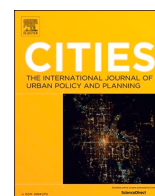


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# Cities

journal homepage: [www.elsevier.com/locate/cities](http://www.elsevier.com/locate/cities)

## Smart governance in institutional context: An in-depth analysis of Glasgow, Utrecht, and Curitiba

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### ARTICLE INFO

#### Keywords:

Smart cities  
Technologies  
Institutional context  
Citizen participation  
Smart governance  
Cross-country comparative case study

### ABSTRACT

Smart governance varies considerably across cities, allegedly due to the influence of the institutional setting. Nevertheless, the institutional factors influencing smart governance have yet to be systematically examined. This research proposes to remedy this by exploring the role of the institutional context in shaping the configuration of smart governance. For this purpose, this study, drawing on insights from institutional theory, zooms in on three cities with dissimilar institutional contexts — Curitiba (Brazil), Glasgow (UK), and Utrecht (the Netherlands). The findings suggest that institutional context does indeed affect how smart governance actualizes in cities. These empirical insights result in a heuristic framework for understanding smart governance in diverse urban environments. The framework exhibits a multi-layered influencing mechanism: institutions co-existing on multiple spatial scales interact and modify – reinforce or dissolve – each other's impact on smart governance. This study opens the door to a different approach to understanding smart governance and sheds new light on how this is interrelated with the institutional context.

### 1. Introduction

In the face of swiftly accruing urban challenges the use of technology, linked to the smart city idea, has gained in popularity and appeal, both among local authorities and academics. The first wave of the smart city concept focused on technology-driven, government-led urban management, often in alliance with corporations, to improve cities for inhabitants (Gabrys, 2014; Kourtit, Nijkamp, & Steenbruggen, 2017; Lim, Kim, & Maglio, 2018).

A more recent wave of the smart city idea points to the inadequacy of merely building a fully computerized urban architectures to enhance the quality of life, which, it claims, can only be created together with citizens based on people's aspirations and joint creation (De Oliveira, Campolargo, & Martins, 2015; Meijer, 2017; Mueller et al., 2018; Trencher, 2019). This is alluded in the literature as smart governance, the focus of this article, signifying technology-enabled collaboration among a wide range of actors to address societal challenges (Caragliu, Del Bo, & Nijkamp, 2011; Dameri & Rosenthal-Sabroux, 2014; Giffinger et al., 2007; Hollands, 2015), or, as Meijer and Bolívar (2016, p. 392) phrase: “*smart governance is about crafting new forms of human collaboration through the use of ICTs to obtain better outcomes and more open*

*governance processes*”.

The notion of smart governance puts emphasis on its “*community-based*” (Tapscott & Agnew, 1999, p. 37) and “*truly citizen-centric*” (Bătăgan, 2011, p. 85) nature: citizens as vital drivers of urban transformation by actively engaging in, deciding about and shaping collective issues (Ruijter, Grimmelikhuijsen, Hogan, et al., 2017; Rodríguez Bolívar & Alcaide Muñoz, 2019). Although the idea of citizen engagement in collective affairs is not new (Yigitcanlar et al., 2018; Allam & Newman, 2018) the use of technologies promises to give it a boost. These prospects have roused many city governments to launch technology-facilitated collaboration projects (Albino, Berardi, & Dangelico, 2015; Fernandez-Anez, Fernández-Güell, & Giffinger, 2018; van Winden & van den Buuse, 2017).

Such smart initiatives often appear identical, especially concerning their emphasis on multiparty collaboration, the use of technologies and data, citizen involvement and the aims to create more sustainable – i.e. socially, economically and ecologically balanced – cities (Albino et al., 2015; Tomor, Meijer, Michels, & Geertman, 2019). At the same time, a closer look reveals different smart governance configurations in different urban settings (Lee, Hancock, & Hu, 2014; Kitchin, 2015; Angelidou, 2015; Anthopoulos, 2017; Meijer, Ramon Gil-Garcia, &

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<https://doi.org/10.1016/j.cities.2021.103195>

Received 10 September 2019; Received in revised form 24 February 2021; Accepted 18 March 2021

Available online 1 April 2021

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Rodríguez Bolívar, 2016; The European Parliament, 2014). These place-based varieties have impelled an increasing number of scholars to call attention to the significance of the context in understanding smart governance processes. They dispute the prevalent universalist narratives imposing a contextless perspective on the real-life, place-specific and historically evolved dynamics of cities (Meijer, 2016; Meijer et al., 2016; Raven et al., 2019; Walters, 2011; Kitchin, 2015).

