratisation cannot provide a priori preferences for a particular organisational type (Habermas, 1976). However, according to the deliberative model of democracy, institutions need to be set up in a way that the "common interest of all results from processes of collective deliberation conducted rationally and fairly among free and equal individuals" (Benhabib, 1996, 69). As such,

> deliberative democracy provides for a form of political autonomy: that all who are governed by collective decisions – who are expected to govern their own conduct by those decisions – must find the bases of those decisions acceptable. (Cohen, 1996, 102)

Habermas' discourse ethics serves as the basis for general principles and processes behind the claims to validity of deliberative democracy. The institutionalisation of appropriate procedures and communication requirements and its interplay with public opinions informally formed are central to the theory (Cohen and Fung, 2004, 24). In this context, the proceduralisation of popular sovereignty and the connection of the political system with the peripheral networks of the political public form the image of a de-centred society. Civil society is considered the social foundation of autonomous public spheres and is to be distinguished from the economic system as well as from public administration (Habermas, 1992, 363).

Conceptualisation and definition of legitimacy

In modern political philosophy, the qualities of empirical or sociological legitimacy as opposed to normative legitimacy are debated among philosophers. The sociological or empirical concept of legitimacy is based on the actual recognition of domination (Petersen, 2008, 7). Normative legitimacy considers the dimension of the worthiness of recognition of domination. A "power relationship is not legitimate because people believe in its legitimacy, but because it can be *justified in terms of* their beliefs" (Beetham, 1991, 11, emphasis in the original, cited in Stanford Encyclopaedia of Philosophy, 2022). Hence, the normative standards which form the basis of rule need to be accepted (Petersen, 2008, 7).

Habermas (1976) criticises both an empirical notion of legitimacy as well as a normative concept. Instead, he offers a third conceptualization which combines aspects of the two:

reconstructive legitimacy. As in the normative model, legitimacy, according to Habermas, describes a political order's worthiness to be recognized. The stability of a system of rule depends on its practical recognition which is why the notion of legitimacy is usually articulated in situations with legitimacy problems, in the sense that a political order is contested (ibid., 39). As in the sociological model of legitimacy, Habermas acknowledges that the belief in legitimate rule depends on empirical motives. However, these motives are not built independently of their power of justification. What is accepted as justification and able to achieve consensus depends on the standard of justification. The standard specifies formal conditions and procedures for the acceptability of justifications. The conditions are specified as rules of communication that allow for an agreement amongst free and equal people. These rules are the only valid source of legitimacy. Consequently, reconstructive legitimation describes a process of finding a system of justifiability that enables the assessment of given legitimacy demands for their validity (ibid., 58) (see also Willers, 2014).

Discourse ethics

Hands (2007, 94) argues that "e-democracy requires a moral dimension to ensure it does not collapse into a de-facto struggle for domination." In this thesis, justifiability is determined in Habermas' discourse ethics, a moral constructivist theory which relies on an epistemic notion of truth. The procedure to justify norms is the practical discourse (Habermas, 1991, 132-133). The practical discourse is governed by the principle of universalization U, stating that all affected can accept the consequences and the anticipated side effects of a norm's general observance, and the consequences are preferred to those of known alternative possibilities for regulation (ibid., 31-32). This moral principle counts always and everywhere and is not bound to a certain epoch or culture. Therefore, it is universalistic. Thus, U is the only purely moral principle in Habermas' philosophical theory as it belongs to the logic of the discourse itself. In this sense, the principle D, which replaces the concept of subjectivity with the concept of intersubjectivity, is a deduction of U. It states that only those norms can claim to be valid that find the consent of all concerned, if they would participate in a practical discourse (ibid., 32). Therefore, legitimate norms need to be approved by every person potentially affected whereby every participant would reasonably decide to accept the norm. Hence, every person in the actual argumentation is forced to take the perspective of all other participants (ibid., 134).

Communicative action and discourse rules

Discourse in the public sphere should be based on communicative reason instead of instrumental reason. Only via reason founded in communicative interaction, norms can be justified (Habermas, 1987a). The discourse is reasonable if it can be challenged by the following validity claims: *intelligibility* (the utterance can be understood in the respective situation), *truth* (arguments have „the goal of communicating something about an objectified reality" (Habermas, 2001, 64)), *normative rightness* (the norms of the discourse are morally acceptable), and *sincerity* (the speaker is truthful and means what she or he says) (ibid., 63-64). However, not every discourse can meet these requirements and in most cases an approximation must suffice. The validity claims should be perceived as intuitively known pragmatic presuppositions of an ideal speech practice (ibid., 64).

Processes of opinion and consensus formation become institutionalised in the public sphere. In deliberative democracy, procedures and communicative preconditions for democratic will-formation are the most important channel for the discursive rationalisation of political decisions. Governmental power is not only monitored after its exercise but also programmed (Habermas, 1996). "Citizens in such an order share a commitment to the resolution of problems of collective choice through public reasoning and regard their basic institutions as legitimate insofar far as they establish the framework for free public deliberation" (Cohen, 1997, 72). However, the public sphere cannot act upon itself. In the Habermasian "two-track" model (Benhabib, 1997, 725), communicative action is transformed via legislation into political and administrative power (Habermas, 1992, 362-363).

Cohen (1997, 74-75) and Habermas (1992, 370-371) agree on the following characteristics for deliberation as the basis for a high-quality discourse. Firstly, the format of deliberations needs to be reasoned and argumentative. "Reasons are offered with the aim of bringing others to accept the proposal (…) through free deliberation among equals" (Cohen, 1997, 74). Secondly, deliberations should be inclusive and open. Every citizen possibly affected by the problem discussed is allowed to participate in the deliberation. This reflects the legitimacy criterion of inclusiveness developed in the theory of participatory democracy. Thirdly, deliberation needs to be free of internal pressure: "participants are substantively equal in that the existing distribution of power and resources does not shape their chances to contribute to deliberation, nor does that

distribution play an authoritative role in their deliberation" (ibid.). Statements are motivated by the 'force of the better argument' (Habermas, 1992, 370). Fourthly, deliberation must be free of external pressure in the sense that participants are sovereign and autonomous. They are only bound to the preconditions for communication and the rules for the process that have been agreed upon before. Additional conditions describe the political character of the deliberations' procedure (Habermas, 1992, 371; Cohen, 1997, 74). This includes that deliberations are generally aimed at a rationally motivated consensus and can in principle be continued indefinitely (or resumed at any time). The need for a decision, however, is acknowledged so that political deliberations can be ended by majority vote. As this vote is combined with deliberative practice, it is assumed that the fallible majority opinion is reasonable if the minority does not convince the majority otherwise (Benhabib, 1996, 72). Lastly, political deliberations can extend to all matters whose public regulation is in the interest of citizens as well as to the interpretation of needs and a change in attitudes and preferences. However, no complex society will even under the most favourable conditions ever fully correspond to the model of purely communicative socialization. The image of an ideal discourse is a methodological fiction which can reveal problems in society and the reverse side of communicative reason (Habermas, 1992, 394-395).

Critics of deliberative democracy

Due to its normative character and demanding preconditions, deliberative democracy has been criticised from different angles. Foucault (1984, 373) rejects Habermas' universal discourse ethics and considers the validity claims as belonging to a power/knowledge nexus which is characterised by three constraints that define the discourse: first, external rules dictate which discourse is respectable. Second, internal rules provide techniques to define truth (e.g. culture or hierarchy). Third, rules of employment determine which parts of the discourse are open for everyone as well as the weight of each speaker's voice (Love, 1989, 279-280). Foucault analyses discourse as part of history that constitutes individuals as subjects (ibid., 274). According to Foucault, there is no space for communicative action in society. He asserts that a society or a democratic system without the exercise of power does not exist. However, he also acknowledges that studying power relations becomes even more important under these conditions to find ways to eradicate them. Foucault (1984, 378) recognises that "[t]he idea of consensual politics may indeed at a given moment serve even as a regulatory principle or better yet as a critical principle with respect to other political forms".

Feminist thinkers and difference democratic theorists (e.g. Fraser, 1990; Young, 1996) claim that deliberative democracy suppresses difference. They stress the need for democracy to support historically and socially oppressed segments of society. These critics agree with Foucault that the arguably reasonable interaction in deliberative democracy is not neutral in real life, as it excludes a variety of voices, particularly those of minorities, and neglects inequalities in the discourse (Dryzek, 2000, 57-58; see also Kapoor, 2002). Radical democrats, such as Mouffe and Laclau (1985), agree that a fully inclusive consensus is impossible to achieve. In Mouffe's (2000, 13) opinion, deliberative democracy is not able to perceive agonism and value pluralism. Instead, a democratic model is needed that is better able to capture democracy's political nature, placing power and agonism at the centre. Austen-Smith (1992) is skeptical that arguments by one actor can change the preferences of another actor, as speech in politics is strategic. Przeworski (1998) points out that deliberation may induce individuals to accept false beliefs about the courses of action that are in their interests. Others emphasize that there *must* be a vote at the end of every deliberation. Otherwise, deliberation will be endless (Saward, 1998, 64).

Although raising important points, some critics of deliberative democracy, like Foucault, have difficulties to separate between the subject's capabilities and its constraints through power. Foucault does not distinguish between different sorts of power – those that can be used for emancipation and those that suppress (Love, 1989, 291). One of Foucault's most crucial analytical problems is that he denies the subject's capability of self-determination: "Foucault asks us to examine how subjectification limits us and to resist those limits. But what in us can criticize and transgress? Once Foucault defines subjectivity as subjugation, where can he turn for resistance?" (ibid., 277).

Responding to Mouffe's critique, Dryzek (2005) points out that her approach lacks a place for the resolution of societal problems and democratic decision-making. In her account, he says, societal divisions cannot be overcome, as adverse identities are reinforced, especially under conditions of oppression and hierarchy. On Iris Young's critique that deliberative democracy cannot handle difference and has no place for identity, Dryzek (ibid., 225) argues that "[i]dentities are bound up with discourses." They are not a genetic constant but socially constructed in the discourse and as such more fluid. Some deliberative democrats agree that there are forms of communication that may be more conducive for specific societal groups. Storytelling and rhetoric may be included in

deliberations if the speech act is non-coercive (Dryzek, 2000, 68). Moreover, it needs to be kept in mind that Habermas does not deny difference and inequalities in discourses - quite the opposite, for if there was no difference, there would be no need for deliberation. The discourse rules, as intuitively assumed preconditions for a reasonable discourse and presuppositions of existing argumentation practice, can facilitate consensus-seeking *despite* difference. Habermas also acknowledges that modern societies will never fully correspond to the model of purely communicative socialization. He thus does not describe the empirical realization of the discourse, but its normative ideal to facilitate legitimate decisions that are acceptable to as diverse groups as possible. As outlined, the ideal discourse is a normative fiction which should bring the reverse side of communicative reason, hence power and oppression, to light to overcome it (Habermas, 1992, 394-395). Despite valid and important critique, therefore, deliberative democracy's notion of legitimate political rule remains a highly valuable normative tool for transgression, enabling an assessment of the standard of legitimacy of political institutions and processes and revealing existing power imbalances.

A participatory-deliberative framework of democratic legitimacy

Deliberative and participatory democracy have for a long time been conceptualised as two lines of democratic theory (Fung and Cohen, 2004, 24). It is argued that not all forms of participation have a deliberative component and that not every deliberation must occur among all citizens potentially affected by the subject (Florida, 2013). This section argues that the distinction between participation and deliberation is artificially constructed, following researchers such as Elstub (2018), Fung and Cohen (2004), della Porta (2013) and Dryzek (1987). Elstub (2018, 188) points out that the explanatory and normative potential of both participatory and deliberative democracy is reduced without considering the other: "so it is desirable and coherent to pursue a 'participatory deliberative democracy' in which citizens participate in making collective decisions through deliberation."

I suggest bridging the gap between the two concepts by Habermas' discourse ethics. The principles D and U, stating that only those norms can claim to be valid that could meet with the approval of *all affected,* connect the understanding of legitimacy in participatory and deliberative democracy. As such, they build an overarching framework that reconciles the two theories. Both theories emphasize that the affected subjects need to be included in decision-making processes regarding the policy at stake. Deliberative

democracy reflects participatory democracy's core principle of egalitarian access to decision-making power. In line with Fung and Cohen (2004, 31), it is assumed that "participatory-deliberative arrangements and competitive representation can be transformed and linked so that each strengthens the other." One may ask why this thesis applies the terminology 'participatory-deliberative' if participatory democracy can be integrated in deliberative democracy. The reason is that some theories of deliberative democracy place less emphasis on active participation of broad citizenry. This thesis, however, emphasizes the importance of both dimensions on an equal footing, participation by all potentially affected, that can empower the subject, and deliberation based on communicative reason. However, critics may counter that a high-quality deliberation usually comes at the cost of large-scale participation and vice versa. The complexity of modernity may limit the extent to which both participation and deliberation can be pursued (ibid, 27-29). Fung and Cohen (2004, 28-29) offer two responses: "Mediated (Indirect) Society-Wide Deliberation" and "Direct Participatory Deliberation". In the former concept, deliberation takes place in a Habermasian public sphere, shaped by social movements, associations, vibrant media, civil society organisations, and other citizen networks. The latter describes deliberative mini publics in which citizens deliberate over given public or social issues. In this thesis, both concepts will be combined in a systemic approach of participatory-deliberative legitimacy, inspired by Mansbridge and colleagues' (2012) concept of a deliberative system.

Summarizing, the participatory-deliberative legitimacy framework offers a space for reflection to review and revise DCE. How this can be materialized while including the systemic dimension of the smart city will be subject of the following section.

3.2 Bringing systems theory back in

Deliberative democracy has found its way far beyond academia into practical policy-making (Pateman, 2012, 7; Pateman and Smith, 2019). Citizen juries, deliberative polling, citizen forums and assemblies as well as deliberation in participatory budgeting are just a few examples in which deliberative democracy is practised. However, these projects often remain single episodes with little impact on political decision-making. They are sometimes criticized as a legitimizing strategy (tokenism), for involving too few participants and for crowding "out organic forms of civic life and citizen participation" (Dean, Boswell, and Smith, 2020, 691). As Mansbridge and colleagues argue (2012, 1), "no single forum, however ideally constituted, could possess deliberative capacity

sufficient to legitimate most of the decisions and policies that democracies adopt." Consequently, Dryzek (2010), Mansbridge and other colleagues (2012) have in recent years advocated for a systemic turn in the study of deliberative democracy. The following section summarizes the current academic debate on deliberative systems and explores the relationship between deliberative systems and governance networks which are particularly important in the SC context. I argue that a systemic perspective on participatory-deliberative democracy should be supported, but that current research on deliberative systems largely disregards the importance of systemic power imbalances, introduced by the interference of the political and economic system. Therefore, this section aims to connect Habermas' earlier works on system versus lifeworld with recent research on deliberative systems.

3.2.1 The systemic turn in deliberative democracy

The deliberative systems approach emphasizes that democracy should be perceived as multiple acts that involve different degrees of deliberation: "A systemic approach to deliberative democracy is one that can conceptualize heterogeneous deliberative practices and sites, as well as their respective contributions to a deliberative system's overall quality" (Esau, Fleuß, and Nienhaus, 2020, 2-3). Therefore, scholars study democracy as 'deliberative' instead of 'deliberation' itself (Parkinson, 2018, 432).

> Normatively, a systemic approach means that the system should be judged as a whole in addition to the parts being judged independently. (...) [I]n the systemic approach the entire burden of decision-making and legitimacy does not fall on one forum or institution but is distributed among different components in different cases. (Mansbridge et al., 2012, 5).

The deliberative system approach of Mansbridge and colleagues considers four main dimensions: state decisions and laws, processes that lead to these decisions, informal speech related to these decisions, and speech arenas that are not related to state decisions but deal with issues of common concern (ibid., 9). They argue that deliberation should be studied beyond single spaces "to understand how each venue is influenced by interactions across the various parts of the deliberative system as a whole" (ibid., 25-26). According to Esau and colleagues (2020, 91),

> thinking about deliberative democracy in systemic terms is not an entirely new approach. The core idea can be traced "back to Habermas' (1996) notion of the dual-track model of deliberation" (Elstub et al., 2016, p. 143). Habermas conceptualized the socio-political system as being constituted by a political-administrative "center" and the "peripheries of discursive production".

Analysing online deliberation on German immigration policy, the authors identify three levels of deliberation in a deliberative system: informal (e.g. social media), semi-formal (e.g. discourse and comments under online newspapers) and highly formal (e.g. an online consultation, initiated by a government body). Proponents of the deliberative systems approach "take the state and its legislatures as the ultimate decision-makers in a polity, but not as the centre to which everything is aimed" (Mansbridge et al., 2012, 9-10).

Smith and Owen (2015) criticize, however, that the focus on the deliberative system waters down the normative quality of its parts. They say that a democratic system could account for a deliberative one even if there is no deliberation among citizens at all, only if deliberation in general takes place, for example between elected representatives or in media. Parkinson (2018, 440-441) therefore suggests to "think of a deliberative democracy in which none of its component parts meet all the criteria for deliberativeness but which expresses the deliberative quality given particular configurations of its constituent parts." Hence, a deliberative system can consist of actions that do not comply with all deliberative criteria constantly, but it needs to feature deliberation at least to some degree. However, while there is a vast literature on the different shapes a deliberative system may take, "very little has been offered in terms of standards or criteria for what is required for a system to be both deliberative and democratic" (Erman, 2016, 264). Erman (ibid.) suggests basing the evaluation on the extent to which a deliberative system may enable inclusion, representation, and equality. This thesis instead bases the evaluation on the legitimacy framework developed in this chapter, coupling deliberative and participatory democratic theory. For the conceptual framework, the normative ideal of deliberation does not need to be fully reached on every engagement platform, but the ideal of a participatory-deliberative democracy is used to evaluate participatory and deliberative actions and their linkages as part of the system, using an interpretivist methodology.

Interpretive network analysis

Ercan, Hendriks, and Boswell (2017) have analysed the role of interpretive research for studying deliberative systems. They depict two trends in research on deliberative democracy: First, a trend towards the empirical analysis of deliberative processes, e.g. in the context of citizen forums or juries, testing hypotheses derived from deliberative

democracy theory. The second movement looks beyond specific forums, analysing different sites, actors and spaces that contribute to deliberation (ibid., 196):

> Some of these sites are more deliberative than others, others more contestatory (Mansbridge et al, 2012). Some occur within the state, others outside (Ercan and Dryzek, 2015). Some sites are ongoing and form part of established political institutions; others are one-off innovations or public protests. What is important is that different sites serve overlapping functions, involve diverse participants and invoke different norms of engagement. Few, or perhaps none, entail all the ideal aspects of democratic deliberation in isolation, but, ideally, as a collective they foster inclusive and reflective discussion on matters of common concern.

Maps of networks, consisting of nodes and venues, may be used to visualize deliberative systems. What constitutes venues connecting the nodes of different deliberative acts is contested, as linkages or transmissions between nodes are undertheorized and understudied: "Network maps present deliberative systems as venues—nodes—connected by … well, connected by what? The deliberative literature is unclear on this point" (Parkinson, 2018, 438). At the same time, for a functional system, the links between its elements are fundamental (Lyons, 2017, 2-3). Linkages or transmissions could for instance stand for hashtags, hyperlinks, keywords used, assumptions, degrees of power or discourses (Lyons, 2017; Park, 2003; Parkinson, 2018). Boswell, Hendriks, and Ercan (2017) differentiate between three types of deliberative transmissions: institutional, discursive, and innovative. The first refers to transmissions entering and within democracy institutions; the second relates to narratives and claims across institutions and discourse sites; the third analyses how democratic innovations are coupled with the traditional institutions of representative democracy.

Horizontal governance networks, defined as partnerships between the public and the private sector to develop policies, can play an important role in deliberative systems, involving a range of activities such as multi-stakeholder processes, co-production, or public-private partnerships (Hendriks and Boswell, 2018, 408). Tamura (2014) conceptualizes grassroots civic participation as part of deliberative systems as "nested deliberative system" that is both part of macro-systems and micro-systems. He argues that more informal participatory spaces where collective decision-making occurs, like social movements and the intimate sphere, should be considered as micro-deliberative systems, even if their mode of communication may be mostly non-deliberative. Erman

(2016, 267) agrees that deliberative systems are constituted by both informal (e.g. civil society engagement) and formal parts (e.g. decision-making procedures). Governance networks should not be mistaken to constitute a deliberative system in its entirety, as they often consist of elites with strong interests. They should rather be perceived as an important contribution to such a system. Hendriks and Boswell (2018) identify four strengths and three weaknesses of governance networks as part of deliberative systems. The first strength is that they provide a space where new, creative ideas are developed and implemented. Second, networks possess the necessary knowledge and resources to focus deliberation on complex issues and resolve political problems. Third, they offer possibilities to connect communicative spaces by bringing together different stakeholders (citizens, academics, business and media representatives, politicians etc.). Fourth, actors in governance networks "can help push public deliberation beyond opinion formation into will formation. (…) The capacity for network actors to produce concrete policy outcomes helps bring legitimacy to public deliberation" (Hendriks and Boswell, 2018, 411).

The challenges governance networks bring to deliberative systems are, first, a tendency towards elitism and exclusion, as governance networks consist mostly of selected professionals from civil society, government and public administration, academia, and business. Second, it is difficult for governance networks to connect to informal and less organized discourses, movements, and networks. Third, there is a risk that governance networks become dominated by interest groups or controlled by the state. Thus, governance networks can potentially involve a diverse group of stakeholders in political decision-making processes, increasing its inclusiveness, although issues of representativeness frequently arise. Moreover, governance networks do not always apply to deliberative democracy's norm of openness as they often operate out of public gaze. On the other hand, "secrecy can help to promote effective deliberation among actors who would be unwilling to reach for common ground under the bright lights of publicity" (ibid., 409).

The contribution of digital networks

How can digital networks contribute to deliberative systems? Zgiep (2019, 1-2) applies a network approach to deliberative systems by offering a "relational-pluralist structure in which horizontal and vertical ties are established not only between institutions but also among individual actors and entire networks." He argues that in deliberative

systems theory, the link between the micro and macro level is missing. Taking institutions as main elements of a system, he differentiates three levels of connections: "intra-institutional (actor-centered), inter-institutional (institution-centered) and trans-institutional (network-centered)" (ibid., 2). Digital media can enable linkages between different discursive spaces (Lyons, 2017, 2): "A social network structure is created when connections ("links," "ties," or "edges") are created among social actors ("nodes" or "vertices"), such as individuals and organizations" (Himelboin et al., 2017, 2). According to Castells (2001), networks play a critical role in the information age (see also section 2.1). A network society is organized around digital networks of information. Simone (2010, 120) argues that "participatory digital technologies best support interactive and adaptable networks for deliberation. These networks sustain enclave and shared nodes where multiple publics can engage in deliberation within and across public boundaries." Here, the "public sphere is constituted by multifaceted networks of communication, which include nodes populated by multiple publics, some dominant, some subaltern" (ibid., 126). Only "if those enclave nodes can be tied to each other as well as to shared nodes, democracy benefits" (ibid., 128).

The advantage of the framework developed in the previous sections is that the institutional arrangements are flexible, as deliberative democracy does not a priori prefer one particular institutional form. Owen and Smith (2015) criticise about Mansbridge's systemic approach that the appropriate place of deliberation is not clear as well as the balance between deliberation and other participatory activities and interactions. As demonstrated, participation is inherently intertwined with deliberative democracy. This way, the model of the participatory-deliberative system covers both a far-reaching conceptualisation of the public sphere and its deliberative and participatory spaces as well as an embeddedness in existing structures and institutions of representative democracy. The deliberative systems approach is applied to participatory-deliberative theory. What is missing, however, is the role of the economy in this approach, which is particularly important when analysing digital democracy in the smart city, as demonstrated in chapter two. The next section aims to fill this gap.

3.2.2 Lifeworld and system in a digital age
The influence of economic power on political decision-making is missing in deliberative systems theory which largely neglects that deliberation in a deliberative system may be distorted by the rationalities of the economic system. To be able to make sense of a

potentially colonized public sphere in market-driven smart cities (see section 2.2), the gap in theory will be filled by referring to Habermas' (1987a) earlier works on the differentiation of system and lifeworld, combining them with current research on deliberative systems and the digital public sphere. The 'system' in this section has a different meaning than the 'deliberative system' of the previous section. The former refers to Habermas' early works on system and lifeworld, whereas the latter depicts current debates on democratic systems. What Habermas calls lifeworld is a central component of deliberative systems. Following Fuchs (2021, 13), Habermas concept of the public sphere is updated to help us better understand digital democracy.

The colonization of the lifeworld through systems

Communicative action, institutionalized in a strong public sphere, the lifeworld, offers the necessary tools to create a counterweight against the technical-instrumental rationality of capitalism (Habermas, 1987a, 337-339). Simplified, human interaction can be strategic and based on utility calculations or directed towards reaching a common understanding (Baxter, 1987, 40). The context in which the latter, communicative action, occurs is called lifeworld. The structure of the lifeworld is symbolically reproduced by processes of communicative action, ensuring that new social situations can relate to already existing conditions (ibid., 51). The process of reproducing the lifeworld works fine if it is balanced and undistorted. However, when traditions and old stocks of knowledge become less important they lose their "meaning and cannot be continued without adaptions" (Hartmann, 2019, 251). Important norms of interaction lose their relevance. A reproduction crisis of the lifeworld is the consequence (Habermas, 1987a, 341-343). The process of reaching agreement through language then becomes a necessary condition to connect with one another. Within modern societies, universalistic procedures of will formation (section 3.1.2) strengthen solidarity and stabilize processes of socialization. This, according to Habermas (ibid., 363-365), is the normative content of society.

With processes of differentiation and rationalization, a systemic world, a material reproduction, splits up from the lifeworld. Greater contingency of the lifeworld allows on the one hand for a rational debate based on validity claims. On the other hand, it triggers the development of communication media in the economic and political system. For the economy, the generalized medium (*Steuerungsmedium*) is money, for politics it is power. They "replace linguistic 'communication' in certain functional contexts, thereby

replacing the 'mechanism' of linguistic understanding and consensus" and the "interactions that they mediate are 'uncoupled from the life-world'" (Baxter, 1987, 56). Whereas communicative action in the lifeworld is normatively motivated, interactions regulated by money or power are empirically motivated towards the satisfaction of needs. In modernity, the economy is functionally interwoven with the state. Money allows for the creation of a specialized subsystem that supports its interaction with the system's environment. Through taxes, the economic system relates to the political system. The medium of the political system (power) is thus assimilated with the medium of the economic system (money). These contexts of interactions have gained autonomy as subsystems and take the form of a norm-free societal system (Habermas, 1987a). The system has functional imperatives to maintain itself whereas the lifeworld follows a normative logic.

> Habermas reaches the conclusion that private enterprises and the state do not treat people as citizens, but as consumers, and that the instrumental rationality of money and power colonise rational-critical deliberation (…). Habermas detects a strategic colonisation by the economic and bureaucratic means of the market and the state towards the lifeworld – and this gives rise to structural violence exercised by systemic restriction of communication: "In the end, systemic mechanisms suppress forms of social integration even in those areas where a consensus-dependent coordination of action cannot be replaced, that is, where the symbolic reproduction of the lifeworld is at stake. In these areas, the *mediatization* of the lifeworld assumes the form of a *colonization* (1987, 196; italics in the original)." (Valtysson, 2012, 80)

The lifeworld and its vulnerable interaction which is based on communicative reason plays a rather passive role as against the motors of societal modernization, state, and economy. But the normative logic of rationalized lifeworlds can find expression, for example through post-material values that conflict with the functional imperatives of the systemic world. The private and the public sphere are both integrated in the lifeworld and thus differentiated from the systemic world. The public sphere is perceived from the perspective of the political system as network of communication in which political discussion occurs (through the press, digital media, or the culture industry) (Baxter, 1987, 67). As Habermas (2006, 415) puts it: "Imagine the public sphere as an intermediary system of communication between formally organized and informal face-to-face deliberations in arenas at both the top and the bottom of the political system."

There is a need for autonomous public spheres, so that impulses from the lifeworld can enter the systemic world. According to Erman (2016, 278), "the public space must be sufficiently independent of the decision-making loci and not try to 'mirror' it." Therefore, the analysis of external interchange processes between lifeworld and system must be part of social theory. Habermas (1987a, 196) refers to interchange processes between system and lifeworld as mediatization of the lifeworld, while identifying an expansion of the economic and political system at the expense of the lifeworld. Thus, when analysing participatory-deliberative systems, their 'systemic' or economic dimension must be carefully included, paying attention to its potential influence on discourses in the public sphere. At the same time, discourses in the public sphere can influence both the political and the economic system. "At the periphery of the political system, the public sphere is rooted in networks for wild flows of messages (…). These published opinions originate from various types of actors—politicians and political parties, lobbyists and pressure groups, or actors of civil society" (Habermas 2006, 415). More recently, "it has been suggested that markets are not norm free" (Hartmann 2019, 252) and that they "take their legitimations from an evolving lifeworld that supplies them with the normative backing they need" (ibid., 253).

The public sphere: between independence and colonization in a digital age

What are the implications of the lifeworld/ system model for the normative legitimacy framework of *digital* democracy? In "Technology and Science as Ideology" (1971), Habermas states that technology's role in modern society can either be culturally or purpose driven. What is new to modern societies is not technology itself, but the extension of the rational-instrumental logic of the systemic world that permeates technology at the expense of communicative action. According to Dahlberg (2001, 619), "[d]emocracy requires political information flows and public debate autonomous from both corporate and administrative power." Guarding against an expansion of a rational-instrumental logic, Habermas demands a distinction between technology-facilitated work and interaction, as well as a sphere for communicative reason to be expressed.[12] Tina Sikka (2011, 94) argues that

> current technologies, at least in degree, are engineered to transform more fundamentally the sociocultural, environmental, and biological landscape of our lives both within and outside of the realm of the everyday. What sets them apart, as such and this remains the

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[12] Habermas generally views the instrumental rationality of the system as neutral. Only when this logic infiltrates the lifeworld, it becomes problematic.

case whether we are talking about computer technologies, biotechnology, reproductive technologies, communication technology or environmental technologies is their profound invasiveness and totalizing logic.

Feenberg (1996, 67) develops Habermas' thoughts further by introducing technology as another steering medium of the systemic world next to power and money: "Technology is a medium in which instrumental action-coordination replaces communicative understanding through interest-biased designs." He agrees with Habermas that the rationalization of modernity has become increasingly all-encompassing. Therefore, he aims "to rectify this bifurcation of reason and experience through a reformulation of technology and technical practice. His interest, as such, is in developing an alternative kind of modernity made possible through the democratization of technological design" (Sikka, 2011, 99). Drawing on constructivism, Feenberg (1996, 59) – opposed to Habermas – does not think that technology is neutral, but that it is the result of cultural, economic, and political processes. He argues that technology as a new medium is comparable to money and power. "The essence of technology is shown to be historical and reflexive, like the essence of other social institutions. As such an institution, its rationality is always implemented in value-biased forms subject to political critique" (ibid., 45). According to Heyman and Pierson (2015, 5), a colonization of the lifeworld through the medium technology occurs when an expectation is prescribed, for instance about sharing personal information on social media:

> Our premise is that social media in the commercial space are often configured in such a way that their prescribed program is aimed at immaterial labor. In that way, social media technology can lead to colonization of the lifeworld. (…) From the moment social media systems extend beyond their intended social goal, the lifeworld is colonized.

The authors show how Facebook, based on the media technology and money, colonializes the public sphere by limiting the subject's communication to those features that support profit generation, while subsuming the private (or semi-private) sphere in the commercial market (see also Valtysson, 2012). Habermas (2006, 416) emphasizes that "the deliberative model expects the political public sphere to ensure the formation of a plurality of considered public opinions." The public sphere needs citizens to voice societal problems. Fuchs (2021, 14) therefore argues for "slow media":

> The predominant media are high-speed spectacles that are superficial and characterised by a lack of time provided for debate. They erode the public sphere and the culture of political discussion. They leave no time or space to citizens for grasping the complexity

of society and for developing arguments. What we need today is the decommodification and deceleration of the media.

Summarizing, technology and algorithms are always embedded in and influenced by their social, political, and cultural environment. As shown by data commons or open-source initiatives, they must not necessarily follow the instrumental logic of the systemic world. Depending on technology's practical realization, it may as well support the creation of a counterweight against the instrumental rationality of the systemic world.

3.3 Conclusion: a participatory-deliberative systems approach to evaluate democratic legitimacy

The theoretical framework developed in this chapter is based on a reconstructive notion of legitimacy that is embedded in a participatory-deliberative system of democracy. It draws upon the legitimacy concepts of both participatory and deliberative democracy and couples them. Based on participatory democracy, democratic decisions are legitimate if they have an *empowering* effect. Shared in both participatory and deliberative democracy is that the decision-making process must be *inclusive* and *effective* in the sense that decisions and actions have a meaningful impact and can be influenced by everyone affected by the issue at stake. In deliberative democracy, deliberation should occur prior to a decision. Legitimate decisions are reached if the format of deliberations is *argumentative*, deliberations are *inclusive and open*, deliberation is *free of external and internal pressure*, aimed at a *rationally motivated consensus*, relates to *all matters whose public regulation is in the interest of the citizens* and is extended to the *change in pre-political attitudes and preferences*. This is a highly normative ideal which can never fully be reached in practice. Therefore, a participatory-deliberative *systems* approach enables the researcher to reflectively analyse the effects of different engagement opportunities. As analysed in chapter two, the digital may have both a positive or negative effect on democratic legitimacy, depending on its realization. As such, the digital has a dialectical relation with democracy's legitimacy. To evaluate the quality of the participatory-deliberative system, its agents, platforms, and connections are comprehensively analysed in the empirical analysis. The smart city offers an ideal testbed for this endeavour. Following an interpretivist approach, the normative ideal serves as an analytical framework to narratively assess the empirical reality, discussing desirable developments as well as structures in need of improvement. In this regard, an independent public sphere for participation and deliberation is important to prevent an extension of economic rationality at the expense of communicative action. The methods to

empirically investigate the impact of digitization on the legitimacy of democracy in the smart city are operationalized in the following methodology chapter.

4. Methodology

This chapter describes the thesis' methodology which consists both of a theory-proposing and a theory-applying part (van Evera, 1997, 89-90). The theory-proposing part firstly elucidates a problem, the question of digitization's impact on democracy's legitimacy in the smart city (SC), and a deficit in satisfying responses to this problem (chapter two). The thesis secondly suggests an innovative approach to perceive the problem by analysing it from the perspective of a reconstructive framework of legitimacy, based on participatory-deliberative systems theory (chapter three). Based on these reflections, an analytical framework is developed in this chapter to evaluate the legitimacy of digital democracy in the SC (section 4.1). The thesis' theory-applying[13], empirical component applies the proposed framework to a concrete example of digital democracy in the SC of Amsterdam (chapter five to seven). Afterwards, the findings are tested for their generalizability through interviews with SC experts from across the globe and linked to the current state of research (chapter eight).

The purpose of the theory-application is to reveal the legitimacy problems and ambivalences of digital democracy in the SC. The empirical research illustrates the practical limits of applying the standards of participatory-deliberative systems theory on the SC context. Qualitative research will expectantly not only reveal the prospects and deficits of digital democracy applications for increasing the legitimacy of democratic processes and structures in smart cities, but also point to problems and shortcomings of applying the theory in the SC context. Following the "logic of discovery" (Bennett, 2004, 21), the case study thus contributes critically to the theory of participatory-deliberative systems. It has a theory-building function in that it helps advancing democratic theory, while considering empirical opportunities and constraints (Dryzek, 2007, 240). As such, it follows a dialogical approach between empirical evidence and norm.

The first research question of this thesis is:

What is the impact of digitization on the legitimacy of democracy in the smart city?

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[13] Van Evera (1997, 90) uses the term 'theory-testing', but I prefer the term 'theory-applying' as it is difficult to 'test' a normative theory in the sense of verifying or falsifying it.

The literature review in chapter two does not give a definite answer to this question. As outlined, the thesis' underlying assumption is that the more digital applications support participation and deliberation, according to the previously outlined ideal, the higher the level of legitimacy. As a novel theoretical approach is developed to examine the legitimacy of digital democracy, the framework needs to be critically assessed. Therefore, the second research question of this thesis is:

To what extent can participatory-deliberative systems theory be applied to evaluate digital democracy's legitimacy?

The explorative in-depth case study of digital democracy in the smart city of Amsterdam applies semi-structured interviews, as well as document and platform analysis, following an interpretivist approach. The SC's systemic dimension is visualized and analysed by means of web-based social network analysis (SNA). The empirical section of this thesis is thus classified as qualitative research with a mixed-methods research design.

This chapter firstly develops a framework for evaluating digital democracy's legitimacy based on the findings established in the previous sections. Secondly, the choice of employing the example of digital democracy in the SC of Amsterdam is justified and the research design of an explorative single case study is explained. Afterwards, the methods selection to examine the case is introduced and justified.

4.1 A framework for evaluating the legitimacy of digital democracy

Studying the normative concept of deliberative democracy empirically is not without challenges: "Some have argued that any such translation will fail. On this view, normative and empirical types of inquiry are incompatible, or even incommensurable" (Bächtinger, 2018, 657). However, this view has become a minority position among scholars. In investigations of deliberation, the Discourse Quality Index (Steenbergen et al., 2003) is often used, which is based on a quantitative analysis. However, broad quantitative studies struggle with the problem of causality and of intersubjective understanding as well as the individual's agency and interpretation of indicators (Bächtinger, 2018, 659-660). When it comes to deliberative systems, there are currently few examples of how they can be studied empirically. Bächtinger (2018, 661) suggests that researchers might need to develop new tools and concepts to analyse the quality of deliberation in deliberative systems. This thesis contributes to filling this gap by offering a novel framework

on how to evaluate the legitimacy of participatory-deliberative systems, combining SNA and an elaborate legitimacy framework (table two).

The characteristics in table two offer examples on how the legitimacy criteria can be evaluated. They focus on input legitimacy in the sense that they evaluate how the affordances of digital platforms facilitate civic participation and deliberation. Following deliberative systems theory, not all legitimacy criteria need to be fulfilled on all platform types or participation tools. What matters is the sum of all interactions and how they are linked to each other and to the institutions of representative democracy. The legitimacy concept offers a comprehensive framework to evaluate the practices and structures of ICT-enabled civic participation and deliberation in the SC. The criteria are used to analyse policy documents (how are participation and deliberation in the SC *envisioned*?) and ICT-enabled engagement platforms (how are participation and deliberation in the SC *implemented*?). They are based on the literature in chapters two and three.

Characteristics of legitimate democratic decision-making	Examples of attributes to facilitate the legitimacy criterion	Characteristics of illegitimate democratic decision-making
Inclusiveness	Every affected subject knows about its right to participate in political decision-making (*outreach*). Subjects can participate as part of their everyday lives, for example by using low threshold tools and initiatives (*access*). Participation and deliberation are attractive, for example through gamification, ideally leading to high *numbers* of participation. Heterogenous groups of citizens are attracted to participate in political activities and engage with each other (*diversity*).	Exclusiveness
Empowerment	Citizens are supported in gaining *skills and knowledge* to participate effectively in political life. Citizens have *ownership* in the policymaking process. There are mechanisms to *prevent subtle or concealed repression or coercion*. Adequate and fact-checked *background information* is provided prior to and during participation.	Disempowerment

Effectiveness	Citizen engagement should have an *impact* on the policy at stake.	Ineffectiveness
	Final decisions can *become part of institutionalized policy-making* processes.	
	If an idea is not implemented, a *justification* is given.	
	There are structures for *monitoring* and *evaluating* the impact of citizens input in political decision-making.	
	Policy-making outcomes are *published* in a way that they become available to every subject.	
High quality of deliberation	An *argumentative* discourse is facilitated, supporting the equal exchange of arguments.	Low quality of deliberation
	Citizen participation and deliberation extends to *all matters in the public interest*.	
	All topics and problems citizens wish to address can become subject of citizen participation and deliberation.	
	Every individual can problematise every statement or action, introduce a new topic and *express his or her own ideas, wishes and beliefs*.	
	Everyone has a *right to be heard* and is encouraged to express comments and questions on equal terms.	
	Moderation follows the principle of sufficiency.	
	The speaker has a *durable identity online*.	
	Participants are supported in *achieving consensus* and/ or finding a solution for a problem.	
	Deliberation is supported by transparent *argument visualization*.	
	All *information* about the policy making process is made available to citizens.	
	There are communication channels for citizens to express *concerns or questions* as well as to receive answers and feedback.	
	No predetermined standards or policy packages are at place.	
Independence	The public sphere is *free from economic and political pressure*.	*Colonization*
	Personal data is protected (*data protection*) as well as controlled by citizens (*data sovereignty*).	
	Data in the public interest is published (*open data*).	
	The infrastructure, algorithms and data of online platforms are publicly available (*open source*) and owned (*data commons*).	

Table 2: Framework for evaluating the legitimacy of digital democracy in the smart city.

4.2 The explorative in-depth case study

The case study of digital democracy in the SC Amsterdam is an explorative within-case examination of a typical single case (Diefenbach, 2008, 877; Gerring, 2007). Although research questions and hypotheses guide the analysis, new questions might emerge during the investigation. The advantage of this research design is that it allows for flexibility during the research process.

In this thesis, the case study definition of Seawright and Gerring (2008, 296) is applied: "the intensive (qualitative or quantitative) analysis of a single unit or a small number of units (the cases), where the researcher's goal is to understand a larger class of similar units (a population of cases)." According to George and Bennett (2005), the advantages of case studies are fourfold (see also Mohajan, 2018): first, high conceptual validity; second, a strong basis for proposing new hypotheses; third, they facilitate the examination of causal mechanisms; fourth, they can make sense of complexities. The benefit of single case studies is further that they can conceive complicated relationships, causes, and effects, as well as path-dependencies (Hall, 2008, 307). On the other hand, the potential of generalising single case studies is small when compared to other techniques such as large-N qualitative studies or quantitative research, as the context of single case studies is difficult to replicate. Another weakness of qualitative case study research as opposed to quantitative research is the difficulty to demonstrate the scientific rigor of the analysis. Case studies are often criticized for being subjective (Mohajan, 2018). However, for this thesis, in-depth qualitative research is preferred over a quantitative methodology due to the high level of complexity of the case's structure (Bennett, 2004; Hall, 2008). A reflection on the shortcomings of qualitative research will actively guide the empirical analysis, making sure that data collection is as objective as possible and has a solid scientific basis. Moreover, the shortcomings are counterbalanced by testing the case study's findings in an additional series of interviews with international SC experts, including the experiences of smart city practitioners and researchers across the globe. The aim of this novel approach is to test the finding's generalizability.

The time frame of the fieldwork for the Amsterdam case study reaches from November 2019 until March 2021. The case of Amsterdam has been selected according to four criteria:

- The city is perceived as a smart city in the literature (e.g. Angelidou, 2016, 2017).

- The city emphasizes the importance of citizen-centred SC governance. It is known for offering online platforms and tools for civic engagement (e.g. Bria and Morozov, 2018; Allwinkle and Cruickshank, 2011; Willis and Aurigi, 2017).

- Previous academic research on the SC can be included in the analysis (e.g. Capra, 2016; Kuyper, 2016).