This emergent context-related recognition has resulted in studies that highlight the influence of local-specific characteristics on smart governance. They particularly emphasize the impact of institutions (Meijer, 2016; Nam & Pardo, 2011; Meijer et al., 2016; Raven et al., 2019; Ruhlandt, 2018; Neirotti, De Marco, Cagliano, Mangano, & Scorrano, 2014; Walters, 2011; Angelidou, 2015) reflecting the economic, political, legal and regulative frameworks as well as the norms and values of a particular society (DiMaggio & Powell, 1983; Hansen & Coenen, 2015; North, 1990; Pierre, 1999). In this regard, Bolívar and Meijer (2016) relate to administrative cultures and the political milieu in cities as potentially impactful factors concerning smart governance choices and styles. Other studies highlight the power and autonomy structure of cities, moulded by multiple government levels, as responsible facets affecting smart governance (Batty et al., 2012; Raven et al., 2019; Ruhlandt, 2018; Scholl & Alawadhi, 2016; Taylor Buck & While, 2017; Walravens, 2012). There are further works that do not explicitly examine the issue of the contextual impact yet they clearly reveal the relevance of institutions, namely the political choices determining smart governance strategies (Bunders & Varró, 2019; Calzada, 2017; Caragliu & Del Bo, 2019; Datta, 2015; Grossi & Pianezzi, 2017; Gupta, Pfeffer, Hebe, & Ros-Tonen, 2015; Wiig & Wyly, 2016). This is exemplified by the City of Barcelona where the left-wing, green coalition elected in 2015 converted its predecessor's smart city strategy by prioritizing citizens over technologies (Camboim, Zawislak, & Pufal, 2019; Capdevila & Zarlenga, 2015; Cardullo & Kitchin, 2018; March & Ribera-Fumaz, 2016).

These literature insights expose the need to consider the institutional context that can affect the ways in which novel urban developmental approaches, such as smart urban governance, take off from the ground and fare (Coenen, Benneworth, & Truffer, 2012; Karvonen & van Heur, 2014; Meijer et al., 2016). So, learning about institutional factors can lead to the improved understanding of varieties of smart governance models and why certain developments happen in particular places and not in others. However, knowledge about the relation between the institutional context and approaches to smart governance is underdeveloped. This insufficient understanding stems from the absence of adequate theoretical and empirical research into this relationship - only few papers mention, hypothesize or examine the potential role of the context, let alone the institutional environment, in smart governance (Ruhlandt, 2018; Meijer et al., 2016; Bunders & Varró, 2019; Tomor et al., 2019; Raven et al., 2019). One part of these few studies examines the connection between smart governance and the broader context although they are mostly based on assumptions and conceptualizations not verified by empirical studies. Other scholars compare various smart governance activities in different cities, in which the differences identified lead to the conclusion that context matters, referring to the impact of the aforementioned local situational - e.g. social, economic, historical, cultural and physical - conditions that "interact with a series of political, administrative, and technological choices regarding the use of new technologies for urban governance" (Meijer, 2016, p. 75). Most of these works, however, lacks a more systematic approach that could more accurately identify institutional or other contextual factors and analyse their mechanisms shaping smart governance activities. As a result, the institutional context is mainly referred to in the debates as a likely factor in smart governance and as a future research avenue (Haarstad, 2017; Ruijter, Grimmelikhuijsen, & Meijer, 2017; Walters, 2011; Roche, 2016; Willems, Van Den Bergh, & Viaene, 2017).

This research insufficiency hinders a more systematic understanding of the nature of the smart governance models applied in cities and of the

more fundamental institutional conditions underlying these models. This research gap is addressed by the present study that seeks to advance the conceptualization of the relationship between the institutional context and smart governance by asking: "How does the institutional context shape the actual configuration of smart governance in cities?". This question will be investigated by comparatively analysing the smart governance strategies of the cities of Glasgow (UK), Curitiba (Brazil) and Utrecht (the Netherlands) by building on insights from institutional theory. This choice of cities was prompted by their dissimilar institutional contexts, enabling comparisons to be made about the interrelations between smart governance and institutions.

This study aims to contribute to the literature on smart cities and smart governance in diverse ways. It strives to provide rich empirical and theoretical insights by focusing on the underexposed issue of the relationship between institutions and smart governance, moving towards a context-sensitive concept of smart governance. The knowledge gained in this study can support to learn how institutional factors affect smart governance, for instance which aspects stimulate and hinder the implementation of smart governance. It can provide useful indications if some institutional environments are more conducive to smart governance than others, which may help to comprehend and predict how and which directions cities within their specific institutional context may develop smart governance. A further academic addition lies in the methodological construct of the paper, and particularly its empirical approach inserted in an international comparative case study. This paper, by investigating not only policy documents but actual practices, surpasses the conceptual perspectives prevalent in the literature (Gil-Garcia, Pardo, & Nam, 2015; Meijer & Bolívar, 2016; Scholl & Alawadhi, 2016; Wiig & Wyly, 2016). This multiple-case, comparative and cross-country approach has the added value of more widely exploring the research question, illuminating differences and similarities between the cases, and analysing the data across situations (Eisenhardt, 1989; Gustafsson, 2017), thereby enabling more general conclusions and thus theory development.

The study offering concrete insights into real-life practices of smart governance in different cities/countries and policy areas can also contribute to policy-makers by providing a stronger understanding of the working of contextual conditions. It can make urban managers more aware of institutional aspects underlying successful initiatives, and whether and how they can translate it to their setting. On the other hand, these insights can aid to develop more realistic smart governance strategies building on the specific circumstances of cities (Meijer et al., 2016; Kourtiti et al., 2017).

This paper is divided into seven sections and organized as follows. The second section presents the major components of smart governance, serving as the dependent variables in this research. The third section discusses insights from institutional theory on which this study draws to empirically explore smart governance in context. This section then presents three specific institutional dimensions - the independent variables - that may influence smart governance. Having opted for the use of a comparative case study design, the fourth section shortly presents the institutional contexts of each city. The fifth section describes the methods of case selection, data collection and method of analysis, while the findings are presented and analysed in the sixth section. The seventh, and final section concludes with a discussion of the results.

## 2. The components of smart governance

This section elaborates on the main components of smart governance and the forms they can take. This is relevant here since smart governance components may be subject to their specific institutional context - a relationship on which this study focuses. Smart governance, based on the aforementioned definition by Meijer and Rodríguez Bolívar (2016), consists of three main components structuring this section: societal goals, collaboration and technologies.

### 2.1.1. Societal goals

The societal goals constituting the first component of smart governance display a broad range of aspects in the literature, which are common in their aim of public value creation (Kummitha et al., 2017; Webb, Hawkey, & Tingey, 2016; Baccarne, Mechant, Schuurma, De Marez, & Colpaert, 2014; Abella, Ortiz-de-Urbina-Criado, & De-Pablos-Heredero, 2017). It implies the creation of a better future in a variety of different – both tangible and intangible – forms contributing to tackle urban challenges (Meijer, 2017; Yigitcanlar et al., 2018; Osella, Ferro, & Pautasso, 2016).

In the literature, these societal goals are mainly categorized according to whether they are concerned with substance or spatial scope. A frequently used substance goal is urban sustainability, known as the triple bottom line and aimed at sustaining a balance between economic return, social equity and environmental preservation (He et al., 2017; Angelidou et al., 2017; Yigitcanlar et al., 2018; Kruger et al., 2018). However, societal goals, may also more simply be comprised of a single element, i.e., just social, or just environmental or economic development. Concerning spatial scope, societal goals can serve either place-specific or more universal purposes. The latter relate to more uniform challenges and approaches across the cities of the world (Cowley, Joss, & Dayot, 2017; Viitanen & Kingston, 2014) while the first one refers to more tailor-made ambitions fitting local-specific circumstances (Castelnuovo, Misuraca, & Savoldelli, 2016; Hansen & Coenen, 2015; McCann & Ward, 2010).

### 2.1.2. Collaboration

The second component of smart governance is collaboration. This is referred to in the literature as the engagement of diverse actors whose visions and resources are necessary to define and implement collective goals (Camboim et al., 2019; Fernandez-Anez et al., 2018). These actors can be governments, businesses, citizens, communities, knowledge institutes and other societal organizations. The extent to which these various types of actors are included or excluded in smart governance defines the composition of participants and the breadth of the collaboration. A limited circle of stakeholders will therefore lead to a narrow base for collaboration and conversely, an extensive variety of participants will produce a broad-based governance configuration (Viale Pereira et al., 2017; Breuer, Walravens, & Ballon, 2014).