- The city is accessible in the sense that its environment and context facilitate data acquisition.

Amsterdam is considered in SC literature as a flagship in the field of (citizen-centred) SC governance (e.g. Allwinkle and Cruickshank, 2011, 1; Willis and Aurigi, 2017). Digital democracy in the SC of Amsterdam is a typical or 'most likely' case which approaches the normative ideal more closely than other cases (Gerring and Seawright, 2008; Yin, 2009). The advantage of most likely cases is that they are "almost certain to fit a theory if the theory is true for any cases at all" (Bennett, 2004, 29). Hence, a typical case is chosen to attain a valid proof for the general applicability of participatory-deliberative systems theory. At the same time, practical considerations play a role in choosing the case: How available is the data? Does the researcher speak the local language to communicate with the experts and to be able to read documents in the original language? Another typical case is the city of Barcelona which is often considered as the main textbook example of a citizen-centred smart city. However, language problems and other practical considerations such as the accessibility and size of the object of investigation make Amsterdam a more suitable choice. The empirical research takes into consideration the danger of theory-laden observations and attempts to avoid them by considering the theory's limits. Based on the results in Amsterdam, a questionnaire is developed to test the findings in less likely cases with the goal to reveal variances and mechanisms of deviations as well as to strengthen the evidence while increasing generalizability (Yin, 2009). Throughout the analysis, attention is paid both to internal and external validity. Moreover, each step in the investigation is critically checked for potential biases.

4.3 Main methods

This section outlines the main methods to empirically apply deliberative-participatory systems theory. The critical review of existing literature on the SC of Amsterdam substantiates the methods mix, as outlined in table three.

Theoretical reference	Methodology	Resources	Goals
Participatory-deliberative systems theory *(overarching)*	Interpretivism *(overarching)*	All the below	Understanding transmissions, interactions, and participatory-deliberative spaces within the digital democracy system.
Systemic dimension	Web-based social network analysis	Websites, online platforms	Visualization and analysis of sites and agents and their interrelations.
	Document analysis	Policy documents	Identifying digital democracy policies and connections between stakeholders.
	Semi-structured interviews	Experts	Understanding digital democracy policies as well as the interrelations between the economic and political system and the digital public sphere.
Deliberation	Document and online platform analysis	Policy documents, online platforms	Identifying strategies and impact of digital citizen deliberation; analysing the deliberative affordances of online platforms for civic engagement.
	Semi-structured interviews	Experts	Understanding platform design and online deliberative processes as well as their impact on democratic legitimacy.
Participation	Document and online platform analysis	Documents, websites, online platforms	Identifying strategies and impact of digital citizen participation.

	Semi-structured interviews	Experts	Understanding the facilitation of digital citizen participation and its impact on democratic legitimacy; evaluating how citizens are empowered.

Table 3: Methodological overview.

4.3.1 An interpretivist approach to participatory-deliberative systems

As research on deliberative systems is still novel, little empirical groundwork exists (Bächtinger, 2018, 661). An exception is for instance Dean, Boswell, and Smith (2020) or Ercan, Hendriks, and Boswell (2017; see section 3.2.1). Ercan and colleagues (2017, 197) suggest using an interpretivist approach to answer the three most central methodological questions related to empirical research on deliberative systems:

> i) how can we identify and portray the sites, agents and discursive elements that comprise a deliberative system, ii) how can we study connections and transmissions across different sites of a deliberative system, and iii) how can we understand the impact of the broader socio-political context on both specific deliberative sites and the entire deliberative system?

Interpretivism is applied in this thesis because it is particularly helpful for in-depth qualitative research that is contextual and contingent. Following a constructivist approach, interpretivism focuses on actors' actions and meanings according to their own subjective understanding (Williams, 2000, 210). It aims to analyse phenomena in their local, political, and social context, forming a "constitutive causality" (Ercan, Hendriks, and Boswell, 2017, 198). It can disclose ambiguities and diverging interpretations "based on an abductive, rather than deductive, logic of inquiry. Its goal is not to test hypotheses drawn from theory or previous studies, but to draw on theory and experience in a way that is iterative and recursive" (ibid.). Interpretivism stimulates debates rather than to settle them. "Interpretivists seek to explain the reasons for intentional action in relation to the whole set of concepts and practices in which it is embedded" (King, Keohane, and Verba, 1994, 37). They see "value in exploring a system in its messy reality and within its real world context. They believe that true insight into the system can be gained through exploring the whole system rather than reducing it to its component parts" (Cosgrave, 2013, 56). Different researchers have successfully implemented interpretivism in empirical studies of deliberative democracy (e.g. Dean, Boswell, and Smith, 2020; Fung

and Wright, 2001). In this thesis, Ercan and colleagues' (2017) three-step approach forms the basis of the system's interpretative enquiry:

1) Identifying the platforms, sites, agents, and participatory-deliberative elements of digital democracy in the smart city

Interpretive research can help identify the three key elements of participatory-deliberative systems: participatory-deliberative elements, sites, and agents. In the SC, sites are not only physical sites, but can also be organisations (e.g. in civil society, administration, research, private sector), online platforms or apps. As this thesis is focusing on digital democracy in the SC, the actors' presence in the digital public sphere, hence their online platforms and websites are at the centre. The empirical investigation does not only reveal what is happening on the sites, but also how they are perceived by and linked to different actors as well as to the economic and political system.

2) Understanding transmissions and connections of digital democracy in the smart city

Digitally facilitated deliberation and participation opportunities can only be described as a system if they are linked to each other in a meaningful way. Therefore, the digital sites are not only analysed individually, but also by the character and number of their connections through a social network analysis of the selected digital engagement platforms and of the most important actors' digital representations. Participatory-deliberative systems theory appreciates innovative small-scale participation or deliberation opportunities, as it does not expect a single intervention to realize all legitimacy criteria. It analyses them in terms of how well they are embedded in the wider system: "Designs will likely have to distribute functions across different arenas, paying careful attention to which functions are realised where, and that the system as a whole is comprehensive" (Dean, Boswell, and Smith, 2020, 692).

3) Understanding the impact of the broader socio-political context on digital democracy in the smart city

The case study findings are tested in chapter eight in which they are discussed with international smart city experts, including researchers, practitioners in other smart cities, and managers of international smart city networks. The goal is to increase or refute the generalizability of the case study's findings and assess the extent to which challenges and opportunities with regards to the legitimacy of digital democracy are replicable to smart cities in other geographical, political, social, and cultural contexts. Furthermore,

the discussion with other experts helps to reduce bias of the researcher. As "the communication of meaning is always negotiable" (Dey, 1993, 38), interpretivism will most likely not arrive at irrefutable and fully generalizable conclusions. The findings should rather be seen as a starting point for further debate and research on the topic.

4.3.2 Web-based social network analysis

The smart city's digital democracy system is based on a governance network composed of interconnected representatives of administration and politics, organized civil society and citizens, research institutes, as well as the private sector. As explained in the previous chapter, governance networks cannot constitute a deliberative system in its entirety, but they can have an important contribution to such a system. For this purpose, a social network analysis (SNA) based on links among websites and platforms is conducted. SNA emerged in sociological research in the early 20th century to study the relationships between actors. The method was strongly influenced by Granovetter (1973) who examined how information is spread in social networks, emphasizing the importance of interpersonal ties for the study of macro phenomena. Following Elgin (2015), it is assumed that stakeholders in a network are more prone to include links to actors important to them or with similar policy goals and beliefs than to stakeholders they disagree with or have little relevance for their work. Setting a link on one's web presence to another stakeholder thus reflects a communicative choice. Park (2003, 50) says that "[h]yperlinks let individuals or organizations running websites on the Internet expand their social or communication relations by making possible easy and direct contact among people or groups". To understand the digital sphere of smart city governance, it is essential to examine the connections between different sites of deliberation and participation as well as among the actors involved. The web-based SNA thus focuses on the interconnections of the system's web presences, mirroring the *digital* dimension of democracy in the smart city. Its biggest disadvantage is that it cannot make sense of spaces or actors that operate in the *offline* public sphere. One might argue that the analysis of the digital democracy system is incomplete without offline processes and initiatives, especially considering digital democracy's hybrid nature (see section 2.3). However, this thesis aims to narrow the analysis to online processes to gain a better understanding of digitization's impact on democracy's legitimacy. As this thesis focuses on how the *digital* affects democracy, web-based SNA is considered particularly suitable to delineate the digital from the analogue realm. Analysing both offline and online processes would be beyond the scope of this thesis. It would be worthwhile to include both dimensions in future

research on the general development of participatory-deliberative systems. Furthermore, websites and online platforms are highly dynamic and subject to constant change. Therefore, the SNA can only be a snapshot at the time of writing.

There are two main ways to conduct a web-based SNA. The first one is through *hyperlink-based* SNA which involves automated web crawling of all incoming and outgoing links of a set of seed websites. The second possibility is to manually create a list of *linked partners* of the selected seed websites. As the two approaches have advantages and disadvantages, both were tested in preparation for the case study. For the hyperlink-based analysis, a list of online platforms and websites was crawled using the software VOSON (Ackland, 2010) which is specifically programmed for hyperlink collection and analysis. An advantage of this method is that *all* hyperlinks of a website can be studied without any intrusion of the researcher, offering a comprehensive picture of a system in its entirety. The disadvantage is, however, that if a link is not properly set, outdated or no longer active, the software is not able to include the connection in the analysis. Moreover, the analysis often includes links with no or little relevance for the overall system leading to overly extensive networks with little meaning. Besides, a hyperlink hidden somewhere in a subpage of a website may not necessarily stand for endorsement.

To avoid these pitfalls, it was decided to focus on the partners linked on a platform. In comparison with hyperlink-based SNA, this 'web-based' SNA has the advantage that, based on the assumption that listing a partner institution on one's website constitutes a communicative decision, partners can be included in the SNA even if a link is outdated. In the rapidly developing online world where websites constantly change, this is particularly important to derive meaningful results. Besides, there are no ethical issues, as the information is publicly available and manually collected. Moreover, it can more cogently be assumed that listing the respective partner stands for endorsement. Therefore, the SNA becomes more directed towards the links that matter most for the respective institution and assumably delivers better results. The list of partners provided on a website reflects a communicative choice and agenda and as such serves a social function. According to Lyons (2017, 7), "a networked sphere includes not only a social dimension but an objective or structural one, which includes texts, digital media objects, and social and hyperlink networks."

For the SNA, a list of 16 actors and platforms is created as seed websites. Maier et al. (2018) emphasize that these points of origin need to be selected with caution, as they build the basis for the network's overall structure. Therefore, a literature analysis, policy document analysis, platform analysis, and expert interviews are conducted before the selection. Second, the websites of the actors and platforms are searched for the listed partners. The list of seed websites and linked partners are analysed with the SNA software Ucinet (Borgatti, Everett, and Freeman, 2002) which is among the most widely used SNA tools in academic research. With Ucinet, power relations in the network and communicative links between actors and platforms, as well as the different sectors in which they are located, can be analysed and visualized. Connectivity and centrality dimensions are operationalized through SNA descriptive measures, such as the network's density, nodal degree centrality, and node reciprocity (Maier et al., 2018). To determine the degree of independence or interconnectedness of the public, private and political sphere, actors were coded by sector (private sector, education and research, non-profit and civil society organisations, politics and administration). An effort is made to include actors from all sectors, despite difficulties in finding stakeholders from the private sector that are relevant for the digital democracy system.

SNA can analyse large amounts of data in a systematic manner. According to Hanneman and Riddle (2005), "the techniques of graphing and the rules of mathematics themselves suggest things that we might look for in our data — things that might not have occurred to us if we presented our data using descriptions in words." The results serve as a first indication of the SC's digital democracy governance network. Importantly, the analysis includes only those actors that seem particularly important in the digital democracy realm – it does not include actors from other SC areas, such as smart mobility or circular economy. Moreover, it does not claim to include all relevant actors, as blind spots may remain. Although it is assumed that the web-based SNA of the city's digital sphere will lead to significant first results, it can only be an approximation and needs to be enriched by document analysis and expert interviews to derive meaningful results. Moreover, the extent to which the network reflects offline communication channels and more informal digital spaces (e.g. neighbourhood WhatsApp groups) remains unanswered. While web-based SNA has been used in other fields (for hyperlink-based SNA see Lyons, 2017; Maier et al., 2018; Park, 2003), this method is novel to the study of participatory-deliberative systems and therefore also contributes to research on the empirical investigation of such systems.

4.3.3 Semi-structured interviews

In this thesis, in depth, semi-structured elite interviews with key experts and stakeholders in the field of digital democracy in Amsterdam are conducted. Citizens are not included as interview partners because the analysis focuses on the input dimension of digital democracy's legitimacy, referring to the extent to which civic engagement is facilitated by key stakeholders and platforms in the governance network.

"Semi-structured interviews consist of several key questions that help to define the areas to be explored, but also allows the interviewer or interviewee to diverge in order to pursue an idea or response in more detail" (Gill et al., 2018, 291). This method is chosen because open-ended interviews provide more extensive and richer material than surveys, allowing for new information to emerge (Yin, 2009, 10). Another advantage is that the semi-structed format supports reciprocity between the interviewee and the researcher and allows the latter to improvise follow-up questions. The interview guide is structured by main themes, covering the legitimacy criteria, and follow-up questions (Kallio et al., 2016, 2960; see appendices two and three). The interview questions are critical, as data is not only collected but also constructed and guided by the questions (Dey, 1993, 16). The questions and the interviewer try to be as neutral and free of bias as possible. All interviews are recorded and transcribed. Based on a simple coding scheme along the lines of the legitimacy criteria identified in table two, the data is analysed and interpreted. The aim of the content analysis is to reveal underlying themes or patterns. The data is understood in context to be able to identify relationships that connect different statements or events with the whole (Maxwell, 2009). The respondent's answers are critically analysed as research suggests that there is a tendency to respond in a way that makes oneself look better or to say what the respondent thinks is expected of him or her (Diefenbach, 2008, 881). It is ensured that the respondents' identities are treated confidentially, and that the thesis' goal and content are clear to the interviewee. As data from one interviewee cannot provide a full picture of the situation, data from diverse respondents, engaged in different sectors, is collected. Interviews with 16 experts involved in digital democracy in the smart city of Amsterdam from the following sectors are conducted (see appendix four):

- Politics and administration
- Private sector
- Non-profit and CSO
- Education and research

To test the Amsterdam findings, a second round of interviews is conducted with 16 international experts and practitioners from the same fields, eight of them representing city networks (see appendix five). In total, the international experts have worked with more than 300 cities globally. The selection of interview partners needs to be critically reflected, too, because "[o]nly interviewees selected have the opportunity to put forward their worldviews and, therefore, influence the outcome of the research" (Diefenbach, 2008, 880). The recruitment process is noted for transparency reasons.

4.3.4 Document and platform analysis

Document analysis is included in the research design to assess how digital democracy in the SC is *envisioned* in relevant policy papers. Platform analysis illustrates how it is *implemented* on online engagement platforms based on the criteria for evaluating the legitimacy of a participatory-deliberative system as outlined earlier.

The iterative process of document analysis "combines elements of content analysis and thematic analysis. Content analysis is the process of organising information into categories related to the central questions of the research" (Bowen, 2009, 32). The main categorizing strategy for the document analysis is deductive coding. According to Maxwell (2009), the aim of coding is not quantitative, but to rearrange data into categories to better be able to analyse it. The aim is to compare the city's theoretical approach to digital democracy as outlined in policy papers to its practical implementation, examining the extent to which practice lives up to theory. The document selection is a result of desk research and expert interviews. The documents were recommended by interview partners and can be found on the main actors' websites. The objective is to include official documents of the local government as well as policy guides by influential non-governmental organisations. The document analysis draws upon eight policy papers (see also chapter six):

Lead Organisation	Document name	Year
National government (Mikkers, J.[14])	The Dutch National Smart City Strategy "The future of living" (NL SCS)	2017
Gemeente Amsterdam (CoA)	Coalition agreement (CA)	2018a

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[14] Project chair.

Gemeente Amsterdam (CoA)	Ambitions and implementation agenda (AIA)	2018b
Gemeente Amsterdam (CoA)	Agenda for the Digital City "A digital city for and by everyone" (CoA ADC)	2019
Gemeente Amsterdam (CoA)	Datastrategie Gemeente Amsterdam - Amsterdamse zelfbeschikking over data (DS)	2021
Amsterdam Economic Board et al.	Tada Manifesto – Data disclosed	2019
Netwerk Democratie (de Zeeuw and Pieterse)	Handreiking Digitale Democratie – (engl.: Digital Democracy Guide; DDG)	2018
Waag and AMS Institute (Schouten)	A strategy for urban data. How to develop collaborative data projects – for citizens, urban innovators, researchers and policy makers (SUD)	2019

Table 4: List of documents.

The platforms are analysed through a direct user experience of the platform in the sense that the functions are tested wherever possible without being too invasive. It is for example unethical to participate on the platform for participatory budgeting because this would distort the policymaking process (as the researcher is not a resident of the district). But it is valuable, for instance, to test an online game for educational functions. Moreover, semi-structured interviews with platform developers are conducted to gain a better understanding of design decisions. Evaluating all engagement platforms in Amsterdam would be beyond the scope of this thesis. Therefore, eight platforms are selected, based on desk research and on the results of expert interviews (participants were asked which platforms they deemed most important.) The goal is to provide an exemplary picture of a) the various *types* of platforms with their b) different *purposes and affordances*, which were administered by c) diverse *stakeholders* in the municipality of Amsterdam. As the digital democracy network in Amsterdam is embedded in European and international structures and a lot of smart city and digital democracy projects are funded by the EU, a European project (Claircity Skylines) is included in the platform mix. Five platforms are explicitly recommended by interviewees. Three additional platforms are added through desk research to diversify the platform sample considering the three above mentioned criteria. The City of Amsterdam is a particularly important actor in the digital democracy system which explains the relatively high number of official

government platforms in the selection. The following platforms are analysed (see also chapter seven):

Lead Organisation	Platform Name	Platform Type	URL
City of Amsterdam	Mijn Amsterdam	Digital Identity	https://mijn.amster-dam.nl/
Amsterdam Economic Board	Amsterdam Smart City	Governance	https://amster-damsmartcity.com/
City of Amsterdam	De Stem van West	Online agenda-setting	https://stemvan-west.amsterdam.nl/
City of Amsterdam	West Begroot	Online participatory budgeting	https://westbe-groot.amsterdam.nl/
Trinomics and University of West England	Claircity Skylines	Gamification	https://apps.ap-ple.com/de/app/clair-city-sky-lines/id1358300473 (App store)
Vrije Universiteit Amsterdam	Mijn Park	Crowdsensing	https://mijnpark.en-vironmentalgeogra-phy.nl/
Gebied Online	Hallo Ijburg	Neighbourhood and community engagement	https://halloijburg.nl/
Technische Universiteit Delft and AMS Institute	SocialGlass	Social big data	https://social-glass.tudelft.nl/

Table 5: List of platforms.

4.4 Research ethics

Utmost importance is given to research ethics throughout the investigation. The main ethical considerations take place in relation to the expert interviews which are based on the principles of confidentiality, anonymity, and informed consent (see appendices two and three). Bryman (2008, 118) identifies four types of ethical reflections for research involving human participation: "whether there is harm to participants; whether there is a lack of informed consent; whether there is an invasion of privacy; whether deception

is involved" (see also Dean, 2016, 78). The potential harm of participants is relatively small as only experts are selected for the interviews who are invited to talk about their respective field of expertise. Sensitive or personal questions are prevented, and the interviewees can refuse to answer any question at any time without consequences. A potential harm to the interviewee's reputation, e.g. with regards to critical comments concerning the interviewee's employer, is minimized by anonymizing all transcripts and by removing information that may identify the participant or other persons that the interviewee talks about. In the interview transcripts, each interviewee receives a reference code (see appendices four and five). Moreover, participants can withdraw from the interview at any time without having to give a reason. They are informed about the modalities of the interview through an information sheet in which the objective and goal of the research project and the interviews are carefully explained. They are also asked to sign a consent form prior to the interviews. In this way, participants are made fully aware of the process, preventing potential misunderstandings. The problem of privacy breaches is minimized by storing the transcripts and audio files separately. According to data protection principles, most notably the GDPR, data is kept securely. The audio files and the sheet with the interviewee's contact information are stored in password protected files. The researcher only uses information that is publicly available and that is provided by the interviewee voluntarily. Under freedom of information legalisation, the interviewees are informed that they are entitled to access the information they provide at any time. Due to the Coronavirus pandemic, the interviews took place online or via phone. Reliable video conferencing was used in password protected meeting rooms. Privacy breaches, such as unauthorized persons entering the meeting room, did not occur. The University of Westminster's ethics rules are followed carefully, and the completed ethics forms are approved by the university's ethics committee.

4.5 Conclusion: strengths and weaknesses of the research design

This chapter offers an overview of the methodology to apply the normative framework of participatory-deliberative systems theory empirically. In an explorative in-depth investigation of a single case study – digital democracy in the SC of Amsterdam – semi-structured expert interviews are supplemented by SNA, as well as platform and document analysis. The analysis is guided by an interpretivist approach. Some weaknesses of the research design were already mentioned in the previous sections. They are summarized here to fully reflect them and to highlight methods to counterbalance the shortcomings.

First, one may criticize that there could be a bias in terms of selection and interpretation of interviews and other data sources. Due to the limited scope of this thesis, only a selection of potentially relevant interview partners, documents and platforms can be included in the analysis. Potential bias is prevented by elaborating the specific reasons for the source selection. A related criticism is that the researcher's worldviews may influence the research outcome. This is reduced by discussing the case study's findings with international SC and digital democracy experts. The advantage of qualitative research is that it can include these considerations in the analysis and reflect them in a transparent manner. Moreover, even the most objective quantitative research is not free of bias (Diefenbach, 2008, 876).

Second, the reliability and sufficiency of sources may be a problem (internal validity) as well as the generalizability of the findings (external validity). The first issue is tackled by implementing a mixed-methods design in which the analysis is not only based on one source but on different types of data. The second problem is indeed a serious issue, especially for in-depth single case studies. Therefore, as outlined, the findings of the single case study are discussed with key SC experts across the globe to increase the findings' generalizability.

Third, it may be criticized that a normative theory, such as participatory-deliberative systems theory, cannot be tested or meaningfully applied. Clearly, the empirical world can only approximate the norm which serves as a framework for reflection. Another difficulty may be that there is little previous empirical work done on applying deliberative systems theory. This shortcoming is transformed into an asset, giving this thesis a theory-building dimension, while contributing to the development of research on participatory-deliberative systems. Another difficulty is the inclusion of potentially disconfirming evidence. The open nature of the research question and the broad mixed-methods approach help avoiding this issue. Transparent research procedures contribute to higher levels of objectivity. Lastly, the research subject is highly dynamic and rapidly developing. Therefore, the case study can only be a snapshot at the time of the empirical analysis (November 2019 until March 2021).

5. Amsterdam's digital democracy system

On 15 January 1994, Amsterdam launched *De Digitale Stad* - the Digital City (DDS; Alberts, Went, and Jansma, 2017, 148) – one of the first urban social networks worldwide (Dameri, 2014). Its goal was to connect citizens with local politicians and to offer residents a virtual public space. Little did the early adopters of urban digital democracy know how timely their efforts would remain thirty years later. The DDS experiment in Amsterdam was terminated some years later – but the city had let the genie out of the bottle. Since the early 2000s, smart city initiatives came to the fore in Amsterdam, focusing on the reduction of CO2 emissions and environmental protection. Today, there is not just one digital or smart city platform in Amsterdam, there are a multitude of initiatives, apps, and platforms, introduced not only by the municipal government, but by neighbourhood groups, researchers, civil society organisations, or the private sector. So, how did Amsterdam become one of the smartest cities in the world (Capra, 2016; Dameri, 2014; Somayya and Ramaswamy, 2016)? How does Amsterdam's digital democracy system look like today? This chapter aims to answer these questions by examining Amsterdam's governance network as part of its digital democracy system. To generate strong results, two methods are applied. First, the digital layer of the smart city (SC) of Amsterdam is examined by identifying web-based hyperlinks between the main actors' web presences, offering a comprehensive picture of the system's online communicative links and power relations. However, this method alone may create a distorted picture of reality, as it can only show the *quantity* of digital connections, not their quality. Therefore, it is complemented by an interpretive analysis of the connections' *quality* by means of semi-structured interviews. Importantly, the governance network does not constitute the digital democracy system in its entirety but should rather be perceived as an important contribution to it. Before the network analysis, an introduction to digital democracy in the smart city of Amsterdam is given based on secondary literature.

5.1 Introduction to digital democracy in the smart city of Amsterdam

In 2020, the urban area of Amsterdam, the capital of the Netherlands, has a population of about 1.15 million (about 0.87 million within the city limits). 1.6 million people live in the city's greater metropolitan area (World Population Review, 2019). The Netherlands is a parliamentary constitutional monarchy with a decentralized, unitary structure, encompassing central, provincial, and municipal governments. Every Dutch citizen aged 18 or older is eligible to vote in the parliamentary, provincial, and municipal elections, as well as for the European Parliament elections, according to a voting system of proportional representation (Figee, Eigeman, and Hilterman, 2008, 16). The city has an

annual budget of 5.7 billion Euro. Amsterdam's population is highly diverse, and the city consists of seven districts: Nieuw-West, Centre, Noord, West, Zuid, Oost, Zuidoost. With its major North Sea port, Amsterdam has been a global centre of trading and finances for centuries. The city is built on a large system of canals and is sometimes referred to as the Venice of the North, making it an attractive destination for tourists. Amsterdam has a reputation for its tolerance, diversity, creativity, innovation, and arts (van Winden and Oskam, 2016, 115). According to van Winden (2016, 15), "[t]his blend makes it well-positioned to develop urban technology innovations, where new technology typically becomes embedded in the social, civic life and commercial life of the city." As Amsterdam is situated two meters below sea level, it has been on the forefront of climate policies.

Digital infrastructure

Somayya and Ramaswamy (2016, 831) find that Amsterdam "is deploying an enormous number of Internet of Things (IoT) technologies for civic services available in 24×7." The city started to build its fibre network in 2005 and offers high-speed broadband coverage (Kuyper, 2016, 19). Amsterdam is home to the major non-profit Internet exchange point AMS-IX, established in the early 1990s, giving Amsterdam a critical role in the global internet infrastructure, as one of the largest online traffic hubs worldwide (AMS-IX, 2022). The city also invests in its sensor network based on mobile or stationary devices and in cameras (Angelidou, 2016, 23; CoA, 2020e). In 2019, 97% of Amsterdammers had access to the internet and nearly every person older than 12 years had a smartphone (CoA ADC, 2019, 6). Almost 80% of Amsterdam's residents aged 12 and older use the internet for keeping social contacts. The numbers decline, the older the resident. 55% in the age group of 65 to 75 use the internet for social contacts and only 22% in the 75-plus age group (ibid.).

Smart city policies

Amsterdam was among the first cities in Europe to start a smart city initiative (Dameri, 2014). Its high level of connectivity and innovation made Amsterdam a pioneer among European and international smart cities (Jameson, Richter, and Taylor, 2019, 2). In 2017, the city was ranked third in the Global Innovation Index (Ryan and Gregory, 2019, 12). Moreover, it consistently ranks among the top ten European smart cities (Kuyper, 2016; van Winden, 2016). In 2009, the online platform Amsterdam Smart City (ASC) was launched to connect stakeholders and to facilitate their collaboration. The idea

behind ASC "is to go from a traditional "knowledge-silo-thinking" to a holistic information community, where synergies are created through cooperation" (Somayya and Ramaswamy, 2016, 836). Amsterdam is acclaimed by academics and practitioners alike for its bottom-up strategy in smart city governance, with a focus on social innovations, collaboration, and liveability (Kuyper, 2016, 14).

Its citizen-centric approach to the smart city is analysed by a range of different researchers. Groen and Meys (2017), for instance, examine collaborative data practices in Amsterdam's neighbourhood Dapperbuurt based on Public Participation GIS (PPGIS). Winden and colleagues (2016) note that citizens are seldomly part of official smart city partnerships, but rather perceived as users of SC initiatives. Capra (2016) evaluates how the ASC platform involves citizens in its governance regimes and how governance characteristics influence the quality of citizen participation in complex settings. He uses a social network analysis to examine ASC's governance network and finds that different governance models co-exist in the network that involve citizens in varying ways. Large and complex projects on the ASC platforms are more formalized and include citizens to a lesser degree than smaller, more flexible projects based on strong personal relationships. Niederer and Priester (2016) analyse the impressive number of 40 online neighbourhood platforms in Amsterdam, finding that most of them revolve around helping and informing neighbours. Angelidou's study (2016) suggests that education and training as well as social and digital inclusion play a subordinate role in Amsterdam's smart city approach. The focus, according to her research, is instead on supporting business development, for instance through seed funding and business incubators. Along these lines, Macpherson (2017) finds that start-ups in Amsterdam were able to raise 195 million Euro in 2016.

The city itself draws from a rich knowledge base. Besides the Amsterdam Institute for Advanced Metropolitan Solutions (AMS Institute), a leading research institute for urban innovations, there are for instance two universities of applied sciences, InHolland and the Amsterdam University of Applied Sciences, as well as two research universities, the Free University and the University of Amsterdam (van Winden, 2016, 16). Moreover, a lot of smart city projects are started at grassroots level by citizens or NGOs. Participatory processes and collaborative action among citizens, researchers, businesses, and the local government are critical for Amsterdam's smart city governance, but "there is still work to be done towards extending bottom up engagement into the strategy

development phase" (Angelidou, 2016, 24). Dameri (2014) differentiates between Amsterdam's digital city and smart city policies. According to him, Amsterdam's digital city (DC) policies are characterized by bottom-up, open participation processes, and a flat governance structure that mainly consists of private individuals with little interaction among actors. They aim at sharing of information and data, while improving connections and communication in the city. SC policies, in contrast, are defined by top-down, closed participation processes and a hierarchical governance structure that is based on public-private partnerships organized through formal organizations. They aim at a better use of natural resources and a reduction of CO_2 emissions (see also section 2.2).

Following an open data approach, the city makes its data available to all residents and businesses on the online portal 'City Data' (data.amsterdam.nl; see also Kuyper, 2016, 19-20). Data sets include information about public space, traffic, buildings and land, liveability, healthcare, and the environment.

> Data.amsterdam.nl aims at strengthening the economy of the Amsterdam metropolitan area by unlocking available (public) data sources to citizens and businesses. By using this data, citizens, businesses, research institutions and other parties, are enabled to develop services that previously wouldn't be possible or too expensive. (ASC, 2020b)

Four benefits are mentioned: "transparency", "releasing social and commercial value", "participatory governance" and "efficiency" (ibid.). On the open source community platform GitHub, the city offers an overview of open source projects in Amsterdam (GitHub, no date). The city also provides a large set of maps showing the city's sensors and cameras as part of a crowd monitoring system (CoA, 2020j). However, the city can only publish data it owns, not data by private companies. According to Richter and colleagues (2019, 122), there is an active debate in Amsterdam "over the question of how to balance between protecting citizens' privacy in digital data flows, on the one hand, and leveraging commercial, science and technology, and innovation sectors for urban services delivery on the other." Jameson and colleagues (2019, 8) find in their study on data collection and perceived surveillance in Amsterdam that people felt "distinctively uncertain about who is watching, while at the same time feeling hypervisible." Although "people were conscious of trading their information for convenience and services and sometimes feeling unsettled by it, there was an understanding that more data and the integration thereof leads to better service provision and they trusted the government to

do good" (ibid., 10). From 2017 to 2019, Amsterdam and Barcelona took part in the 3-year project DECODE, a platform for citizens to control third parties' access of online personal information (Decode, 2021; Kuyper, 2016, 23).

Political system

Amsterdam's city government and administration (Gemeente Amsterdam; in what follows: City of Amsterdam, or short: CoA) are among the driving forces behind the implementation of digital democracy in the SC. Since July 2018, the leftist green party *GroenLinks* has provided the mayor whose regular term is six years. In addition to the mayor, there are eight alderpersons or deputy mayors in charge of policy implementation, selected by the city council, from the parties *GroenLinks (*green left*)*, *PvdA* (labour) and *D66* (social liberal). The mayor and alderpersons represent the city's government. The alderpersons portfolios include e.g. ICT and the digital city as well as democratization. The city council is elected every four years and holds 45 members of twelve parties with a term from 2018-2022 (CoA, 2020f, h). Meetings are open to the public and streamed online. Every district in Amsterdam has an Executive Committee of three members, representing different parties. They act in the districts on behalf of the mayor and alderpersons who appoint them. Every member of the Executive Committee is responsible for certain tasks and different neighbourhoods (CoA, 2020f). They take part in the meetings of the District Committee. The District Committee is elected by residents and consists of representatives from the neighbourhoods. The Committee represents the interests of residents while advising the Executive Committee and the city administration on developments in the district and its neighbourhoods. The number of members depends on the number of inhabitants of the district. The district committee of Amsterdam West, for example, consists of 14 members, representing five parties (CoA, 2020p). Neighbourhood agents act as contact persons for residents and local entrepreneurs if they have ideas or wishes for their neighbourhood or street. There is a 'Gebiedsmakelaar' in every neighbourhood in Amsterdam, building a connection between neighbourhood residents and the city government and administration. The city also develops area plans for the neighbourhood to improve liveability. Lead by a Chief Technology Officer (CTO), the city's innovation team applies technology to develop solutions for making Amsterdam more accessible and liveable (CoA, 2020i). The innovation team focuses on five thematic areas: circular economy, digital city, democratisation, smart mobility, and startup in residence (ibid.). Part of the CTO's democratisation department is the 'OpenStad' (Open City) team. Its aim is to create accessible and interactive digital

tools for collaboration between the residents of Amsterdam and the municipality. If citizens or other municipal departments have an idea for an engagement project, they can contact OpenStad for guidance. OpenStad is involved in both online platforms Stem van West and West Begroot (see section 7.1). The OpenStad approach is based on the *Handreiking Digitale Demokratie* (engl.: Digital Democracy Guide) which is published on its website (see section 6.1). However, the municipal government and administration are not the only actors contributing to the city's digital democracy system. Other relevant actors from civil society, research and the private sector, and their interlinkages are introduced in the next section in which a web-based social network analysis (SNA) explores Amsterdam's digital democracy governance network.

5.2 Web-based social network analysis: exploring the city's digital layer

The connections between the main actors and platforms in Amsterdam are analysed through a web-based SNA to gain insights into power and communicative relations between the city's stakeholders in the digital democracy field. For this purpose, the links to partner websites are examined. Maier et al. (2018, 6) demonstrate that linking another website "is a form of endorsement that may cause an increase in site traffic and subsequent forms of support". They emphasize that "[w]ell integrated central actors enjoy higher visibility and influence than marginalized actors" (ibid.; see also Elgin, 2015). Based on expert interviews, desk research as well as platform and document analysis, the online presence of 16 actors is included in the analysis of Amsterdam's *digital democracy governance system* (see table four). The list is influenced by van Winden's (2016) analysis of the ecosystem of the SC of Amsterdam and Capra's (2016) analysis of governance networks of Amsterdam Smart City. An effort was made to include actors from different sectors, namely politics and administration, education and research, non-profit and CSOs, and the private sector. The list of important actors cannot claim to be complete. It should rather be seen as a first indication on how sectors and actors are connected in the governance network and will be substantiated by a qualitative analysis.

No.	Actor	Description	Sector
1	City of Amsterdam (CoA) – Innovation team	Lead by a Chief Technology Officer (CTO), the city's innovation team applies technology to develop solutions for making Amsterdam a more accessible and liveable city (CoA,	Politics & administration

		2020i). Part of the CTO's democratisation department is the *OpenStad* (Open City) team.[15]	
2	Amsterdam Economic Board (AEB)	Connects knowledge institutes, the local government, and the private sector to tackle urban challenges.	Politics & administration[16]
3	AMS Institute	Its mission is "to develop a deep understanding of the city – sense the city – to design solutions for its challenges, and integrate these into the city of Amsterdam" (AMS Institute, 2020).	Education & research
4	Waag	Waag works at the interface between technology, science, and the arts, focusing on technologies as tools for social change.	Non-profit & CSO[17]
5	Pakhuis de Zwijger (PdZ)	Pakhuis de Zwijger, a former warehouse, is "a debate centre of the 21st century, putting dialogue before debate and connection before opposition. It stimulates collaboration towards a livable city" (PdZ, 2020).	Non-profit & CSO
6	DECODE	Decentralised Citizen-Owned Data Ecosystems to democratize the management of digital personal data, giving back the individual control over its data, while offering technology that allows for controlled, anonymised data sharing with the long-term goal of a data commons.[18]	Non-profit & CSO

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[15] For the SNA, the partners listed on the CoA's innovation website are used.

[16] The AEB can be seen as a public-private partnership. It is categorized as 'politics & administration' instead of 'private sector' because its mission and goal to connect stakeholders to facilitate a smart, healthy, and green Amsterdam is a political one. Moreover, Amsterdam's mayor is the Board's chair.

[17] Waag also conducts research but is categorized as 'non-profit & CSO' because of its mission to trigger to social change.

[18] DECODE is a European project but brings together important stakeholders in Amsterdam and is therefore included in the analysis as a facilitator of digital democracy developments.

7	Tada[19]	'Tada' is a group of professionals and institutions in and around Amsterdam with the aim of giving citizens control over their data and shaping a responsible digital city.	Non-profit & CSO
8	Johann Cruijff/ Amsterdam Innovation Arena	The "world's leading smart city playground" (ASC, 2020a) with the goal to accelerate the market introduction of smart stadium and smart city applications.[20]	Private sector
9	City of Amsterdam, Stem van West	Online agenda-setting platform, initiated and hosted by OpenStad for the West district.	Engagement platform
10	City of Amsterdam, West Begroot	Online participatory budgeting platform, initiated and hosted by OpenStad for the West district.	Engagement platform
11	Gebied Online, Hallo Ijburg	Neighbourhood platform for Ijburg, initiated and hosted by the cooperative Gebied Online.	Engagement platform
12	TU Delft and AMS Institute, SocialGlass	Web-based application analysing and visualizing big urban data for city planning.	Engagement platform
13	Vrije Universiteit Amsterdam, Mijn Park	App gathering information on citizens' perception and use of the Rembrandt park in Amsterdam while informing the city's renovation plans for the park through crowdsensing.	Engagement platform
14	City of Amsterdam, Trinomics, University of West England et al.,	Serious game to capture citizen decision making about issues in their city, collecting ideas for policies to achieve clean air before 2050.	Engagement platform

[19] Only Tada's initiators are included in the analysis, not its supporters. The high number of supporters (more than 600 at the time of writing) would have distorted the network analysis. Moreover, anyone can sign up as a supporter, giving little information on the quality of support.

[20] Based on desk research and the expert interviews, it was difficult to find relevant stakeholders from the private sector. The Amsterdam Innovation Arena was mentioned in the interviews as a testbed for SC technology and is therefore included. It is a public-private partnership but listed under 'private sector' here because of its business-oriented agenda.

	ClairCity Sky-lines[21]		
15	City of Amsterdam, Mijn Amsterdam	Digital platform to access personal data the municipality has stored about residents, as well as information about their neighbourhood.	Engagement platform
16	Amsterdam Economic Board et al., Amsterdam Smart City	Amsterdam's main governance platform for smart city activities and stakeholders.	Engagement platform

Table 6: List of actors for the SNA.

Based on the information provided on the stakeholders' websites, their *institutional* partners are fed into the SNA software UCINET for the network analysis (Borgatti, Everett, and Freeman, 2002). To only include the most relevant actors, *project* partners are not included whenever the website differentiates between project and institutional partners. When there is no differentiation, all partners are included. Waag's website does not list any official partners. Therefore, no outgoing links can be included.

The seed pages constitute the network's 'egos' while the partners listed on their websites constitute the 'alters'. The network mirrors exclusively actors' connections in the digital sphere, not their offline interactions. The resulting list of stakeholders is categorized into non-profit and CSO, education and research, politics and administration, and the private sector. For some websites, two categories apply equally, e.g. for the Amsterdam Innovation Arena, the Amsterdam Economic Board or Amsterdam Smart City which are positioned at the intersection between politics and the private sector. The two latter are grouped under politics and administration because they are political initiatives. Table seven provides an overview of the organisations in the network by category, including all egos and alters.

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[21] The project has received funding from the European Union's Horizon 2020 research and innovation programme (under grant agreement No. 689289).

Category	Number	Node shape
Politics & administration	63	▲
Private sector	133	◘
Non-profit & CSO	51	◊
Education & research	39	○
Total	**286**	

Table 7: Overview of all websites (nodes) by category.

The entire network consists of 286 nodes and 359 ties. A tie is a binary measure of the relationship between two nodes, distinguishing between having a relation (coded 1) or having no relation (coded 0) (Hanneman and Riddle, 2005). The network is analysed in a sociogram, visualizing the ties between the nodes, based on the directed single type of relation (simplex). Directedness is represented through arrows, in the sense that ties originate from an *ego* and reach an *alter*. Reciprocated ties are illustrated by a double-headed arrow (ibid.). The nodes' colours and shapes indicate the category of platform type, as listed in table seven. The network consists of one component, meaning that there are no parts which are completely disconnected. At the same time, the network's density, the present proportion of all possible ties, is exceptionally low (0.4%), indicating that most actors in the network are not connected. The higher the ratio, the denser the network and the more connections among the individual actors. Thus, there is no actor completely detached, but most actors connect to only one other subject. As the overall network is too complex to draw meaningful conclusions, it is broken down into different measures and sub-networks.

Network centrality

Actors with many ties to others have an advantaged position in the network because they can connect to more actors and draw upon more resources of the entire network. Due to their high numbers of ties, they may be seen as facilitators of exchanges among others and may benefit from establishing these connections. The actor's power potential and centrality in the network is measured by degree. However, in systems with a low density, like in this one, power can be exerted only to a limited extent (ibid.). Examining the entire network by degree shows that the Pakhuis de Zwijger (PdZ) and the Amsterdam Economic Board (AEB) are the best-connected actors based on the number of outgoing and incoming links. Not surprisingly, the City of Amsterdam (CoA) – being

involved in many of the engagement platforms – and Amsterdam Smart City – as a governance platform – are equally important actors. Although Waag has no outgoing links it is among the most important civil society actors due to its relatively large number of incoming connections. Figure three shows the network of nodes with a degree above 1 (having more than one incoming or outgoing connection). The node size indicates the degree centrality, while the nodes' colour and form indicate the actor's sector.
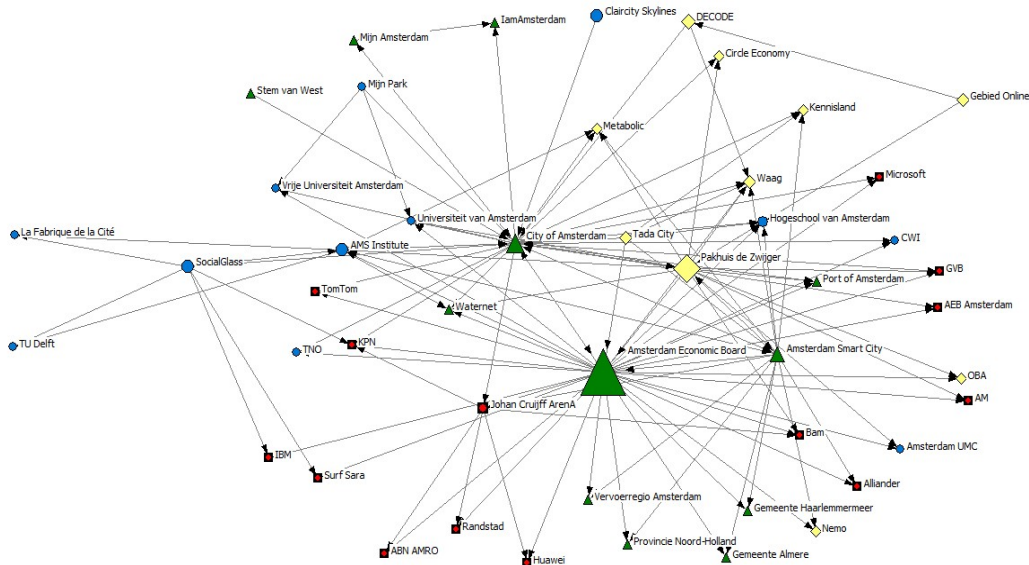
Figure 3: Network by degree centrality > 1 (Borgatti, Everett, and Freeman, 2002).

AEB's and PdZ's high degree centrality is based on their large number of outgoing connections (out-degree). Actors with many outgoing ties are considered influential and able connect to others. They can make their viewpoints heard in the network (ibid.). It can be assumed that partners are only listed on the website if the link is based on an actual partnership, presuming the consent of the respective *alter* to be listed. Stakeholders with a high *in-degree* are said to have a high level of prestige, as many actors seek a connection with these actors. Compared to the other nodes, the City of Amsterdam (CoA) has a relatively high in-degree, indicating its importance for the other actors.

Descriptive statistics provide further information on the overall network centralization. To generate more meaningful results, two SNA methods are coupled. Freeman's degree centrality measure demonstrates that network centralization is larger with respect to outgoing links (27.4%) than regarding incoming links (1.9%), indicating that the number of incoming links is more equally distributed in the network. The outdegree variance is high (std. dev. = 10.456 relative to a mean betweenness of 1.29). Both seems plausible

considering an exceptionally high number of outgoing links of the AEB and PdZ, in comparison to the other actors. The two stakeholders, together with Amsterdam Smart City (ASC), serve as platforms to facilitate connections between different actors in the smart city which explains their high out-degree. The indegree variance (std. dev. = 1.019 relative to a mean betweenness of 1.29) is low, underlining again that incoming connections are relatively equally distributed (see figure four).

```
DESCRIPTIVE STATISTICS

                        1            2            3            4
                   OutDegree     InDegree     NrmOutDeg     NrmInDeg
                 ------------ ------------ ------------ ------------
     1     Mean      1.290        1.290        0.226        0.226
     2  Std Dev     10.456        1.019        1.834        0.179
     3      Sum    369.000      369.000       64.737       64.737
     4 Variance    109.318        1.038        3.365        0.032
     5      SSQ  31741.000      773.000      976.947       23.792
     6    MCSSQ  31264.912      296.913      962.293        9.139
     7 Euc Norm    178.160       27.803       31.256        4.878
     8  Minimum      0.000        0.000        0.000        0.000
     9  Maximum    157.000       12.000       27.544        2.105
    10 N of Obs    286.000      286.000      286.000      286.000

Network Centralization (Outdegree) = 27.413%
Network Centralization (Indegree) = 1.886%
```

Figure 4: Freeman's degree centrality measure (Borgatti, Everett, and Freeman, 2002).

Again, the analysis shows little centralization of power in the network, especially with regards to incoming connections, stressing that there is not one central actor keeping the network together. Instead, the network is highly decentralized, indicating that it lacks a coordinating body.

While there is little centralization of power in the network, there might still be influential actors holding the network together. In SNA, 'cutpoints' are particularly important nodes with the ability to connect otherwise disconnected groups. The node size in figure five indicates the degree centrality within this sub-network of cutpoints (Hanneman and Riddle, 2005).
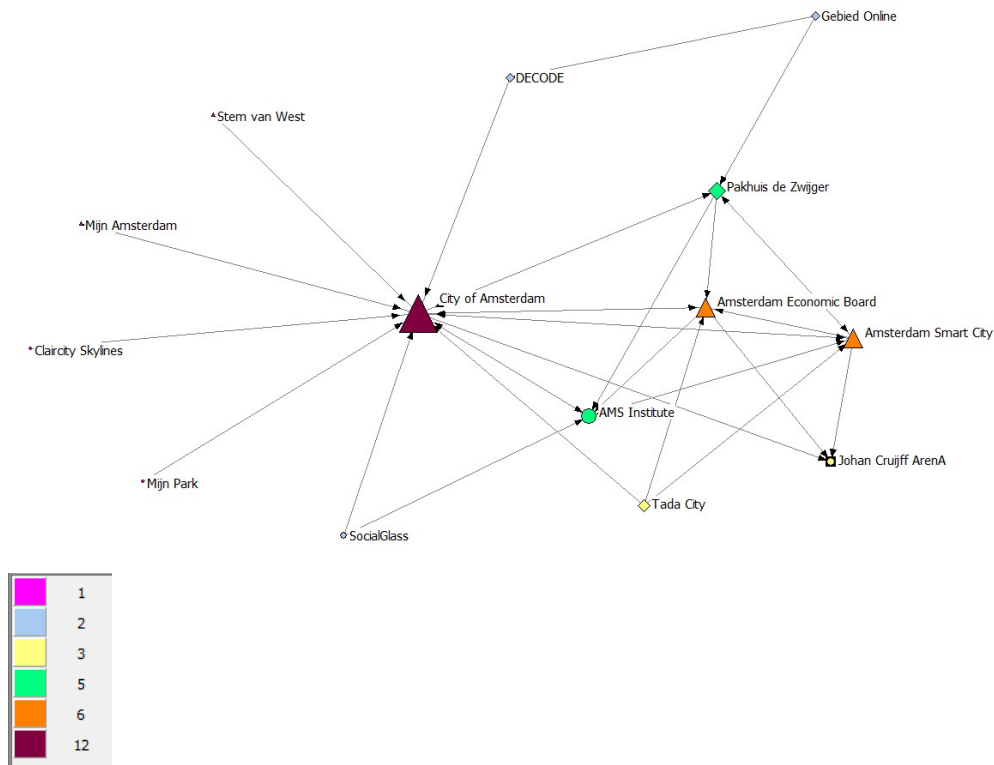
Figure 5: Cutpoints network, node size and colour by degree (Borgatti, Everett, and Freeman, 2002).

It does not come as a surprise that the cutpoints are the seed websites entered for the SNA, as the connections originate from these actors. However, two seeds are missing: West Begroot and Waag. Among all seed websites, these actors have the least integrative function. As a result of a high number of incoming connections (in-degree), the CoA is the most powerful actor by degree centrality in the network of cutpoints. Thus, despite the network's decentralized nature, the CoA can be considered the most important reference point preventing the network from falling apart. The three most powerful actors in the network are all political or administrative institutions, emphasizing their important role for Amsterdam's digital democracy system, followed by non-governmental and research organisations. The private sector does not play a major role. To gain a better understanding of how different sectors are connected in the governance network, connections between organisations in the four stakeholder categories are examined.

Non-profit & CSO

In the network of non-profit and civil society organisations, consisting of 51 nodes and 39 ties, PdZ is the main cutpoint, keeping the network together. There are ten nodes with

no ties that are not included in the following graph due to their negligible importance for the network.
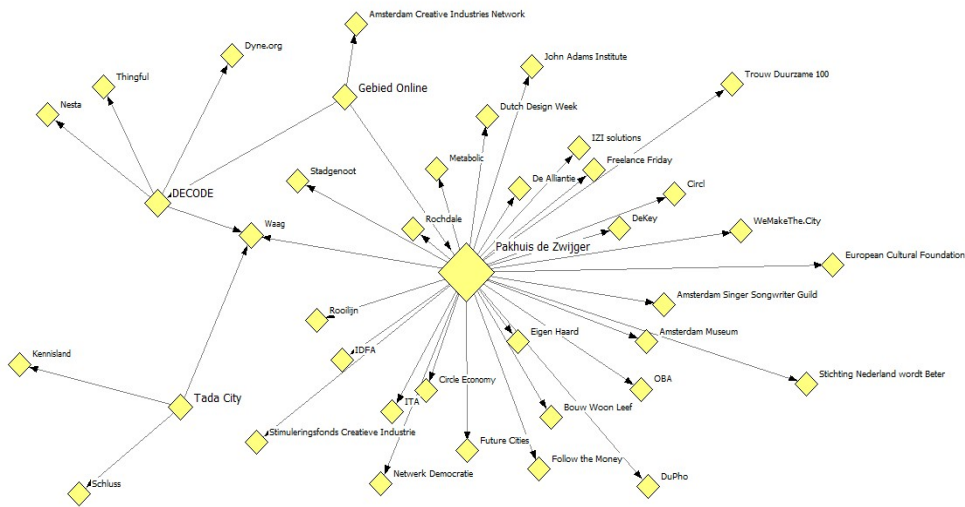
Figure 6: Network of non-governmental organisations; node size by degree (Borgatti, Everett, and Freeman, 2002).

As introduced, PdZ lists most partners on its website and is a well-connected organisation with a high out-degree score. This is confirmed in the expert interviews. When asked about important organisations in Amsterdam, PdZ is often mentioned as a space to discuss issues related to the smart city and digital democracy (see section 5.3). However, while the Pakhuis is an important *offline* actor, e.g. by contributing to the organization of the WeMakeThe.City festival, it plays a smaller role with regards to the city's *online* infrastructure for engagement (although this might change due to the pandemic). Waag, on the other hand, has no outgoing connections but receives three incoming links by influential actors (Tada, PdZ and DECODE), underlining a high level of prestige. Like PdZ, Waag is central in organizing offline engagement around digital themes, particularly in Amsterdam's Makers' Scene, an ICT-based extension of the Do-It-Yourself sub-culture.

Education & research

The network of education and research organisations (39 nodes and 16 ties) consists of three main components and 22 loose actors which are disregarded in figure seven.
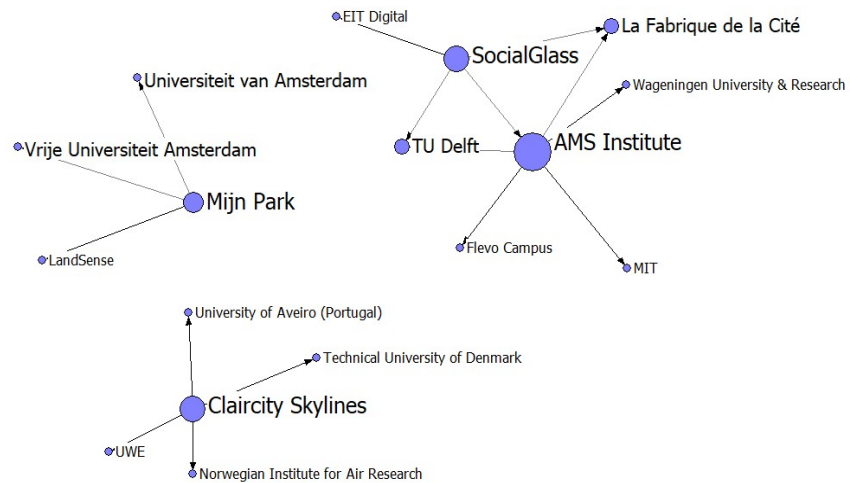
Figure 7: Network of education and research organisations; node size by degree (Borgatti, Everett, and Freeman, 2002).

The node with the highest degree centrality is the AMS institute, emphasizing its importance in Amsterdam's SC research landscape. Besides, the AMS Institute is interlinked with SocialGlass that is part of the platform analysis (see chapter seven). The other two sub-networks revolve around ClairCity Skylines and Mijn Park, also part of the platform analysis, that are connected to their project partners but not to other actors in the network. Therefore, their relevance for the network is relatively small. The education and research network shows a lot of connections to actors outside of Amsterdam and even outside of the Netherlands, indicating that this sub-network is well embedded in European and international smart city structures.

Politics & administration

The network of actors in the field of politics and administration consists of 63 nodes and 60 ties. Its main cutpoint is the Amsterdam Economic Board due to its large number of outgoing links. The main actor with respect to incoming links is the City of Amsterdam. Again, loose nodes are not shown in the following graph.
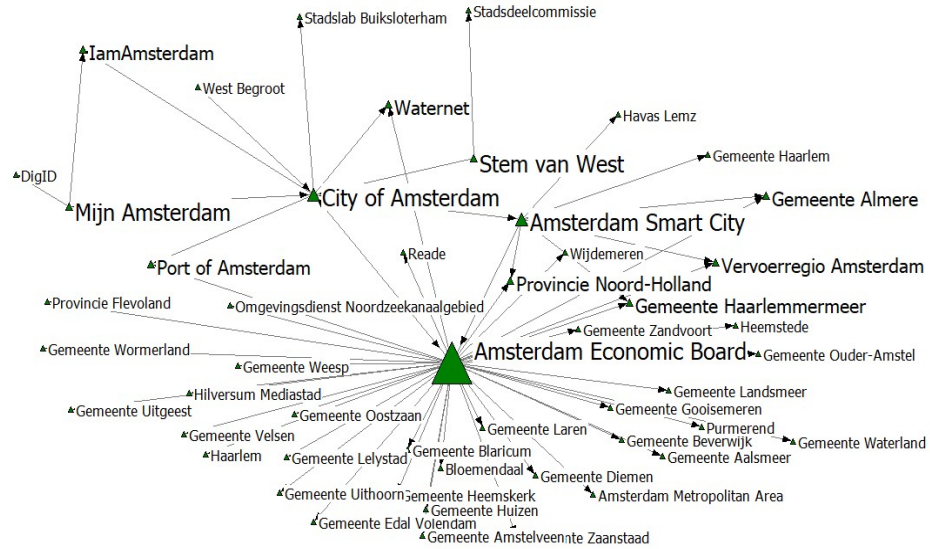
Figure 8: Network of political and administrative institutions; node size by degree (Borgatti, Everett, and Freeman, 2002).

Compared to the other networks, this network is more densely linked. The AEB connects to many other municipalities in the Netherlands, indicating influence beyond the municipality of Amsterdam. The CoA, ASC and AEB build a powerful triangle that connects to most other actors in the network.

Private sector

The private sector network, consisting of 133 nodes and 9 ties, is connected only by the Johan Cruijff/ Amsterdam Innovation Arena. All other 123 private sector organisations are disconnected (see figure nine). The network thus has the highest number of actors that are, however, the most loosely connected. Again, nodes that are not connected are not shown in the graph. This finding indicates that although the private sector is part of the SC network, its impact is limited, as there are no connections to the other actors in the governance network.
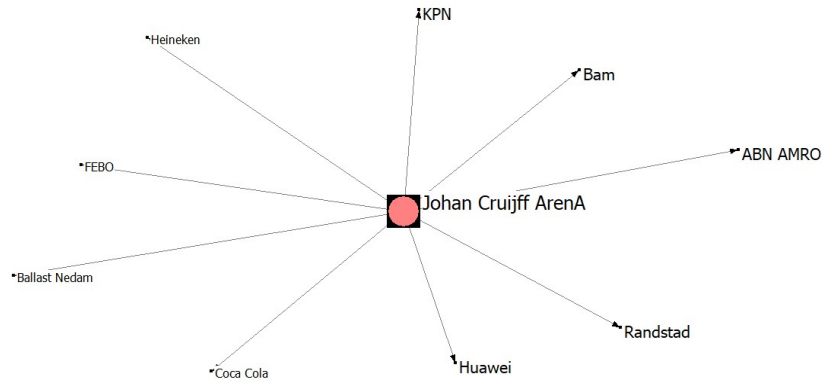
Figure 9: Network of private sector organisations; node size by degree (Borgatti, Everett, and Freeman, 2002).

How can the high number of private sector actors in the network be explained then? The picture would be different if ASC and the AEB were listed as private sector actors. Most of the loose nodes from the private sector originate from their list of partners. Therefore, another interesting question is how strongly the private sector is connected to politics and administration. This is illustrated in figure ten.
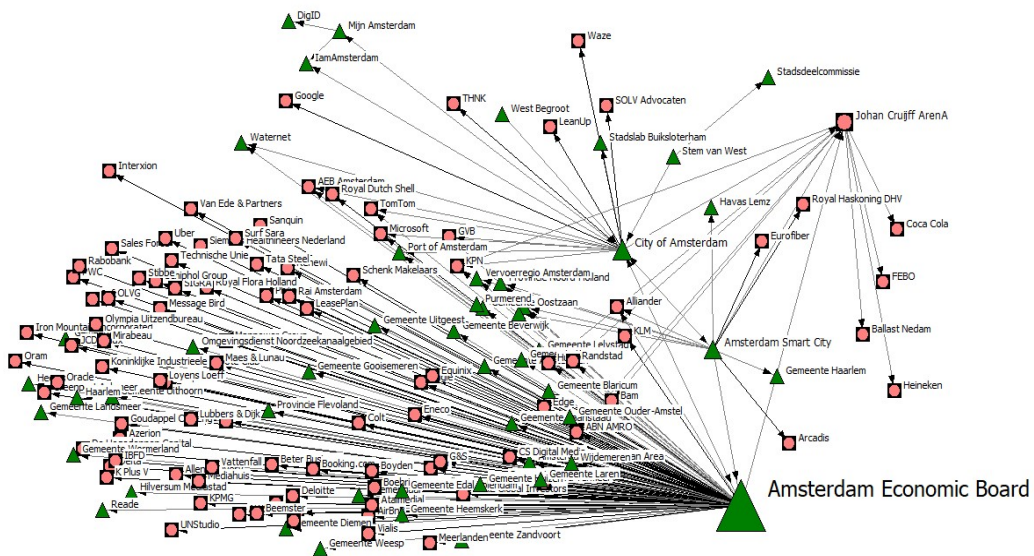
Figure 10: Network of private and public sector organisations; node size by degree (Borgatti, Everett, and Freeman, 2002).

The graph demonstrates that many of the unconnected private sector organisations are now linked to the AEB. The entire network consists of 196 nodes and 170 ties with a relatively low density. Although there are still some disconnected nodes, it can be

confirmed that the AEB builds a bridge between public administration – including municipalities beyond Amsterdam – and the private sector. Nevertheless, the impact of the private sector should still not be overestimated as the actors' connections are mostly limited to the AEB.

Engagement platforms network

Examining only the network of engagement platforms, the CoA is the network's major actor (see figure eleven).
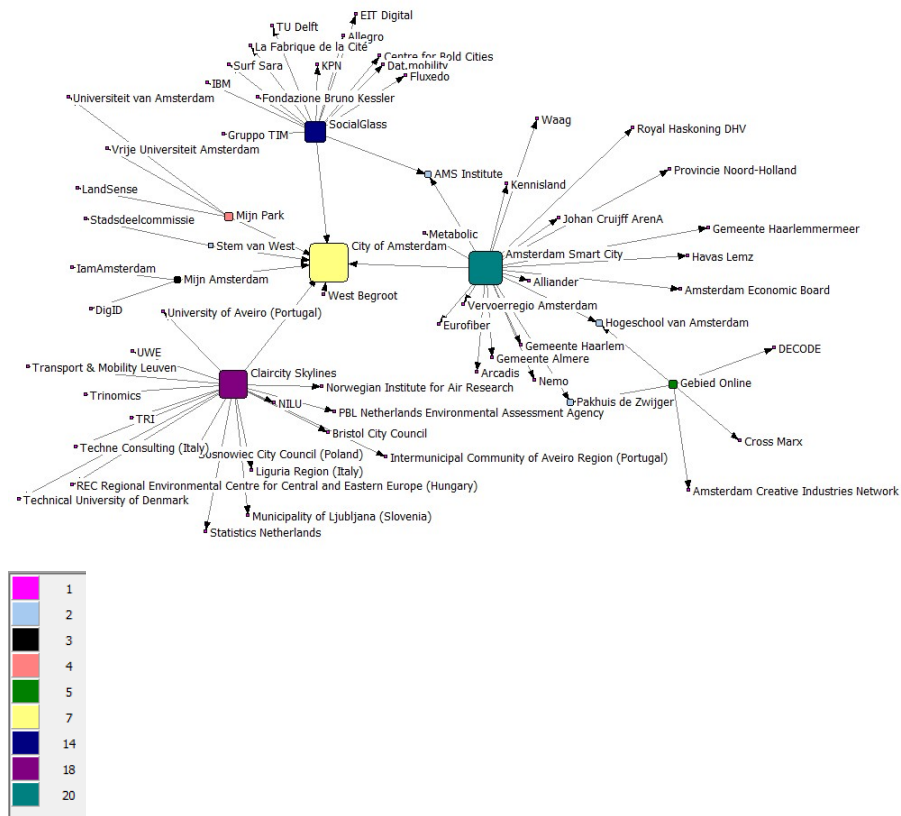
Figure 11: Network of engagement platforms (node size by level of betweenness, node colour by degree) (Borgatti, Everett, and Freeman, 2002).

Although the CoA itself is not an engagement platform, it is the most relevant actor because a lot of engagement platforms link to it. It is thus the most powerful stakeholder in this network in terms of betweenness. Betweenness describes the extent to which nodes stand on the most direct path between each other. In SNA, these nodes are seen as important gatekeepers. As a comparison to the level of betweenness, the overall degree centrality is indicated by the node colour in the graph. As expected, Amsterdam Smart City has the highest degree centrality because of its large number of outgoing links. While the overall analysis suggests that the network could be more meaningfully

connected – due its low degree centrality – figure eleven shows that there are indeed ties to capitalize on when strengthening the system's governance coordination. The CoA could assume an important role in this regard.

Conclusion

This section introduces power and communicative relations in the online network of engagement platforms and stakeholders in Amsterdam's digital democracy system. The SNA demonstrates a low density and centrality of the network. There is thus not one powerful actor keeping everyone together. At the same time, there are no disconnected actors, as the network consists of one component. Despite little centralization of power, some actors stand out. Due to their high number of outgoing links, AEB and PdZ are the best integrated actors with the ability to connect to many others. With regards to overall degree centrality (in- and out-degree combined), the AEB and the CoA are the network's most influential stakeholders. The most powerful actor with regards to in-degree centrality is more difficult to evaluate because power is distributed more equally. The CoA seems to have a slightly more elevated position than others in this regard. Many actors are seeking the CoA's ties, emphasizing its importance. When examining only the network of engagement platforms, of which the CoA is only an *alter*, it is still most powerful in establishing connections. Despite the network's low centrality, there are indeed ties, particularly to the CoA, to capitalize on, which may enhance the coordination in the network. Comparing the impact of different sectors, stakeholders in the domain of public administration and politics are most powerful (notably CoA, AEB and ASC), followed by non-governmental organisations. In this category, PdZ is most influential, followed by Waag. They are less connected to the selected engagement platforms, however. While the private sector's contribution to the quantity of the overall network is high, its impact on the network's quality of connections and depth is low. In all areas, connections reach beyond Amsterdam and even beyond the Netherlands, making it difficult to limit the network to the city's boundaries. Institutions in research and education are most internationally connected. Summarizing, the SNA provides first indications on how actors and spaces are connected within the governance network that is part of Amsterdam's digital democracy system.

5.3 An interpretive analysis of Amsterdam's digital democracy system

This section analyses the connections between the network's main components based on interviews with local stakeholders. The interpretative analysis aims to provide

insights on how the actors themselves perceive connections between the governance network's stakeholders. The interview partners include experts outside of the network as well as representatives of organisations within the network.

The role of politics and administration

The SNA indicates that the City of Amsterdam (CoA) assumes a central role in facilitating digital democracy in Amsterdam's SC governance system. While the SNA treats the city as a unitary actor, one needs to differentiate between the CoA's government and administration and between different actors within both entities. Opening governance structures for digital participatory democracy is a political decision by the incumbent government. Therefore, the administration has the political mandate to develop solutions for ICT-enabled civic engagement. There are a variety of departments involved, with the CTO and its innovation and OpenStad team leading the way. Several municipal interviewees state that it sometimes requires persuasiveness to get everyone in the administration on board to implement citizens' proposals. Moreover, there are deficits in technology and technological expertise among staff. Some government representatives are considered frontrunners in the field of civic participation, while others are more sceptical of ICT-facilitated participation. Despite varying levels of enthusiasm for digital democracy within the local government and administration, the municipality of Amsterdam is perceived by interview partners as exceptional in terms of the extent to which the CoA is committed both to civic participation and the protection of digital rights.

Within the administration, the OpenStad team perceives itself as a "knowledge hub where we help and support colleagues in our organization to design a clear process, to maximize influence for citizens" (I8). OpenStad is situated in a department in which around 30 employees work on democratization and participation. The democratization department is again part of the CTO's office. At the time of writing, OpenStad is reflecting new possibilities of sharing knowledge with other cities and expanding its platform to make their digital tools available for others, including a community website with best practice examples, CMS and file management systems, as well as information for privacy and security officers. The focus is less, however, on connecting to engagement platforms run by other actors in the municipality. Representatives of neighbourhood platforms, like Gebied Online, point out that they would like to cooperate more efficiently and on equal footing with the CoA. As outlined in the SNA, the CoA, in the form

of the OpenStad team, Amsterdam Smart City, and the Amsterdam Economic Board could assume a stronger coordinating role in the city's digital democracy system.

On the one hand, there is the desire for better coordination of digital engagement opportunities and stakeholders through the local government and administration among interviewees. On the other hand, the interviewees value multiple entry points for civic participation and decentralized multi-stakeholder structures, in which the government is one partner among others. Following Esau and colleagues (2020, 91), one may envision the governance system "as being constituted by a political-administrative "center" and the "peripheries of discursive production"". The findings also reflect Bennett and Segerberg's (2012) analysis that traditional, hierarchical modes of collective action are increasingly replaced by more decentralized, dispersed collaboration. As outlined in section 2.1, the theory of New Public Governance can be used to explain the rise of governance models that replace hierarchy and control with multi-stakeholder processes of collaboration and the negotiation of diverse interests to solve urban problems (Bovaird, 2007; Boyte, 2005; Granier and Kudo, 2016). This seems to take place in Amsterdam. The SNA and the interviews demonstrate that the local government remains an important actor within the governance network, but that it shares policymaking power in hybrid and decentralized configurations with the private sector, research institutes, and civil society. Many interview partners would like to see the government as a facilitator of these connections, as outlined by Boyte (2005, 543-544).

The role of research and non-governmental organisations
Research and non-governmental organisation are analysed together because the interviews suggest that the two sectors are strongly interlinked. The interviews confirm that Pakhuis de Zwijger (PdZ) is an important actor with regards to Amsterdam's policies on digital democracy. However, its role is mostly related to facilitating public debates in the city's *offline* public sphere. As of 2020, the Corona pandemic contributed to a shift towards more online debates. Most interviewees confirm that participation processes require a combination of online and offline elements. A representative of Amsterdam's democratisation department states, for instance, that "only digital participation will never be enough to organize a participation process in a neighbourhood. You also have to do it offline" (I5). As this thesis focuses exclusively on digitally facilitated participation, PdZ plays a minor role in the next sections. Future research, however, could examine the intersection between offline and online participation, as the findings

illustrate difficulties separating them in an urban digital democracy ecosystem. For instance, a variety of living or urban labs regularly takes place offline, but they still have a major impact on the city's digital fabric. A representative of the AMS Institute sees the city itself as an urban lab in which research contributes to designing solutions for urban challenges.

Besides interlinkages between offline and online engagement, bottom-up and top-down organized participation compete with and complement each other. A municipal interviewee says that she is particularly interested in seeing where top-down organized participation by the city and bottom-up participation by civil society can meet: "we organize a lot of top-down instruments (…), but it would be nice if we also, as a government, would be able to organize more level playing fields, also with digital participation, with more bottom-up communities and bottom-up participation forms" (I5). This desire for a level playing field is shared by civil society representatives who criticize a crowding effect of top-down participation platforms vis a vis established bottom-up neighbourhood platforms. A member of the Gebied Online cooperative points out: "you need more co-creation and participation and doing things together, but they [the local government] decided to create their own budget and give the citizens a small budget to do their own things". The civil society representative thus feels that government services may be 'outsourced' to citizens instead of developing real co-production channels (see chapter seven for more details).

At the same time, civil society representatives are increasingly included in multi-stakeholder initiatives with the local government. For example, the head of Waag is a board member of the AEB. Working together with people from different sectors, like artists, designers, or hackers, is deemed important by several interview partners to address the digital transformation's systemic implications. Non-governmental organisations can serve as intermediaries to connect to citizens within the urban digital democracy system but the city administration and managers of engagement platforms also reach out directly to citizens, becoming involved e.g. through co-creation, co-design, and co-ownership in the systems' governance structures.

As the SNA can only make senses of formalized spaces for participation and deliberation, blind spots remain. For example, one interview partner points out that there are active WhatsApp and Telegram groups in some neighbourhoods. Although these groups

do not directly influence policymaking but rather serve the purpose of community-building, they are important building blocks of a digital public sphere in which public opinion is formed. Interview partners report discourses on Twitter that would account for what Dahlberg (2011, 6-7) defines as counter-publics in which social media are used for activism, group formation and contestation. For example, an active movement against gentrification in Amsterdam Noord has formed on Twitter. The SNA cannot grasp these discursive bottom-up spaces, although, according to Tamura (2014), grassroots spaces should be considered as micro-deliberative systems, even if their mode of communication may be mostly non-deliberative.

On the one hand, the findings reflect how ICT can be used to improve governance processes, facilitate communication between the local government and citizens and involve citizens directly in the co-creation and co-delivery of services (Bovaird, 2007; Pollitt, Bouckaert, and Löffler, 2006; see also section 2.1). On the other hand, with the local administration increasingly directly reaching out to citizens and creating its own communication channels, established intermediary organisations feel pushed aside and in competition with the local government.

Cooperation with the private sector

Although the private sector has the highest number of nodes in the governance network, international companies, such as IBM, Microsoft, or Siemens that dominate the SC market (Bria and Morozov, 2018), as indicated in the literature review (section 2.2), do not play a significant role in Amsterdam's digital democracy governance network. According to several interviewees, the private sector is more important with respect to smart city infrastructure, e.g. in the mobility area, rather than with regards to digital democracy applications. Collaborations with the private sector mostly take place when external expertise is needed, and services are outsourced, e.g. with consulting agencies.

The city is hesitant to work together with the private sector on aspects of democratic engagement. The OpenStad team, for instance, recounts some negative experiences with private companies and therefore deliberately decided to run its platforms independently. A member of the project team explains that a private company

> made a page for one of our projects. And then we asked them to change their layout because it was blue and we wanted it to be red because that's the colour of the

municipality. (…) And they said well, no, because if you use Twitter, you also don't change the design of Twitter and we want to be a platform like that. (I6)

The example shows how the logic of the commercial market (in this case brand recognition) is transferred to the digital public or political sphere. The experience is among the reasons why the CoA started developing its own platforms. Difficulties in working with the private sector are based on a number of reasons. Another municipal employee, for example, says that cooperation with the private sector "immediately triggers a whole lot of resistance" among citizens and questions about security. The CoA thus takes the SC criticism, as outlined in section 2.2, into account and actively counters it by setting up its own platforms on which it can more easily monitor data protection. Thus, based on the SNA and the interviews, it cannot be confirmed that handling and managing data in Amsterdam's smart city is not with the democratically elected government but with private companies, as outlined e.g. by Kitchin (2015), Cardullo and Kitchin (2017), or Greenfield (2013).

Besides, there are issues related to the private sector's diverging incentives and visions for long-term democratic engagement: "the incentive would be to deliver that specific project instead of contributing to the community" (I8). This reflects Mejias' (2013, 5) questioning of the 'publicness' of online spaces owned by private companies that may lead to a privatization of the public sphere. A representative of Waag explains fittingly the relation between smart city development and the economic system in Amsterdam:

> to reform the digital, you also have to reform your economics. This is at the same time happening in Amsterdam (…) where you think about externalities and regenerative as two models for economics. I think these apply exactly also on the digital. (…) surveillance capitalism has externalities and the type of digitization that we would like is regenerative. (…) Otherwise, you stick to the utilitarian perspective of technology. (I1)

At the same time, an ASC representative warns of demonizing the private sector:

> in the Netherlands, we have this contest who is the most privacy invading organisation of the year. And time and again the government has won. (…) you need to be vigilant with governments and private companies, both of them. It does not matter. Both of them have a tendency to collect too many data. (I4)

The interview partner thus warns that the engagement of political actors may equally threaten an independent public sphere.

Between the smart and the digital city

The differentiation between the smart and digital city terminology was first established in the literature review (section 2.2). In Dameri's (2014) comparison between smart and digital city policies in Amsterdam, he finds that the SC focuses on a variety of technologies for improving city infrastructure and reducing urban environmental hazards. In comparison, in DC implementation, citizens take a more proactive role. While DC initiatives require strong digital literacy skills of citizens and a digital maturity of both people and infrastructure to ensure participation, SC initiatives are based on investments in facilities and infrastructure, participation of the private sector, and strong economic plans.

Asked about the diverging terms in Amsterdam, an ASC representative is surprised that the term 'digital city' is being used:

> I will not use 'digital city' because cities are about people. And definitely not about digital techniques. (…) A smart city is… what we are working for is a wise, fibred, sustainable, inclusive city and even region. (…) And digital cities would be dystopian cities. (I4)

The interviewee thus associates the 'digital city' with a technology centred approach, while the 'smart city' seems more citizen centred to her – the opposite of Dameri's (2014) findings. A representative of the municipality's democratisation department, on the other hand, perceives the smart and the digital city as two different programmes:

> So, the smart citizens use more smart technology. For example, the way of organizing traffic (…). It is on the smart citizen and smart stands for using more relevant data and digital stands for… not the use of data but using the digital as a method. (…) So the smart city is 'how can we be more smart by using data' and digital city is 'how can the city be more digital in function'. (…) the Amsterdam Smart City platform and the Digital City programme, they are all part of the CTO organization within Amsterdam, but we are not very connected within each other. (I5)

The quote indicates that there are indeed two spheres of influence in the governance network that are not well connected. A researcher at the AMS Institute adds that digital democracy, like democracy in general, is open for all kinds of issues in the public interest. SC related policies, such as smart mobility or energy, may just be some of these issues. The SC realm may thus be defined as issue-specific whereas the digital democracy realm is more open policy-wise. A representative of Waag elaborates on the roots

of the DC and SC movement in Amsterdam, dating back to the launch of the digital city in 1994:

> by the time you would visit the digital city by logging onto the internet. And now the digital city is the whole city. So you can't even log out of it anymore. (…) And problematic of the whole story is that someone started to call this 'smart' which is kind of… [laughing] So since this is called 'smart city', it suddenly proclaims to be better than the 'not smart city'. There, something really went wrong. (I1)

The interview partner thus criticizes the branding of the smart city, as outlined by Wadhwa (2015), and an artificial differentiation between the 'smart city' and other ICT-related urban processes. Despite a seemingly different approach to digital democracy, the smart and the digital city overlap in the governance network and should not be separated too strictly. The interview partner from Waag explains further:

> We always worked on smart citizens. So the whole smart citizens movement is, I think, as old as the smart city movement. Not just as a reaction, but also as an idea that we need smart citizens to be enabled by digital tools in order to democratize technology and to have power balances. (I1)

She explains that Waag is participating in SC initiatives like the ASC to "bring in the social-technical perspective" and "the perspective of the commons, of the open source, of the public values, of the smart citizen" (I1). Increasingly, the digital city community, which was based on these values to begin with, merges with the SC community, which used to be driven by "companies that want to push ICT in cities" (I1) and used the SC as "a marketing tool." According to the interviewee, "this kind of informal network helped to keep it moving, to keep this whole discussion sane" (I1).

Concluding, the interviews indicate that there seem to be different philosophies and actors behind the smart and the digital city approach in Amsterdam.

5.4 The structural dimensions of Amsterdam's digital democracy system
The aim of this chapter was to examine Amsterdam's digital democracy system based on its governance network. First, the analysis demonstrates the system's complexity. Although a comprehensive mixed-methods approach is applied, blind spots remain. The governance network shows the connections and power relations between the system's most important actors and between the selected online engagement platforms, but it cannot adequately grasp all spaces in which deliberation and participation occurs, especially

in the offline public sphere and more informal spaces. Some actors who are not listed as partners on the websites may have slipped through the net. As outlined earlier, digital networks contribute to nodocentrism, meaning that everything that is not a node in the system is automatically excluded and becomes invisible (Mejias, 2013, 9-11). This accounts in particular for offline spaces, which are not subject of this investigation, and informal spaces, such as WhatsApp or Telegram neighbourhood groups, which could not be grasped by the SNA. However, based on the variety of methods, it can be assumed that most of the network's relevant actors in Amsterdam's online public sphere and their links have been identified.

The SNA demonstrates a low overall network density, indicating that there are few links and little centralization of power in Amsterdam's digital democracy system. The expert interviews and the SNA demonstrate that the CoA, in particular the CTO or the innovation office, is seen as the strongest connecting point. Within the CTO, one can differentiate between the democratisation team to which OpenStad belongs and other SC policy priorities, such as smart mobility or circular economy. The findings support Simone's (2010, 126) argument that the digital "public sphere is constituted by multifaceted networks of communication, which include nodes populated by multiple publics, some dominant, some subaltern." All nodes are tied to each other what can be considered a good sign for the cohesion of Amsterdam's digital democracy structure: if "nodes can be tied to each other as well as to shared nodes, democracy benefits" (ibid., 128). Although many interview partners stress the importance of coordination within the governance network, a decentralized approach is seen as equally advantageous in that power is dispersed and that there are many entry points for citizens to become engaged.

The interviews indicate differing terminologies within the network. The term *digital city* (DC) is used by those that relate more strongly to the digital democracy sphere, notably OpenStad and civil society actors, and the *smart city* (SC) term is predominantly used by representatives of the AEB and the ASC. It seems that the DC is more inward directed, establishing policies for Amsterdam's residents, whereas the SC is more outward directed, also functioning as a 'marketing tool' through the ASC platform (whose language is English). Although all interviewed stakeholders stress the importance of democratic values and civic participation, there are differences in terms of operationalization. The AEB and the ASC have most connections to the private sector, but the overall private sector engagement is low. It is questionable whether the digital democracy sector

128

is as attractive for private sector investments as other SC areas, such as mobility or energy, as the private sector is perceived of little importance for digital civic engagement tools and platforms.

Lastly, the technology behind both the smart and digital city approach seems of less pertinence than its governance dimension, as interview partners strongly emphasize the importance of multi-stakeholder processes that involve citizens through e.g. co-production, indicating that the SC is increasingly recognized for its *governance model* instead of its technological infrastructure. This confirms the assumption that the role of local governments is changing towards a facilitator and connector between different actors and services in the smart city (Misuraca, Ferro, and Caroleo, 2010; see also Willis and Aurigi 2017, 144).

6. Amsterdam's vision of digital democracy

> We believe that Amsterdammers should be able to share their data securely, that their rights should be protected and that our democratic values should also hold true in the digital world. The city belongs to everyone, and so does the digital city.
> (Touria Meliani, Deputy Mayor of Amsterdam, in: CoA ADC, 2019, 1)

To examine how digital democracy is practiced in the smart city of Amsterdam, it is essential to understand how it is *envisioned* on a normative level. In what follows, Amsterdam's digital democracy strategy is examined in selected policy papers, providing insights into the city's goals and ambitions regarding different aspects of digital democracy as described in the literature review (chapter two). Eight policy papers are analysed. They are selected based on desk research, the SNA results, and expert interviews and can be found on the main actors' websites. The objective is to include official documents of both local and national authorities as well as policy guides by influential non-governmental organisations (see section 4.3.4). Two of the documents deal with open data policies – one from a civil society and one from the local government's perspective to illustrate differences and similarities between the stakeholders. Needless to say, numerous other documents could be included, e.g. Waag's Roadmap for the Digital Future (Stikker et al., 2020), Lobby Lokaal Amsterdam, a handbook for citizen lobbyists (Stichting Lobby Lokaal and Wallaart & Kusse Public Affairs, 2020), or the City of Amsterdam's agenda for digital security (CoA, 2020). These documents, however, miss either the digital dimension of citizen participation or the participation dimension of digitization. The selected papers reflect both spheres. An exception is made for the governing parties' coalition agreement and its implementation agenda which are added to evaluate the placement of digital democracy policies in Amsterdam's overall policy priorities. All documents are coded based on the outlined legitimacy criteria (see chapter three and section 4.1). They were selected and analysed between December 2019 and March 2021.

6.1 Analysis of policy documents

In this section, the selected policy documents are briefly introduced in the order of the range of SC policies they cover, from a broad to a narrow spectrum.

The Dutch National Smart City Strategy "The future of living"

The Dutch National Smart City Strategy "The future of living" (NL SCS[22], 2017) was developed in 2016 in a multi-stakeholder co-creation process, including officials from the CoA as well as representatives from ASC and the AMS Institute. It is based on a cross-sectoral approach "to improve quality of life and maximise economic opportunities for people living in cities", while creating "an effective investment climate" (NL SCS, 2017, 6). For this purpose, five preconditions are identified (ibid., 7-9):

1. "Safe, standardised digital infrastructure"
2. "Public-private partnership with room to experiment"
3. "New models of governance, integral and in collaboration with citizens"
4. "Education and employability"
5. "Regional collaboration in which cities operate as a network"

The strategy can be seen as an overarching framework in which the CoA's smart city policies are embedded.

Agenda for the Digital City "A digital city for and by everyone"

Amsterdam's first *Agenda for the Digital City* (ADC) was published in March 2019 by the CoA. It shows the way forward for the city's digital development. It was developed in a co-productive process, based on a screening of best practices from other cities around the world, a survey with 892 residents on their perceptions of the digital city, 70 street interviews, field visits at relevant organisations, and several co-creation sessions with citizens (CoA ADC, 2019, 38). The policy paper revolves around the three main ambitions of the digital city of Amsterdam: free, inclusive, and creative. Attached and frequently referred to in the ADC is the Tada Manifesto, drafted by experts from the Amsterdam region and signed by government authorities, businesses, civil society organizations, and other institutions.

Manifesto 'Tada – Data disclosed'

Part of the ADC is the manifesto *Tada– Data disclosed* (Amsterdam Economic Board et al., 2019) which revolves around six principles to which the CoA pledges. The goal is "to shape a responsible digital city" (ibid.) The six principles are:

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[22] To make it easier for the reader to distinguish between the documents, appropriate abbreviations have been introduced.

- Inclusiveness: considering the differences between groups and individuals, without losing equality.
- Control: protecting the freedom of residents and people's control over data.
- Tailored to the people: the human should be at the centre, not technology.
- Legitimate and monitored: citizens have control over the design of the digital city.
- Open and transparent: transparency on collected data as well as its outcomes and results.
- From everyone - for everyone: data that governments, companies, and other organizations generate and collect should be shared and commonly owned.

The Tada Manifesto is supported by a broad alliance of actors and institutions from civil society, research, business, and politics.