Among these manifold actors the role of citizens is particularly emphasized, which reflects the presumption of the “truly citizen-centric” (Bătăgan, 2011, p. 85) character of smart governance. It invokes the idea of deliberative citizens taking part in and shaping public matters (Capra, 2016; Hollands, 2015; Wilson, Tewdwr-Jones, & Comber, 2017). At the same time, the extent and forms of citizen roles in public affairs can differ, which is reflected by the manifold ways in which citizen participation is conceptualized and classified in the literature: *passive participation*, in which citizens are one-way information recipients, service users, data collectors or invisible inhabitants; *consumerism*, where citizens use, purchase or co-create commercial services; *consultation*, enabling citizens to provide feedback on planned scenario’s; and *citizen power*, signifying citizens’ managing or controlling role in shaping collective matters (Arnstein, 1969; Cardullo & Kitchin, 2018; Krabina, 2016; Molinari & Ferro, 2009).

### 2.1.3. Technologies

The final component, the use of technologies, appears in various guises in the literature. One of the most important refers to the technological functions that optimize city management., which serve to improve urban infrastructural and management systems such as the regulation of traffic flows, garbage pick-up, safety surveillance, or sensor-based street lighting (Abella et al., 2017; Alusi, Eccles, Edmondson, & Zuzul, 2011; Gabrys, 2014; Lim et al., 2018; Stratigea,

Papadopoulou, & Panagiotopoulou, 2015). The use of technology has also been seen to enable social exchanges and collaboration on public matters (Castelnuovo et al., 2016; Batty et al., 2012; Jiang, Geertman, & Witte, 2019). These tools fostering participation and cooperation entail websites, community platforms, digital maps, discussion platforms, social media, smart phones, geo-referenced 3D visualizations (Ertiö, 2015; Niederer & Priester, 2016; Stratigea et al., 2015) or community-based smart energy and mobility systems (Granier & Kudo, 2016; Koirala et al., 2016; Mueller et al., 2018).

This section detailed the structure of smart governance and revealed the various patterns its separate components can assume. Whether this variance can be actually detected in the different city contexts is the core issue to be explored in this article, which will be done by empirically examining the abovementioned three components of smart governance, namely, the societal goals, collaboration, and the use of technologies. These outcomes will be linked to the scrutiny of possible variances in smart governance and how these connect to the specific institutional contexts in the different cities. Therefore, the next section elaborates on theoretical insights into institutions, aiding the conceptual embedding of this exploration on smart governance.

## 3. The role of institutions in smart governance

This section first discusses theoretical insights concerning the significance of institutions in urban studies, thereby highlighting its relevance for the study of smart governance. Then, three particular institutional dimensions are presented, which can potentially shape smart governance. This is followed by describing plausible relationships between these institutional dimensions and smart governance, and by the formulation of a number of expectations.

### 3.1. Institutions matter in urban development

The recognition of institutional theory in urban studies and political science as of the 1980s was largely triggered by the emergent multiplicity of actors involved in urban politics (Davies, 2004; Lawrence & Suddaby, 2006; Lowndes, 2001) and by the gradual understanding of institutions as “the rules of the game in a society ...that shape human interactions” (North, 1990, p. 3). The institutional approach became considered valuable to analyse, explain or predict urban politics and city development (Kim, 2012; March & Olsen, 1984; Zhao, 2015). This “institutional turn” in urban studies reasserts the key tenets of earlier institutional traditions, namely that formal institutions – e.g. laws, regulations, constitutions, political structures, administrative traditions – shape political behaviour, public policy formation, and state-citizen deliberation (Abelson & Gauvin, 2006; Kittilson & Schwindt-Bayer, 2010; Kubicek & Aichholzer, 2016; Lijphart, 2012; Loeffler & Bovaird, 2018; Powell, 2000). However, it was new by highlighting informal institutions – e.g. conventions, norms, values, customs, habits – as vital factors guiding policy-making and urban governance processes (Follador, Duarte, & Carrier, 2018; Helmke & Levitsky, 2004; North, 1990; Pierre, 1999). Informal institutions embody (political) values and power relations, thereby affecting policy choices, governance structures, stakeholder composition, and instruments (Hansen & Coenen, 2015; Pierre, 1999; Pierre, 2005a; Raven et al., 2019).

The institutional angle in urban studies furthermore puts emphasis on the role of actors in effecting, transforming and maintaining institutions (DiMaggio, 1988; DiMaggio & Powell, 1983; Eisenstadt, 1980; Lawrence & Suddaby, 2006). This exposes the ‘double life’ of institutions that are not only “social forces in their own right” but also “human products” (Grafstein, 1988, pp. 577–578) or “humanly devised constraints” (North, 1990, p. 3).