Handreiking Digitale Democratie – Digital Democracy Guide
The *Handreiking Digitale Democratie* (de Zeeuw and Pieterse, 2018; engl.: Digital Democracy Guide, short: DDG) was drafted in 2017 by the non-profit network *Netwerk Democratie – Digitale participatietools for locale overheiden* (engl.: Network Democracy - Digital participation tools for local authorities) in collaboration with Waag and the Dutch Ministry of the Interior.[23] The project aims to provide guidance to Dutch public authorities on the use of digital participation tools. The CoA refers to the guide on its OpenStad website, providing information on participation possibilities. Moreover, the OpenStad team was involved in its development (CoA, 2020l). The guide offers a step-by-step plan for the use of digital applications for democratic participation.

Datastrategie Gemeente Amsterdam - Amsterdamse zelfbeschikking over data
The CoA's first data strategy (CoA DS, 2021) was published in January 2021. It aims to find a balance between interests of citizens, companies, and governments in terms of data governance. The starting point is that Amsterdammers should be able to move anonymously in public space (ibid., 5). The DS is linked to the ADC in the sense that it clarifies the necessary actions in the field of data to achieve the ADC's goal of protecting the digital rights of Amsterdam's residents. The measures are listed under two headings:

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[23] All involved organisations: Citizens Foundation, People's Assembly, Decide Madrid, Waag Society, VNG, KING Pilotstarter, OpenStadsdeel Amsterdam (now OpenStad), Argu, YouMee, Councilwise, Petities.nl, SIDN fonds en Movisie (de Zeeuw and Pieterse, 2018, 5).

first, citizens should receive more control over their data, and second, data about the city is to be used for the city (ibid., 6). Like the ADC, the DS refers to the Tada manifesto.

A strategy for urban data. How to develop collaborative data projects – for citizens, urban innovators, researchers, and policy makers

In 2019, Waag and the AMS Institute published *A strategy for urban data* (SUD; Schouten, 2019). The publication is selected because of the significant role Waag and the AMS Institute play in the smart city ecosystem, the importance of data governance, and as a comparison to the CoA's official data strategy. The report advocates for the development of a data commons and thus has a different focus than the DS. Data commons is defined as "data collections that are maintained and managed by communities of citizens in collaboration with other (local) parties" (ibid., 4).

Coalition Agreement (CA, 2018) and Ambitions and Implementation Agenda (AIA, 2018)

The final documents analysed are the Coalition Agreement, in particular the introduction and the implementation agenda 2019. The coalition agreement was drafted by the parties Groenlinks (green left), D66 (social liberal), PVDA (social democratic) and SP (socialist) in May 2018 and has the title *Een nieuwe lente en een nieuw geluid* (engl.: A new spring and a new sound). In September 2018, the city government additionally published the Ambitions and Implementation Agenda (CoA AIA) for 2019. Only the coalition agreement's (CoA, 2018a) most relevant sections for this thesis are examined: 'inclusive and connected', 'economy and innovation', 'democratization and the digital city', and 'collaboration and culture'. They have the closest ties to the case study's digital democracy focus. In addition, the more compact implementation strategy (CoA, 2018b) is analysed entirely to compare it with the overall implementation priorities. The document is separated into the following sections: equality of opportunity, open and tolerant city, good neighbourhoods, liveable city, freedom and safety, healthy and sustainable city, participatory and digital. Under 'Democratization and Digital City', there are three budget lines: neighbourhood budgets (2019: 2 million Euro; 2020: 4 million; 2021: 6 million; 2022: 8.5 million), democratization and fearless cities (2019: 1 million; 2020: 1,5 million; 2021: 2 million; 2022: 2 million), and digital city (budget for four years: 14 million).

Overall, these documents give a nuanced picture of how Amsterdam and its various stakeholders envisage digital democracy, including not only government strategies, but also policy papers by influential research and civil society organisations. What is their impact on the legitimacy of digital democracy in Amsterdam from a normative perspective? In what follows, the documents are analysed using the legitimacy criteria inclusiveness, empowerment, effectiveness, deliberation, and independence to answer this question.

6.1.1 Inclusiveness: how to encourage participation for all

All documents emphasize the importance of inclusive citizen participation in the smart city. The ADC explicitly mentions the goal of creating a more "participatory democracy" (40) and the NL SCS (2017, 8, 50, emphasis added) stresses that "[g]overnment authorities have a responsibility to encourage *all* citizens to participate and to prevent divisions in society." The aim of smart city policies is to make lives better for residents. This should be achieved through top-down and bottom-up participation, with active, articulate, and well-educated citizens (ibid., 37). All documents are less clear, however, on how the ambition of inclusiveness can be realized in practice. Most frequently discussed issues are digital access and the inclusion of marginalized groups, as well as inclusive governance processes, like co-production or multi-stakeholder initiatives.

Access to digital participation

According to the city's ADC (2019, 22), the first step to counter the digital divide is to extend the public Wi-Fi network. The ADC also acknowledges that real access depends on one's abilities to confidently act in the digital world and handle the overflow of information (ibid., 6). Therefore, the city aims to make its public services more accessible and develop its own online services for residents (ibid., 23). However, this cannot account for actual citizen participation, but might rather be a contribution to the smart city's promise of greater efficiency that is criticized for perceiving the citizen as a consumer of government services (Sadowski, 2019; Townsend 2013, 31; see section 2.2). The DDG (de Zeeuw and Pieterse, 2018, 9), on the other hand, addresses inclusiveness in top-down decision-making processes. With good communication and outreach strategies as well as the involvement of civil society and neighbourhood organisations, the diversity and inclusion of participants can be increased and hard-to-reach communities can be integrated (ibid., 32). The documents thus acknowledge the findings of the literature review that the digital divide may prevent parts of society from participating (see

section 2.1). The city aims to collaboratively draft a digital inclusion strategy so that "everyone, regardless of social position, cultural origin, or sexual orientation" (CoA ADC, 2019, 21) can participate in city life. Among all selected documents, the CA and AIA (2018), hence official government documents, place the strongest emphasis on the need to involve marginalized groups, for instance residents with a migrant background, with less financial resources or with little digital skills. Face-to-face meetings, not necessarily digital tools, are central to this approach, emphasizing again the hybrid nature of digital democracy that is embedded both online and offline (see section 2.3). The focus of reaching more diverse citizens is mostly on offline methods in the policy documents, less on low-threshold online ways, such as social media which are, despite their shortcomings, the most widely used platforms of different sections of society (Statista, 2021). The possibility of integrating digital participation opportunities into citizens' everyday life as a way of countering unequal access to DCE, as suggested by Willis (2019), are not thoroughly discussed.

The DDG (de Zeeuw and Pieterse, 2018, 36) partly fills this gap by stressing that the city government should facilitate participation for all, for example by combining online and offline participation modes, types of participation – consultation, e-petition, ideation etc. – as well as by engaging with relevant intermediary organisations, such as media and civil society organisations. Gamification is mentioned as a method to increase participation (ibid., 45). The type of tool should always match the task it needs to fulfil, and the more participation channels are open, the more people participate (ibid., 48). This reflects the decentralized nature of Amsterdam's digital democracy governance system that was established in the SNA. Before setting up online engagement opportunities, the DDG advocates for a survey among citizens on their preferences. This recommendation has been picked up by the OpenStad team that consulted citizens before designing its first engagement platforms. Emphasizing the important role of intermediary organisations, the DDG suggests that the local government should become part of a participatory multi-stakeholder process (ibid., 32).

ICT-facilitated participatory governance
The AIA (2018b, 2-3) emphasizes that Amsterdammers 'make the city'. For this purpose, the government plans to develop a joint agenda for democratic renewal with citizens and, for instance, have them help design and decide a roadmap towards climate-neutrality. The city states that it will create free meeting and development places, where

possible at neighbourhood level, as well as co-creation sites in all district offices (CoA CA, 2018a, 58). Waag's strategy for urban data (Schouten, 2019, 4) emphasizes that the process of creating and using a data commons should be open for citizens, NGOs, and communities. Their needs should form the basis for data projects. In all projects, strategies to involve larger parts of the public, building "a large and accessible impact" (ibid., 13), should be drafted. Co-creation is advocated, denoting "multi-stakeholder processes in which participants exchange views and ideas" (ibid.), while emphasizing direct involvement of peers and co-ownership of resources and solutions (ibid., 17). Similarly, the CoA's data strategy (2021, 7) states that the city will organize twice a year an open meeting with residents and experts to update the DS and discuss the actions for the next six months. Co-creation thus mainly happens offline. The possibilities of ICT-enabled processes for co-production are less explored (Lember, 2018). On the other hand, the documents confirm the finding of the literature review that co-creation processes and multi-stakeholder alliances are increasingly important in SC governance (Gil-Garcia, Pardo, and Nam, 2016; Chourabi et al., 2012; see also section 2.2.2). They underline that the government is increasingly seen as a platform or facilitator of multi-stakeholder connections (Boyte, 2005, 543-544). Disadvantages to this approach, such as a lack of political oversight (Cardullo and Kitchin, 2017, 10), are not critically discussed.

The NL SCS (2017), explicitly focusing on the smart city, also advocates for an inclusive and integrated approach of local authorities, science, business, citizens, and the national government. However, its overall focus remains on facilitating collaborations between the private and public sector, emphasizing repeatedly the importance of creating an environment that attracts foreign investment. Social and economic reasons are mentioned for involving citizens, while labour participation and the development of a skilled labour force are stressed (ibid., 50). The focus is less on a normative dimension of participation. Critical aspects of PPPs (as discussed in section 2.2.3), such as the accountability paradox, are not reflected. Lastly, while all documents stress the importance of inclusive, citizen-centred governance processes, they remain vague on the role of citizens in multi-stakeholder regimes, focusing more strongly on governance with intermediary organisations than through direct citizen participation. Out of the analysed documents, the DDG is most explicit on providing specific examples and instructions for policymakers to ensure inclusiveness through concrete online engagement activities.

6.1.2 Empowerment: how to promote skills and agency

In the selected documents, the empowerment of residents plays a minor role, in line with Angelidou's (2016, 23) findings on empowerment in Amsterdam SC, namely that „most smart city programs include minimal education and training activities for individuals" and that there is a lack of digital and social inclusion initiatives (ibid., 24). When addressed, issues related to empowerment revolve around creating equal opportunities and reducing discrimination, promoting skills development for an educated labour force, strengthening digital literacy, for instance through creativity, arts and culture, and, lastly, empowerment through the participatory process itself. However, potential measures to strengthen empowerment remain vague.

Skills development

The NL SCS (2017) addresses civic empowerment in relation to the knowledge economy and an educated labour force: "An inclusive society is intrinsically connected to knowledge and to labour market access. Society is divided along educational lines. Digitalisation is both an opportunity and a threat, since technological progress is turning the labour market upside-down" (ibid., 8). Education and empowerment are directed towards creating a labour force that is ready for the 'smart city market'. The approach to skills development is thus instrumental (see also Cardullo and Kitchin, 2017, 16; Cosgrave, 2013, 37). Waag's SUD, on the other hand, emphasizes that the "aim is to turn the 'regular consumer' into somebody who is engaged, skilled and in control" (Schouten, 2019, 9), following a more normative approach. Active empowerment can avoid negative effects of ICT and enable citizens to participate (ibid., 15, 21). Overall, the "smart society derives its smartness not from a large number of devices and sensors that generate data, but from a learning and development process that is open to a large number of parties" (ibid., 18). The policy paper thus embraces the shift, identified by Khanna and Khanna (2015, 40; see section 2.2.2) "from the 'Internet of Things' to the 'Internet of People'", perceiving the SC as socially constructed and a result of the 'smartness' of its citizens. Most documents clearly contribute to the "neo smart city paradigm" (Steenbock Vestergaard, Fernandes, and Presser, 2015, 40) in which citizen empowerment is seen to improve cities on citizens' terms. However, the overall goal of empowerment is still to improve the city, thereby instrumental. It is less seen as "an independent desideratum of democratic politics" (Fung and Wright, 2001, 28).

Creativity, arts, and culture

The CoA aims to use the creativity of its residents to find solutions for future challenges. In the ADC (2019), the concept of creativity is linked to (economic) innovation on the one hand, and to arts and culture on the other. The former reflects the point raised by Willis and Aurigi (2020, 5; section 2.2.3) that the 'creative economy' stands for a general shift towards a networked, competitive, and highly skilled workforce that is needed for the smart city market. The latter raises public awareness for creating a digital culture that is receptive of social and ethical issues. In this context, technology is expected to support the accessibility of art (CoA ADC, 2019, 6). Likewise, the CA's implementation agenda (AIA, 2018, 5) outlines that cultural experiences in the neighbourhoods should be upscaled to reach and empower more people. According to Chourabi et al. (2012, 32) and Willis and Aurigi (2017, 111), it is critical to create a space for citizens to express alternative views and engage in their own participatory practices. In this context, the self-creation of citizenship or 'do-it-yourself citizenship' through citizen journalism or online community-building (Ratto and Boler, 2014) – examples of which exist in Amsterdam (see chapter seven) – could have been discussed but are missing largely from the documents. Moreover, the question of how digitization in the smart city transforms the subject's identity and the development of unlinkable, multiple identities online that may be based on blockchain technology are not thoroughly discussed in the documents (Feher, 2019; Goodell and Aste, 2019; see also section 2.1.1).

Digital literacy and anti-discrimination

At the centre of CA and AIA (2018a, b) is the creation of equal opportunities to avoid discrimination and to give everyone the same possibilities to become an active member of society. This includes measures for empowerment and emancipation. The CoA also supports these policies in the ADC (2019, 30), turning the city into "a space in which knowledge is available to all Amsterdammers". Moreover, the ADC states that "Amsterdammers must be digitally resilient and have the right skills to be able to participate" (ibid., 21). Resilience and technological awareness are promoted to prevent bullying, discrimination, and intimidation online, and to support digital health (ibid., 22, 32).

The DS (2021, 12) adds that the CoA is developing together with the public libraries a programme for data literacy. This is important to develop a better understanding on what information is being collected and how, while increasing trust and transparency in the smart city's digital democracy (Araya and Hassan, 2015). Moreover, it may prevent

subtle forms of steering citizens by way of nudging (Cardullo and Kitchin, 2017, 8-9). In the Civic Artificial Intelligence Lab, the CoA is investigating together with the University of Amsterdam how AI can combat inequality in the city (ibid., 21). However, as outlined by Choenni and colleagues (2016; see also section 2.2.2), data analysis based on AI and algorithms can create accountability problems, as data is susceptible to signal errors and confirmation bias. These issues are not controversially discussed in the policy papers with regards to non-discrimination policies.

Empowerment through the participatory process
The dimension of empowerment through participatory processes is both implicitly and explicitly addressed in the selected documents. The focus of the DDG is explicitly on citizens acquiring skills and expanding knowledge on the functioning of democracy through the act of participation (de Zeeuw and Pieterse, 2018, 12, 25, 43). In line with Pateman (1970, 43), the DDG states that the more often people participate, the more they become familiar with the political process and city policies (de Zeeuw and Pieterse, 2018, 20). The justification for participation therefore does not only rest on the outcome in terms of policies but also on the development of social and political capabilities. However, the DDG is less explicit on support structures citizens may require to develop these capabilities.

Although the economic dimension of smart cities is at the core of the NL SCS' (2017), it also emphasizes the importance of being able to claim one's rights and participation in the digital urban context. For instance, the strategy acknowledges that "[c]itizens should not only be able to control data, especially their own data, but they should preferably be able to develop their own services to some extent" (ibid., 53). On the one hand, this may be understood as giving citizens a space for expressing their own needs, experimenting with potential solutions, and thereby developing skills. On the other hand, it may be perceived as an outsourcing of government services in the sense of a solutionist perspective of urban governance that focuses on fixing problems to deliver on the promise of greater efficiency (Townsend, 2013, 31; see also section 2.2.2). It is questionable whether citizens at the margin would be able "to develop their own services", thereby creating participation opportunities solely for the better educated classes. The ADC (2019, 32) is more citizen-centred, stating that it wants to ensure that all Amsterdammers receive the necessary skills and information for participation and decision-making as well as information on their respective neighbourhoods. Neighbourhood initiatives are

said to be given the space they need, and the city is investigating how it can better support them, e.g. through a fund for small-scale social initiatives or through neighbourhood budgets (CA, 2018a, 58). The CoA aims to ensure that all residents have access to important information to strengthen participation, decision-making, accountability, the use of public funds, and the results thereof (ibid.).

6.1.3 Effectiveness: how to make citizens' voice heard

All documents recognize the importance of involving citizens in policymaking (e.g. NL SCS, 2017, 8). As in the previous areas, they are less clear on how to practically ensure civic impact. An exception is the DDG that provides specific instructions for this purpose. A compelling explanation for the DDG being more concrete in this regard may be that it was drafted by an NGO, based on a co-productive process, with the specific aim to provide recommendations for authorities on how to give citizens a say in policymaking. For actors external to institutionalized decision-making it may be easier to 'think out of the box', as they are less constrained by institutional processes and structures. Overall, the documents see residents in the role of *informing* policymaking and *consulting* local authorities, but do not perceive citizens themselves as decision-makers, except for the DDG and the coalition agreement, when referring to neighbourhood budgets.

From consultation towards ownership

The NL SCS (2017, 50) states that citizens are to

> become city-makers, using their data and skills to improve services in their own city, for instance by sharing information about transport or personal energy use. Their information helps local authorities to make choices based on current situations and actual needs, rather than assumptions.

Residents thus feed their data into the urban system, enabling local policymakers to make informed decisions. However, whether residents can indeed become 'city-makers' through this passive notion of participation is questionable. As outlined, improving services in the smart city is not to be mistaken for open-ended citizen participation. Again, the NL SCS demonstrates a rather instrumental approach to civic engagement (see section 2.2).

Another possibility to increase civic impact in policymaking, addressed in the selected papers, is through digital agenda-setting, notably in online consultations. In this regard, the ADC (2019, 7) states that "the Council can give a political voice to the concerns of

Amsterdammers about the protection of their data collected by companies". To give citizens more ownership, the CA and AIA (2018a, b) mention an agenda for democratic renewal (*Agenda voor democratische vernieuwing*) that will investigate in participatory co-creation sessions how the link between participatory and representative democracy can be renewed, strengthened, and expanded. The aim is to give residents of Amsterdam greater say over their immediate surroundings, municipal services, and the city as a whole (ibid.).[24] Neighbourhood budgets have the goal of giving citizens a bigger voice in the development of their urban surroundings. Additional strategies to improve civic ownership, beyond neighbourhood budgets, are largely missing in the documents. Central to effective digital participation is a redistribution of power towards citizens (Menser, 2018, 11). If digital tools are mainly used for citizens to improve public service delivery or to merely alter the modes of communication and information between citizens and the government, while the organisation making the decision remains the same (Kingston, 2007, 143), the effectiveness of citizen participation remains low.

Institutionalisation

For participation to have an impact it is helpful to link it to institutionalized policy making. The ADC (2019, 30) acknowledges that "[i]nfluence and ownership at the local level require a change in the democratic process, involving citizens from the outset to find solutions". The DS (2021, 21) adds that a fundamental change in the organization and working method of the municipality is required to move towards a digital city where not only the person collecting data determines what happens to it, but also the person subject to data collection has a say (ibid., 12). The DDG suggests that the local government needs to create space in policy-making structures for civic involvement to increase citizen impact on decision-making (de Zeeuw and Pieters, 2018, 9, 13), e.g. through agenda-setting in online consultations or ideation processes (ibid., 20, 41). To ensure effective participation processes, there must be a demand both from local authorities and citizens (ibid., 19, 23). The DDG recommends different ways on how to structure participatory processes to be as effective as possible, involving transparency, the implementation of results in policy and law making, as well as an independent impact analysis (ibid., 18, 21, 28, 29, 31, 40-41, 47). The role of the municipality is to provide a team that supervises and supports the activities (ibid., 18), along with a dedicated budget (ibid., 46). The city government should make participation part of regular

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[24] At the time of writing, the agenda had not yet been published.

institutionalized decision-making (ibid., 38). To enforce the institutionalization of participation, according to the CoA's coalition agreement (2018), the local government plans to introduce a participation paragraph as standard in policy documents, explaining how Amsterdammers were involved and what was done with their input (ibid., 58). While the institutionalization of engagement processes seems relatively advanced in Amsterdam, the level of participation mostly remains on an informative or consultative basis.

6.1.4 Deliberation: how to create spaces for exchange

Examining the selected documents, a differentiation between online and offline deliberations can be established. Offline deliberation takes the form of stakeholder dialogues or co-creation sessions and is more often addressed than online deliberation. This may hint at difficulties stakeholders perceive in enabling online deliberation. Only the DDG includes concrete proposals on how deliberation among citizens and policymakers can be supported (de Zeeuw and Pieterse, 2018, 48).

Online deliberation

The ADC (2019, 7) criticizes the use of algorithms in the sense that they may distort discourses by providing people with information as part of their respective filter bubbles, while leaving little space for open debates. As such, they reflect the point raised in the literature review (Bozdag and van den Hoven, 2015; Seargent and Tagg, 2019; section 2.1.2). The DDG introduces platform types on which online deliberation can be facilitated, e.g. online consultation platforms or social media. The latter, however, are more described as a communication and outreach tool for participation activities. Deliberation and consensus-finding are central to the DDG, although the challenges of meaningful deliberation and the deliberative qualities of these platforms, e.g. issues revolving around anonymity (Asenbaum, 2017, 2018; see section 2.1.2), are little discussed. The guide states that everyone should be able to start a discussion (ibid., 47) and that there should be public communication strategies to publicize deliberation (ibid., 33). Information needs to be shared that enables citizens to meaningfully participate in deliberation (ibid., 27). Digital instruments, the DDG claims, facilitate informed decision-making and consensus-finding (ibid., 9). Platforms may support different features, such as AI, to help users write good comments and to create a newsfeed based on the user's interest (ibid., 39). However, this claim is not supported by examples or evidence of use. Other features may include the visualization of arguments (ibid., 38-39) or

intelligent moderation (ibid., 43, 46). For local authorities, deliberation is portrayed as beneficial to relate to residents beyond party politics and to become more responsive (ibid., 9, 20). Despite presenting little empirical evidence, the DDG addresses several of Friess and Eilders (2015, 319) recommendations in terms of online deliberation's institutional design, communicative process, and desired outcome. As such, it can be seen as a solid basis for designing online deliberation processes.

Offline deliberation

Offline deliberation processes are addressed in the selected policy papers. Although offline deliberation is not part of this thesis, the main points raised in the policy documents are briefly introduced here. In the ADC (2019), residents of Amsterdam are generally encouraged to speak more to each other (ibid., 30). A "well-informed public debate" (ibid.) to influence digital policies and on ethical issues surrounding technology is to be promoted (ibid., 35). However, the ADC remains vague on how these deliberative activities ought to be structured and on their role in decision-making processes. Waag's SUD (2018) acknowledges that "[c]ommunication is crucial to sustain commons. Determining values and deciding on what is needed is not based on technical assumptions, but through conversation and mutual trust" (ibid., 17). In co-creation processes, the motivations of different actors are supposed to become explicit, avoiding not only hidden interests, but also ensuring the ownership of the results. The authors do not elaborate however, how deliberation can be supported and at which phases of the co-creation process deliberation should occur. In the CA and AIA, citizens are invited to enter a discussion and debate with local authorities (CoA CA, 2018a, 58), facilitated with partners such as debate centres and knowledge institutions (ibid., 68).

6.1.5 Independence: how to protect the public sphere

Issues related to the independence of the public sphere, such as privacy and data protection, open source and open data, and the development of multi-stakeholder alliances, in particular public-private partnerships, are most thoroughly discussed in the selected policy documents. This indicates that they are perceived as the most pressing challenges with regards to digital democracy in the smart city, also in relation to the other legitimacy criteria.

Privacy and data protection

In the CoA's Digital City Agenda (ADC, 2019), most issues revolve around data protection and sovereignty. The ADC acknowledges that the Amsterdam City Council cannot "change the internet or the digital global market. It does, however, have policy instruments at its disposal that it can use to ensure that Amsterdammers continue to enjoy digital freedom, independence and security" (CoA ADC, 2019, 7). For instance, the local government aims to regulate public (digital) spaces and markets like the housing or mobility market. Amsterdam stands

> for the digital freedoms and rights of the people of Amsterdam; their privacy must be guaranteed as much as possible, they must be able to participate and be digitally resilient. Companies must comply with the rules when it comes to data and technology (ibid., 9).

Residents should have control over their data without being "spied on" (ibid., 1, 14, 39). The CoA aims to develop a Personal Data Framework and to ban Wi-Fi tracking by private companies in public spaces, while acknowledging existing regulations and laws, such as the GDPR (ibid., 1, 14). The security of technology is another major issue (ibid., 5, 7, 15, 16, 39, 40), especially with regards to a secure infrastructure (ibid., 15). The CoA develops together with knowledge institutions an 'Amsterdam Data Exchange' and appointed an information commissioner who, together with the data protection officer, guards the principles of transparency and privacy. The "Amsterdam Personal Data Commission (CPA) is an additional safeguard in this respect" (ibid., 39). Not only did Amsterdam co-launch the 'Coalition for Digital Rights' and subscribe to the Tada manifesto, but the CoA also aims to contribute to a European approach for data control. The goal is "to make technology human again" (ibid., 14), following a humanistic socio-technological approach.

The municipality's data strategy (CoA DS, 2021) further specifies the path to data sovereignty laid out in the ADC. For instance, companies and organizations that collect data via sensors in the public space should report this. The CoA is investigating with the Institute for Information Law, among others, what options are available in law and policy to force companies to give citizens more control over their data (ibid., 12-13). Platforms for fair data sharing, nationally and internationally, such as FairBnB, iShare and Gaia-X, are to be stimulated so that Amsterdammers can choose responsible alternatives. The CoA is investigating how it can develop a "delete my data button" or a similar user-friendly way for residents to request the municipality to delete their data when there

is no legal obligation or need for collection (ibid., 13). Innovative technology from the DECODE project is tested as part of the registration system for holiday rentals. In the Goed-ID project, the CoA is working on a modern means of authentication that allows residents and users of the city to digitally identify themselves securely and in a privacy-friendly manner (ibid.). The algorithm register, launched in September 2020, explains how the municipality uses data in algorithms and why (ibid.). Moreover, in new agreements with suppliers and related parties, it is stated that collected data belongs to the municipality. In this way, data generated with public funds can continue to be used for public objectives and tasks (ibid., 18). A specialized team searches for data gaps that prevent residents from not getting the same opportunities or access to services because they are not represented in the datasets (ibid., 19). Additionally, the city commits to developing and purchasing more open source software (ibid., 21). The CoA does not want to install unnecessary sensors, cameras, or similar technology in public spaces. Instead, the principles 'open unless' and 'privacy by design' should be guaranteed, promoted, and enforced (ibid., 17).

The CoA's Digital City Agenda (2019) and data strategy (2021) therefore reflect many of the challenges in the field of data protection, sovereignty and privacy discussed in the literature review, ranging from the criticism of "surveillance capitalism" (Zuboff, 2019, 8; section 2.1.1, 2.2.3) and a "corporate colonisation of public space" (Dahlgren, 2014, 195; section 2.1.3) over datafication and the abuse of personal information (section 2.1.3). The ADC also points to legal ways to address these challenges in the smart city, e.g. working towards a European approach for data control, as is currently done with the Digital Services and the Digital Markets Act (see section 2.1.3), as well as technological solutions to counter negative SC developments, such as the algorithm register or the "delete my data" button. As such, both documents have a sound grasp of contemporary developments and are denoted by their progressive policies in the field of data protection and sovereignty.

Open source, open data, and data commons
What is the policy documents' stance on open source and open data in the smart city? The ADC (2019) outlines that the CoA will open its data sets for the public (ibid., 7), stating that the development of a local data commons is an important pillar of the agenda (ibid., 23-24, 35). The document is thus following Fuchs (2021, 19-20) and Dahlberg's (2011, 9) argument for a digital commons that is constituted through "open source

intelligence, the 'general intellect' of 'the multitude'" (ibid.). Whenever possible, the city wants to promote open source, conduct experiments with digital identities to facilitate data sufficiency, and support cooperatives, researchers, and start-ups to develop an alternative to major platforms. Accordingly, the local government aims to increase the scope for opposition and entrepreneurial spirit, for cultural avant-gardes and companies offering an alternative to platform monopolies (CoA AIA, 2018b, 2, 9). The online platform *Mijn Amsterdam* (engl.: My Amsterdam; see chapter seven) is supposed to provide a safe infrastructure for digital services and protects residents' personal data, ensuring secure online identification (see also Goodell and Aste, 2019).

In line with the ADC, Waag's strategy for urban data (SUD; Schouten, 2018, 15) states that a data commons should be established because social media platforms "have degenerated into advertising and data harvesting machines". For data to be treated as a public good, its relevance must be made clear for citizens to use and understand the data (ibid., 10). Moreover, "communities themselves should decide what technological solutions are best to use and how this should be done, for example through co-creation" (ibid., 15). The data commons approach in the SUD is guided by open and free data. At the same time, it acknowledges that personal data is sensitive, and therefore needs to be protected. In a data commons, the core values of "sustainability, inclusiveness, privacy, accountability" (ibid., 17) need to be implemented 'by design'. Governments should support this "rights-based approach, in which citizens and CSOs are actively facilitated to take part in collaborative data projects" (ibid., 21). The rights-based approach is linked to the data commons in the sense that it enables citizens to commonly control digital resources and data (Fuchs, 2021, 19-20).

While addressing innovative ideas on how to increase the transparency of data governance, the documents do not reflect the risks associated with open data approaches for vulnerable parts of society. Open data and open source policies mostly serve the benefit of well-educated actors that can read and understand the data, while excluding larger parts of society. As outlined earlier, Richter and colleagues (2019, 15) find that residents of Amsterdam have little knowledge on how their data is being used. This may have a negative impact on digital democracy's inclusiveness.

Free digital sphere

The documents argue for a free public sphere through the transparency and protection of data. They do not explicitly address questions revolving around digitization's impact on urban space and its meaning for its social and discursive dimension. The NL SCS (2017) is most explicit in arguing for public-private partnerships in smart city policies (ibid., 12) but does not mention PPPs accountability paradoxes. As outlined, Flinders (2005) and Willems and van Dooren (2011) argue that accountability in PPPs can be problematic because traditional principal/ agent roles become increasingly hybrid, mixing private and public tasks while decreasing possibilities of political control. Digitally facilitated bottom-up networks that may form more easily around shared interests in a digital public sphere are not mentioned. Instead, the need for international collaboration and city networks is stressed to replicate and export good practices, services, and products and to apply international knowledge locally (ibid., 25, 55, 60). In practice, this can be seen in the EU-funded DECODE project through which Amsterdam and Barcelona aim to install an open-source decentralized data architecture to support civic data control and ownership (Bria and Morozov, 2018). On the local level, smart cities

> should have a 'Technology Agency' to connect internal ICT (including open data platforms) with ICT in the outside world. This function goes beyond just technology; its primary aim is to forge cross-sector connections. A Chief Technology Officer monitors and lobbies on behalf of smart technology developments and other topics (ibid., 69).

Municipalities are advised to designate an official responsible for its information security policy and provide public information about it. This way, they "can prevent at least some resistance from civil society" (ibid.). It is noteworthy that civil society resistance with regards to smart city policies is expected. Yet, with its CTO, data protection, and information commissioner, the CoA administrative infrastructure largely seems to correspond to this suggestion.

6.2 Amsterdam's socio-technological approach to digital democracy

The document analysis establishes the normative dimension of digital democracy policies in Amsterdam: how is digital democracy in the smart city of Amsterdam *envisioned*? The selected policy documents touch upon a wide variety of aspects related to the legitimacy criteria identified in the thesis' theoretical framework, with each paper emphasizing different aspects. Overall, they set a high normative standard which sometimes seems to lack empirical evidence (the platform analysis will evaluate the practice in more detail).

Based on the five legitimacy criteria, issues related to the independence of the public sphere in the sense of a secure digital infrastructure and the protection of digital rights are most frequently discussed in the papers. Citizen participation is deemed important, but the documents are less clear on how civic involvement can be operationalized through digital means. Offline methods, such as co-creation workshops or living labs, are mentioned more frequently than online engagement tools. An exception is the Digital Democracy Guide (DDG) which addresses the effectiveness of participation and deliberation thoroughly, offering concrete examples and methodologies for online engagement. The DDG is also the only document which discusses the importance of citizen deliberation prior to taking decisions. This may be explained by the fact that the DDG is explicitly about digital democracy, while the other documents are more associated with issues related to smart or digital city governance.

All documents advocate for multi-stakeholder alliances between actors from academia, politics, business, and civil society that form a network in the SC. The government is seen as only one, albeit important, actor among civil society organisations, research institutions, private companies, and citizens, illustrating a participatory governance approach (see chapter two). In this regard, the national SC strategy has a stronger emphasis on PPPs, while Amsterdam's Digital City Agenda and Data Strategy follow a more citizen-centric approach. The documents issued by stakeholders in Amsterdam follow a public values-based, humanistic socio-technological approach, whereas the most far-reaching ideas, like establishing a data commons or giving citizens actual decision-making power, are found in policy papers by non-governmental actors, such as Waag or Netwerk Demokratie. The coalition agreement and implementation agenda – the only documents not dealing explicitly with digital democracy or SC policies – focus more broadly on empowering citizens in the sense of reducing inequalities.

The policy papers supplement, but mostly do not refer to each other, except for the Tada manifesto which is frequently used as a reference. This mirrors the SNA's findings that demonstrate a decentralized, loosely connected governance network. The ADC, DS and SUD strongly emphasize the protection of a public values approach to the digital city, i.e. a free public sphere in the digital age in terms of data protection, data sovereignty, and data commons. The approach seems close to the democratic ideal, as outlined in chapter three, in terms of independence. However, although open data policies are

148

strongly promoted, the documents remain vague on how this potential can become accessible for citizens. The ADC is also weak in terms of other legitimacy criteria, such as on depicting how the effectiveness of civic participation in digital democracy can be ensured. This is where the DDG is at its strongest part, emphasizing that civic participation and deliberation must have an impact. The paper also introduces platform types on which online deliberation can occur. Although the deliberative quality of these platforms' affordances is less thematized, deliberation and consensus-finding are central to the DDG. The coalition agreement emphasizes more strongly the social dimension of city policies.

Remarkably, the term 'smart city' is not mentioned once in the documents, except for the national SC strategy. Instead, the terminology 'digital city' is used in Amsterdam to describe the city's digital development. This is striking, considering that the SNA identified 'Amsterdam Smart City' as the city's main governance platform for digital and smart city policies (see chapter five). A digital city approach, in the sense of applying democratic values to digitization, may be a bridge between *digital democracy* actors, emphasizing ICT-enabled civic participation and deliberation (normative approach), and *smart city* related actors and initiatives, applying digital technologies to improve urban life in specific policy areas (utilitarian approach), as identified in section 5.4. Civil society actors such as Netwerk Democratie advocate for ICT-enabled, inclusive citizen participation and deliberation with an impact, illustrating how digital democracy could be designed in the smart city. On the other end of the spectrum, the national SC strategy is more concerned with technology, infrastructure, and efficiency in the SC, as well as PPPs with the private sector. The public values approach, as introduced in the ADC, builds a bridge between the two spheres. In line with Dameri (2014), this may indicate a shift from an instrumental, neo-liberal orientation of city policies associated with the 'smart city' towards a humanistic socio-technological approach of the 'digital city'. Moreover, the documents indicate that there is the political will to make digital democracy in the smart city more participatory, open, and transparent. As outlined, the DDG seems a valuable basis for the CoA to develop and implement its *digital democracy* policies whereas the other documents are more effective in steering general smart or digital city policies. Table eight provides an overview of the documents, summarizing their main goals and strongest point of relevance with regards to the legitimacy criteria. Whether promises are delivered on, and rhetoric is transformed into action, is the focus of the next chapter on Amsterdam's online engagement platforms.

Title	Author	Goal	Relevance (criteria)
Dutch National Smart City Strategy (NL SCS, 2017)	Multi-stakeholder (including CoA, ASC, and AMS Institute)	Cross-sectoral approach to tackle urban issues, improve quality of life and maximize economic opportunities.	Secure infrastructure and protection of digital rights, importance of PPPs (independence).
Agenda for the Digital City (ADC, 2019)	City of Amsterdam	Shows the way forward for the city's digital development.	Digital public sphere through public values and digital rights approach (independence).
Manifesto 'Tada – Data disclosed'	Amsterdam Economic Board and partners	Shared values for a responsible digital city	Retaining authority and control over data in the digital city (independence).
Handreiking Digitale Democratie (DDG, 2017)	Netwerk Democratie, with Waag Society and the Dutch Ministry of the Interior.	Guidance for Dutch public authorities on digital participation tools.	Enabling digital civic participation and deliberation (effectiveness).
Data Strategy Amsterdam (DS, 2021)	City of Amsterdam	Specification of the ADC in the field of data governance.	Data governance (independence).
A strategy for urban data (SUD 2019)	Waag and the AMS Institute	Guidance for development of a data commons.	Establishing a data commons (independence).
Coalition agreement (CA 2018)**, Ambitions and Implementation Agenda** (AIA 2018)	City of Amsterdam (government)	Policy priorities for the incunbemt government's term.	Reducing inequalities (inclusiveness and empowerment).

Table 8: Analysis of selected policy documents.

7. Implementation of digital democracy in Amsterdam

The realization of digital democracy in Amsterdam becomes evident in the smart city's wide variety of online engagement platforms. Evaluating all engagement platforms in Amsterdam would be beyond the scope of this thesis. Therefore, eight platforms are selected for the following analysis, based on desk research and on the results of expert interviews (participants were asked which platforms they deem most important). As outlined in section 4.3.4, the goal is to provide an exemplary picture of a) the various *types* of platforms with their b) different *purposes and affordances*, which were administered by c) diverse *stakeholders* in the municipality of Amsterdam – and to demonstrate their impact on digital democracy's legitimacy. The platforms are evaluated based on their design, less on their process and results (Friess and Eilders, 2015), hence by their structure and affordances, considering the legitimacy criteria inclusiveness, empowerment, effectiveness, quality of deliberation, and independence. In the next section, the platforms are briefly introduced. They are then analysed comparatively based on the legitimacy criteria.

7.1 Analysis of engagement platforms

This section introduces the selected engagement platforms.[25] All platforms were active in Amsterdam between 2017 and 2020. Some are one-time projects, while others are set up as a long-term possibility for citizens to become engaged. Some are initiated bottom-up by civil society, while others are installed top-down by the local government. The selection includes the most relevant and widely used platforms, but also smaller projects, initiated by researchers or neighbourhood groups. They thus cover a wide variety of different platform types. The platforms were evaluated between November 2019 and March 2021. As the online engagement landscape in Amsterdam is a highly dynamic environment, the analysis can only be a 'snapshot' at the time of writing. It is based on expert interviews, mostly with platform administrators, policy documents, as well as user experience and secondary literature, where possible.

Establishing a digital identity: Mijn Amsterdam
Mijn Amsterdam[26] (My Amsterdam) is a digital platform for residents to access personal data the municipality has stored about them, as well as information about their neighbourhood, e.g. events or waste points, on a personalized map. It offers citizens advice

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[25] Niederer and Priester (2016), Rommelse (2019), or Stevens (2020) have examined aspects of some of these platforms before but with a different respective focus.
[26] https://mijn.amsterdam.nl/, accessed 15 October 2020.

on municipal services they may be eligible for through an algorithm that is matching their personal data with applicable services. Announced in the local government's coalition agreement and implementation agenda, the municipality launched the platform in November 2019. Users can log in with DigID, a secure system to verify one's identity and do transactions online. Mijn Amsterdam thus enables citizens to develop digital citizenship and a digital identity online.

Governance platform: Amsterdam Smart City

Amsterdam Smart City[27] (ASC) is Amsterdam's main coordination platform for smart city activities and stakeholders. It was launched in 2009 "as a collaboration project between Amsterdam Innovation Motor and the grid operator Liander, in close association with the municipality of Amsterdam" (Somayya and Ramaswamy, 2016, 838). KPN, a Dutch telecommunications company joined the initiative in 2011, allowing the ASC to diversity its operations (Capra, 2016, 27). ASC describes itself as an "innovation platform that brings together proactive citizens, innovative companies, knowledge institutions and public authorities to shape the city of the future" (ASC, 2020d). The goal is to find innovative solutions for social, ecological, and economic problems in the city through collaboration and knowledge sharing, to develop new markets, and to support sustainable economic growth. ASC is based on a public-private partnership and collaborations with research institutions and NGOs. At the time of writing, there were 20 programme partners, including research institutes, government bodies, cultural institutions, and business associations. ASC closely collaborates with the municipality's CTO (ASC, 2020c). The ASC's core values are the creation of public value, collaboration, citizen-centrism, openness, and transparency. The network consists of 7407 individual users and 517 member organisations (in December 2019). The latter include large companies such as Cisco and Siemens, SMEs, governmental organizations, NGOs, local start-ups, and citizens' initiatives. The platform is divided into the following categories: updates, requests, events, projects, themes, visits, and network. Anyone can create an account on the platform and contribute with ideas. Five ASC staff members act as community managers (see also van Winden and Oskam, 2016, 116). In January 2020, there were 287 projects listed on the platform (ASC, 2020f), distributed as shown in figure 12 under the respective themes:

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[27] www.amsterdamsmartcity.com, accessed 4 August 2020. In autumn 2020, the platform was re-launched with a new design. The analysis is based on the platform before the re-launch.

PROJECTS ON AMSTERDAM SMART CITY

■ Digital City ■ Energy ■ Mobility ■ Circular City ■ Governance & Education ■ Citizens & Living

35; 12%
57; 20%
36; 13%
66; 23%
27; 9%
66; 23%
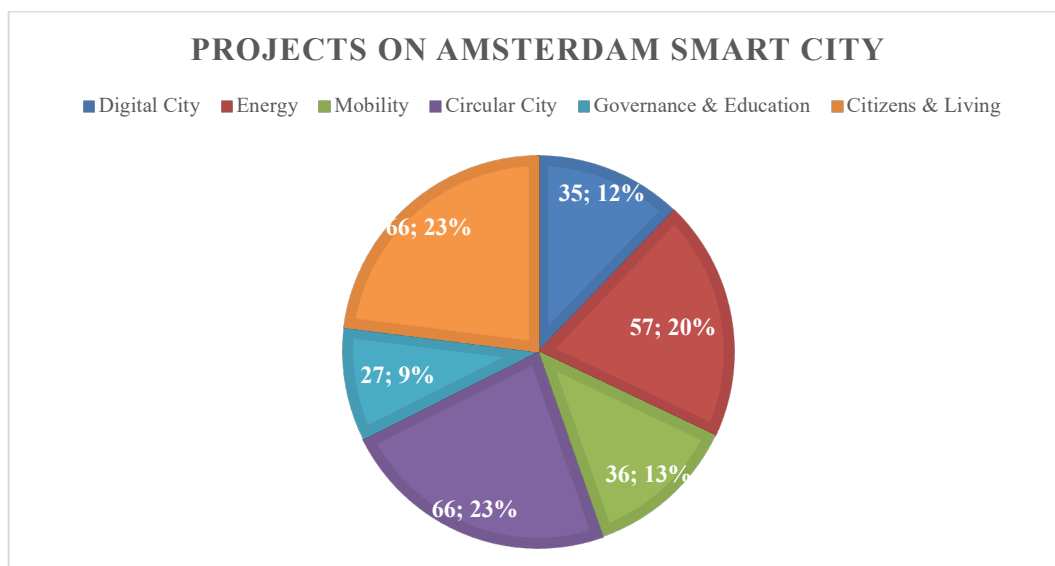
Figure 12: ASC project overview (ASC, 2020f).

Online agenda-setting: De Stem van West

De Stem van West[28] (engl.: Voice of West; short: SvW) is an online agenda-setting platform for the district West. It was developed by the OpenStad team and offers residents the possibility to suggest local projects. It does not operate with a fixed budget for residents to distribute but more openly serves as an ideation tool. The platform was "recognized by Eurocities as one of Europe's most innovative digital democracy experiments" (Stevens, 2020, 219).

SvW was launched in 2017 as one of the first online platforms for civic engagement in Amsterdam, set up by the city administration. Before developing the platform, the city conducted a bottom-up, user-centred design process (ibid., 225). Citizens' needs were turned into three functionalities that form the basis of SvW: inspiring and stimulating content, interaction between members of the district committee and residents as well as residents among each other, and involving the district committee in the platform (de Zeeuw and Pieterse, 2019, 20). At the end of January 2017, residents were invited for the first time to post ideas, statements, and plans for their neighbourhood on Stem van West. They can campaign for their ideas during a period of three months to collect at least 100 positive votes. If they reach this threshold, the proposal is put on the district committee's agenda. The district committee is elected by residents and consists of political representatives from the neighbourhoods. The district committee of Amsterdam

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[28] https://stemvanwest.amsterdam.nl/, accessed 28 January 2020.

West consists of 14 members, representing five parties (CoA, 2020p, q). District committee members moderate the platform. Users can vote and comment on the proposals. The person whose proposal receives more than 100 votes at the reference date is invited to explain the idea at a district committee meeting. The committee then decides whether and how the proposal is to be implemented (see also Stevens, 2020, 223). Due to its success, the 'Stem van' platform expanded to other districts of Amsterdam, such as Centrum, Oost, Nieuw West, Zuid and Zuid Oost.

Online participatory budgeting: West Begroot

Most districts in Amsterdam have an online participatory budgeting platform (PB). West Begroot[29] (engl.: West budgeted; short: WB) is analysed as an exemplary case because it serves as the blueprint for PB platforms in other districts. WB is a PB process for the district Amsterdam West which contains both online and offline elements. At the centre of the process is the online PB platform on which proposals on how to allocate a dedicated municipal budget of 300.000 EUR can be uploaded and voted for. WB is the first online PB platform set up by the OpenStad team in 2018. During the second edition (2019/ 2020), residents, organizations, and entrepreneurs were invited by the municipality to suggest projects in the areas of "Green: a green environment", "Diverse: everyone participates" and "Sustainable: a better climate" (CoA, 2020s). All persons aged 12 and older, registered at an address in the West district, can vote for their favourite plans with a personal voting code sent to their address. In September 2019, 112 plans were submitted out of which 96 reached the required threshold of 50 likes or more on the platform. Like on SvW, residents can like or dislike ideas (thumbs up and down) and discuss proposals. City officials then test the successful proposals for feasibility. In the 2019/ 2020 edition, 68 plans remained after the feasibility test. The members of the district committee then preselected 30 plans. Afterwards, the residents of West distributed the budget among those plans by voting for their favourite proposals and thus determining the realization of plans in 2020 (see figure 13). 14 plans were selected to be realized at the beginning of 2020 (ibid.).

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[29] https://westbegroot.amsterdam.nl/, accessed 7 August 2020.

| 9 Sept.- 6 Oct. 2019: Submit proposals | 9 Sept. -13 Oct. 2019: Campaign for proposals | 14 Oct. - 19 Nov. 2019: Feasibility test | 20 Nov. -17 Dec. 2019: City selects proposals for voting phase | 13 Jan. - 9 Feb. 2020: Voting phase | 13 Feb. 2020: Announcement of winning proposals |

Figure 13: Timetable of West Begroot in 2019-2020.

Gamification: Claircity Skylines

The goal of the project 'ClairCity – Citizen-led air pollution reduction in cities' is to create awareness about air pollution and to reduce CO2 emissions. The project was funded by the EU's Horizon 2020 research and innovation programme and implemented by 16 partner organisations, including research institutes, the private sector, and six cities.[30] Citizens and policymakers co-create future scenarios and policy options to reduce air pollution. This analysis focuses on the Skylines game to examine how gamification can contribute to digital civic engagement in the SC of Amsterdam. ClairCity Skylines is a serious game, developed at the University of West England in Bristol and launched in Amsterdam in November 2018. Players take the role of their city's mayor. The game is

> designed to capture citizen decision making about issues in their city, where players travel between areas representing a city's environment, economy and its citizen's health & satisfaction, collecting ideas for policies to enact to achieve a low carbon, clean air, healthy future before 2050. This allows the ClairCity project to 'crowd-source' and understand the public perceptions and acceptability of various policies. (King and Hayes, 2019, 8)

The players' decisions have a positive or negative impact on the city, illustrated in the decay or regeneration of the city's landmarks. Every five years (in game time), ideas can be promoted to policies in the town hall, transforming their attributes into the long-

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[30] The game is available in the iOS and Android app store. It is also presented on the ASC platform: https://amsterdamsmartcity.com/updates/news/clair-city-skylines-game--can-you-save-amsterdam, accessed 4 March 2021.

lasting impact of a policy (between five and thirty years). The game is won when the user has fully raised the environment attribute as well as one other attribute (see also Slingerland et al., 2020, 66; King and Hayes, 2019, 13-15).

Figure 14: Screenshots of the ClairCity Skylines app.

Crowdsensing: Mijn Park

Mijn Park is an app gathering information on citizens' perception and use of the Rembrandt park in Amsterdam while informing the city's renovation plans for the park through crowdsensing (Schrammeijer, 2020). For this pilot, which was part of the European 'LandSense' project, the Institute for Environmental Studies (IVM) at the Vrije Universiteit Amsterdam (VU) worked together with the CoA.[31] The project has two goals: first, to analyse how citizens experience and use urban green space and second, to examine the usability of an app to gather this kind of information. The app was active from May to October 2018 and invited the user to visit three out of 30 possible locations in the park. At each location, the app asked questions about the user's perception of that location, e.g. on noise, safety, relaxation, and the user's satisfaction with the vegetation and facilities. After having visited three locations, the user had to answer questions about the entire park, e.g. how much people liked to see certain things change (Schrammeijer, Sturn, and Moorthy, 2020). "The volunteers act like kind of 'human sensors' indicating how they feel at certain points in the park" (LandSense, 2020). The

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[31] The project is also presented on the ASC platform: https://amsterdamsmartcity.com/updates/project/crowdsensing-rembrandtpark, accessed 4 March 2021.

app was downloaded by 793 and used by 156 people. Figure 15 shows the results for different locations in the park.

Figure 15: Results of Mijn Park (Schrammeijer, 2020).

Neighbourhood and community engagement: Gebied Online's Hallo Ijburg

'Gebied Online' (engl.: Area Online) is a cooperative to develop bottom-up online neighbourhood and community platforms. The goal is to connect people and initiatives in a neighbourhood or with a shared interest. The project began with the neighbourhood website 'Hallo Ijburg'[32] in 2012, developed by a resident of the district Ijburg in Amsterdam. As interest grew outside of Ijburg, the platform's functions were made available to others and the Gebied Online cooperative was founded. At the time of writing, the cooperative's over 30 members were representatives of local or thematic networks throughout the Netherlands. They pay a membership fee of 2,500 Euro for the first year and an annual contribution of 1,000 Euro for the following years to use the services. In these "bottom-up networks, all members see a motor of necessary social and democratic renewal" (Gebied Online, 2020a). The Gebied Online platforms are modular and offer different functions, e.g. project proposals, messages, activities, news, wishes, a calendar, and personal profiles. Hallo Ijburg, which is examined in this thesis, is the first website created by Gebied Online and has the original CSS. On their personal profile page, residents and organisations can add information on their occupation and hobbies, as well

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[32] https://halloijburg.nl/, accessed 17 July 2020.

as their contact details. About 750 organisations and more than 200 locations, e.g. cafes, sports centres, and restaurants, have signed up. Residents can suggest initiatives and projects (Gebied Online, 2020). Some project ideas were included in the 'Gebiedsplan' (area plan) which is drawn up annually by the CoA. In 2020, Gebied Online provided a dedicated space for 'Oost Begroot', the PB platform for Amsterdam's Eastern district.[33]

Figure 16: Screenshot of Hallo Ijburg (Gebied Online, 2020).

Harnessing social big data: SocialGlass

SocialGlass[34] is a digital environment of platforms and tools developed at the University of Delft with the support of the AMS Institute. The web-based application analyses and visualizes big urban data for city planning and policymaking (Bocconi et al., 2015, 175). It combines public datasets (e.g. demographics or spatial statistics) with social media content, such as from Twitter, Foursquare, Flickr or Instagram, mobile phone data, and other sources, e.g. sensors, to better understand urban dynamics and improve decision-making. The platform's architecture relies upon different tiers (see figure 17), analysing social media, for instance semantically, geographically, or demographically.

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[33] As West Begroot is introduced in depth, the Oost Begroot process is not further elaborated here.
[34] https://social-glass.tudelft.nl/, accessed 13 January 2022.
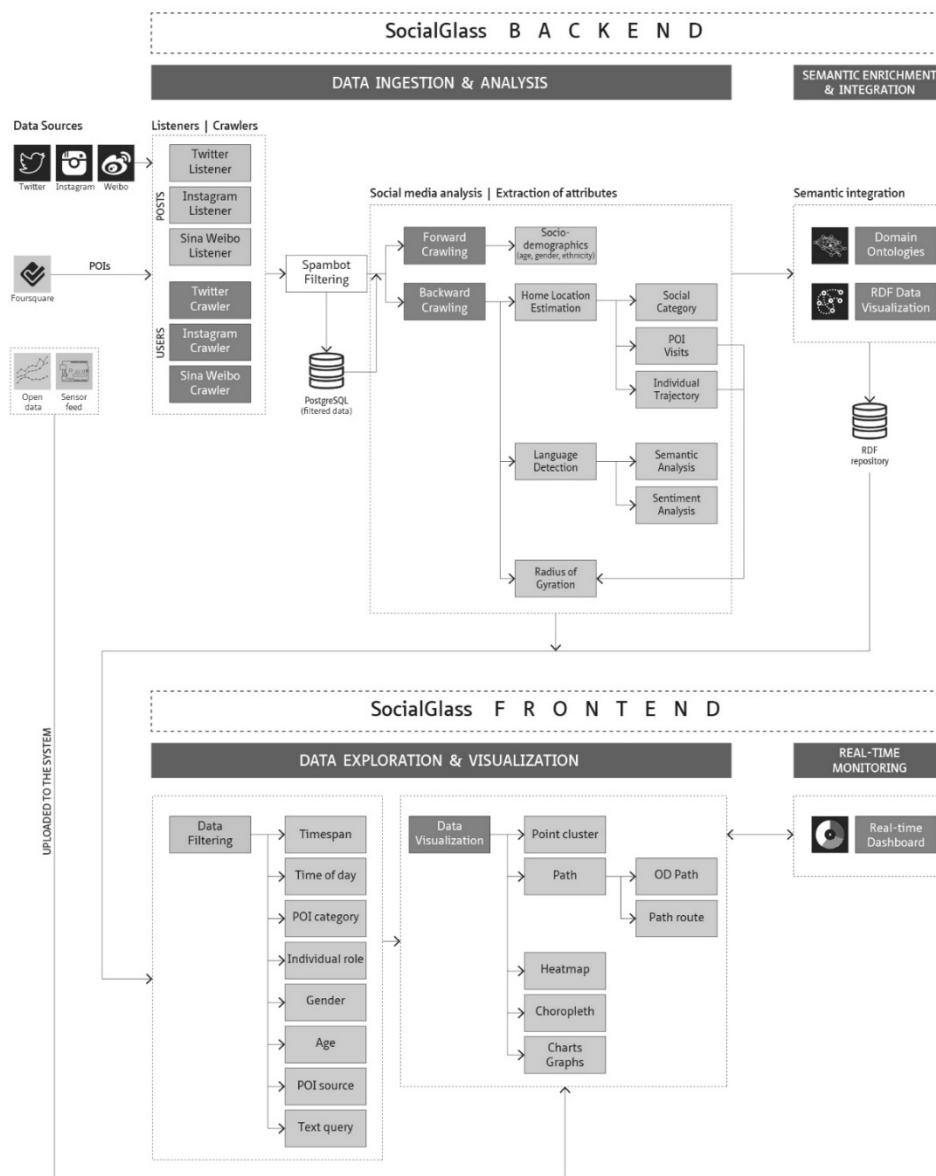
Figure 17: SocialGlass backend and frontend (Delft University of Technology and AMS Institute, 2020b).

One of SocialGlass' first application cases was the Amsterdam Light Festival in 2015, a recurring event where art installations are displayed all over the city. The goal was to study the event's impact in terms of mobility patterns and visitors' behaviour. For this purpose, social media data was correlated with Amsterdam's demographic statistics (age, gender, income etc.). The "system collected a total of 26,740,669 geo-referenced tweets (linked to Foursquare venues) and 15,959,566 Instagram posts" (Psyllidis et al., 2015, 239-12). During the Corona pandemic, SocialGlass researchers developed a social distancing dashboard. Interactive, colour coded maps show where it is possible to keep the distance of 1.5 meters in the city, using data on street and sidewalk geometry (see figure 18).

Figure 18: SocialGlass Social Distancing Dashboard (Delft University of Technology and AMS Institute, 2020a).

The examples illustrate how the information provided through SocialGlass support policymakers in designing context-specific policies for city planning.

The next sections analyse the affordances of the engagement platforms in light of the five legitimacy criteria inclusiveness, empowerment, effectiveness, deliberation, and independence.

7.1.1 Inclusiveness: participation for all?

The document analysis shows that Amsterdam discursively emphasizes the importance inclusive citizen participation through a citizen-centred approach to urban digitization. However, how this can be achieved in practice remained rather vague. The platform analysis also underlines the importance inclusiveness is given in Amsterdam. Developing inclusive engagement opportunities that reach a wide variety of residents beyond the 'usual suspects' of the higher educated, male, older citizen (Kingston, 2007; Min, 2010) is, according to most interviewed platform managers, their platforms' main goals – and their main challenge at the same time. This reflects Firmstone and Coleman's (2015, 691) empirical study on digital participation in local government in which most non-governmental interview partners were concerned about including diverse groups of citizens. This section compares the platforms' strategies to ensure the involvement of large and heterogenous groups of citizens.

Number of participants

In 2018, about a quarter of Amsterdammers became engaged for the neighbourhood or the city. There is a strong correlation between this commitment and interest in local

politics (Michon, Sewdas, and Rubingh, 2019, 142). Especially residents between the age of 35 and 54 are committed to the neighbourhood and city (30% participation rate). Interest in local politics in Amsterdam is greater (68% in 2017) than general interest in politics at a national level (61% in 2018) (ibid., 146). Among the selected platforms, the number of users vary strongly. Although the participation number does not tell us anything about the platform's affordances to ensure high levels of inclusiveness, it is a critical indicator of how successful the platform is in reaching out to citizens.

The highest participation numbers are reached by Gebied Online's Hallo Ijburg and the municipal platforms. In only one year since its launch, Mijn Amsterdam, for instance, had up to eight thousand visitors per week, according to a municipal employee. She explains the platform's high engagement numbers mainly with the Corona crisis, as the platform shows the status of requests for financial support, e.g. for those who had lost their job or had reduced working hours. On Stem van West, 28,963 users participated in its first year and 6,987 people uploaded a proposal (Stevens, 2020, 228). On West Begroot, 12,864 residents participated in its second edition. This was about 10% of those eligible to vote. The most impressive participation rate is reached by Hallo Ijburg. Almost a third of Ijburg's overall population has an account on the platform (assuming that every registered user is indeed a resident of Ijburg which cannot be verified, however). In December 2020, more than 7,000 persons were registered. An explanation for the high engagement numbers of those platforms may be their embeddedness in the neighbourhood or district and their benefits for citizens, according to several interview partners. This resonates with Willis' (2019, 27; see also section 2.2.1) finding on the importance of everyday practices and "small-scale ways in which citizens employ technologies and data that meets their needs in a socially and spatially embedded context". It thus seems that both community integration and institutional linkages are important to facilitate participation. Platforms with less institutional or community linkage, such as ClairCity's Skylines game or Mijn Park, reached significantly fewer people. In Amsterdam, 371 users played the Skylines game (Sardo et al., 2020, 86). During the Mijn Park project, the participation period was prolonged twice due to low engagement numbers. In the end, 156 people participated (Schrammeijer, 2020). Compared to participation in general elections or social media's user numbers (see section 2.1.1), these rates are very low. Nevertheless, the project manager reports that her counterparts at the municipality were satisfied with the outcome, as more people had participated than through offline workshops or neighbourhood meetings the municipality used to organize.

Diversity

The need to diversify engagement opportunities to reach more heterogenous groups of residents was the starting point of reflections on facilitating digital engagement at the CoA. A former municipal employee explains that the offline engagement opportunities "were tweaked to one particular kind of citizen - which is a person that knows really well how a system works. The person that has a lot of time and a person that is well able to articulate themselves" (I6). Only a hand full of people regularly attended local in-person meetings to discuss projects for the district. Moreover, she reports that there were too many disconnected communication channels linking citizens with the local government. Stem van West (SvW) was a response to both pool and diversify engagement opportunities, rendering them more accessible while increasing the transparency of communication. However, there were obstacles to overcome. An interviewee involved in SvW explains that there was reluctance both from engaged residents and neighbourhood agents: "both of them were not really open to new tools and diversifying the process. The designer because he wanted to stay in control and the six citizens because they felt really important" (I6). The six citizens she is referring to are the 'usual suspects' that would come to almost every neighbourhood meeting.

For West Begroot's (WB) project leader, reaching a diverse group of citizens, especially those that usually do not participate in political affairs, is the project's main criterion for success and simultaneously its biggest challenge:

> For me that will be a success that everyone is able to participate, although I do think that maybe that's a bit too idealistic. But yeah, I mean we're trying to. We have the homepage of the website in four different languages. We're also trying to see if we can record some voice memos in different languages to send them through WhatsApp to different networks. (I10)

The platform managers thus try to use media integreated in people's everyday lifes for outreach. In 2020, 639 young people (12 to 18 years old) were involved in WB. That is 7.4% of the total number of young people in West. Most voters were in the age group of 40 to 64, followed by 23 to 39 years. The smallest age group consisted of those older than 80. Slightly more women than men participated (10,4% of all women in the district and 9,5% of all men) (CoA, 2020s). In Rommelse's (2019, 41-42) study on online participation in Amsterdam, city representatives state that a development moving away from the 'usual suspects' was noticeable: "we see different types of people submitting

plans, they are younger, and some have a non-western background." Other platform managers confirm that more young people participate online. The most common age ranges of Skyline players, for instance, are 25-34 (30%) and 35-49 (30%) (Sardo et al., 2020, 87). As SocialGlass' input relies strongly on social media, there is a tendency towards younger participants as well. According to Psyllidis and colleagues (2015, 239-16), "each one of these platforms also presents intrinsic demographic diversities (e.g. Twitter is mainly used by young males, while Instagram is mostly preferred by females). It was also obvious in our studies that older populations were poorly represented." The project team is aware of its data's limits and tries to counterbalance them by using different data sources.

The most 'exclusive' platform is ASC. Although it describes itself as citizen-centric, the platform is mostly used by professionals and organisations. Contributions by non-organized residents of Amsterdam are rare. One reason may be that the platform's language is English, establishing a barrier for Dutch citizens to participate, especially for those with lower education levels. Mostly professional, specialized content is posted, deterring citizens with less experience in the SC area. A team member confirms that the platform's design and structure are not targeting citizens: "we asked the professionals: what would you think if we change it a bit and make it in Dutch and a bit more accessible for citizens? And the professionals said, well, then it's not my platform anymore" (I3). Nevertheless, the project leader explains that "in our way of working, we reach out to citizens, we help our partners to reach out to citizens" (I3). As such, the ASC platform rather seems to be a platform for branding Amsterdam as innovative, liveable, sustainable and collaborative for a professional English-speaking community, than a genuine space for civic engagement, as criticized by several authors (e.g. Cardullo and Kitchin, 2017, 17-18; Gibbs, Krueger, and MacLeod, 2013, 2151; Wadhwa, 2015, 125).

Most platforms particularly struggle with engaging residents with a migratory background, with lower levels of education, and of a higher age, confirming that there is a digital divide in online participation (see section 2.1.1). The project leader of Hallo Ijburg acknowledges that users are not representative of the neighbourhood, as mainly white people with higher education sign up. The Mijn Park developer also noticed that there were "a lot of Western migrants using the app, but non-Western migrants were almost non-existent" (I11). This may potentially foster enclave development, while denying some parts of the population their right to the SC (Willis, 2019; see section

2.2.3). The results are in line with previous studies on digital participation in urban governance in which researchers establish "the paradox that digital participation (even in the best case scenario) can mobilize more citizens, but simultaneously reproduces existing political inequalities (Legard and Hovik, 2022, 184). This reflects Dahlberg's (2001, 628) argument that spaces for online civic engagement

> may largely be following the course of what Habermas described as the bourgeois public sphere, a narrowly defined rational-critical public increasingly marginalized by the commercialization of the medium and by more populist forms of political participation.

Reasons for these results may be found in the platform's outreach strategy and access which are examined next.

Outreach

Platform managers follow different outreach strategies. The CoA's OpenStad team, for example, conducted research on residents' needs in terms of participation before Stem van West was launched. The platform Mijn Amsterdam is well integrated into other municipal services and websites what makes it easily accessible. West Begroot uses easily understandable language as well as instruction videos. The organizers of the PB process facilitate participation by sending a personalized letter to all residents aged 12 and above. The online process is complemented by offline engagement opportunities, as residents who are unable or unwilling to vote online can come to a voting location, community centres or the district office with their personal voting code. Neighbourhood agents inform residents about the possibility to participate. In this way, citizens can be included that are invisible to the digital network (Mejias, 2013; see also section 2.2.3). The letter with the personal voting code is sent out in Dutch, but translated in English, Turkish, and Arabic on the website. One of the project leaders points out: "that's also an act of insubordination because in Amsterdam, the policy is not to translate into other languages than English (…). But we chose to add the Turkish and Arabic translation because we want to show to people it's important for us they join as well" (I9). As outlined, residents can voice and text message through WhatsApp to contact the PB organisers, using everyday practices to increase outreach.

For almost all engagement platforms, advertising relies strongly on social media – with mixed success. As demonstrated in section 2.1.1, social media can be used to facilitate citizen mobilization for a political cause under certain conditions. The ASC's social

media community, for example, is comparatively large, with 9,000 likes on Facebook, about 12,000 Twitter followers, 2,800 LinkedIn followers, and 500 YouTube subscribers (in January 2020). An evaluation on Stem van West, commissioned by the OpenStad team, also confirms that many residents discover the platform through social media (Rommelse, 2019, 42). ClairCity's social media strategy to raise awareness for the Skylines game, on the other hand, had little success with only 87 Facebook followers in Amsterdam (Sardo et al., 2020, 52). The MijnPark team also experienced problems increasing participation through social media. An interviewee explains that the social media outreach "was not ideal because we didn't have any followers yet" (I11). The analysis thus shows that social media channels are used, in addition to offline campaigns, as a method to campaign for and advertise the engagement platforms. They work best for established platforms that have a solid basis of followers. Social media are not applied as a tool for participation itself. Only in SocialGlass, social media are used as a source of (passive) participation, as publicly available social media content is analysed to inform policymaking. Indirect participation through SocialGlass may increase inclusiveness because it is integrated in citizens' daily life through sensors or social media posts. Residents do not have to actively create an account on a specific platform. Only Gebied Online does not invest in social media campaigns to attract users but relies, according to the platform manager, on their platform's content and embeddedness in the neighbourhood. In Amsterdam, social media are also used to facilitate counter-publics for activism and contestation (Dahlberg, 2011, 6-7), e.g. to protest against gentrification in Amsterdam Noord. However, these counter-publics exist outside of the formalized spaces for civic engagement that are examined in this chapter.

Access

Most platforms have a low threshold for participation. Mijn Amsterdam uses the most elaborate registration process through DigID[35] due to the data's sensitivity. Only Dutch citizens can create a DigID account – a major difference to all other platforms which can be accessed by residents without Dutch citizenship. Having to register on DigID might be a barrier: "DigID for some people is definitely difficult because you have to get how it works" (I14), an interviewee confirms. Therefore, the city administration is testing an easier, attribute-based login procedure through IRMA (I Reveal My Attributes; see section 7.1.5 for more information). The security measures are close to the

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[35] https://www.digid.nl/, accessed 4 March 2021.

process suggested by Goodell and Aste (2019) who advocate for secure identification, authentication, and authorization (see also section 2.1.1).

On all other platforms, it is more simple – and less secure – to create an account. For instance, every resident of Amsterdam West can register on SvW with their e-mail address first name, last name, and zip code. However, there is no data verification. Therefore, one can participate under a pseudonym. West Begroot (WB) uses a similar procedure, except that the voting phase for the 30 pre-selected WB proposals becomes more exclusive and secure, as only residents with an address in the district receive the necessary voting code. On Hallo Ijburg, registration is needed to post content. The user can choose to register through IRMA, with his or her e-mail address, or through Facebook, therefore providing different thresholds in terms of security and effort.

7.1.2 Empowerment: increasing the subject's autonomy?

In the selected policy documents, the goal of citizen empowerment plays a relatively small role. On online platforms, it can be facilitated through providing objective and adequate information, supporting skills development, or giving citizens ownership over the process and results, while preventing subtle forms of coercion. The following section shows the different practical ways the subject's empowerment is facilitated through the affordances of the selected engagement platforms.

Information

The governance platform Amsterdam Smart City (ASC) offers a wide range of information on policies, projects, and events related to the smart city, but it does not go much further, for instance by facilitating skills development. Its empowering effect is thus reduced to offering information which is not fact-checked in most cases.[36] Similarly, one of the main goals of the Skylines game is to offer information related to air quality policy-making processes. However, there are little background resources on the different policies that can be selected as part of the game to help users better understand their implications. An interviewee explains that this is a deliberate decision to keep the game as accessible and simple as possible: "It shouldn't feel like learning, (…) if we would have given lots of information about air quality or climate, then it wouldn't be so appealing to the target group we were aiming for" (I15). The quote illustrates the

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[36] Projects advertised on the platform and implemented on the ground may have a stronger empowering effect, but it is beyond the scope of this thesis to evaluate them.

perception, which cannot be verified through current research, that extensive background information can potentially have a deterring effect.

Mijn Amsterdam also offers information for citizens to facilitate their affairs with the city (e.g. social services), while supposedly offering a particular value to vulnerable groups that would benefit from these services. The platform proactively suggests products that might be relevant to the user and gives citizens more power over their data and eligible services. In a passive sense of participation, Mijn Amsterdam could be seen as a way "for making rights claims" (Isin and Ruppert, 2015, 8) and a possibility for creating a digital identity for empowerment through better service delivery, particularly of vulnerable groups (Masiero and Bailur, 2021) – under the condition that vulnerable know about and are able to use the platform. Otherwise, they might become further marginalized (Datta, 2018; Willis, 2018). The platform can thus contribute to the development of digital citizenship, facilitating the relation between the citizen and the state through digital means, and even to the formation of a digital identity (Tammpuu and Masso, 2019, 622). At the same time, it fosters a rather passive notion of urban subjectivity (Greenfield, 2013), as citizens are treated are consumers of services. Through the secure DigID login procedure, privacy is ensured on the platform which is particularly critical when sensitive personal information is involved (Feher, 2019). As outlined, trust in platforms is perceived as a critical precondition to disclose and access information online (Kwame Adjei et al., 2020; Nagy and Koles, 2014; see section 2.1.1).

Skills development and ownership

Through Stem van West (SvW) and West Begroot (WB), users follow a project from the idea until its implementation. In this way, they can acquire knowledge on the policy cycle. Residents are supported by the district team during the process. Anyone uploading an idea should receive a call from a moderator who is usually a member of the district committee. The initiator with most votes on the reference date after the campaign period receives guidance for the presentation in front of the district committee where the plan, the results of a feasibility study the municipality conducts, and the next steps are elaborated (see figure 19 for SvW's project page).
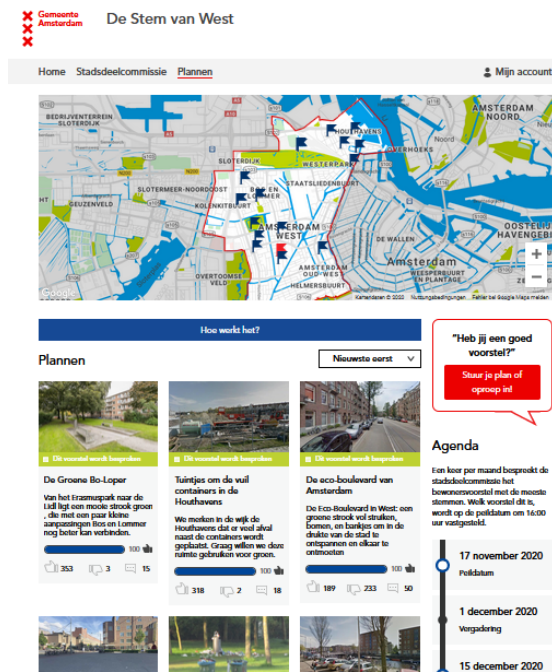
Figure 19: Screenshot of the Stem van West project proposal page (CoA, 2020e).

Those who are less digitally skilled can ask for help at community centres or through WhatsApp. Becoming involved in the political process is a new experience for many idea givers, and some are nervous presenting in front of the district committee. A few citizens criticize that the support could be stronger (Warendorf, 2017, 3-4). They are sometimes disappointed that their project is not implemented without having received proper feedback. Despite these shortcomings, the SvW and the WB process are designed to support the development of skills on how to manage a political project. Civic ownership is particularly high in the WB process, because there is a fixed budget assigned to it, giving citizens the responsibility to decide what to do with the money. In this process, the citizen is not perceived merely as a consumer or costumer of SC policies (Chourabi et al., 2012; Greenfield, 2013) but provided with agency to develop ideas in a relatively open process, albeit within a given framework and under pre-determined headings (e.g. policies for a greener Amsterdam).

The Gebied Online cooperative offers the strongest level of ownership over the participation process. By becoming a member (and paying the annual membership fee), anyone can create and manage a platform with the available software tools. A group of platform coordinators offers support. The platform is not run top-down by a private company or a public institution, but bottom-up by neighbourhood and special interest groups. Even the platform design and content are owned by citizens. In Arnstein's

(1969) ladder of participation, Gebied Online would thus take the rung of 'citizen control', leading to an empowerment of participants as they own the platform and are responsible for it. In Sassen's (2017) words, the cooperative 'hacks' a city space and claims power over its community's digital public sphere. On Hallo Ijburg, the self-creation of citizenship or 'do-it-yourself citizenship' (Ratto and Boler, 2014) takes the form of online community-building (Hintz, Dencik, and Wahl-Jorgensen, 2019, 21, 28-29).

Other platforms are less successful in ensuring skills development and ownership, however. Although the goal of the Skylines game is to educate people on air pollution and should lead to the development of new skills, it has little empowering effect. After playing the game, only 36% of users "felt they understood more strongly, 46% felt it stayed the same, 10% were more unsure and just 7% felt they understood less well" (King and Hayes, 2019, 37). According to the project evaluation, "[t]his may be a result of the game asking participants to run the city straight away and not focusing on explaining these issues" (Sardo et al., 2020, 130). Paradoxically, despite these negative findings for improved understanding, almost 80% of users indicate they would change their behaviour in the future (ibid., 132). The findings hence remain ambivalent as to whether gamification contributes to skills development in this case.

Prevention of coercion
On SocialGlass, citizens create data for a specific purpose (e.g. a restaurant rating) while they – sometimes unknowingly – contribute to the municipal policymaking process. The project manager acknowledges "that people that don't know about this stuff, they feel very scared about it, that there is somebody watching them" (I16), indicating that process transparency is critical to avoid a feeling of coercion. The findings reflect Cardullo's and Kitchin's (2017, 8) criticism on passive participation in the SC in which citizens are not aware that their data is collected: "the citizen is a 'data-point' that provides information with often little access to, and no political capital to act upon, those data." Moreover, big data can be inaccurate and lead to accountability problems when the algorithm behind the data collection is difficult to understand for citizens (Choenni et al., 2016; see section 2.2.2). Hintz and colleagues' (2019) recommend an informed use of ICT and digital infrastructure to facilitate digitization's empowering potential.

The SocialGlass researchers also employ more direct modes of engagement through a crowdsourcing sub-system based on social sensing and human computation (Bocconi et

al., 2015, 176). In the social sensing mode, users receive messages to opt-in for a crowdsourcing activity, e.g. through Twitter, and, once confirmed, a link to the operation (ibid., 177). Engagement is also facilitated through specific social media hashtags used in communication campaigns, for example to invite residents to comment on the re-design of a playground. The interviewee points out: "if the municipality for instance communicates that this thing happened because we had at our disposal this data (…), then the people will be more willing and it will be less of, you know, of a scary thing" (I16). However, for this purpose, citizens need to know that their data is collected in the first place.

7.1.3 Effectiveness: power to the people?

A platform with no or little impact on policymaking could be accused of tokenism. The selected policy papers remain rather vague on how to ensure meaningful impact. This section demonstrates that the effectiveness of the selected platforms ranges from having no impact on political decision-making at all (Mijn Amsterdam) to citizens taking full control (West Begroot). For participation to be effective, decisions should ideally be binding and if proposals are not implemented, a justification should be given. Their implementation should be monitored and the outcomes should be published, so that all affected citizens, not only those who participated, gain access to the results.

Impact and justification

Mijn Amsterdam has no direct effect on policymaking. However, that is not the platform's purpose. Its goal is to offer citizens a safe place to access data the municipality stores about them. Another platform with little influence on policymaking is Amsterdam Smart City (ASC). The platform serves as a tool to connect stakeholders and increase the visibility of SC projects. Similarly, the goal of the Skylines game is not to influence policymaking directly, but to serve as a door opener for citizens to reflect on issues related to air quality in cities. Skylines is a simplification of real-life politics and reduces the complexity of policymaking to two options among which the player can choose. Due to the game's simplification, it is questionable whether it adequately mirrors citizens' genuine policy preferences. Moreover, the project team found users from Russia and China as well as bots among the downloads (King and Hayes, 2019, 43). Due to its shortcomings in adequately reflecting policy priorities, the results were never explicitly presented to the policymakers, as a team member points out: "the weight we gave to the results of the game was a lot lower than the weight we gave for instance to the workshops

where we brought 25 experts together to talk about policies in Amsterdam" (I15). Thus, three out of eight platforms do not have the goal of creating an impact on policymaking. The examples show that even if a platform does not fulfil all legitimacy criteria, it may still have a value for the overall digital democracy system.

Compared to Skylines, the Mijn Park app is better integrated in institutionalized policy-making processes in Amsterdam. The respondent's experience in the park is shared based on spatial information. The results provide policymakers with detailed maps, while allowing them to identify locations in need of attention (see figure 20). The municipality uses this information to ensure that the availability and quality of green spaces is aligned with the preference of citizens (Schrammeijer, 2020).
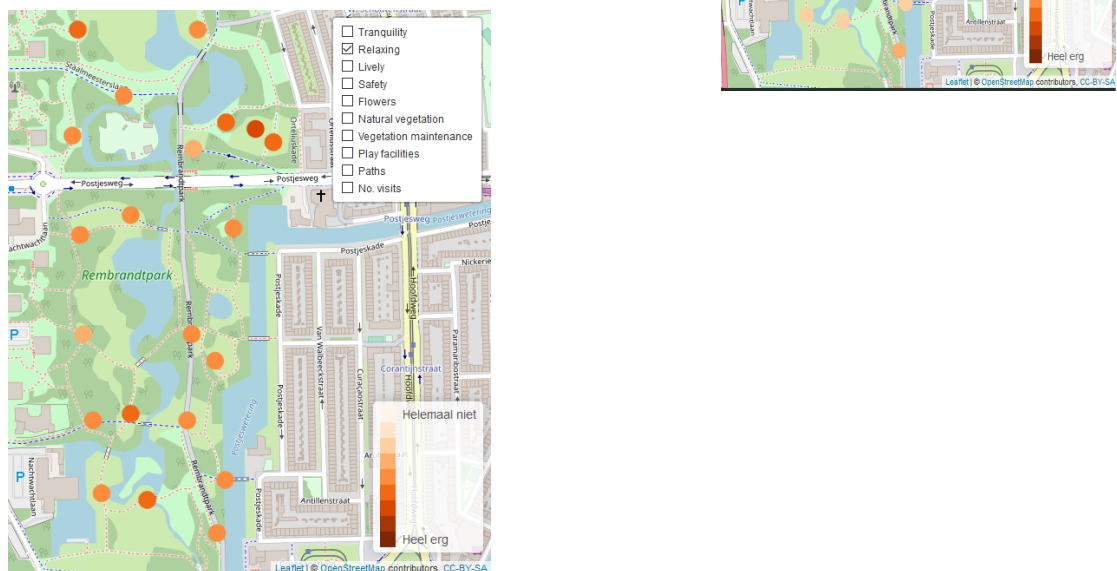
Figure 20: Map results for the categories 'relaxing' and 'play facilities' (Schrammeijer, 2020).

The overall map in figure 20 displays all answers users gave. For the category 'safety', for instance, the data helped the project leader to identify locations people thought were less safe: "So, there were a few areas (…) that were priorities for improvements. So that was also something that the municipality was quite happy with" (I11). As Baykurt (2011) points out, platforms like these promote an individualized, problem-focused participation culture. The government benefits from citizens real-time feedback, increasing transparency and responsiveness (Hassan, Cole, and Cole, 2015). However, it sometimes lacks collaboration, openness, and deliberation. These novel ways of involving

citizens correspond to the New Public Governance paradigm, postulating that service delivery should not be separated from service design (Granier and Kudo, 2016) and citizens should be included through co-production, leading to hybrid governance configurations (Bovaird, 2007, Lember, 2018; see section 2.1.1). In these configurations, the final decision usually remains with the elected officials and the administration (Kingston, 2007). Citizens provide input on a consultative basis.

The municipality's openness for digital citizen consultation tools to improve policymaking is illustrated by the increasing importance of city-initiated participation platforms. Stem van West has a clear focus on offering citizens the possibility to influence policymaking. More than 100 proposals were submitted on the platform. An interviewee from the municipality describes SvW as a success: "it's still running also in the other six boroughs. So, there are seven versions of them now. And the next iteration of it was the neighbourhood budget which was a similar structure" (I6). According to Rommelse's interviews (2019, 47), politicians were enthusiastic about the new platform because "they realized how valuable it was to stay in contact with their supporters after the elections." Moreover, a member of the district committee states that "you get more positive participation, instead of the negative participation we usually had in the past. Citizens who are happy with their neighbourhood generally will not show up at a town hall meeting, but the usual suspects will come and complain" (Rommelse, 2019, 43). Idea-givers report that their engagement was appreciated by the district committee members, but that they were sometimes disappointed with the follow-up process (Warendorf, 2019): "many people telling us that the citizens who submit plans are very, very, very disappointed to be rejected" (I9). This corresponds with King and Brown's (2007) findings on the difficulties of managing users' expectations with regards to service delivery performance. Sometimes citizens criticize local politicians' lack of justification for not selecting an idea (Rommelse, 2019, 38).

West Begroot gives citizens more influence on policymaking as participants can take binding budget decisions within the assigned thematic fields and are sometimes even in charge of project implementation, climbing up to level 7 "delegated power" of Arnstein's (1969, 226) ladder of participation. Figure 21 gives an overview of submitted plans on WB from 2019-2020.
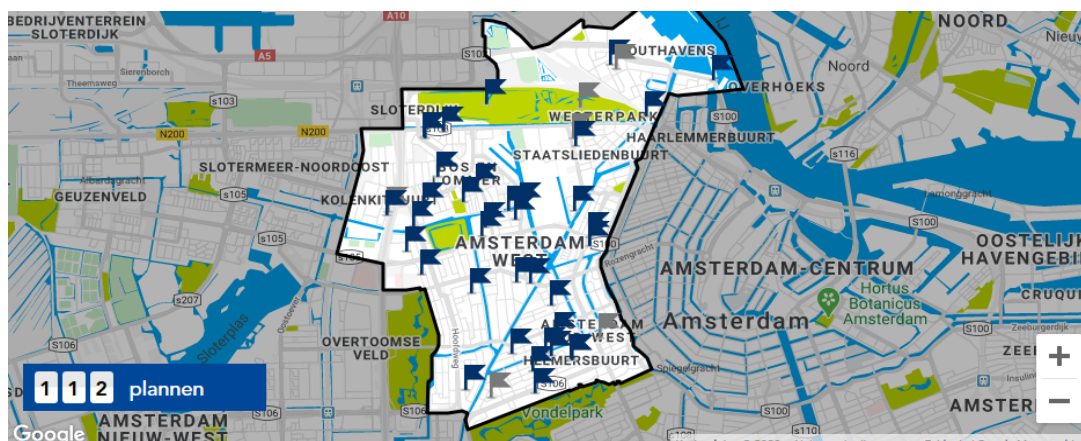
Figure 21: Overview of submitted plans in West Begroot 2019-2020 (CoA, 2020s).

WBs project leader explains that "sometimes people are able to realize the project themselves, sometimes it's in cooperation with the municipality and sometimes it's completely for the municipality" (I9). However, the municipal administration is occasionally reluctant to implement the selected ideas, "because it is the other way around, it is not them who think about something that should be done in the public space, but it's people who come with a proposal" (I9). On WB, citizens propose, debate, and select ideas to improve their direct environment. In the 2019/2020 edition, there were two thresholds, however, during which their decision-making power was reduced: a feasibility check conducted by the municipality and the pre-selection of 30 proposals by the district committee. The feasibility check has the goal of preventing proposals being selected which cannot be implemented to avoid disappointment. The pre-selection of 30 ideas by the district committee is explained by the perceived impracticability of citizens judging more than 30 ideas in the final decision round. However, in the 2020/2021 edition, the pre-selection mechanism was abolished because, according to one organizer, "that phase is so non-transparent, it's very hard to explain to the citizens" (I10). Besides, the justifications and reasons for not having selected a proposal did not convince participants and therefore led to disappointments. The selection criteria in the 2019/ 2020 edition were published in a jury report but remained vague and somewhat contradictory, emphasizing again the importance of justification. The district committee's members also increasingly felt uncomfortable with the task. With the creation of West Begroot and Stem van West (as well as their equivalents in other districts), the municipality, most notably OpenStad, has become an important actor for the realization of digital democracy in the smart city.