Another feature of institutional theory refers to the idea of embeddedness of political institutions. It denotes ‘path dependence’ highlighting the historical development of political institutions (King, 1995; Pierson, 1996) as well as the nested character of institutions

interacting on different scales (Clegg, 1990; Lawrence & Suddaby, 2006; Lowndes, 2001) and ingrained “*within an ever-ascending hierarchy of yet-more-fundamental, yet-more-authoritative rules and regimes and practices and procedures*” (Goodin & Klingeman, 1996, p. 18).

These theoretical views are valuable for this study as they accentuate the interplay between institutions and governance actors, affecting processes of local politics and urban governance. Therefore, it can be assumed that institutions similarly play a crucial role in configuring, constraining, stimulating and diversifying smart governance practices. Using this institutional lens helps the present research to explore the ways in which the institutional context affects smart governance, enabling to better comprehend – and probably even to predict – the forms and courses of these collaboration processes. For this purpose, three specific institutional factors are chosen that emerge from the bespoke literature on urban and political studies as potential forces in shaping smart governance: the intergovernmental state structure, the system of local political power relations and the urban governance model (Hodgson, 2017; Keman, 2010; Martin, 2000; Pierre, 1999). The first two dimensions belong to formal institutions and can be related to Lijphart’s (2012) work on public policies and societal development and to follow-up studies (Lijphart, 2012; Ansell & Torfing, 2016; Bryson et al., 2014). Lijphart’s institutional classification reveals how the political system of modern democracies determines the entire socio-political landscape in which actors operate and interact: different systems have been found to produce variations in interaction patterns in respect of purpose, means, stakeholder composition and societal outcomes. For instance, citizen engagement and citizen-state deliberation proved to be contingent on power distributions, legal provisions, and administrative traditions. The extent to which citizens contribute to policy-making seemed to be greater in consensus democracies, as these are power-sharing systems operating on ideals of inclusiveness, broad representation, and the distribution of power. By contrast, majoritarian democracies may well deter citizen engagement, as these are power-concentrating systems that are built upon ideas about the importance of decision-making by the actual powerholders (Kittilson & Schwindt-Bayer, 2010; Lijphart, 2012; Powell, 2000). The third, informal, institutional factor – urban governance traditions – has been used to analyse societal norms and political principles of city administrations and how these affect policy choices and collaboration patterns in urban development. For instance, the role local governments ascribe to market forces in urban development can be an influential force: the forms of cooperation and eventually, a city will evolve differently if business interests prevail over community demands (Helmke & Levitsky, 2004; Kantor, Savitch, & Haddock, 1997; Pierre, 1999). These three institutional dimensions bear relevance here as they relate to the autonomy, resource availability and the socio-economic and political orientation of local governments, which can induce variations in smart governance configurations. These three institutions are discussed in the following passages.

### 3.2. The intergovernmental state structure

The intergovernmental state structure – a formal institution – can be defined as the processes and relations through which different governmental levels interact within a political system (Phillimore, 2013). Intergovernmental relations can be typified as: 1) unitary-centralized 2) unitary-decentralized and 3) federal systems. These types denote various levels of functional and fiscal autonomy and competencies of local governments in relation to the control and support of the national state (Heinelt et al., 2018; Swianiewicz, 2014; de Almeida & Herminia, 2006), and thus potentially influence the extent to which local governments can shape their smart governance configuration. Unitary-centralized systems feature powerful state bureaucracies operating from the central to the local level. Here, local governments have a low functional and fiscal autonomy due to the determining role of the central government in agenda setting, policy coordination and funding (Pierre, 2005a, b;

Sellers, 2002). In unitary-decentralized states, functional and fiscal autonomy is transferred to local governments so that they construct their own policies and services. This autonomy can vary between countries, in line with the degree of decentralization, and fiscal and functional independence is not necessarily linked. In decentralized systems, city governments are in charge of urban development, which necessitates their liaising with a range of actors to identify local issues and to implement policies (Heinelt et al., 2018; Ivanyna & Shah, 2012). Finally, in highly decentralized federal states, the locus of both functional and fiscal authority sits with local governments, who bear the prime responsibility for managing local affairs and raising revenues (Keating, 2017). Local authorities receive weak top-down support for public provisions and thus have limited capacities, which makes them dependent on society. Hence, a federal state structure requires city governments to ally with citizens, businesses, and other organizations in order to realize urban progress (Brenner, 2009; Kincaid, 1999; Mora & Varsano, 2001).