Crowding out effects

The case of Gebied Online's Hallo Ijburg platform shows that increased top-down engagement by the local government in digital democracy can result in the unwanted side effect of crowding out established neighbourhood platforms. In its early years, Hallo Ijburg's projects section was linked to the development and implementation of the local 'Gebiedsplan' (area plan). So called area teams develop its focus tasks and priorities into concrete projects. Throughout the year, partners and residents can submit ideas and activities on these priorities. The final area plan includes both projects from the municipality and projects submitted by residents. Each area has a basic budget of 200.000 € (CoA, 2020g). The area plan process and the submission of residents' ideas for projects were linked in 2017 on Hallo Ijburg where residents could propose projects for the area plan online. Hallo Ijburg's project leader explains:

> After we had our Ijburg experiments with these tools, then the government at the same time came with their own 'Gebiedsplan' while we were with all the neighbours and active people right in the process of creating our own priorities. So that was completely two parallel processes. Then I went to the government and I asked: Can we create the 'Gebiedsplannen' together on a digital platform? And they were willing to do that. (I12)

The following figure shows the co-creation of the area plan based on the share of projects proposed by the municipality, citizens, and other organisations from 2016 to 2019.
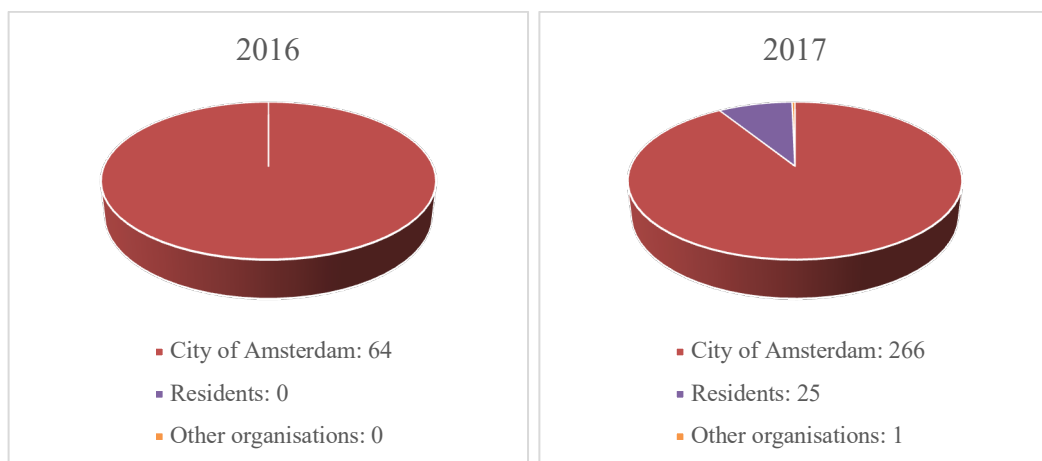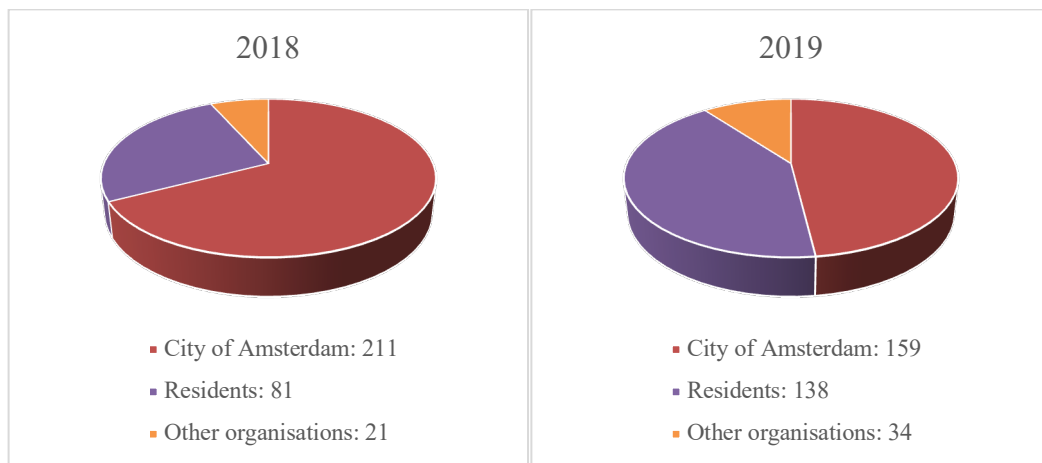
Figure 22: Share of projects proposed by the municipality, citizens, and other organisations in the Gebiedsplan (CoA, 2020g).

The red share stands for projects suggested by the municipality, the purple part shows projects proposed by residents, and the orange share exemplifies projects by other organizations. The share of citizen initiatives has steadily increased from 2016 to 2019. According to the municipality (CoA, 2020g), this "working method also shows that drawing up the area plans together is a good way to structurally increase the involvement of residents in the neighbourhood." An interviewee from Gebied Online states, however, that the municipality did not continue the collaboration with Gebied Online for the Gebiedsplan 2020. Instead, "in 2020, the situation of 2016 returns. (…) they decided to change the process and create the Gebiedsplan as a government owned plan and start Oost Begroot", a participatory budgeting platform for Amsterdam's Eastern district. The CoA (2020g) confirms on its website that in 2020, no broad call was published for the wider public to submit ideas for the area plan. Instead, targeted discussions were held with parties about the tasks in a neighbourhood and money was released for a PB pilot. This development is surprising considering that the municipality acknowledges the area plans collaboration's success (ibid.). The municipality explains the change in striving for more

> results, transparency and cooperation. (…) We want to be able to facilitate initiatives by residents throughout the year, instead of project proposals being made in one specific period. By focusing in an area, we can use the available time, money and capacity in a more targeted and effective manner. (ibid.)

Although Oost Begroot has its own section on the Hallo Ijburg platform, a Gebied Online representative is worried about Oost Begroot replacing the area plan participation process because

> there were a lot of projects in the Gebiedsplan that really needed a cooperation between the government and the people that live here. So that was very good. And now it's mainly only projects of our own, in Oost Begroot. (…) Now they give us money and they say you have to do it yourselves and we are not responsible at all.

The relation between the Gebied Online's bottom-up platforms and the participatory budgeting processes suggests that control and power over the participatory process remain in the political system which is somewhat uncoupled from the lifeworld. It seems that the generalized medium of power associated with the political system interferes in interactions between the lifeworld and the political system (Baxter, 1987, 56). The collaborative process between the municipality and Gebied Online shifted towards Oost Begroot, leading to a crowding out of Hallo Ijburg's impact on the area plan development. There seems to be a shift within the municipality from collaborating with an established bottom-up platform with relatively high participation numbers towards developing more top-down, city-owned platforms and processes. The results suggest that, in this case, a formalized digital space for participation has driven out parts of the informality of the online public sphere organised bottom-up.

Publishing of outcomes

To increase transparency of the participatory process, it is important to publish the outcomes of civic engagement in an accessible and appealing way. The most innovative form of outcome publishing can be found on SocialGlass. For policymakers to better be able to evaluate the data, SocialGlass offers a wide variety of interactive maps and visualizations: "We believe that, in this way, SocialGlass will enable different city stakeholders to perform meaningful analyses, by overlapping data they frequently use (e.g. real-estate records, land-use, economic, energy data etc.), with insights from social media" (Psyllidis, 2015, 239-19). Through data exploration tools, users can organise layers randomly and extract insights from sources, "typically originated by enriched, but siloed, social media (e.g. Twitter, Instagram), sensor, and statistical data" (Bocconi et al., 2015, 177). Visualisations display "geo-located objects, e.g. micro posts, point of interest, sensor data" (ibid.). Filters, such as time span, points of interest, or user categories, allow sharing and exporting data in a number of formats (ibid., 178). The crowd turns

into a distributed network of social sensors that allows policymakers to gather important information on the citizen's habits: "A spatial analysis of the aggregate activity generated by such networks can show us how social activity in a city is distributed, revealing fine-grained spatial patterns evident in the social life of cities" (Bawa-Cavia, 2011, 1).

Stem van West and West Begroot publish the (interim) results of each proposal on their website. On West Begroot, whenever a proposal is not selected for the next phase, an explanation is given. People whose plan does not achieve 50 likes are personally informed by email. For the project team, it is important that updates on project implementation are published regularly on the website, although they admit that there is room for improvement: "We have PDFs and sometimes some photos to show what is happening over there but it's mostly texts and it's very boring" (I9). Accordingly, the presentation of results could be improved to support institutional responsiveness (see also Peixoto and Fox, 2017).

Monitoring

An important factor to supporting trust and accountability is to give citizens the opportunity to monitor the impact of their contribution. A lack of information on the process and its results can have negative consequences for the legitimacy of the platform, as the Stem van West example shows. According to Warendorf's evaluation (2019), idea-givers sometimes do not feel adequately informed about their project's progress. Moreover, a proposal may have received positive feedback during the committee presentation and was still not implemented. This leads to disappointment among citizens, as expressed by one idea-giver: "It was said that there would be a budget and a plan of action within two weeks, but that didn't happen" (Warendorf, 2019, 5, quoted in Rommelse, 2019, 43). The degree to which idea-givers are involved in the plan's implementation varies. Some idea-givers are not aware that they are supposed to contribute to their plan's implementation, confirming the criticism of the Gebied Online member that the PB process sometimes left citizens alone:

> The final conclusion was that if more had to be achieved from the plan, then I had to continue with it. I had to find the people who can help me with it and the people who handle certain pieces of land. I just have a job and a kid, so I don't have time to work this out completely. It kind of felt like 'figure it out'. (Warendorf, 2019, 6)

Hence, when participation takes the form of "citizen control" (Arnstein, 1969, 226), as outlined in section 3.1.1, it can decrease the efficiency of policy implementation. A district committee member and moderator of the platform criticizes that the budget available to Stem van West proposals is not clear, unlike in the PB process: "At the Stem van West, it now seems like the budget is unlimited" (Rommelse, 2019, 46). According to Stevens (2020, 234), the SvW team worked on these issues by establishing a commission of civil servants, citizens, and local politicians to improve the monitoring of project implementation. The commission can intervene when problems emerge in the implementation process and solve problems between the neighbourhood administration and the citizens. On other platforms, such as Skylines or SocialGlass, the concrete impact of civic input remains largely in the dark.

This section demonstrates that on most of the selected engagement platforms, citizens can influence policymaking in a consultative manner and have a limited effect on shifting political decision-making power towards citizens. This is in line with Legard and Hovik's (2022, 185) study of the impact of DCE on urban governance in three cities in which the authors find that "participation through digital technologies had a limited impact on power relations". A crowding out effect through increased top-down municipal engagement with regards to the bottom-up platform Gebied Online is established. The next section evaluates the extent to which the selected platforms facilitate meaningful deliberation among citizens and policymakers before taking decisions.

7.1.4 Deliberation: lost in (digital) space?

This section examines how platform affordances may facilitate or limit asynchronous deliberation. The analysis focuses on the platform's institutional input or design, less on the communication process (Friess and Eilders, 2015, 319). Following the framework developed in section 4.1, it examines how the platforms support an exchange of arguments and facilitate consensus seeking, e.g. by proving a moderator. It also looks at the openness of the discourse, in the sense that the discourse is free of pressure, and that everyone can express their own ideas and beliefs. Synchronous deliberative spaces are not included in the analysis because the platforms used for this purpose are mostly conventional video conferencing platforms, like Zoom or Skype. They are not specifically designed for participation and deliberation. Therefore, they are less suitable for this analysis which focuses specifically on the design features of digital engagement platforms. A wider selection of platforms within the participatory-deliberative system

would be beyond the scope of this thesis but may be included in further research. Only four out of eight selected platforms provide a space for discussion. This supports the finding of the document analysis that digital democracy in the SC focuses more strongly on participation than on deliberation.

Reasoning and consensus-seeking

Among the selected platforms, only Amsterdam Smart City (ASC), Hallo Ijburg, Stem van West (SvW), and West Begroot (WB) offer a dedicated space for comments. On the ASC platform, an exchange of arguments and reasoning does not take place, however. Although it is possible to comment on requests and updates, this function is rarely used. When comments are posted, they mostly do not relate to each other. On SvW and WB, users are invited to debate the submitted proposals. The discussion section is divided into arguments for and against ideas (see figure 23). It is also possible to like and dislike proposals without leaving a comment. The proposal with the highest number of likes on SvW at the time of writing received 684 positive likes and 52 against. The function 'react to' a comment is rarely used in the comments section. Hence, arguments seldomly build up on each other. Moreover, comments are repetitive, and the content is not structured for people to follow the debate more easily (except for the pro and contra section). Argument visualization could help structure the debate's topics (Benn and Macintosh, 2012, 61).
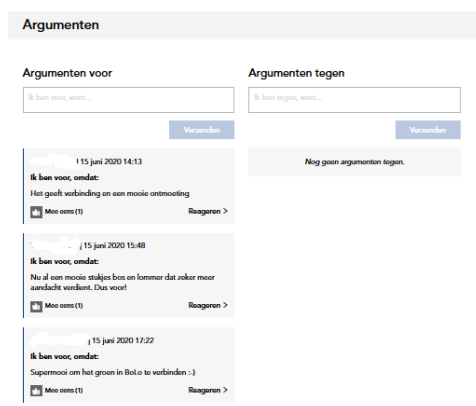
Figure 23: Screenshot of Stem van West discussion space (CoA, 2020e).

The number of arguments for a plan is generally higher than the number of arguments against an idea, indicating that the project proposals are positively received. For both platforms, SvW and WB, the respective administrators confirm that inappropriate comments are not an issue. The character of comments is thus different from social media platforms where discussions are criticized to be uncivil (Malmasi and Zampieri, 2017;

Mondal, Araújo Silva, and Benevenuto, 2017; Mathew et al., 2019). Based on the literature review, one reason for the civility of the argument exchange could be that most people register with their real names on the platform, ensuring communicative accountability (Moore, 2018). The examples illustrate, however, that the platform's architecture does not support consensus seeking, as arguments are not reciprocal and there is no actual deliberation. Following Janssen and Kies (2015, 321), a more active moderator could enrich and synthesize the debate (see section 2.1.2).

With regards to Gebied Online's Hallo Ijburg platform, it is important to differentiate between deliberation among members of the cooperative, taking place mostly offline, and discussions on the online platform Hallo Ijburg. Decisions in the cooperative are consensual, meaning that they are taken "when none of the members have substantiated and predominantly objected to the decision" (Gebied Online, 2020). On the online platform Hallo Ijburg, there is limited space for discussion among residents. The platform developer explains that it is

> more a bulletin board where people post their information and it's not really a discussion platform (…). I don't know why that is, it's maybe the kind of people that are involved or the fact that Ijburg is relatively small (…). In the past we had a lot of small children where we met each other at schools or sport clubs or shopping malls or other areas. So, what I saw is that people post things on Hallo Ijburg and then the discussion was just offline on the street or where we meet people. (I12)

Hence, non-formal everyday communication in physical urban space takes precedence over communication on a formalized online exchange space.

Overall, the examples demonstrate that reasoning and an exchange of arguments does not take place on Amsterdam's online engagement platforms, confirming Hartz-Karp's and Sullivan's (2014, 2) finding that the asynchronous environment of online deliberations "is not conducive to intensive, empathetic, collaborative discourse. Rather, it is conducive to direct democracy that merely aggregates the unreflective opinions of self-selected voters".

Free of pressure
Deliberation should ideally be free of internal pressure, treating participants equally, and of external pressure in the sense that participants can contribute autonomously. Stem

van West (SvW) is moderated by district committee members to increase their ownership for the process. According to Stevens (2020, 230-231), the moderators are offered specific courses on "how to neutrally intervene in online discussions. (…) The main rule of intervention is when a comment discredits a person, calls for violence, or harms the participation of other citizens on the platform." A member of the SvW project team explains that local politicians "take one by one a day to moderate the content because sometimes people ask questions on the platform and you need to (…) get an answer." However, the moderators do not activate the debate or reveal contradictions and inconsistencies. According to the SvW's evaluation (Warendorf 2019), moderation is not always well maintained.

None of the other platforms have a moderator. WB's project leaders describe that this is a deliberate choice for more citizen-centredness because "West Begroot is of course for the citizens and through the citizens. (…). We are only organizing the process" (I10). Due to the low level of moderation engagement, it can be said that the debate is free of pressure and bias from the moderator. On the other hand, a continuous exchange of arguments or fact checking are not supported. Reflections on including artificial intelligence (AI) to enhance moderation on West Begroot were discarded:

> We did have a few meetings I think with a professor in artificial intelligence and someone who wanted to (…) use our data from the 'like' section from the previous edition. Sort of feed the artificial intelligence so that it could work as a sort of moderator. And in that way determine the three themes for the next project online. But we, to be honest, were a bit hesitant whether it would work for us. Firstly, because it was quite expensive. (…) And also, if you feed the artificial intelligence only with the arguments from last year, that's all the program knows then. So, it's going to function as a moderator based on what it knows. (I10)

The quote shows the project officer's reluctance to employ AI and deepen the platform's technological dimension because of uncertainties concerning the algorithms' objectiveness in moderating the discourse.

Openness
As outlined in section 3.1.2, every citizen possibly affected by an issue should be able to participate in a deliberative process and be able to address any topic of public concern. SvW adheres to the principle of openness in the sense that everyone can suggest an idea

or a proposal in any field in the public interest, it only needs to be related to the district. The openness with regards to the topics is seen as an advantage by the organizers: "Whereas in an offline conversation, you can filter which comments you take among them, which ones you don't and really moderate the conversation. But everything that is online, it is there black and white, so you always have to come with an answer." While there are no pre-determined topics on SvW, WB asks for ideas in three broad categories (green, sustainable, diverse), limiting the openness of the process. The Mijn Park app does not provide a space for citizens to communicate. Instead, users provide input based on predefined questions. The app's openness is thus limited which is criticized by participants. Offering a more open space for interaction and discussion is one of the project leader's main lessons learnt. Similarly, the Skylines game does not offer an open space for ideas as players have to choose between pre-determined policy options. There is no possibility to introduce new ideas. Although anything can be posted on the ASC platform, the space is mostly used by professionals in English, creating a barrier for citizens to post their ideas.

This section demonstrates the lack of deliberation on the selected platforms. Only half of the analysed platforms offer a space for comments. When there is a space for debate, it is of a low quality. It seems that organizing deliberation on asynchronous platforms is challenging and that the SC does not (yet) manage the transition from offline interactions to digital platforms. These findings link to previous studies on online deliberation in urban governance that establish a lack of platforms that can facilitate large-scale deliberation (e.g. Legard and Hovik, 2022, 184).

7.1.5 Independence: towards a free public sphere?

Online engagement platforms contribute to the legitimacy of digital democracy if they adhere to the standards of data protection, data sovereignty, and data commons. Ensuring the independence of the digital public sphere is the main issue raised in the selected policy documents. The following section examines how the engagement platforms live up to the standards set in the policy papers.

Data protection

The platform analysis confirms that data protection policies are of high importance in the SC of Amsterdam. All platform managers are aware of data protection and security policies. An interviewee who used to work at the municipality confirms that the CoA

pays a lot of attention to data protection and adhering to the GDPR. However, she thinks that "the city sometimes lacks skilled people when it comes to developers or designers or people who can actually work with the data" (I6). In her opinion, this is worrying because "software developers are somehow the new lawmakers" (I6). West Begroot's project leaders confirm that applying privacy regulations is time-consuming and remains a challenge for the municipality.

On WB, the following personal data is collected: postcode, name (with the possibility of using an alias), email address, IP addresses. The email address of the city's data protection officer as well as information about the collection of data are provided on the platform. To identify eligible PB voters, the municipality prepares a list of people aged 12 years and older in the district with individualized identification codes. The list of personal data, derived from the Municipal Personal Records Database, is destroyed within 14 days after the closing of the voting period. At the end of the liking and campaigning phase, data is processed in a short, anonymised analysis in terms of users' basic attributes, e.g. their location. Data protection rules for Stem van West are similar. If there is a suspicious number of votes for a proposal, the OpenStad team checks the IP addresses and, if necessary, deletes the fraudulent votes. However, people can still research zip codes of the district West, register with them, and vote for proposals although they do not live in the neighbourhood. The low threshold to register can thus lead to distorted results with regards to the policy-making process.

To ensure regulations are properly applied, Mijn Amsterdam is tested every year by an independent survey. For security purposes, information is not stored on Mijn Amsterdam itself:

> We get information real time from source systems, from product systems based on APIs. So, actually, the information only becomes available when you login to the platform, so it's not there. It doesn't really exist. It's like a virtual set of data. (I14)

As outlined, users log in with their DigID, the Dutch central authentication mechanism. DigID provides a safe, but elaborate registration mode. Therefore, the project team is experimenting with IRMA (I reveal my attributes) by the Dutch Privacy by Design Foundation for data minimization and to facilitate the registration process. IRMA is an app based on attribute-based credentials (ABC) in which personal attributes are entered to register online (address, bank account, age, gender etc.): "IRMA empowers you to

disclose online, via your mobile phone, certain attributes of yourself ("over 18"), but at the same time hide other attributes (like your name, or phone number). IRMA protects your privacy in this way" (Privacy by Design Foundation, 2020). The DECODE project team collaborates with Gebied Online to implement the ABC software IRMA. Mijn Amsterdam, however, is not working with Gebied Online or the DECODE project. The municipality is also not collaborating with any partners from the private sector on the project, because, according to the product owner, "any type of collaboration to disclose information on our city portal, personal information on our city portal, which comes from outside parties immediately triggers a whole lot of resistance" (I14). Municipal representatives are thus aware of the problems associated with data acquisition through the private sector in the smart city (Choenni et al., 2016; Fuchs, 2021; Greenfield, 2013; Kitchin, 2014). Wolfond (2017) suggests the use of blockchain technology to further increase data security and trust. None of the selected platforms has implemented this technology as part of its security infrastructure.

Other platforms managers confirm the importance of data protection measures. For the Skylines game, the data "remained at the University of West England who's the owner and (…) ethics partner" (I15). However, the mobile application does not inform the user that their information may be used for a policymaking process as part of the ClairCity project. Only a link to the project website is provided with general information on privacy and cookie policies. There is thus a lack of transparency with regards to data collection and usage.

According to the SocialGlass developers, all data sets are anonymized: "the only thing that we know is individual IDs, so we have some kind of hexadecimal kind of code. There is an individual ID, so that only identifies whether we're talking about the same person or different persons" (I16). The ID cannot be traced back to a single person. However, as in the Skylines game, the user does not always know that his or her data is being collected and used to inform policymaking. Besides, SocialGlass may nudge the user towards a certain behaviour, e.g. to avoid crowded places during the Corona pandemic through the Social Distancing Dashboard. As Cardullo and Kitchin (2017, 9) put it: the citizen is "gently persuaded of how to conduct a way of life contained within optimal or ideal targets". Overall, however, the literature review's criticism that digital platforms are used to monitor citizens' behaviour, steer their actions, and to control them through large scale collection of data cannot be confirmed.

Data sovereignty

The notion of data sovereignty is closely related to data protection, referring to the subject's awareness of the collection and proceedings of its data. Providing citizens with a transparent overview over the data the municipality collects about them and, on this basis, to offer more customer-tailored services is the main goal of Mijn Amsterdam. At the time of writing, not all civic data is accessible through the platform, as the public services department, that oversees Mijn Amsterdam, relies strongly on other departments' data supply. If data is securely stored, the platform may help to increase sovereignty over one's data, providing transparency on the data the municipality stores.

As outlined, on SocialGlass, the user may not always be aware that his or her posts are collected through the platform, reducing the subject's power over its data. Working with social media platforms, and their inherent data colonization issues (Couldry and Mejias, 2019), raises ethical questions. Although data is anonymized and not collected for profit but to improve policymaking, citizens may perceive a loss of sovereignty over their data when they are not informed how their data is used. As Wadhwa (2015) points out, already the subjective feeling of being monitored can lead to changed patterns in behaviour. Kitchin (2015) similarly criticizes this form of geo-surveillance. SocialGlass and Mijn Park follow an instrumental approach to the SC, seeing urban space as a physical infrastructure in which problems can be solved through techno-spatial solutions (Willis and Aurigi, 2017). Greenfield (2013) warns of the deterministic and positivist logic underpinning the datafication of cities in their quest for more efficiency.

An ASC representative is generally aware of data sovereignty issues revolving around the smart city, but sees problems with data collection both by governments and private companies:

> What is really terrible is to use the knowledge of all the data. I might lose my autonomy because then they start filtering all the knowledge, which I get of my Google account or on my website (…). That we are all going to be nudged either by Siemens or by the government without even knowing. (I4)

Giving users ownership of their data would prevent companies and governments from collecting data and nudging the user in a certain direction. On the ASC platform, however, different organizations have access to the collected data, such as Facebook, Crowded, a data processor and site administrator, and Intercom, a customer relationship

software, which registers the browser and its language, location, and IP address of a registered user (ASC, 2020e). This relatively broad access challenges the principles of purpose limitation, proportionality, and minimization and could be seen as a threat to the subject's data sovereignty.

For platforms hosted by Gebied Online, each network remains the owner of its data and can receive exports. The members of the cooperative jointly determine whether external parties (e.g. municipalities) may receive the aggregated data. The advantage of a cooperative is, according to the platform developer, "a better relationship with the neighbourhood because it feels like it's our own platform. (…) So, it's much more a bottom-up experimental environment" (I12).

Open source and open data

The document analysis demonstrates the importance the CoA attributes to open source and open data policies. For its open source codes, e.g. for Mijn Amsterdam or the Open-Stad platforms WB and SvW, the CoA set up a dedicated GitHub page. SocialGlass also publishes its source code transparently. The source codes of ASC, Mijn Park, and Skylines are not open source. The platforms hosted by Gebied Online are not open source either, but as opposed to the other platforms, members of the cooperative own the platforms and datasets. Although not all platform users are members of the cooperative, it can be said that control over data is in citizens' hands. A representative of Gebied Online explains that the cooperative is "owner of the platform, of the software, and of the data and all members together make all major decisions" (I12). In the document analysis, open source and open data are described as intrinsically good and desirable for citizen-centric SC development. A researcher at the AMS Institute, however, warns of open data's pitfalls: "one should not be under the impression that the data would only be available to citizens, because if you open up the data, then the question is, well, who will access the data" (I3). According to the interview partner, open data "has this kind of positive image, it is represented as something being intrinsically right in many opinions (…), but there are not always equal opportunities in economic terms of who can participate" (I3). This perspective reflects warnings that the smart city can lead to new mechanisms of exclusion, especially for people who are not able or willing to adapt to the smart city (Willis, 2019). The benefits of the smart city are available only to those who know how to take advantage of them.

Free digital sphere

There is a need for an autonomous digital public sphere, preventing an expansion of the systems' rational-instrumental logic to the areas of social and political life. In this case study, all examined platforms are developed with a non-profit purpose, none of them is commercially driven. A special case is the public-private partnership ASC that is publicly funded but collaborates with the SC's business sector. However, according to an interviewee, the companies registered on the ASC platform are intrinsically, instead of instrumentally, motivated to contribute to the network:

> They all are very inspired and motivated to create better places, better cities, healthier cities, inclusive cities. They all know they have a specific knowledge and capabilities which we can take and put into place and they also all know that they are lacking other capabilities and knowledge. (I4)

However, the literature review suggests (section 2.2 and 3.2.2) that there may also be profit-oriented interests behind the participation of private companies what may challenge the independence of the digital public sphere to which the ASC platform contributes.

SocialGlass, Skylines, and Mijn Park are created by university researchers, partly outside of Amsterdam, but they all collaborate with the municipality and therefore have strong political-institutional linkages. The idea of developing the Skylines game was strongly influenced by the EU's funding conditions. An interviewee explains that "the call we responded to (…) with this Horizon 2020 project required innovative tools to be used. So, using a mobile game was a little bit of a given" (I15). Consequently, the (funding) logic of the political system (the EU) influences the digital spaces created for participation and deliberation, also with respect to platforms established outside the municipal political system.

The most independent platform is hosted by the Gebied Online cooperative, as it is designed and owned by the cooperative itself and funded through a membership fee. Following Kersting (2013, 270), Gebied Online's participation platforms may be described as "invented participation" as compared to "invited participation" by the municipality. The team states explicitly on its website that it offers "a positive alternative to Silicon Valley commercial platforms such as Facebook" (Gebied Online, 2020b). It must be noted, however, that the founder of Gebied Online is a software developer and owns a

software company through which he is involved in building the cooperative's platforms. As outlined, Gebied Online has been working together with the municipality on projects like Oost Begroot or the Gebiedsplan. However, what the project leader would like

> to accomplish is that we have a structural coordination to discuss what they do and what we do. So that we do not make it a competition. But since they [the municipality] are not willing to start this dialogue, we are always surprised about what they're doing. They do what they want - and we can do the rest. That's how it feels. (…) It's very hard to start a structural dialogue with the government about the division of functionality between their platforms and ours. (I12)

The interviewee criticizes that the local government is "not focusing on the whole eco-system of all other digital platforms that are around in the city. They just do their own thing" (I12). Gebied Online's high level of independence from the government and private corporations is thus an advantage in terms of autonomy, but may be a disadvantage with regards to creating synergies and increasing the impact of civic engagement on the platform. The platform developer welcomes a closer collaboration with the municipal administration without giving up Gebied Online's bottom-up approach:

> What I like to see is that there will be one civil servant that will be responsible for having a broad overview of all platforms like GebiedOnline in Amsterdam and bring the key persons together once a year, discuss how we can… well, work together is difficult be-cause we all run our own platforms. (I12)

This reflects Fuchs' (2021, 23) suggestion to introduce "public/civil society partner-ships" instead of public-private partnerships:

> Using such forms of material support, public service Internet projects and civil society Internet projects, and networks of public service and civil society organisations should create Internet platforms of, for, and through the public sphere that advance the digital commons and follow the remit of advancing democracy, education, culture, and partici-pation in society with the help of digital technologies. Such public, civil, and public/civil Internet platforms challenge capitalist Internet platforms and thereby digital capitalism.

Concluding, the overall influence of the private sector on the independence of the digital public sphere is much smaller than anticipated in the literature review. There is little private sector funding involved and no breach in terms of data protection policies is reported. In comparison, the influence of the political system on the digital public sphere seems rather high, with advantages for the impact of civic engagement on platforms

with stronger institutional linkages and disadvantages in terms of platform independence.

7.2 The contribution of online platforms to the legitimacy of digital democracy

In this chapter, a wide variety of online engagement platforms in Amsterdam's digital democracy ecosystem, initiated by different stakeholders, was examined. The OpenStad team, situated with the municipality's CTO, plays a central coordinating role with respect to government-driven platforms, but the platforms are not connected through an overarching governance architecture for all digital democracy platforms, confirming the SNA's findings. Moreover, OpenStad is not linked to engagement opportunities in more general SC projects, such as those promoted on ASC. The main smart city governance platform, ASC, covers a wide variety of SC projects and platforms, but is less suitable to provide an overview of online participation opportunities for Amsterdam's residents.

Digital democracy in practice: living up to the normative standard?

While the policy documents describe the normative dimension of digital democracy policies in the SC, the platform analysis shows how this is realized in practice. High standards of data protection and sovereignty, outlined in the documents, are mostly affirmed in the platform analysis. Amsterdam follows a progressive open data approach, and the municipality publishes its datasets transparently on a dedicated website. It is questionable, however, whether citizens themselves benefit from these datasets, as they seem to be more interesting for the private sector. Nevertheless, the city's open data and open source policies demonstrate the political will to open up smart city politics for the broader public. A strong impact of the private sector on the public sphere, as indicated in the literature review, cannot not be confirmed for the case of Amsterdam. Instead, the political sector influences the digital public sphere, especially through top-down platforms set up by the municipality. Deliberation does not play a significant role, neither in the documents, nor on the platforms or in the digital democracy governance system. The corona pandemic may well have shifted this dynamic, with more synchronous debate sessions organized in Amsterdam. This is outside the timing of data collection for this thesis – as such, future research will do well to include this development in its analysis.

The effectiveness of civic input is little thematised in the documents, except for the DDG which serves the OpenStad team as guideline. Accordingly, participation's highest

impact was achieved on the OpenStad platform West Begroot. All other platforms have a consultative or informative character. In the overall digital democracy system, power is shifted to a very limited extent from the traditional institutions of representative democracy towards citizens. Empowerment is more implicit to the participation process, but not an explicit platform priority, except for the Skylines games whose goal is to educate and empower citizens, albeit with negligible success. The documents introduce the aspiration to involve all citizens in SC policies but are less clear on how this can be achieved. This is partly reflected in the platform analysis. Inclusiveness is perceived as the most important goal and online engagement platforms are able to reach higher number of citizens than offline meetings. However, strategies to diversify participation have little success so far.

Design tensions among the platforms are discovered. For instance, the online PB processes have a high level of effectiveness in the sense of giving citizens decision-making power but tend to crowd out bottom-up engagement, such as by the cooperative Gebied Online, that is important for the independence of the public sphere. A focus on the quantity of participants can result in lower results in terms of individual empowerment and the quality of participation. Indirect participation through sensors or the monitoring of social media activities that leads to relatively high levels of inclusiveness may negatively impact empowerment and an independent public sphere. Platforms that are independent from the political and economic sphere score particularly low in terms of effectiveness.

Between the smart city and digital democracy
Although all interview partners describe their platforms as citizen-centred, there are significant differences in the role the subject assumes. There seems to be a delineation between instrumental, *issue specific platforms* related to smart city (SC) topics, e.g. to improve air quality or park infrastructure, and *open platforms* for civic participation that are explicitly established to contribute to digital democracy (DD). SC related platforms aim to achieve a specific goal that is set top-down *through* citizen participation. On platforms more strongly related to the digital democracy realm, citizen involvement *is* the goal – the policy to be developed is determined bottom-up. Following this logic, Mijn Amsterdam, ASC, Claircity Skylines, Mijn Park, and SocialGlass can be grouped under the SC realm, while Stem van West, West Begroot, and Hallo Ijburg can be categorized under the digital democracy domain (see table nine).

Platform	Goal	Domain
ASC	Connect stakeholders to create smarter, greener, and healthier cities	SC
ClairCity Skylines	Inform about and improve air quality in cities	SC
Mijn Park	Improve park quality and infrastructure	SC
SocialGlass	Support political decision-making on specific urban problems through social big data	SC
Mijn Amsterdam	Provide citizens with an overview and access to the personal data the city has collected about them	SC
Stem van West	Collect residents' ideas for their neighbourhoods	DD
West Begroot	Enable residents to distribute parts of the municipal budget for projects of their choice	DD
Gebied Online	Support neighbourhoods and special interest communities in connecting and collaborating online	DD

Table 9: Comparison of platform goals in the smart city and digital democracy domain.

The platforms related to the SC realm use a diverse and innovative set of technologies to achieve their goals: Skylines applies gamification to inform citizens about policies related to air quality; SocialGlass uses social big data to enhance urban planning; Mijn Park applies crowdsensing to improve a park. The platforms in the DD realm are relatively simple in their structure, consisting of a range of building blocks that can easily be transferred to other contexts. The technology in the DD domain is thus less diverse, specific, and advanced than in the SC area. Instead, it enables more open participation. Whereas Dameri (2014) and the document analysis demonstrate an analytical line between the digital and the smart city, the platforms show that a differentiation between the smart city and its digital democracy pillar equally makes sense. Table ten summarizes the main differences of platforms in the SC and DD domain.

	Smart City	*Digital Democracy*
Platforms	Amsterdam Smart City;	Stem van West;
	Claircity Skylines;	West Begroot;
	Mijn Park;	Gebied Online
	SocialGlass	
	Mijn Amsterdam;	
Policies	Specific	Open
Role of technology	Technology-centred	Technology-facilitated
Role of citizens	Citizen-facilitated	Citizen-centred

Table 10: Differences between platforms in the smart and digital city realm.

The SC and DD categories are useful for analytical purposes. In practice, the two realms overlap and cannot be separated strictly. In both areas, for instance, most platforms *inform* policymakers in the sense that they serve a consultative purpose. All platforms are linked to *offline* processes, demonstrating again that a clear distinction between online and offline participation can hardly be made. Besides, most platforms – except for SocialGlass – are based on *active* participation. The DD platforms seems to be slightly more vigilant with respect to privacy policies, although all interviewed platform managers are aware of the importance of data protection principles. In both domains, there are bottom-up platforms (initiated by non-governmental actors) and top-down initiatives (by government actors).

Concluding, the analysis demonstrates that none of the platforms fully fulfils all legitimacy criteria. They contribute differently, sometimes complementary, to the legitimacy of Amsterdam's digital democracy ecosystem. The next chapter synthesizes the findings of the Amsterdam case study and considers their generalisability through interviews with international smart city and digital democracy experts.

8. Putting the findings to the test: digital democracy from Amsterdam to smart cities around the world

The findings of the Amsterdam case study show an ambivalent picture in terms of digitization's impact on democratic legitimacy. Although a form of digital democracy in Amsterdam that is inclusive, empowering, effective, deliberative, and independent from pressure of the systemic world is described in rhetorical terms in the policy documents examined, the analysis has revealed weaknesses in its implementation. As it is difficult to derive generalizable conclusions from a single case (see chapter four), the findings of the in-depth case study are put to test in this chapter. For this purpose, 16 additional expert interviews were conducted with experienced policymakers, digital democracy and smart city practitioners, and some of the most well-regarded researchers in this field. The goal was to examine the extent to which the Amsterdam findings are applicable to other digital democracy systems in smart cities across the globe.

8.1 Lessons learnt from Amsterdam

This section presents the case study's main findings, analyses them in the context of the literature review (chapter two) and the legitimacy framework (chapter three) and draws conclusions to be tested with experts from international smart city networks and other smart cities around the globe.

The literature review indicates that digitization in the smart city can range from progressive citizen-centred governance all the way to the Orwellian worst-case scenario of 1984, depending on how it is implemented. The case study demonstrates that the smart city of Amsterdam is far from an urban Orwellian dystopia. Instead, it follows a humanistic socio-technological approach with a focus on ICT-enabled citizen participation. Overall, the municipality has put in place progressive policies for a value-driven and citizen-centred digital democracy. Differences in policy implementation can be identified for, first, the smart city realm and, second, its digital democracy dimension, constituting two sides of the governance network that leave room for deeper integration. As suggested in the literature review, participation in the SC realm is framed in an instrumental, topic-specific way, whereas in the digital democracy sphere, it is more open and normative in nature. Technology on the SC platforms is more advanced than on the DD platforms. The three digital trends that shape and are shaped by democracy – hybridization, individualization, and liberalization (see section 2.4) – are reflected in the case study's findings. Social media are rarely used for participation and deliberation, but rather for outreach and dissemination. Counter-publics, facilitated through social media,

other more informal digital spaces for discussion, like neighbourhood WhatsApp groups, and offline participatory spaces were identified in the qualitative analysis. They could not be captured through the SNA, both indicating blind spots in the digital democracy system and the methodology's limits (chapter five).

Chapter three developed five criteria to assess the legitimacy of digital democracy. In what follows, the case study's overall findings under these criteria are briefly summarized. Moreover, the findings for the systemic dimension of digital democracy in the smart city, as outlined in section 3.2, are condensed. In each section, the main conclusions are derived.

Inclusiveness

Establishing *inclusive* governance processes and online participation opportunities is seen by most platform managers as the main challenge and goal of their work. The document analysis stresses the ambition to involve citizens in SC related policymaking. In the digital democracy system, there is a wide variety of online engagement platforms, initiated both bottom-up and top-down, offering citizens multiple entry points for participation. Compared to offline participation, online platforms seem to reach higher participation numbers and involve younger participants through offering a low threshold for engagement. Yet, despite significant efforts to integrate participation opportunities more naturally in citizens' everyday life (e.g. through offering WhatsApp as a communication channel, neighbourhood agents, and the use of different languages), diversity among participants remains low, leading to what one may call a "bourgeois public sphere" (Dahlberg, 2001, 628).

Conclusions
a. Reaching high levels of inclusiveness is both the main goal and challenge for digital engagement platforms in the smart city.
b. Decentralized structures and platforms for online engagement offer citizens multiple entry points for participation and can raise inclusiveness.
c. Participation numbers on online platforms are reportedly higher than in offline participation.
d. Despite significant efforts, diversity among participants remains low.

Empowerment

Empowerment through *digital* participation and deliberation plays a minor role in the SC, confirming Angelidou's (2016, 23) finding that "most smart city programs include minimal education and training activities for individuals". The document analysis emphasizes the importance of citizens' resilience and awareness of technology usage to prevent surveillance, nudging, and discrimination online but digital safeguards or initiatives for this purpose are hard to be found. Instead, a variety of *offline* workshops and living labs are organized that may contribute to civic empowerment. Creative approaches, such as gamification in the Skylines app, have limited results in terms of civic empowerment. Although users indicate in the game's evaluation that they would change their behaviour in the future, they do not report gaining knowledge or skills in the process.

Citizens can also be empowered through the participatory process itself. In online participatory budgeting, citizens gain a high level of ownership over the policy-making process, as they are responsible for the process from the initial idea towards implementation. In the Gebied Online cooperative, citizens even control platform management, what may have an emancipatory effect. However, the cooperative is rather detached from institutionalized policy-making processes, limiting citizens' impact on that dimension. The Amsterdam case study examines how the affordances of online platforms support empowerment. This does not capture the extent of empowerment experienced by users. Future research could fill this gap by involving citizens in the analysis.

Conclusions

a. Although the importance of empowerment is confirmed in rhetorical terms, empowering citizens in practice through digital participation and deliberation plays a minor role in the smart city.

b. Digital empowerment tools and platforms are subordinate to offline face-to-face empowerment in living labs or workshops with citizens.

c. Online engagement cooperatives can empower citizens by giving them ownership over platform management.

Effectiveness

In the document analysis, the DDG provides guidelines on increasing civic participation's impact in digital democracy. In practice, the overall impact of participation is rather low, as most online participation is organized on a consultative basis. Thus, decision-making in most cases rests with the elected officials. A significant shift of political decision-making power towards citizens is not found (see also Legard and Hovik, 2022, 185). Justifications for implementing an idea (or not) are not always given. In this regard, monitoring and evaluation could be improved. West Begroot has the highest level of effectiveness because citizens relatively autonomously decide how to allocate the given budget for projects of their choice. The impact of the bottom-up neighbourhood platform Gebied Online is reduced through the development of top-down online participatory budgeting processes launched by the municipality (crowding out effect).

Conclusions

a. Participation and deliberation have a limited effect on power relations between citizens and representatives of the municipality.
b. Online citizen participation mostly has a consultative or informative character.
c. Engagement platforms, that are increasingly set up top-down, risk crowding out and thus reducing the impact of bottom-up neighbourhood platforms.

Deliberation

In the document analysis, facilitating online deliberation among citizens and other stakeholders, most notably political authorities, plays little role, except for the DDG. Asynchronous deliberation is weak on the evaluated engagement platforms, underlining Hartz-Karp and Sullivan's critique (2014, 2) that it is "not conducive to intensive, empathetic, collaborative discourse." Machine learning or argument visualization are not used to structure the discussions. Moderation is limited and does not follow the principle of sufficiency to ensure a respectful, inclusive, and rational deliberation online (Eilders and Friess, 2015, 327; Kies, 2010). Rather than online, interview partners report that discussions predominantly take place offline, either in informal encounters, or at events organized by civil society actors. During the Corona pandemic, synchronous spaces for deliberation increasingly emerged, using videoconferencing software such as Zoom or Skype. They might change the role of (synchronous) online deliberation in the future.

Overall, the focus in the smart city of Amsterdam is less on deliberation, but more on participation and concrete action.

Conclusions

a. Asynchronous deliberation on online platforms rarely takes place on the selected engagement platforms.
b. Argument visualization and machine learning for argument structuring are not widely used on the online engagement platforms.
c. Deliberation is more likely to occur synchronously, in informal spaces, or during offline meetings.

Independence

The analysed documents emphasize the need for a free online public sphere based on public values, data sovereignty, and data commons. The approach seems close to the democratic ideal, as outlined in chapter two and three, in terms of independence. The platform analysis does not report any privacy or security breaches. All actors try to make sure that personal data is not treated as a commodity. Instead, data protection is found to be of high importance. Market-driven solutions play a minor role both on engagement platforms and within the governance network in the field of digital democracy. All OpenStad platforms are open source with the source code published on GitHub. The city publishes large data sets on a dedicated website. Influential non-governmental organizations, such as Waag, are advocating for a data commons. Gebied Online is noteworthy because its funding model relies on a cooperative with members paying an annual fee to use its services in developing and maintaining online engagement platforms. Accordingly, the members of the cooperative own the data. This finding sits uneasily with criticism by some authors (e.g. Wadhwa, 2015, 125; Kitchin, 2015, 133; Cardullo and Kitchin, 2017, 17-18) that smart cities merely discursively emphasize civic engagement, but keep their logic of technocratic governance, market-led solutions, and the massive collection of data for increasing efficiency. Although some platforms, such as SocialGlass, may use big data for nudging and improving policy-making, the overall digital democracy system is far from a surveillance state.

The private sector plays a small qualitative role in the digital democracy governance network of the smart city (while this may be different for other SC areas). Social media

are used as an outreach tool and for protest and contestation, less as a space for participation and deliberation itself. As such, their business model does not significantly impact the independence of the digital public sphere. Consequently, the findings do not suggest a colonization of the public sphere. However, the increasing engagement of the formal institutions of representative democracy have led to shrinking spaces for a bottom-up, more informal digital sphere shaped by non-governmental actors. Thus, a formalization of the online digital sphere through the political system, leaving fewer space for non-formal and informal actors, is established.

Conclusions

a. A colonization of the online public sphere through the private sector does not take place in the smart city's digital democracy realm.

b. Increased involvement of the formal political system leads to a shrinking space for the bottom-up, informal online sphere.

c. Open data and open source policies are widespread in the smart city.

d. A model for a data commons is achieved bottom-up, taking the form of a platform cooperative.

e. Data protection and data sovereignty standards are adhered to by policymakers and platform managers alike.

Systemic dimension

The term 'smart city' is not reflected in the selected policy documents from Amsterdam. Instead, the expression 'digital city' is used to describe the city's digital development, indicating a shift from a more neo-liberal orientation of city policies associated with the 'smart city' towards a more humanistic socio-technological approach of the 'digital city' (see section 2.2.2) – although the definitions of the smart and the digital city are controversial among interview partners. Differences between platforms associated with the digital democracy pillar of SC policies and platforms that deal with more general smart city issues are detected. SC related platforms aim to achieve a specific goal *through* citizen participation (instrumental or utilitarian approach). On platforms more strongly related to the digital democracy (DD) realm, citizen involvement *is* the goal – the policy to be developed is open and to be determined bottom-up (normative approach). The creation of digital civic engagement opportunities that follow a specific goal is commendable. However, attention must be paid not to follow a solutionist or deterministic

perspective on urban governance that focuses on fixing problems in the city with technology (Townsend, 2013, 31). This leaves little space for citizens to engage in alternative practices (Chourabi et al., 2012, 32; Willis and Aurigi, 2017, 111).

The SNA demonstrates that different stakeholders interact in each area. Figure 24 shows the position of selected actors on a scale between purely *digital democracy* policies, *digital city* policies based on a democratic values approach and the *smart city* realm which is looking to improve specific policies through digital technologies.
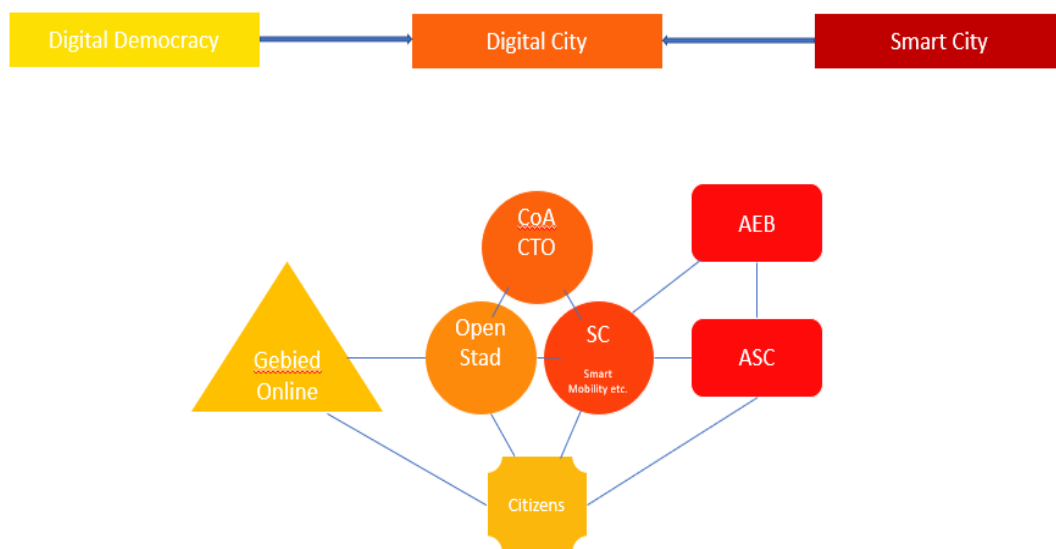
Figure 24: Network actors between digital democracy and the smart city.

Amsterdam's political system significantly shapes the digital public sphere. Creating enabling coordination mechanisms between civil society actors working in the digital democracy field as well as relevant actors in local government and administration might counterbalance observed crowding out effects. On the other hand, a higher centralization of power within the governance network through a coordinating body may also foster the observed crowding out effects. The coordinating body could thus be based on a multi-stakeholder approach to avoid a centralization of power while pooling DCE activities in the SC.

The case study confirms the findings of Fleuß, Schaal, and Helbig (2019) on different levels of formality in a deliberative system. *Formal* spaces for digital participation decrease the space for more *informal* participation in the digital public sphere. A variety of entry points to the governance system may contribute positively to civic participation.

However, as Ercan and colleagues (2017, 196) emphasize, the platforms need to "serve overlapping functions, involve diverse participants and invoke different norms of engagement". One may ask whether *online* participatory-deliberative systems are generally more formalized than *offline* systems, as spaces for deliberation and participation inevitably need to be constructed online. At the same time, spaces for offline deliberation need to be structured as well to create meaningful impact on democracy's legitimacy, as demonstrated with regards to citizen juries (Smith and Wales, 2000). Moreover, more informal online spaces for discussion in digital democracy exist, such as neighbourhood WhatsApp groups. They are just difficult to see through the lens of a systems analysis based on social network analysis. Formal and informal spaces for participation and deliberation thus exist both online and offline. This thesis shows that we lack the appropriate tools to detect and connect them in a meaningful way in a digital democracy system.

Lastly, the question remains open whether the system can indeed be described as a participatory-deliberative one, as the legitimacy criteria are only partly fulfilled. In line with Owen and Smith's (2015) warning that a focus on the overall system may water down the quality of its parts, the analysis underlines a gap in deliberative systems theory: what threshold needs to be crossed to be able to call a system deliberative? Some of the challenges governance networks bring to deliberative systems, as identified by Hendriks and Boswell (2018), are confirmed, e.g. a tendency towards elitism and exclusion, as the governance networks consist mostly of selected professionals from civil society, government and public administration, academia, and business, as well as difficulties connecting to informal and less organized actors and a risk to become dominated by the local government.

Conclusions

a. The smart city and its digital democracy pillar constitute two loosely connected governance systems.

b. Both smart city and digital democracy actors prioritize civic involvement but use different approaches to digital citizen participation with the former facilitating issue-specific, technology-centred, instrumental participation, and the latter implementing open, citizen-centred, normative participation.

c. Conceptually, a public value centred 'digital city' approach bridges technology-centred smart city policies and citizen-centred digital democracy policies.

d. Power centralization in governance networks may create synergies but bears the risks of crowding out bottom-up engagement.

e. There is a lack of appropriate tools to detect and connect informal and formal spaces for participation and deliberation in digital democracy.

The next section puts the findings to test.

8.2 Comparing the findings: digital democracy in smart cities across the globe

In this section, the conclusions of the Amsterdam case study are discussed with international smart city and digital democracy experts. The 16 interview partners include three experts from academia and two civil society representatives (one of them involved in digital democracy in Barcelona[37]). Three interviewees are working on topics related to digital democracy in or for a local government or administration, representing the cities of Berlin, Reykjavik, and Helsinki. Familiarity amongst these interviewees as well as a civil society representative from Barcelona generates important comparisons with Amsterdam. Barcelona, Helsinki, and Reykjavik are often named among the most progressive cities in terms of digital democracy whereas Berlin is perceived as medium advanced (although most SC indexes come to very different conclusions on what the 'smartest' city in the world is due to different methodologies and the concept's vagueness) (RankingRoyals, 2022). The other experts represent smart city networks. Together, they ensure a vast variety of SC experiences. Some of the networks have a regional, others a global focus. They include major international actors, such as the GIZ International Smart Cities Network, GIZ Climate Smart Cities, supporting India's Smart Cities Mission, Eurocities, the G20 Global Smart Cities Alliance, or the SC initiative of the World Economic Forum's Centre for the Fourth Industrial Revolution. The networks engage with more than 300 cities worldwide. The regional expertise of interviewees can be found in table eleven (some interviewees have experience in more than one region).

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[37] Barcelona is widely considered to be at the forefront of citizen-centred smart city development as well.

Region	No. of experts
Europe	9
North America	3
Central and South America	3
Asia and Oceania	6
Africa	2

Table 11: Regional expertise of international interview partners.

Introductory remarks: comparing different perspectives and experiences

Throughout the interviews, the knowledge and experience of interview partners from the technology or economic sector with regards to *digital democracy* tools seems comparatively low. Everyone agrees on the necessity to involve citizens and the potential of technology to do so. But asked about a successful example, most interviewees mention Decidim[38], Barcelona's citizen participation platform that has received wide coverage and serves as an inspiration for other online engagement platforms across the globe, including Amsterdam's Stem van West. The technology experts' knowledge does not extend to how their area of expertise, e.g. big data, can be applied to support citizen participation. More often, the connection to digital democracy by interview partners with a stronger technological or economic background is instrumental, applying technology to fix urban problems. This underlines that the technological and instrumental smart city dimension still prevails (see also Chourabi et al., 2012; Townsend, 2013), despite a trend towards a more sociological, human-centred model that is found in Amsterdam. The smart city is perceived as a service provider by most experts. For instance, when asked about examples of digital democracy, one interviewee mentions a platform where citizens can transparently find information on local businesses and services. Taking Arnstein's (1969) ladder of participation, the website would not pass the threshold of 'informing'. Collecting, processing and visualizing data, sone of the most important fields in the smart city, lack civic participation. As the interviewee from Reykjavik puts it: "the smart city concept is a service concept. But democracy and service are not the same thing" (RI8).

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[38] https://decidim.org/, accessed 1 July 2022.

The interview partners from or working with local administrations agree that citizen participation should become a horizontal issue, permeating all departments, ideally with centralized support units to help other divisions, as currently practiced in Amsterdam with OpenStad. However, in their view, this is often hindered by institutional boundaries, e.g. a lack of committed personalities driving the issue, administrative and structural constraints, and a lack of resources or of political support (see also Hassan, Cole, and Cole, 2015, 193). A crowding out effect by the increased engagement of the local government in the field of citizen participation vis a vis already existing neighbourhood engagement is not reported, however. No interviewee is aware of any digitally facilitated bottom-up engagement (besides local social media groups) that may be driven out by top-down digital democracy applications and platforms. A reason might be that few cities are as advanced as Amsterdam when it comes to both bottom-up and top-down civic engagement – there is simply nothing to crowd out or nothing that can crowd out.

Amsterdam is mentioned by many experts as an outlier in terms of its advanced policies in the digital democracy field. With regards to differences between cities, countries, and regions, all interviewees emphasize that digital democracy policies are highly context specific, depending on the cultural background, ICT availability, and both local and national policies. When comparing different regions in the world, some interview partners with global experience state that digital democracy development in North America and Europe, especially in the Nordic countries, is more bottom-up and that SC policies there are perceived as a new way of governance. In Asia, the developments are perceived as more top-down, initiated by the local or national government, such as India's Smart Cities mission. However, these can only be indications. Each smart city needs to be analysed individually to derive meaningful conclusions.

For the next sections, the Amsterdam findings under the five legitimacy criteria are cross-examined with the international experts. The results are presented in the broader context of the challenges and opportunities of digital democracy in the smart city, as outlined in chapter two.

8.2.1 Digital participation: inclusiveness, empowerment, and effectiveness in the smart city

What does it mean to be a digital citizen in the smart city? Following Isin and Ruppert (2015, 8), the digital citizen is defined in this thesis as a subject exercising its civic and

political rights in relation to its socio-technological environment. The following analysis illustrates how these rights are exercised in the smart city.

Digital citizenship and empowerment

Hintz and colleagues (2019, 40-41) point out that digital citizens are both self-constructed and created by an increasingly data-driven economy and state. For citizenship to be enacted, media literacy, empowerment, and an informed use of ICT as well as a digital infrastructure built on the principle of 'privacy by design' are required. The Amsterdam case study finds little empowerment through digital means in the SC, except for the 'do it yourself' citizenship exercised through Gebied Online. This is confirmed in the expert interviews for this section. For instance, a smart city network manager recognises that the empowerment of citizens is

> not as high on the agenda is it probably should be. You know, you always see these sort of smart city frameworks and I always feel like citizens are a little bit on the periphery of these, are not really at the core of it, you know. In terms of your governments' governance structure, you have the policymakers, you have the service providers, you have the data providers… well, citizens are also providers of data, of course, but that seems to be the extent of it. So they are just, you know, human sensors that give you the data to then make your decision. But in terms of actually putting them at the same level of the conversation, putting them at the table, you know, with everyone on the same level… it could be more prioritized to empower them. (RI2)

The interviewee thus criticizes the lack of impact and empowerment through the participatory process and the low priority empowerment is given. Reflecting the results of the Amsterdam case study, many interviewees mention that SC initiatives are following a "middle class neo-liberal agenda" (RI1) and accordingly only target higher educated segments of the population, if at all, while fostering the digital divide (Cosgrave, 2013; World Bank, 2016). The digital divide, both in terms of access and skills, is considered by experts on African and South American smart cities as the biggest obstacle for inclusiveness. In South America, areas with no internet access at all are reported, e.g. the Amazon region. In these regions, digital democracy rather accentuates the problem of equal access to civic participation.

As outlined, trust in platforms is perceived as a critical precondition to disclose information online (Kwame Adjei et al., 2020, 5; Nagy and Koles, 2014, 5, 7). In Amsterdam,

the platform managers work hard to gain this trust, placing data protection high on the agenda. In the interviews with representatives from European cities, empowerment is about "building with people, instead of building for people" (RI6), e.g. through hackathons, citizen science projects or living labs (as is also seen in the Amsterdam example). European experts try to reach vulnerable communities through ICT to avoid digital democracy becoming a middle- and upper-class endeavour. In other SC contexts, the situation is more complex. The international experts point out that there is often a lack of trust in the code and algorithms governing online participation. Too often vulnerable groups and minorities have become victims of discrimination facilitated through ICT. Some experts working with these groups, especially in non-European cities, would largely refrain from using digital tools for engagement and use offline tools instead.

Experts working with smart cities in developing and emerging economies see an actual risk for empowerment through SC developments. Following the goal of increasing efficiency, "smart city projects in Brazil and in India were cleaning the street up, basically moving all the informal economy off the street" (RI1). In this context, the SC does not only challenge democratic empowerment but also economic empowerment, while mostly paying lip services to better service delivery to the periphery. As a result, according to an interview partner, a strong bottom-up movement *against* the smart city is emerging in India. This is in line with Datta's findings (2018, 414) that postcolonial citizenship in the SC can lead to shrinking spaces for those on the margins of governance networks that are supported by an elite society. Accordingly, the market may set the framework for the delivery of public goods, arguably leading to a technocratic and paternalistic governance model. The SC, some experts stipulate, is an invented top-down term in the sense that a solution is developed before an actual societal issue is identified, treating the city, and its underlying messiness and incompleteness, itself as a problem. However, according to some interviewees, it is exactly in this messiness and incompleteness where possibilities for citizen participation and bottom-up engagement can be found. As bottom-up participation takes time and can itself be messy, it does not always fit to the SC's efficiency paradigm.

Especially in developing countries, digital democracy may further marginalize vulnerable groups in local digital democracy. The findings challenge the conclusion from the Amsterdam case that high levels of civic ownership in the participatory process empowers citizens. Online participatory budgeting projects or civic engagement cooperatives

are much more difficult to develop in fragile contexts. The findings highlight the complexities and risks of top-down civic engagement for empowerment with an aim of reducing the 'messiness' of participation, especially in marginalized communities. Open-ended, normative digital democracy platforms are preferable to goal-specific, instrumental digital engagement platforms in such a context.

Ensuring inclusiveness through digital participation

Besides facilitating the creation of "invited participation" (Kersting, 2013, 270), ICT can also support "invented participation" by civil society. Both exist in Amsterdam. As outlined in section 2.1.1, social media have large user numbers and can thereby foster inclusiveness. The interviews in Amsterdam indicate that social media are mostly seen as an outreach tool. They can also be used for the creation of counter-publics, facilitating the group formation around a cause (Breuer, 2012; Dahlberg, 2011). In the Global South, they are more strongly perceived as a tool for actual participation due to the lowered threshold of engagement they offer: "I think they're quite interesting in that you're hacking an existing platform" (RI1). However, as shown in the literature review (see section 2.1.3), the question is who is being hacked by whom. These more informal spaces are difficult to grasp as part of the digital democracy system. Following Bennett and Segerberg (2012), it can be confirmed that traditional, hierarchical modes of collective action are increasingly replaced by more decentralized, dispersed groups, organized around a shared cause in the smart city. In Amsterdam, this becomes evident through the wide variety of engagement possibilities, including participation platforms initiated by citizens such as Gebied Online's Hallo Ijburg.

While reaching high levels of inclusiveness is seen as one of the main goals of digital democracy in Amsterdam, some international experts question the desirability of inclusiveness as a normative standard for civic participation in the SC. In line with the results of the Amsterdam case study, practitioners working for or with the local government and administration agree that creating inclusive processes and structures for citizen participation is the biggest goal and challenge of digital democracy. However, two of the researchers interviewed raise the question to what extent full inclusiveness should be the normative ideal for civic participation:

> having a lot of people tokenly involved is really positive and you don't need… actually you shouldn't be having lots of people like fully involved. So actually, it's about sort of widening that set of actors and creating multiple points of entry and exit. (…) if you've

got a thousand people tokenly participating and only ten people actively participating, that's much better than 15 people really actively participating and nobody on the token level. (RI1)

The quote challenges the legitimacy framework on three levels. First, it questions the legitimacy criterion of inclusiveness in the sense of potentially giving all citizens affected by the issue at stake the opportunity to participate. The researcher argues that full inclusiveness does not always need to be achieved on one platform, but that multiple entry points for citizens with varying levels of inclusiveness may be preferable – as is the case in Amsterdam. Second, it raises the question to what extent citizen participation needs to have an impact. According to the interviewee, it might sometimes be preferable to have a high number of people tokenly participating, rather than only 15 citizens being actively involved. This also relates to the criterion of empowerment. Following her argument, a small participating elite may emerge that benefits from the participatory experience and may be empowered by it. However, this might further contribute to a second-level digital divide (Min, 2010). If only those participate who are already engaged, then what is the goal of enabling digital participation? In an ideal world, inclusiveness, empowerment, and effectiveness should go hand in hand. As this is highly challenging to achieve in practice, as demonstrated in the Amsterdam case study, the participatory-deliberative systems approach allows for examining a range of online engagement platforms that all bring different strengths and weaknesses to the table. However, it does not provide an indication how to weigh the different legitimacy criteria. What if there is broad participation but only a small sub-section of participants is truly empowered? What if there is deliberation without an impact? How to deal with these conflicting goals? The empirical analysis underlines this weakness of the systems approach. It is a highly useful tool to critically assess existing participatory and deliberative practices, but it does not indicate how to weigh different legitimacy criteria against each other. The findings thus substantiate Erman's (2016, 264) criticism on deliberative systems' lack of criteria for evaluating what makes them democratic and deliberative.

Some interviewees add that people are not keen to engage with SC related topics because they are too abstract. Not all citizens have the capacity or the will to participate in all matters. Along these lines, several interview partners emphasize the importance of providing citizens with the necessary resources to participate, e.g. by hiring staff for civic empowerment or to organize workshops, bringing different societal groups

together. Some interviewees have good experiences with intermediary institutions, such as libraries or local associations, in reaching out to citizens, mirroring the Amsterdam experience. Furthermore, interviewees refer to platforms that citizens use as part of their everyday life, such as WhatsApp groups, recognizing the "value of a range of everyday, small-scale ways in which citizens employ technologies and data that meet their needs in a social and spatially embedded context" (Willis, 2018, 27). Applying gamification to ensure inclusiveness does not lead to increased participation, output quality or community building (Thiel et al., 2016, 36) in Amsterdam and international experts also do not mention it as a tool to reach more citizens.

Despite some challenges in ensuring the diversity of participants, many interview partners state that the participation numbers are higher online than offline. They also find that the Corona pandemic has contributed positively to the acceptance and awareness of online engagement opportunities.

Creating impact in digital citizen participation
A shift in the SC from technological solutions towards a governance approach has already been established, raising the question between the difference of the New Public Governance and SC approaches (Granier and Kudo, 2016, 63; Lember, 2018). The Amsterdam case confirms that government is increasingly replaced by hybrid configurations (Swyngedouw, 2005, 1992), sharing policymaking power with the private sector, organized civil society, and citizens. The case study demonstrates the wide variety of engagement platforms, covering many of the examples mentioned in the literature review, e. g. online consultations, gamification (Thiel et al., 2016), collaborative mapping (Kingston, 2007), and social sensing (Gutiérrez et al., 2014; Geijer, Larsson, and Stigelind, 2014). The local administration is increasingly seen as a platform or facilitator of these multi-stakeholder connections. What role do citizens play in these configurations?

The international experts not only confirm the result of the Amsterdam case study that online citizen participation is mostly consultative or has an informative character, reflecting Capra's (2016, 34) findings on citizen participation in ASC projects. They go a step further, as about half of the interview partners contend that in their experience, online participation is often tokenistic. Citizens, they say, are often consulted at the beginning of a project, but rarely included in its implementation, indicating what Moon

(2018, 302) calls "crowdsourcing design and government delivery". One expert adds that when bids for SC funding are developed, e.g. by the EU, citizens are never involved, leading to project proposals for which there is no actual citizen demand. This is also due to the heavy requirements of EU funding applications which prevent citizen participation at this stage. In these cases, NGOs or other civil society actors often have to broker between the citizens and the local government to facilitate participation in the project implementation phase. On the other hand, the Amsterdam case study shows that citizens are not happy about implementing projects completely on their own. There is thus a delicate balance between including citizens in a meaningful way and making sure that public services are not merely outsourced to citizens in the spirit of efficiency.

The experts report a shift in recent years, that they welcome, from consultation and discussion towards co-creation and co-design of policies and projects, although at small scale and with few participants. In most experts' opinion, the focus should be on collective action instead of public discourse and asking citizens for their opinion. This is the case in Amsterdam as well, where participation is much further developed than deliberation. That this does not necessarily give citizens actual decision-making power and lacks an exchange of argument is not critically reflected. Some experts state that, in their experience, the more there is at stake with respect to the decision taken, the smaller the space for civic engagement. Most experts see digital civic engagement still in its "experimentation phase" (RI9) without much structural scaling up. Even in highly digitized cities, such as Boston or Dublin, digital participation offices, like in Amsterdam, do not exist, according to an expert. In his opinion, digital democracy often takes the form of a "civic paternal stewardship" (RI12). Although the experts report good intentions with regards to digital democracy in the cities they work with, they see a lot of flaws in its execution. Some propose applying models of participatory or consultative planning, as developed in urban studies, more strongly in the SC area. Others suggest capacity building workshops for the local government to ensure that the expertise and motivation to facilitate digital participation remains in the administration even when there is a change in political leadership.

The interview partners emphasize that the impact of digital democracy initiatives is always context-dependent, varying not only from country to country and from city to city, but also from department to department within the city administration. A condition for success of digital democracy is the support and drive by the mayor or other leaders. In

Amsterdam, a progressive government is facilitating digital democracy initiatives. On the other hand, some experts explain the limited impact of digital civic engagement in the smart city by local government's failure to meaningfully connect top-down initiatives with bottom-up engagement. Instead of re-inventing the wheel, the focus should be on scaling up and structurally implementing successful civic projects. On the one hand, the expert interviews confirm the main findings of the Amsterdam case study, namely that digital civic engagement has little impact overall and is not structurally decisive. On the other hand, the interviews underline the unique character of the Amsterdam case study, illustrating that, despite Amsterdam's relatively limited results in terms of effectiveness, the impact of digital civic engagement is even lower in most other smart cities around the world.

8.2.2 Digital deliberation: searching for deliberative spaces in the smart city

The literature review differentiated between digital deliberation on social media and digital deliberation on online consultation platforms (see section 2.1.2). Based on the academic literature, deliberation in the smart city seems to play a subordinate role in relation to civic participation and collaboration (section 2.2.2). In Amsterdam's digital democracy system, the focus is on online engagement platforms that are specifically created for civic engagement.

Deliberation on social media platforms in the smart city

Platform managers and other interview partners report that social media are predominantly employed as an outreach tool to advertise engagement opportunities. Some interviewees add that social media are used to establish counter-discourses online, e.g. to protest gentrification in Amsterdam Noord. Moreover, informal WhatsApp or Telegram groups are used to discuss issues in Amsterdam's neighbourhoods (see section 5.3). The SNA was not able to detect these informal and highly dynamic spaces. The international experts working outside of Europe report that they sometimes use social media as a tool for civic participation and discussion, as these media are well embedded in citizens' everyday life. Tamura (2014, 63) conceptualizes these forms of grassroots civic participation as "nested deliberative system", arguing that more informal participatory spaces should be considered as micro-deliberative systems, even if their mode of communication may be mostly non-deliberative.

Deliberation on online consultation platforms in the smart city

In Amsterdam, little or no deliberation, as articulated in the evaluation framework, has been found on the selected online engagement platforms. Interview partners state that deliberation mostly takes place synchronously, in informal spaces or during offline meetings. Asynchronous deliberation on online platforms without active moderation is highly unlikely and argument visualization or machine learning for argument structuring are not widespread. These findings are reflected in the interviews with international experts. Firstly, the interviewees have little knowledge, understanding, or experience of online deliberation except for the platforms Decidim or Pol.is. Decidim affords roughly the same structure as Stem van West, with a pro and a contra section and a commenting function. A Decidim representative explains that they chose this platform design deliberately to facilitate deliberation. However, as seen on SvW, the platform's pro and contra structure does not support an exchange of arguments. The interviewee reports that most comments are positive and constructive on Decidim, like on SvW and WB in Amsterdam. The developers have not yet found a good way for data exploration and visualization to support the debates. In Amsterdam, the OpenStad team plans to experiment with Pol.is in the future. As outlined earlier, the platform examines comments and votes through machine learning, creating a map of opinions and like-minded users in relation to other participants, while indicating spaces of agreement and disagreements (Tang, 2019). However, this still falls short of deliberative forms of interaction as conceived by deliberative democrats.

Some interviewees explain that, in their experience, asynchronous discussions do not work because they lack the "social glue" of real time conversations. Others add that online platforms demand more resources from citizens than they can or want to afford, especially given the demands of the 'attention economy'. This is in line with Fuchs' (2021, 23) argument for "slow media: The public sphere needs time for critical thinking, reading, critical writing, critical presentation, critical debating, critical coproduction." All interviewees report that during the Corona pandemic, more synchronous online meetings were organized on Zoom or other videoconferencing platforms. However, especially in developing countries, digital infrastructure is often lacking. As one of the interviewees states, reflecting on a Global South example:

> The problem was with the systems that they had. Even their computers or their digital
> hardware that they had was not supporting some of the simple tools that we had (…). And

then getting multiple groups to take part and use the log in forms, it is impossible. So whenever possible we did this face to face. (RI14)

In this regard, asynchronous platforms may be more inclusive than synchronous platforms as they are less demanding in terms of software and equipment (e.g. no microphone and camera are needed).

The question emerges as to whether the smart city and its governance approach are designed to facilitate deliberation. The focus is more strongly on participating, co-designing and co-creating, and prototyping solutions, as well as on analysing data. The findings suggest that there is little room for online deliberation in the smart city. This has severe consequences for our understanding of democracy, as there is no longer a basis for public justification and an exchange of arguments to compare views and change them if necessary. Deliberation provides for a form of autonomy, that all who are affected by political decisions can accept their consequences and anticipated side effects (Cohen, 1996, 102; Habermas, 1991, 32). When citizens are excluded from deliberative processes, their autonomy, and the legitimacy of democracy itself, are at risk.

8.2.3 Structural dimension: the independence of the public sphere in the smart city

Digital democracy is determined by the cultural, economic, political, and social environment it is embedded in, but also by the relation between the materiality of the city and its digital public sphere. This section analyses the structural dimension of digital democracy in the smart city by focusing, first, on its economic and social dimension, second, on digital democracy in a datafied city and, third, on governance between the city's digitality and its materiality.

Economic dimension: a colonization of the digital public sphere?

The Amsterdam case study shows that a colonization of the online public sphere through the private sector, as expected from the literature review, does not take place with regards to the smart city's digital democracy dimension. The international interview partners confirm that the private sector does not play a major role in the smart city's digital democracy pillar. Just like in Amsterdam, private companies are consulted in multistakeholder arrangements – if they are active in this area at all. The smart city experts report that the private sector, in their experience, no longer sees a business case in the 'smart city' as a concept:

Siemens had a cities and infrastructure division and had a big digital component to it. That was part of the reorganization, that's gone. Cisco announced just before Christmas this year that they were shutting down their smart cities group. You know, that doesn't mean they're not going to do those projects. It just means… it's not like a separate unit. So it's a reorganization. But it suggests that they don't see it as a distinct market that has a lot of value in selling and packaging what it is, their products and services. IBM, you know, has completely withdrawn. They still do tons of business in cities. They just don't call it smart cities. (RI4)

It seems that the smart city as a concept is outdated from the perspective of the private sector and that digital democracy is currently not a profitable area for investment. In Amsterdam, the private sector involvement in this regard is mainly limited to consulting companies. Assuming that for the economy, the generalized medium (*Steuerungsmedium*) is money (Baxter, 1987, 56), it is understandable why the private sector is underrepresented in the digital democracy field. Within private investments in the wider SC context, digital democracy seems to be a niche with little profits to be expected. On the one hand, this prevents a colonization of the digital public sphere. On the other hand, this leads to a lack of investment in civic infrastructure. Consequently, digital democracy will most likely remain a niche in the SC if local governments do not significantly increase their spending. Financial support from private and public investors would help scale up digital participatory and deliberative spaces, increasing their inclusiveness and impact (see also Dahlberg, 2001, 629).

The private sector still invests in urban infrastructure and technology, but no longer frames it as 'smart city' investment, leading to the assumption that the smart city as a concept may have died from a corporate perspective. That does not necessarily mean, however, that the problems associated with a colonization of the public sphere through the private sector logic will completely disappear. Privacy concerns in the smart city are reported by most international experts during the interviews. However, these concerns seem quite abstract, as concrete examples of privacy breaches are not mentioned. Experts working with smart cities in Latin America, Asia, and Africa say that data protection and data sovereignty are not perceived as important as in Europe and sometimes seen as obstacles to a faster digital transformation. As outlined, some interview partners say that social media are much more frequently used for participation itself, accentuating the business model associated with these platforms that turns the subject's information

into a commodity, selling it to other companies for advertising purposes (Fuchs, 2016, 122; Sandoval, 2014, 144; see also section 2.1.3). Overall, however, for the smart city's digital democracy pillar, the findings do not confirm the common argument that "[c]apitalism colonises and commodifies the (digital) commons and the (digital) public sphere" (Fuchs, 2021, 9), albeit the results may be different for other SC areas of activity with more private sector involvement.

Digital democracy in a datafied city

Couldry and Mejias (2019) describe the dynamics of datafication as a new form of colonization. Data protection and democratic control over data governance are seen as essential to prevent this. Davies (2020, 78) argues for more participation in data use, production, and design (see section 2.2.3). Compared to the Amsterdam case study, open data and open source policies are not perceived by international experts as widespread in the smart city, especially in the Global South. Although they are deemed important by all experts, they give no indication that open data and open source are applied pervasively. The expert from Berlin, for instance, argues that datasets are so dispersed, unfiltered, and non-compatible (in terms of file format) among the city's departments and districts, that a centralized, coherent open data platform would be almost impossible to set up at this point. Moreover, until recently the city had not thought of including the rights to the data in their procurement contracts with private companies. For instance, the interviewee reports that Siemens has for a long time owned most of the city's data on mobility. For the city to access the raw data, the procurement regulations need to be transformed. Open source technology is mostly not included in procurement standards. The example shows that handling and managing data in other SC areas besides digital democracy, and with more private sector involvement, is often not controlled by the democratically elected government but by private companies to extract profit (Couldry and Mejias, 2019).

For citizens, open datasets in their current form are seen as non-accessible by almost all experts. Some experts support the idea of providing the private sector with open datasets and emphasize that "open data initiatives can help breaking the silos. It makes data also available for other public authorities, for other cities. They work on the same services that provide the same products and it helps to improve them and helps to validate them" (RI10). Others question the normative ideal of open data. Especially in non-formal urban settings, open data is seen as a risk exposing vulnerable communities.

We did a workshop with a favela in Brazil. (…) we were doing some data gathering around the sort of infrastructures they have, that are already smart, and talking to some, and did some interviews, and we made a decision, after doing that, that we would not make that open. Because those communities are informal and actually making that data open makes them very vulnerable. Because some of the things they're doing are illegal in a sort of formal sense. (…) Being open and being sort of… enabling data about their lives is made open is actually really problematic. (RI1)

The quote supports Aurigi and Odendaal's (2020) argument to facilitate iterative, experimental urban change and urban informality in smart city development.

In line with the findings in Amsterdam, some experts suggest that a data commons should be established bottom-up, creating data libraries for communities, in which citizens choose autonomously what data they would like to publish or sell to the private sector. This corresponds with Couldry and Mejias (2019) suggestion to engage in civic activism and data literacy to counter data colonialism. Similarly, Fuchs (2021, 19) argues for a digital commons, referring to "digital resources that are commonly controlled by humans". Examples for the digital commons range from non-profit platform cooperatives that are governed and owned by a community to free and open source software (see also Dahlberg, 2011, 9). Gebied Online could account for such a bottom-up data commons that seems unique in international comparison, as the idea of a data commons is not wide-spread among smart city experts (some had not heard of the term before). Only Barcelona is mentioned as an example where this idea is actively being pushed. In this regard, the DECODE project in Amsterdam and Barcelona is referred to as illustrating the complexities of creating a data commons. None of the international experts recalls a concrete example in which the online public sphere is crowded out through increased engagement of the political system, as in the relation between Gebied Online's Hallo Ijburg and the municipal PB platforms and processes.

Governance networks between digital spaces and the materiality of the smart city
Regardless of their regional background and origin, the experts agree that the smart city concept is in many ways redundant. The term thus seems like an empty signifier. A SC researcher states: "it's a way that people identify, often use it for marketing or for engaging citizens, it's a way to sort of badge something up but there is no definitive description of it" (RI1). The terminology is used differently in various cities, regions, or

by different actors, as indicated in the literature review (see section 2.2.1). What matters to the experts are the actions behind the words. Therefore, it might be a mistake to focus too strongly on the terminology of the 'smart city' and the 'digital city' as a main line of differentiation for the city's digital democratic potential and governance network (see section 6.2). The two concepts are useful for analytical purposes in Amsterdam, but interpretations of the terms may differ in other contexts.

Despite the experts agreeing that there is not *one* smart city, they also acknowledge that there are critical developments associated with the smart city that have an impact on local digital democracy and are sometimes conflicting with each other:

> One is around the economic and the marketing and the city branding at quite an infrastructural level often. As part of the whole neoliberal discourse, this idea of efficiency and city, it's a whole sort of taking of the city as a product and making it more efficient, optimizing it (…). And if anybody wanted to attract money to do work, innovation work, within the city then, you know, badging it as a smart city. So, I think there's a piece that is sort of following the money and very top down and not so democratic. And then, on the other hand, there is, you know, one of the other ways that you see a smart city is as an alternative governance model. So it's not about the technology as such but it's sort of looking at another way to govern the city and that's where (…) people can use technology to (…) have a voice within the city. (RI1)

The quote confirms that a smart city concept is emerging that is increasingly detached from its technological affordances and structures, understanding the SC as a governance model (Rodríguez-Bolívar, 2016, 65). Both developments mentioned in the quote manifest in the Amsterdam Smart City platform which serves as an online governance platform, on the one hand, and as a top-down marketing tool on the other. Other interview partners confirm that they see a shift in the smart city away from technology: "Berlin's vision of the smart city is actually not primarily a technological one. Rather, it is a new form of cooperation that involves new organizational structures, breaking down silos, more speed, and more joy in experimenting in urban development" (RI6). The experts thus confirm the findings of the literature review that there is a shift towards the more sociological SC model as a governance system (Willis and Aurigi, 2017). This development can also be seen as part of the New Public Governance and co-production paradigm in urban public service delivery (Bovaird, 2007; Granier and Kudo, 2016). Technology seems to play a negligible role in this governance model although most interview partners acknowledge that technology could have a positive effect on democratizing

governance processes due to its potential to connect people around a common cause. At the same time, they find that ICT are not yet effectively used and connected to governance and bottom-up processes, e.g. urban movements or neighbourhood groups. The affordances of digital space in the smart city such as sensors, IoT, or online participation platforms thus structure the conditions for its social and discursive dimension only to a limited extent. Material urban spaces and physical encounters remain important. But if the smart city is no longer about technology but about governance, what is the difference between the smart city and the NPG and co-production approach? This question may be answered in future research.

The interviews confirm that SC governance networks are decentralized and messy. Some interviewees see advantages in decentralization, e.g. by offering citizens many entry points to engage. They think of these networks as "interesting experiments in future governance structures" (RI4), supporting Sassen's (2017) argument that cities are complex systems and that there are possibilities for shaping the city in that incompleteness, opening spaces for citizens to reclaim power. Other experts advocate for more cohesion. In their opinion, the creation of a central 'smart city hub' can at least provide a narrative and give the appearance of coherence and coordination. A few experts mention smart city labs that are successfully introduced as anchor points for governance networks. The networks remain messy, but the hubs and labs are perceived as an entity with an overview of most activities and the ability to coordinate and organize citizen participation. In Amsterdam, the ASC partly fulfils this function but has a limited coordinating power, as both the SNA and interviews demonstrate. Capra (2016, 33) finds in his analysis of ASC governance schemes that intermediary organizations such as Waag "that create a link between "institutional" actors (corporations, public bodies, academia) and citizens, play a crucial role in stimulating active participation." Hence, intermediary organizations are still an important bridge between citizens and policymakers, despite the literature review's finding that they have lost relevance due to the new possibilities of direct DCE (section 2.3). Based on the case study and the expert interviews, one can conclude that governance networks in the SC are messy yet siloed. The network's silos are due to structural spheres of influence in politics and administration in the sense that different authorities are responsible for varying aspects of the smart city and digital democracy, but also due to EU funding schemes. One interviewee confirms that if a project is not labelled as 'smart city', it will not receive any EU funding under the respective budget line. This can be seen in Amsterdam as well, where the Skylines game was

developed because the EU funding policy required an innovative approach to raising awareness on air quality improvement.

As outlined by Mejias (2013), digital spaces create new mechanisms of inclusion and exclusion and can contribute to nodocentrism. Focusing exclusively on the digital network provides an incomplete picture of reality. Without rejecting the network as an organizing model of the digital sphere, its logic does not grasp the entirety of activities, e.g. informal digital spaces, such as neighbourhood WhatsApp groups or counter-discourses on Twitter, as well as offline urban spaces. Especially in the Global South, this may bear risks for digital democracy's legitimacy, as it may lead to an expulsion of the informal economy and informality in general from the urban space, leading Willis (2018, 39) to argue for acknowledging the innovation that lies at the margins, while "learning how urban informality adopts and works with technologies".

8.3 Towards harnessing everyday practices in digital democracy

The aim of this chapter is to examine the extent to which the conclusions of the Amsterdam case study on digital democracy are transferable to other smart cities across the globe and to connect them to current research on digital democracy in the smart city. The interviews with 16 international experts demonstrate a more nuanced picture of the legitimacy criteria's empirical realization and their normative potential. The experts confirm many of the case study's conclusions and disagree with others. In what follows, the main findings are summarized.

The legitimacy criterion inclusiveness as a normative ideal for citizen participation and deliberation in the smart city is not unequivocally supported by the interviewed experts. Although most experts agree that establishing inclusiveness is one of the goals and major challenges for urban digital democracy, some emphasize that imperfect inclusiveness may be preferable to full inclusiveness when coupled with multiple entry points for participation in a decentralized digital democracy governance system. Within the system, the analysis has revealed conflicting goals among the legitimacy criteria. For instance, broad participation may come at the expense of individual empowerment. Participatory-deliberative systems theory is a highly useful reflexive tool to critically assess existing participatory and deliberative practices, but it does not give us an indication on how to weigh different legitimacy criteria against each other.

As bottom-up participation takes time and can be messy, it does not fit to the SC's efficiency paradigm and is often rather perceived as a problem than an opportunity, according to some experts. Improving efficiency, participation is increasingly imposed top-down, with local authorities claiming ownership for participatory spaces that were previously constituted by bottom-up engagement. While this supports the impact or effectiveness of citizen participation, it can hinder both inclusiveness and empowerment. As such, the assumption that empowerment through online participation is best achieved through coupling bottom-up engagement platforms and institutionalized policy-making processes is challenged. Especially in fragile contexts, vulnerable groups may be further marginalized when smart city developments and initiatives remove informal spaces from the urban landscape. Overall, the experts agree that empowerment in the smart city's digital democracy is not sufficiently prioritized.

With regards to the effectiveness of participation, most experts say that in their experience, online participation and deliberation in the smart city mostly have a consultative or informative character. They often perceive DCE as tokenistic, without any kind of structural upscaling, and suggest that the focus should rather be on collective action than on consultation. The international experts cannot report any examples of top-down engagement crowding out established online bottom-up participation, seemingly rendering it a relatively unique phenomenon to Amsterdam. This may be due to its strong neighbourhood and civil society foundation. Although policy-making power is selectively transferred to citizens on digital engagement platforms, the power to make final political decisions, and, perhaps even more important, to determine the structure of the digital democracy system largely remains in the political system. As in Amsterdam, the experts see little room for online deliberation in the smart city, leading to the question whether the smart city and its governance approach structurally inhibit deliberation. The focus is more on participation, co-design and co-creation, and prototyping solutions, as well as on analysing data. Moreover, deliberation seems more likely to occur synchronously, in informal spaces or during offline meetings, due to the lack of "social glue" in formalized online deliberation, as an expert put it.