Specific literature on the relations between intergovernmental state structure and smart governance is lacking — a gap that is addressed in this research. Nevertheless, from the generic literature on the influence of the intergovernmental state system (Galvani, 2018; Goldsmith & Page, 2010; Sellers & Lidström, 2007), certain patterns can be postulated in the light of the aforementioned insights. Accordingly, central governments in unitary-centralized state systems may be expected to influence all dimensions of smart governance. Any societal goals will probably reflect more universal and less city-specific ambitions to align with national strategies. Similarly, the substantive content of the societal goals will likely be centrally determined and consistent with the political ambitions of national policies. A narrow collaborative configuration may be expected due to the centrally organized exchanges between political and interest groups, which also predicts a more passive role for citizens. It moreover increases the likelihood that technologies will not be used for collaboration but will instead serve urban management purposes. In unitary-decentralized and federal state systems, where local governments are more directly responsible for urban development, smart governance strategies may be expected to comprise societal goals based on local-specific needs. This will make predicting the substantive content of these societal goals more difficult, since this will probably depend on local policy ambitions. As this local focus requires resource input from a wide range of urban actors, it can be assumed that stakeholders will form a broad collaboration platform in which citizens can also play a more active role (i.e. consultation, citizen power). This, in turn, implies the use of technologies, which will foster collaboration. At the same time, the use and design of these technologies will depend on the type of collaboration partners, and in particular, on the partner playing the dominant role in the collaboration, as the different actors will all have their own perspectives and capabilities regarding the development of tech-based applications. Hence, various types of intergovernmental state systems may produce different configurations of smart governance. Whether and how such differences materialize in varied urban settings will be examined in this study.

### 3.3. Local political power relations

The second – formal – institutional factor refers to the horizontal power relationships between the council, the municipal administration and the mayor or city leader. These power relations define the form of local government system as well as the nature of local political leadership and thus potentially influence how the smart governance configuration in a city is constructed. These relationships are seen as essential factors in urban politics and governance, in particular when it comes to the role of the mayor. Where the mayor or city leader has a strong position his/her political interests and ambitions are likely to be a determining factor in how the city is governed (Pierre, 2014; Sweeting, 2002; Heinelt et al., 2018; Wiig, 2016). These power relations are classified by Mouritzen and Svava (2002), who capture the differences in mayoral

strength in four ideal types of local government system: 1) *the strong mayor form*, in which the elected mayor controls the majority of the city council and is legally and practically fully in charge of all executive functions; 2) *the committee leader form*, in which one person is clearly “the political leader” of the municipality, although the executive powers are shared between the leader and collegiate bodies; 3) *the collective form*, in which the decision centre is one collegiate body, the executive committee that is responsible for all executive functions; and 4) *the council-manager form*, in which all executive functions are in the hands of a professional administrative, the city manager, appointed by the council that has general authority over policy and is headed by a ceremonial mayor (Mouritzen & Svara, 2002, pp. 55–56).

Based on these insights from the general literature, city leaders with a powerful position (i.e. the “strong mayor” and the “committee leader” forms) may be expected to play a decisive role in shaping smart governance. These strong city leaders will presumably define, in accordance with their political orientation, the societal goals and type of collaboration. By contrast, in more collective systems the different dimensions of smart governance are likely to be jointly shaped, although the political orientation of the cabinet may possibly also influence the choices. The use and choice of technologies will be determined by the relevant actors, with the more authoritative actors leading the way, whatever the form of local government. These assumptions show that different kinds of local power relations can produce differently configured smart governance, which will be empirically scrutinized in three different cities.

### 3.4. Urban governance models

The third institutional dimension relates to urban governance models reflecting informal institutions. They are guided by political objectives and values that lead to differences in aspirations, stakeholders and instruments (Stoker & King, 1996; Ansell & Torfing, 2016), which potentially influence the evolution of smart governance in a city. Such differences were classified by Pierre (1999) as managerial, corporatist, pro-growth and welfare governance models.

In *managerial urban governance*, governmental professionals resolve collective needs and interests through efficient urban planning in which market forces are often interwoven. These solutions are made for residents, who mainly act as service users. (Arts & Gelissen, 2016; Delsen, 2012). *Corporatist urban governance* reflects the idea of participatory local democracy by broad interest representation and consensus-seeking. Its objective is the distribution of collective goods through bargaining processes between various societal interests and concerted public-private action (Villadsen, 1986; Hernes & Selvik, 1983). This governance model fits social-democratic welfare systems that promote equality and solidarity by controlling market forces. *Pro-growth urban governance* is characterized by close public-private interaction between city hall and businesses to boost the local economy (Molotch, 1976; Savitch, 1998). It draws on market-conforming instruments such as urban planning, infrastructural development or image-building of the city to attract investments (Pagano & Bowman, 1995). In this governance model, widespread societal involvement is not an option, as this would politicize strategies by bringing in competing spending options such as neighbourhood redevelopment and other distributive measures (Swanstrom, 1985). Finally, the *welfare governance model* applies to once prosperous industrial cities that have not been able to regenerate their economy. These cities are dependent on the state, with the main influx of capital coming through the welfare system. Their key governance actors are local and national government officials and bureaucrats (Parkinson, 1990).

The abovementioned generic insights from urban studies provide some indications for how the various traditions of urban governance might influence the configuration of smart governance in a city. The managerial tradition is likely to apply a top-down approach in the pursuit of city-specific sustainability goals for society: economy (cost-

efficiency; inclusion of businesses), people (public services and goods), and environment (renewably-based infrastructure). Collaboration will probably comprise a narrow range of participants, due to the dominant role of governmental experts and their corporate allies. This may be expected to result in a passive role for citizens acting as service recipients. These prospects point to a use of technology that will probably concentrate on augmenting urban infrastructures and less on interactions. In the corporatist setting, smart governance may be expected to target city-specific goals that reflect a wide array of societal interests, approaching the triple bottom line of sustainability. This presumes a broad-based collaboration consisting of varied types of actors, with more actively engaged citizens (i.e. consultation, citizen power). This participatory tradition will probably lead to the use of technologies that foster interaction, next to other types of tech-based applications. A pro-growth governance environment is likely to generate city-specific goals that are mainly aimed at economic progress, with, as a consequence, a low degree of partnership, since in this model businesses will be the key partners, relegating citizens to the roles of passive actors and consumers. Technologies will therefore not serve to stimulate participatory and interactive exchanges but to promote the development of infrastructural systems and commercial services. Finally, the welfare governance model may be postulated to produce smart governance configurations that would predominantly provide support to the disadvantaged. As a result, the range of collaborative partners is likely to be narrow, as the key actors will be government officials, with the citizens acting as inert beneficiaries. The use of technology may be expected to consist of tools that facilitate limited interaction, namely one-way communication towards recipients of welfare provisions. These expectations signal potential variances in smart governance configurations in cities with different traditions of urban governance. Whether this indeed is the case in practice and in what ways is the focus of the present study.

Table 1 summarizes the theoretical insights discussed in the abovementioned two sections by visualizing the expectations about the relationship between the specific institutional dimensions presented above and smart governance. This summary draws attention to the contrasting expectations within city contexts. An example is the coalescence of the federal state system with a managerial mode of urban governance, which simultaneously predicts a broad and a narrow-based collaboration. This links to the issue of embeddedness discussed in the first part of this section, namely that the impact of institutions can depend on their hierarchical position. Moreover, the influence of some institutional dimensions on smart governance is a salient factor (i.e. the political orientation of powerful mayors or the national strategies in the unitary-centralized state system). Formulating expectations about their exact effects is therefore a difficult task. Hence, this study proposes to scrutinize what happens with these various, sometimes contradicting, institutions in actual practice, and which of these dominates in a specific city context.

## 4. Research strategy

This section presents the research approach applied in this article to examine the phenomenon in question, namely the relationship between the two main concepts – i.e. smart governance and the institutional context – discussed in the previous sections. First, the comparative method and the selection of cities are explained, followed by detailing the institutional dimensions under scrutiny for each city. This part concludes with formulating city-specific expectations based on the conceptual insights in smart governance and the institutional influence, provided in the foregoing two sections. Followingly, the section carries on describing the approach applied to examine smart governance in the three cities (i.e. case selection). Finally, the methods of collecting and analysing the data are specified.

**Table 1**  
Proposed relationships between institutional dimensions and smart governance.

Smart governance	Intergovernmental state structure			Local political power relations		Urban governance model			
	Unitary-centralized	Unitary-decentralized	Federal	Strong city leaders	Collective systems	Managerial	Corporatist	Pro-growth	Welfare
Societal goals • Substance: sustainability (balancing between economy, ecology, and social issues) vs. solitary themes • Scope: universal vs. local, city-specific Collaboration • Composition: broad vs. narrow (citizens, businesses, universities, governments, societal organizations) • Citizens' roles: passive, consumerism, consultation, citizen power Technologies • Urban management • Enablers of collaboration	• By national strategies • Universal	• By local strategies • City-specific	• By local strategies • City-specific	Reliant on city leader ('s political orientation)	Compromise (political orientation of cabinet)	• Sustainability • City-specific	• Sustainability • City-specific	• Solitary theme: economy • City-specific	• Solitary theme: people • City-specific
	• Narrow • Citizens: passive	• Broad • Citizens: consultation, citizen power	• Broad • Citizens: consultation, citizen power	• Reliant on city leader ('s political orientation)	Compromise (political orientation of cabinet)	• Narrow (experts & businesses) • Citizens: passive	• Broad • Citizens: consultation, citizen power	• Narrow (businesses) • Citizens: passive, consumers	• Narrow (local state) • Citizens: passive
	Urban management	• Enablers of collaboration • Actor-dependent	• Enablers of collaboration • Actor-dependent	• Reliant on city leader ('s political orientation) • Actor-dependent	• Compromise (political orientation of cabinet) • Actor-dependent	Urban management	Enablers of collaboration	Urban management (incl. new commercial services)	Enablers of (limited) interactions