As in the Amsterdam case study, an invasion or colonization of the public sphere through the private sector or in the sense that citizens' data is monetized, is not reported. However, the SC's underlying neo-liberal logic and its approach to improve efficiency in urban life and to organize the city's messiness leads to a removal of informal urban

spaces, reducing possibilities for bottom-up civic engagement, while reducing entry points for participation in the SC's governance system. As such, the place for bottom-up civil society engagement is shrinking through a deterministic SC logic. Although the experts state that the private sector increasingly disavows the SC as a concept and the Amsterdam case study demonstrates that the private sector does not significantly impact the digital democracy system, its inherent efficiency-driven logic still seems to govern. Different from Amsterdam, open data and open source policies are rare in most smart cities, both in European and non-European smart cities, on a practical level. In the Global South, open data was even perceived as a threat to informal communities, exposing vulnerable societal groups. Instead, a data commons was proposed, consisting of bottom-up data libraries by and for the citizens. In the Asian and African context, privacy issues are reported to be less present in public debate than in Europe, illustrated e.g. by a stronger use of social media in digital democracy.

The smart city is a highly constructed concept. In many places around the world, it is moving away from technological affordances towards a multi-stakeholder, citizen-centric governance model. However, even in Amsterdam, as one of the most advanced smart cities in terms of digital democracy, the ideal of comprehensive citizen-centric governance does not match the state of implementation. Currently, a technological and a governance pillar co-exist in the smart city with few overlaps and synergies.

In conclusion, the expert interviews demonstrate that the results of the Amsterdam case study are only partly transferable to other smart cities across the globe. Each city must be analysed independently, considering its cultural, political, social, geographic, and economic context. With regards to digital democracy's legitimacy in the smart city, it is shown that, compared to other smart cities, Amsterdam is relatively advanced, despite its shortcomings. As such, it is confirmed that Amsterdam is as close to an exemplary case as is available. The analysis emphasizes that the participatory-deliberative systems approach to legitimacy has some shortcomings with regards to its application to the smart city. Deliberation, for example, merely plays a subordinate role and the normative standard of inclusiveness was questioned by some experts.

9. Conclusion: Rebooting democracy- error 404

The thesis set out to explore the impact of digitization on the legitimacy of democracy. Participatory-deliberative systems theory is a particularly useful framework for this evaluation because of its capacity to make sense of digitization's influence on the way citizens participate in democracy and the way they communicate with other citizens and with elected representatives and officials. A systemic approach is valuable to grasp the smart city's digital public sphere as well as its economic and political dimension, connected through a governance network.

This thesis first introduced the current academic debate around digital democracy in the smart city, indicating a dialectical relationship of digitization and democracy in the sense that the digital transformation may both positively and negatively affect the legitimacy of democracy. To explore this relationship in an empirical case study, the thesis developed a novel normative framework based on participatory-deliberative systems theory that could help evaluate and reflect upon the opportunities and challenges the digital poses for democracy. Following an interpretivist approach, the normative ideal serves as an analytical framework to narratively assess the empirical reality, evaluating desirable developments as well as processes in need of improvement. In the chapters that follow, the framework was applied to the empirical realization of digital democracy in the smart city of Amsterdam. The qualitative research does not only reveal the impact of digital democracy applications on the legitimacy of democratic processes and structures in the smart city of Amsterdam, but also points to problems and shortcomings of applying the theory in the smart city context. The conclusions are abstracted and processed in semi-structured interviews with international digital democracy and smart city experts to evaluate the findings' generalizability. This last chapter sums up the thesis' main results, as well as their theoretical implications. It points to the limitations of the study and provides recommendations for further research.

9.1 Summary of the main findings

This section synthesises the conclusions with respect to the study's first research question that addresses the impact of digitization on the legitimacy of democracy, focusing on whether the rhetoric of digital democracy in the smart city lives up to its empirical realization. Depending on how digital tools are used and implemented, they can have a positive and a negative effect on democratic legitimacy (chapter two). But what exactly can be considered positive or negative? In which direction should digital democracy be heading? This thesis provides a compass in this regard by shedding light on the

normative dimension of democratic legitimacy. For this purpose, a novel participatory-deliberative systems approach is developed (chapter three). To make sense of digital democracy's hybrid and complex processes and structures, the conceptualisation of legitimacy in participatory and deliberative democracy are coupled, emphasizing the importance of *inclusive* and *effective* civic participation that ideally *empowers* the subject and is enabled by reasoned *deliberation*. A systemic approach is developed and set in a broader context of the entanglement between the economic, political, and public sphere that constitutes the smart city. In this regard, an *independent* digital public sphere is considered critical to prevent an extension of systemic rationalities at the expense of communicative action. Applying deliberative systems theory to the participatory-deliberative legitimacy framework enables the recognition of multiple spaces that involve different degrees of participation and deliberation, but that all contribute to the systems' overall legitimacy.

The legitimacy of digital democracy in the smart city of Amsterdam

In an explorative single case study (chapter four) the legitimacy of digital democracy in the smart city of Amsterdam was examined (chapters five to seven). Not only does the case study reveal the legitimacy dilemmas of digital democracy in the smart city, but it also illustrates the limits of applying participatory-deliberative systems theory on the power-laden digital democracy context. Due to its citizen-centric approach to the smart city, Amsterdam is considered an exemplary case for examining the legitimacy of digital democracy. Based on the literature review, it is assumed that digital technologies can facilitate inclusiveness by offering a low threshold of participation. They may support empowerment through skills development and self-realization, improve effectiveness by giving people a more direct say and helping them to organize around a cause, and facilitate deliberation beyond time and space boundaries. On the other hand, it is expected that it would be difficult to maintain an independent digital public sphere free of pressure from the economic system. The Amsterdam case study puts forward some expected and some unexpected results. These were discussed with international smart city experts to test their generalizability (chapter eight).

Inclusiveness: greatest goal and challenge

The literature review suggests that the threshold for democratic participation has never been as low as today, as ICT make it easier to participate in everyday life, only a click away from political participation, such as in online petitions, on online consultation

platforms, or on social media. In the smart city, civic participation has become an important component in governance models, using the city as a laboratory for new forms of collaboration. Besides traditional forms of online participation, such as online consultations or neighbourhood platforms, the smart city applies more technologically advanced, yet often indirect means of citizen participation, in which the subjects act as a sensor or as data point. Despite issues related to the digital divide and the quality of digital participation, based on the literature review, it was expected that ICT could have a positive impact on inclusiveness in digital democracy.

In Amsterdam's digital democracy system, establishing inclusive processes is considered the greatest goal and challenge of the interviewed stakeholders. Indeed, participation numbers on digital platforms are higher than in comparable offline activities. But although a wide variety of engagement opportunities exists and various methods are applied to increase inclusiveness, the success in reaching diverse societal groups is limited. While digital democracy succeeds in offering a low threshold of participation, difficulties in reaching marginalized groups of society remain. Interviewees report that technologies which are part of citizens' everyday lives, such as WhatsApp, are particularly useful to increase the diversity of participants. Nevertheless, many experts, especially those working in the Global South, describe digital democracy in the smart city as an elite project with the potential to further marginalize disadvantaged parts of society. The promise that digital technologies facilitate inclusiveness is thus only partly fulfilled.

At the same time, international experts question whether full inclusiveness should be a normative ideal altogether. Some experts argue that individual empowerment and the quality of one's participation should be valued higher than the quantity of participation; others believe it is preferable to have many citizens involved, if only tokenly. If there is broad participation but only a small number of citizens is truly empowered, this may foster 'elite' participation that can further marginalize disadvantaged groups. While the participatory-deliberative systems approach is a useful reflective tool to critically assess existing participatory and deliberative practices, it does not give us an indication on how to weigh different legitimacy criteria against each other and deal with these conflicting goals, revealing a major shortcoming of the approach.

Empowerment in digital democracy: seriously undervalued

The literature review indicates that the subject is increasingly responsible for choosing its form of individualized participation, based on a wide choice of engagement opportunities and a focus on self-responsibility. Digital media enable the provision of more subject-centred, personalized information, and offer new possibilities for self-representation and identity-formation. On the other hand, digital technologies can also facilitate subtle forms of nudging, undermining informed decision-making and individual empowerment. Despite these risks, it was expected that digital technologies could offer new possibilities for empowerment.

However, the Amsterdam case study shows that empowerment through digital participation and deliberation plays a minor role in digital democracy. The reason may be the focus on the quantity of participants instead of the quality of participation in the sense that citizens gain skills and feel empowered through the participatory process. A large number of participants is more easily measurable than the degree of individual empowerment. In times of austerity, city governments and other organisations need to justify their spending for digital democracy activities based on these quantitative measures what may explain why the focus is more strongly on the quantity of participation than on its quality. In the smart city of Amsterdam, offline workshops and living labs are organized with the goal of civic empowerment, but digital platforms' affordances mostly do not support empowerment. Even on a platform where empowerment through gamification is a specific goal, the success is limited.

As reported by an interviewee there is a low level of trust by citizens in platforms that use social big data and facilitate a passive form of civic engagement or even nudging. Relatively high user numbers indicate that the digital identity platform Mijn Amsterdam, where data the city has stored about its resident is transparently available, helps citizens access public services and supports the transparency of data governance. Yet, although the platform potentially facilitates a certain form of digital citizenship, it is currently rather used as a service tool than a space for empowerment and identity-formation. The citizen acts as a consumer of services, instead of a truly empowered self. In the Gebied Online cooperative, citizens oversee platform management, what may have an emancipatory effect through the participatory process itself. However, in discussions with international experts this kind of bottom-up civic engagement seemed rather unique

to Amsterdam. The promise that ICT may facilitate individual empowerment is thus not fulfilled.

Effectiveness: ranging from information towards consultation

The discussions in the academic literature suggest that the digital transformation leads to a hybridization of democracy in which the individual has easier access to policy-making, e.g. through decreased time and space boundaries, a declining role of intermediary organisations, and new governance models. However, although digital technologies offer a range of new possibilities for civic engagement, the Amsterdam case study demonstrates that the overall effectiveness of participation is rather low. Most online participation is planned and organized on a consultative basis. Online participatory budgeting has the highest level of effectiveness because citizens relatively autonomously decide how to allocate the budget for projects of their choice. However, the high level of effectiveness is not due to the platforms' affordances, and therefore no specific feature of *digital* democracy, as offline participatory budgeting is based on the same principles. Moreover, engagement platforms that are increasingly set up top-down risk crowding out more informal, bottom-up neighbourhood engagement, reducing its impact. It seems that the generalized medium of power associated with the political system regulates interactions between the lifeworld and the political system in the smart city. The relation between Gebied Online's bottom-up platforms and the participatory budgeting processes suggests that control and power over the participatory process rests in the political system which remains rather uncoupled from the lifeworld. The international experts do not report crowding out effects in other smart cities what may indicate that having both active top-down and bottom-up engagement for digital democracy is quite unique in the smart city. Thus, despite its shortcomings, Amsterdam is relatively advanced in terms of the effectiveness of both bottom-up and top-down possibilities for ICT-enabled civic engagement.

No space for online deliberation

In current democratic theory, deliberative democracy is the name of the game. However, the Amsterdam case study demonstrates that this trend cannot necessarily be applied to digital democracy's empirical manifestation. Deliberation is weak on all evaluated engagement platforms. Machine learning, moderation, or argument visualization are not widely used to structure the discussions – if there are any discussions at all. Rather than online, deliberative interactions seem to take place offline, either in more informal

encounters and online spaces, or at offline events organized by different stakeholders. The Corona pandemic increasingly shifted these offline events to online spaces, structured by video conferencing tools such as on Zoom. Whether this development will continue and alter deliberation beyond the pandemic could be part of future research. Overall, the focus in the smart city of Amsterdam is less on deliberation, but more on participation and concrete action. This has severe consequences for our understanding of digital democracy. While Habermas and other deliberative democrats emphasize the importance of discursive will-formation in the public sphere and deliberation among equals as part of policy-making, these important functions of our democracies seem to be missing in the digital public sphere. Therefore, the promise that ICT may facilitate meaningful deliberation is not fulfilled in the smart city's digital democracy system.

Towards a more nuanced understanding of the digital public sphere's independence
The literature review suggests legitimacy problems in the smart city with regards to privacy, data protection, and sovereignty. Different authors warn of a colonisation of the digital public sphere through the all-encompassing rationality of the systemic world, most notably the economic system. Digitization raises challenges to democracy and to the subject's autonomy in a digital public sphere, e.g. by treating personal information and data as a commodity. In the smart city literature, this is expressed by the privatization of public services, deregulation, and decreased public oversight of business activities. The social and democratic system in the smart city is thus highly interwoven with the logic of the economic system it is embedded in. Handling and managing data in the smart city rests often not with the democratically elected government but with private companies. With sensors, the data flow of mobile phones, and CCTV cameras, the smart city may capture the moves and traces of its residents, often without their explicit knowledge or permission, while decreasing trust and transparency in democratic societies.

In contrast, the approach in Amsterdam's policy documents is close to the democratic ideal, as outlined in chapter two and three, in terms of independence. The platform analysis does not report any privacy or security breaches. All OpenStad platforms are open source. The city follows transparent open data policies and influential non-governmental organizations advocate for a data commons. In the Gebied Online cooperative, data is owned by its members. The private sector is irrelevant in the digital democracy governance network of the smart city. The reason for this, some experts suspect, is the low

profit expectation in the digital democracy field. Real power, it seems, can rather be found in other smart city areas. Consequently, the findings do not suggest a colonization of the public sphere by the systemic world in the field of digital democracy.

At the same time, the increasing engagement of the formal institutions of representative democracy leads to shrinking spaces for a more informal, bottom-up digital sphere that is mainly shaped by non-governmental actors. Thus, a formalization of the online digital sphere through the political system takes place. This formalization should not be equated with colonization, since the involvement of formal institutions also brings advantages for citizen participation, such as a higher degree of effectiveness. The analysis in this thesis focuses only on the digital democracy dimension of the smart city. Therefore, the private sector may play a bigger role in other smart city areas, such as in smart mobility. Democratic processes run through all areas of a city and are therefore difficult to limit to the 'digital democracy' pillar of the smart city. However, this limitation of scope was deliberately chosen to examine whether the smart city lives up to its proclaimed standards of citizen-centredness or whether civic participation is tokenistic and disguising a colonization of the public sphere. Overall, the legitimacy problems associated with the public sphere's independence in the smart city, denoted in the literature review, are not affirmed in the empirical analysis.

Understanding a digital democracy system: the whole is more than the sum of its parts
A major advantage of the theoretical framework is that it can move beyond single platforms, actors, and documents, and evaluate a digital democracy system in its complexity. Three main conclusions can be drawn. First, there are conflicting objectives among different engagement platforms and the actors behind them, but also among the legitimacy criteria. For instance, a focus on inclusiveness may come at the expense of individual empowerment. And a high level of effectiveness, e.g. in participatory budgeting, may increase the dependence of the public sphere on the political system. A strength of the systems approach is that it enables the researcher to assess the system's overall quality as well as the interlinkages between its components. However, as outlined, the framework does not provide an indication on how to weigh the different legitimacy criteria against each other. A high variety of entry points for civic participation is found in the decentralized governance system that offers citizens a lot of opportunities for civic engagement. Furthermore, the case study shows that offline and online processes are

closely interlinked in the system and therefore challenging to separate, as attempted in this thesis.

Second, the analysis demonstrates that the governance network in Amsterdam's digital democracy pillar consists of two parts. On the one hand, there are digital platforms and actors that aim to achieve a specific goal through citizen participation (instrumental or utilitarian approach). They are more closely related to the *smart city* narartive. On the other hand, there are platforms and actors that consider citizen involvement to be the goal, in which the policy to be developed is open and to be determined bottom-up (normative approach). They are linked to *digital democracy* policies and initiatives. In its Digital City Agenda (2019), the City of Amsterdam has developed a public values approach that may be able to bridge these two domains on a normative level, as it connects a value-driven and citizen-centric urban agenda with smart city technologies and infrastructure.

Third, the network analysis negates a strong influence of the private sector on digital democracy's online public sphere, as indicated in the literature review. Instead, the Amsterdam case study demonstrates that top-down formalized engagement processes, initiated in the political system, invade some of the space that used to be occupied by more informal, bottom-up participation. In future research, the relation between formal and informal digital spaces and their interlinkages in the smart city's online and offline sphere could be explored in depth. The discussion with international experts indicates that the smart city is increasingly seen as a threat for informal urban life. A tendency towards organizing the city's messiness and an institutionalization of digital urban spaces for engagement, as part of the smart city's efficiency paradigm, leads to crowding out of bottom-up engagement, and leaves little space for those who do not want to or cannot be part of these developments. This marginalizes already disadvantaged groups and drives them further to the city's edges.

So, what is the impact of digitization on the legitimacy of democracy in the smart city? As is so often the case, the answer is: it depends. The empirical analysis has produced some expected and some unexpected results. On the one hand, the findings do not support that citizen participation is merely used to disguise large-scale data collection, neo-liberal policies, and surveillance in the smart city. On the other hand, the positive impact of digitization on democratic legitimacy is low. The high normative ideal set out in

Amsterdam's smart city and digital democracy policy documents is not (yet) fully reached in practice. But in comparison to other cities internationally, Amsterdam has more potential to come closer to these goals in the future. The results thus paint a highly contextual picture of digital democracy's legitimacy in the smart city.

9.2 Theoretical and empirical implications

How useful was the theoretical framework for the evaluation of digital democracy's legitimacy in the smart city? This section aims to answer the second research question by summarizing this thesis' achievements for our understanding of digital democracy from a theoretical and empirical perspective, focusing particularly on the benefits and challenges of participatory-deliberative systems theory.

A reflective approach to the legitimacy of digital democracy

There are two lines of thought among scholars working on issues related to digital democracy: those optimistic about ICT's potential to facilitate civic participation and deliberation (e.g. Castells, 1996; Noveck, 2009; Shirky, 2011) and those examining digitization's impact on democracy in a more critical light (Hofmann, 2019, 2; Kitchin and Cardullo, 2017; Kitchin, 2014, 2015). This thesis' assessment from the perspective of participatory-deliberative systems theory follows a reflective approach and therefore cannot be grouped in either of the two categories. The research fosters a differentiated picture of digital democracy, indicating a dialectical impact of digitization on democratic legitimacy, depending on how it is implemented (see also Coleman, 2017). It reveals the barriers for digitization to generate a positive impact on the legitimacy of a democratic system. Following Fuchs (2021, 9), the research can be described as "digital progressivism", contributing to understanding the development of the digital public sphere. Moreover, the thesis follows the sociological perspective of smart city research (Allwinkle and Cruickshank, 2011; Willis and Aurigi, 2017). It adds to the relatively limited number of publications that focus on smart cities' governance regimes (Ojo, Dzhusupova, and Curry, 2016) – and even less that focus on participation and deliberation.

Connecting participatory-deliberative systems theory with the economic system

The development of the analytical framework (chapter three) helps to identify and fill several gaps in academic research. First, it connects participatory-deliberative systems theory with Habermas' earlier works on the colonization of the lifeworld through the

rationality of the systemic world. As such, it enriches participatory-deliberative systems theory with a component that can make sense of the economic rationality permeating the digital public sphere – a perspective that is thus far neglected in the deliberative systems approach. Moreover, the relation between digitization and democracy is rarely systematically addressed in current research (Hofmann, 2019; Veeckman and van der Graf, 2015). The participatory-deliberative systems framework facilitates methodically solid research on a digital democracy system by, first, deriving five legitimacy criteria, and embedding them in systems theory, and second, applying the approach to an empirical case. Hence, the thesis can shed light on the complexities of digital democracy systems.

Bridging theory and practice by studying participatory-deliberative systems empirically
The thesis contributes to a stronger connection between theory and practice, as empirical studies of deliberative systems are rare (Bächtinger, 2018). As Noveck (2009, 188) put it: so far, academics "have a poor track record at going beyond theory to practice." The thesis reflectively assesses the legitimacy of a digital democracy system, identifies the challenges its actors and sites face, and establishes the interlinkages between the formal and informal, as well as between the offline and online public sphere. Web-based SNA, coupled with interpretivism, is applied to examine a participatory-deliberative system. Therefore, the thesis also contributes to theoretical reflections on participatory-deliberative systems and their empirical implementation. Moreover, it adds to the discussion whether new normative frameworks are required to understand digitization's impact on democratic legitimacy (Fleuß, Schaal, and Helbig, 2019; Peisker, 2021). It is shown that instead of developing a completely new theory, elements of frameworks for 'analogue democracy' can be coupled to make sense of the structural transformations digital technologies facilitate.

Implications of the lack of public deliberation for digital democracy
While this thesis went to great lengths to describe the theory of deliberative democracy and its importance for the legitimacy framework (chapter three), the empirical analysis reveals that deliberation is subordinate compared to participation in the smart city's digital democracy system. However, this does not necessarily mean that one must abandon the legitimacy criterion of deliberation. As all engagement platforms score low in the field of deliberation, the framework demonstrates that an important component of public action and justification is largely missing in digital democracy: societal will-formation

and meaningful exchange between citizens, public officials, and other relevant stakeholders. Public debates, without judging their deliberative quality, seem to work better offline or in more informal digital spaces, such in neighborhood or WhatsApp groups. The theoretical framework has helped discover this gap in digital democracy.

Based on the current academic literature, it was assumed that discussions on social media would be an important component in the smart city's digital public sphere. However, most interviewed stakeholders use social media predominantly for outreach and to advertise for engagement opportunities, but not for participation and deliberation itself. Some report the development of counter-publics and narratives on Twitter, e.g. against gentrification. Overall, it seems that the role of social media in the smart city's digital democracy ecosystem was overestimated. As there is little deliberation in Amsterdam's digital democracy system, the question arises, whether one can still speak of a participatory-*deliberative* system, tying in with Owen and Smith's (2015) criticism that the focus on deliberative systems potentially waters down the normative quality of its parts. Indeed, for Amsterdam, it can be said that both the deliberative quality of its elements and of the overall system is low. At what point a system can still be considered deliberative is a topic for a different research project.

Everyday practice and informal spaces for digital civic engagement
Participatory-deliberative systems theory reveals the importance of everyday practices and informal spaces for digital civic engagement, ranging from chatting in neighborhood WhatsApp groups to joining a cooperative to build an online platform for an urban community. The methodology applied in this thesis can make sense of these more informal spaces and their interrelations with top-down, institutionalized initiatives and offline processes to a limited extent. For instance, the SNA alone is not able to detect informal spaces for participation when they are not linked on the respective websites. The combination of a more quantitative approach and qualitative interviews helps remedy this weakness to some extent.

Connecting research on the smart city and digital democracy
Overall, Benjamin Barber's (2001, 42) 20-year-old quote that "[t]hose who understand technology know little about democracy, and those who understand democracy are woefully ignorant about technology" (see also Fleuß, Schaal, and Helbig, 2019, 479) is still relevant, both from a theoretical and an empirical perspective. The challenges and

benefits revolving around digital democracy, e.g. with regards to social media, a digital public sphere, or deliberation on online consultation platforms, are predominantly published in communication studies and to a smaller extent in political science. The most relevant research on the smart city as a potential application area of digital democracy is mostly conducted by researchers from schools of architecture, urban studies and urban planning, and design and technology. Given the increased attention the sociological smart city perspective has gained in the last years, it is surprising that the topic has not yet been picked up more strongly by scholars working on digital democracy from long established social science perspectives. Digital democracy and the smart city seem to be two barely connected research domains, which this thesis helps to link. Empirically, the same phenomenon is detected. The Amsterdam case study demonstrates that the digital democracy pillar of the smart city is rather detached from other smart city areas, as the stakeholders across these two areas are only loosely connected. There is a divide between a more instrumental approach to technology and civic participation in the smart city realm, and a more normative and open approach in the digital democracy realm (see also Dameri, 2014). While there is a lot of research on different aspects of digital democracy, few studies aim to analyse a digital democracy system, using the smart city as an example.

Concluding, the main achievement of this thesis in terms of its theoretical and empirical implications is that it first, develops a novel theoretical framework to assess the legitimacy of digital democracy, and, second, reflectively analyses the main problems revolving around digital democracy's legitimacy in the smart city which is not – as previously assumed – a colonization of the digital public sphere, but a complex interplay between the digital and analogue, between formal and informal digital spaces for participation, and between the legitimacy criteria inclusiveness, empowerment, effectiveness, deliberation, and independence. The theoretical framework demonstrates that none of the selected engagement opportunities can comply with all legitimacy criteria at once. However, when they are combined in a meaningful, yet decentralized manner, offering a high diversity of entry points, they can contribute to a digital democracy system that can measure up to a legitimacy standard that is lower than the normative ideal, but still relatively high in comparison with other smart cities across the globe. Despite the systems' weak deliberative component, the participatory-deliberation systems approach proves valuable to reflectively evaluate the legitimacy of digital democracy in the smart city.

9.3 Limitations and directions for future research

This thesis examines a rapidly developing digital democracy system in the smart city. A number of potential limitations need to be taken into consideration. One could argue that the concept of the smart city is outdated, as indicated by Bria and Morozov (2018) and substantiated in the interviews with international experts. However, while the term 'smart city' may be past its peak, the technological developments associated with the smart city have lost none of their topicality. On the contrary, the research field is highly dynamic, leading to a situation in which the case study findings can quickly become outdated. They will however remain an important historical contribution to understanding digital democracy's development. Moreover, the thesis focuses on a highly complex digital democracy system and governance network. The complexity of the system needs to be radically reduced to fit the scope of a thesis. For instance, the SNA may be criticized because of its relatively low number of seed websites (eight stakeholders and eight engagement platforms). The selection may be viewed as being too subjective, as often happens for single case studies. There are many more relevant organizations, engagement platforms and documents in Amsterdam that could have been included in the analysis. The confinement necessary for this thesis considered desk research and expert interviews, including representatives of organizations from politics and administration, the private sector, civil society, and research. Although the SNA consists of 16 seed actors, the overall network is comprised of 286 nodes, providing a good picture of the governance network. The mixed method approach of web-based SNA combined with document and platform analysis facilitates a higher level of objectivity. A bigger research project could include more organizations and platforms. Future research could also consider in more depth specific aspects of the governance system, such as the interrelation between formal and informal digital spaces, as well as offline and online interlinkages. This thesis examines exclusively digital democracy's 'digital layer'. However, the case study demonstrates that digital tools and platforms for civic engagement are strongly connected to offline processes. Therefore, it is questionable whether a strict separation between digital and analogue democracy is sustainable. The connection between offline and online democracy would be worth examining in more detail, tying in with research by, for instance, Taylor-Smith and Smith (2018). Further research should investigate how informal spaces and everyday practices are linked to formal structures for participation and deliberation in a digital democracy system. The empirical focus in this thesis is exclusively on the digital democracy pillar of the smart city to evaluate whether its citizen-centric approach is tokenistic or lives up to the normative

standards developed in this thesis and the discursive ideal it sets for itself. It would be worthwhile to apply the theoretical framework to other smart city areas, such as smart mobility.

As outlined in chapter four, the thesis is based on an explorative single case study. Single case studies are often criticized for a lack of researcher objectivity, external and internal validity, and generalizability. The discussion section (chapter eight) with international experts offers a novel methodological approach aimed to remedy this criticism. However, a comparative study involving two or more cities, which was not logistically possible for this thesis, could further increase the generalizability of the findings and establish patterns with regards to digital democracy's legitimacy. Due to the Corona pandemic, field trips to Amsterdam, as previously planned, were not possible. Therefore, all research took place online. As the focus of this project is on digital democracy's digital layer, examining online platforms and tools, the pandemic did not significantly harm the research design, although it was sometimes difficult to find interview partners through e-mail and telephone contact only. Field research in Amsterdam may have led to better contacts with stakeholders.

9.4 Conclusion

Despite its limitations, this study demonstrates that participatory-deliberative systems theory is a highly valuable instrument to critically evaluate the legitimacy of digital democracy. The main achievement of this thesis is to systemically analyse an empirical digital democracy system, confirming some assumptions in current research, while disproving others, offering some unexpected results, while shedding light on new relevant aspects for further research. The thesis puts the lack of online deliberative spaces, and the relation between formal and informal spaces as well as between offline and online spaces in digital democracy on the radar. Digitization's dialectical relation with democracy is confirmed. The case study and interviews with international smart city experts demonstrate that digitization can both have a positive and negative impact on democratic legitimacy, depending on how it is implemented, but that its current impact is limited.

Whereas the literature review suggests that ICT may facilitate inclusiveness, empowerment, and effectiveness of civic engagement in digital democracy, the case study results in these fields were less promising than expected. The theoretical framework rests digital democracy's legitimacy at least in part on meaningful deliberation among equals,

but, in practice, deliberation was not found to any great extent. Therefore, it can be said that, based on these criteria, digitization's impact on legitimacy in democracy is low. On the other hand, the expectation that the rationality of the economic system may co-lonialize the digital public sphere, as expressed in research, cannot be affirmed. Instead, an expansion of formalized, top-down spaces for participation can lead to shrinking spaces for more informal, bottom-up spaces.

The case study results do not fully reflect current research but offer a more nuanced picture of digital democracy: on the one hand, the findings do not support the claim that digitization negatively impacts democracy's legitimacy in the smart city of Amsterdam through marketization, large-scale data collection, and surveillance, as some authors warn. On the other hand, a significant positive impact of digitization on democratic le-gitimacy, through higher levels of inclusiveness, empowerment, or civic influence, is also not confirmed. The findings show that digital technologies' promise of facilitating large-scale citizen participation and deliberation in the smart city does not live up to the normative ideal. Yet, despite its shortcomings, Amsterdam's extensive digital democ-racy system is advanced in international comparison. What may appear a contradiction in fact illustrates that we are still in the early stages of development, with potential to enhance the legitimacy of digital democracy, both in the smart city of Amsterdam and beyond.

Although this thesis cannot prescribe what digital democracy in the smart city should look like, as each digital democracy system is unique, it can offer some guidance for policymakers. The insights generated through this research can be used to enhance the coordination of digital democracy governance networks and improve the practice of ICT-facilitated participation and deliberation in the smart city. It can give citizens, city officials, and practitioners a framework for reflectively assessing the variety of methods, practices, and objectives that can be realised in a digital democracy system through the interplay of different participatory and deliberative platforms. For instance, there is a significant lack of ICT-enabled deliberative spaces in the smart city. To increase the legitimacy of digital democracy, policymakers may wish to focus on the development of online platforms that can facilitate public debate and are integrated in citizens' eve-ryday lives, using established bottom-up networks and online neighbourhood groups. There are currently few online engagement platforms that successfully support individ-ual empowerment, but cooperatives may help citizens to assume ownership for ICT-

enabled policymaking processes. This may range from setting up and managing a platform to the implementation of policy proposals. Local governments and administration can capitalize on these initiatives and structures, as top-down engagement may lead to crowding out effects. A variety of engagement opportunities, both online and offline, offers citizens a lot of entry points to a digital democracy system what may positively impact the overall level of inclusiveness. Policymakers should embrace the messiness of digital urban democracy instead of trying to hierarchically organize civic engagement in a quest for higher levels of efficiency.

What is the impact of digital technologies on democracy's legitimacy? Based on this thesis' results one could say that the impact is comparable to the '404 error' known by every internet user who ever wanted to access a website that could no longer be found on the server. Translated to digital democracy one might say that the normative framework and the infrastructure for fostering legitimacy in digital democracy in the smart city are in place. However, the practical implementation of digital technologies does not lead to a significant impact on democracy's legitimacy. In the smart city, the rhetoric of ICT-enabled civic engagement does not (yet) live up to the normative ideal developed in this thesis. Currently, digital democracy does not fulfil its promise of delivering more inclusive, empowering, deliberative, and effective policy-making processes that support an independent public sphere, although under the right conditions it has potential to do so in the future.

Appendices

Appendix 1: List of seeds for the web-based SNA

Actor	Website
City of Amsterdam – Innovation team	https://www.amsterdam.nl/en/policy/policy-innovation/
Amsterdam Economic Board	https://amsterdameconomicboard.com/en/who-are-we/#network
AMS Institute	https://www.ams-institute.org/about-ams/partners/
Waag	https://waag.org/en/about-waag/
Pakhuis de Zwijger	https://dezwijger.nl/over-ons/partners
DECODE	https://decodeproject.eu/partners.html
Tada	https://tada.city/
Johann Cruijff/ Amsterdam Innovation Arena	https://www.johancruijffarenainnovation.nl/home/
City of Amsterdam, Stem van West	https://stemvanwest.amsterdam.nl/
City of Amsterdam, West Begroot	https://westbegroot.amsterdam.nl/
Gebied Online, Hallo Ijburg	https://halloijburg.nl/
TU Delft and AMS Institute, SocialGlass	https://social-glass.tudelft.nl/
Vrije Universiteit Amsterdam et al., Mijn Park	https://mijnpark.environmentalgeography.nl/who-are-we/
Trinomics, University of West England et al., ClairCity Skylines	http://www.claircity.eu/our-story/
City of Amsterdam, Mijn Amsterdam	https://mijn.amsterdam.nl/
Amsterdam Economic Board et al., Amsterdam Smart City	https://amsterdamsmartcity.com/

Appendix 2: Interview guide and consent form for experts in Amsterdam

Interview guide

The purpose of this questionnaire is to provide structure to the interviews. The questions can be asked in different ways, and their order can change, if necessary, throughout the course of the interview. Not all questions will be asked in the same interview. Further questions will be added to explore issues raised by the interviewee.

Background information: Kindly introduce yourself and describe your current position as well as your professional background.
Questions:
- What are your responsibilities in the implementation of the project/ platform?
- What is the purpose and goal of the project/ platform?
- What are your organisation's regulations or policies that govern public participation?
- Please describe the problems you came across in the course of your work on public participation.
- What is your organisation's budget for ICT-enabled public participation?

Platform type (if applicable): Please describe the main communication channels and participation opportunities available to citizens.
Questions:
- Do people register with their real name, a pseudonym, or do they stay anonymous?
- How does the platform facilitate deliberation (e. g. through moderation)?
- To what extent does the platform support direct and indirect participation (e. g. through sensing or automated data collection)?
- How does the platform translate online participation into offline engagement?

Inclusiveness: How heterogenous are participants and how representative are they in terms of Amsterdam's overall population? How does the platform facilitate inclusiveness?
Questions:
- How many monthly users does the platform have and how many users in total?
- Is the platform open to all residents?
- How does platform design facilitate greater participation (e. g. through gamification)?
- How is information about the engagement opportunity disseminated (e. g. through local media, newsletters, campaigns etc.)?
- How are policy outcomes shared with those citizens of Amsterdam that did not participate?

<u>Empowerment:</u> What skills and knowledge do participants gain? How is this reflected in platform design?

Questions:

- How and what kind of information is provided to citizens before they participate?
- How does the platform/ project support knowledge acquisition beyond the participation activity?
- Do people think of these participation opportunities as enjoyable?
- How do you prevent misuse?

<u>Deliberative process:</u> How is a reasonable deliberation supported?

Questions:

- What is the role of the moderator (if there is one)?
- Is communication asynchronous or synchronous?
- How are citizens encouraged to express their opinions and ideas?
- How active were the residents in the discussions?
- How open is the deliberative process for new topics?
- To what extent does the platform provide argument visualization?
- Do you think the outcome reflected agreement among the participants?

<u>Effect:</u> What is the impact and outcome of the project/ platform?

Questions:

- How do you make sure that outcomes are monitored?
- How is a division of labour supported on the platform?
- Please describe the feedback of the residents.
- Was the project considered successful? According to which criteria was the project evaluated?
- Was the project repeated and/or introduced elsewhere?

<u>Medium ownership:</u> Who owns the platform and its data?

Questions:

- Is the platform open source?
- How are citizens involved in the set-up and design of the platform as well as in the way it is managed?
- How do you support transparency of public decision-making and data governance?
- How do facilitate privacy by design and data protection?

<u>Connectedness:</u> How is the platform linked to other platforms and sites in the smart city?

Questions:

- In your opinion, how well is the project/ platform integrated in the smart city governance system?

- What are the most important organisations or individuals working on the smart city in Amsterdam?
- Please name your most important partners, working on digital democracy in Amsterdam.
- How is your organization funded?

Consent form

I……………………………. voluntarily agree to participate in this research study.

I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without consequences of any kind.

I understand that I can withdraw permission to use data from my interview after the interview, in which case the material will be deleted.

I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.

I understand that I will not benefit directly from participating in this research.

I agree to my interview being audio-recorded.

I understand that all information I provide for this study will be treated confidentially.

I understand that, for the purpose of the research, my function and/ or professional background may be mentioned in the thesis. My name and the names of people I speak about will not be mentioned in the thesis.

I understand that disguised extracts from my interview may be quoted in the thesis, conference presentations or published papers.

I understand that signed consent forms and original audio recordings will be retained in a safe storage place until after the thesis has been examined and will then be destroyed.

I understand that a transcript of my interview in which all personal information has been removed will be retained for two years after the thesis has been examined.

I understand that under freedom of information legislation I am entitled to access the information I have provided at any time while it is in storage as specified above.

I understand that if I inform the researcher that I or someone else is at risk of harm and/or if I refer to concrete instances of abuse or criminal activity during the interview, she may be obliged to report this to the relevant authorities - she will discuss this with me first but may be required to report with or without my permission.

I understand that I am free to contact any of the people involved in the research to seek further clarification and information as well as to learn about the results of the study.

The contact information of the researcher is as follows:

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Date and signature of research participant

Date and signature of researcher
I believe the participant is giving informed consent to participate in this study

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Appendix 3: Interview guide and consent form for international experts

Interview guide
The purpose of this questionnaire is to provide structure to the interviews. The questions can be asked in different ways, and their order can change throughout the course of the interview. Not all questions will be asked in the same interview. Further questions may be added to explore issues raised by the interviewee.

Background information: Kindly introduce yourself and describe your current position as well as your professional background.

I. Governance:
- Please give examples of digital citizen participation and/ or deliberation in smart city projects you know.
- How are online and offline spaces for civic participation created in the smart city?
- How are smart city policies (e. g. smart mobility, circular economy) and the actors in the respective field connected to digital democracy policies (online citizen participation) and respective actors in the smart cities you work with?
- To what extent does the approach on citizen participation differ in smart city projects?
- In your experience, how is ICT-facilitated citizen participation coordinated in smart cities?
- How does the city government/ administration work together with local neighbourhood groups and civil society?
- What is the role of the private sector in the smart city?
- How is online civic engagement connected to offline engagement?
- In your opinion, what is the difference between the smart city and the digital city?
- In your experience, which local actors are the drivers behind digital democracy policies in the smart city?
- How do smart cities work together with European and/ or international actors?
- What are the most important international SC actors?

II. Inclusiveness:
- How do smart cities involve heterogenous groups of citizens in smart city governance?
- How successful have smart cities been so far in ensuring inclusive digital citizen participation processes in your experience?
- What are best practice examples to ensure inclusiveness in the smart city?
- To what extent do smart cities establish comprehensive digital overviews of participation possibilities?

III. Empowerment:
- What smart city initiatives, co-created and co-owned, by citizens do you know?
- How is information on smart city policies disseminated towards citizens on an urban level?
- How is bottom-up engagement facilitated in the smart city?
- How is transparency of governance and platform structures and processes ensured?
- How is empowerment facilitated through arts, culture, and digital innovation in the smart city?

IV. Effectiveness:
- How are online participation processes connected to policy-making and political decision-making processes in the smart city?
- How can citizens monitor, and perhaps influence, progress on their input, ideas, or proposals?
- In your experience, what is the ratio between bottom-up participation, initiated by civil society or citizens, and top-down participation by the local government in the smart city?
- What kind of digital co-creation projects are you aware of on an urban level?

V. Deliberation:
- How are discussions facilitated online in smart cities? Challenges or lessons learnt?
- How are argument visualization and machine learning supported to facilitate online discussions?
- Where do discussions with citizens on matters related to the smart city usually occur in your experience (e. g. a specific venue or a specific online platform)?
- How is communication between the most important smart city actors supported?

VI. Independence:
- What role does the private sector play in the smart city? How is it connected to civil society and/ or the municipal government and administration?
- How widespread are open data and open source policies?
- How is a data commons achieved?
- How is data protected in the smart city and what role do data sovereignty policies play?
- To what extent are there different approaches to these policies by different smart city departments or policy fields? How important are these issues in smart city discourses?
- How are these issues discussed with citizens in your experience?

Consent form

I………………………………. voluntarily agree to participate in this research study.

I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without consequences of any kind.

I understand that I can withdraw permission to use data from my interview after the interview, in which case the material will be deleted.

I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.

I understand that I will not benefit directly from participating in this research.

I agree to my interview being audio-recorded.

I understand that all information I provide for this study will be treated confidentially.

I understand that, for the purpose of the research, my function and/ or professional background may be mentioned in the thesis. My name and the names of people I speak about will not be mentioned in the thesis.

I understand that disguised extracts from my interview may be quoted in the thesis, conference presentations or published papers.

I understand that signed consent forms and original audio recordings will be retained in a safe storage place until after the thesis has been examined and will then be destroyed.

I understand that a transcript of my interview in which all personal information has been removed will be retained for two years after the thesis has been examined.

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I understand that if I inform the researcher that I or someone else is at risk of harm and/or if I refer to concrete instances of abuse or criminal activity during the interview, she may be obliged to report this to the relevant authorities - she will discuss this with me first but may be required to report with or without my permission.

I understand that I am free to contact any of the people involved in the research to seek further clarification and information as well as to learn about the results of the study.

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Date and signature of research participant

Date and signature of researcher

I believe the participant is giving informed consent to participate in this study

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Identifier	Sector[39]
I1	Non-profit & CSO
I2	Private sector
I3	Education & research
I4	Politics & administration
I5	Politics & administration
I6	Private sector (previously politics & administration)
I7	Politics & administration (platform manager)
I8	Politics & administration
I9	Politics & administration (platform manager)
I10	Politics & administration (platform manager)
I11	Education & research (platform manager)
I12	Non-profit & CSO (platform manager)
I13	Politics & administration
I14	Politics & administration (platform manager)
I15	Private sector (platform manager)
I16	Education & research (platform manager)

[39] To ensure the privacy of interview partners, only the area of work is mentioned here.

Appendix 5: List of international interview partners

Identifier	Sector	Region of expertise
RI1	Education & research	Europe
RI2	Private sector (city network)	Africa/ Asia
RI3	Non-profit & CSO	Europe
RI4	Education & research	North America
RI5	Private sector (city network)	Asia
RI6	Politics & administration	Europe
RI7	Politics & administration (city network)	Global
RI8	Politics & administration	Europe
RI9	Politics & administration (city network)	Europe
RI10	Politics & administration (city network)	Europe
RI11	Politics & administration (city network)	Europe
RI12	Education & research	Europe/ North America
RI13	Private sector (city network)	Asia
RI14	Politics & administration (city network)	Asia
RI15	Politics & administration	Europe
RI16	Non-profit & CSO	South America

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