4.1. Comparative case study design

The object of this study is to gain insights into the mechanism of how the institutional context of urban settings influences smart governance. For this purpose the cities of Glasgow, Curitiba, and Utrecht were

**Table 2**  
The institutional contexts of the three cities.

	Intergovernmental state structure	Local political power relations	Urban governance model
Glasgow	Unitary-centralized	1. Local governmental system 2. Position & politics of the mayor/city leader	Pro-growth
Curitiba	Federal	1. Strong-mayor form 2. Strong; left-progressive succeeded by a central-right, nationalist	Managerial & market-driven
Utrecht	Unitary-decentralized	1. Collective form 2. Weak; right-liberal	Corporatist & increasingly market-driven

selected because of their different institutional contexts in view of the three specific institutional dimensions under study (Table 2), which also relates to a four-year international academic collaboration.<sup>1</sup> These diverse urban settings are examined and compared to allow the differences and similarities in their smart governance configurations to emerge and to elicit how these are shaped by their specific institutional contexts. In view of this choice it is the variety in institutions what is most relevant for the aim of the present study rather than the cities themselves. It enables to reveal patterns and mechanisms of influence owing to these diverse institutional settings, building on yet exceeding the particulars of the cities examined. The three cities serve as significant opportunities to more generally learn about the relationship between institutional context and smart governance. As such, Glasgow, Curitiba and Utrecht can be considered as emblematic cases since they may involve insights into the link between institutions and smart governance, manifest in other cities as well. This is a useful methodology for developing theory surpassing one situation towards other situations (Yin, 1981) and a feasible approach to open up the black box of and more systematically investigate the contextual influence on smart governance.

This research strategy implies that the diversity in the institutional settings of Curitiba, Glasgow and Utrecht is a given, serving as a potentially influential backdrop against which smart governance is

<sup>1</sup> The research collaboration entitled "Smart Governance for Sustainable Cities" (2015–2019) involved Utrecht University (the Netherlands), Stirling University (United Kingdom), and Fundação Getulio Vargas (Brazil). This multidisciplinary project examined the value of technologies for engaging citizens and state-citizen collaboration in public issues in different urban (and national) environments.

examined. In other words, the institutional context of the three cities functions here as the independent variable that may affect how smart governance evolves. The institutional context of each city is introduced in this subsection according to the dimensions identified in the previous section: intergovernmental state structure, local political power relations, and urban governance model.<sup>2</sup>

#### 4.1.1. Glasgow

**4.1.1.1. Intergovernmental state structure.** In the UK's unitary-centralized system, the central government has the power to determine the main features of subnational governments. This also applies to Scotland that, despite gaining governmental power in 1997, still relies on Westminster for much of its budget and policy strategies (Henderson et al., 2018). This unitary-centralized system on the national level also relates to local-central governmental relationships within Scotland. Consequently, the Scottish Parliament is in charge of the structure, responsibilities, finances and working practices of the city councils (Bochel & Bochel, 2010; Campbell & Burrowes, 2016; McConnell, 2006). Although local authorities are important in delivering public services, they have a weak legal and political status as well as a low functional and fiscal autonomy (Ladner, Keuffer, & Baldersheim, 2016a; Heinelt et al., 2018). Local governments act within central government policy and primarily rely for their finances on the central Scottish and UK governments (Dinnie & Holstead, 2017; McGarvey, 2002).

**4.1.1.2. Local political power relations.** Each local authority in Scotland is governed by a council headed by the Leader of the Council who is usually the front-runner of the largest political grouping (McGarvey, 2002; The Improvement Service, Cosla, and Solace, 2011). The Leader of the Council is the central figure of de facto political authority by being responsible for the strategies and overall performance of the council, and its relationship with the central government (Hambleton, 2000; Marsh, 2013). Although local authorities also elect a civic leader – the Lord Provost in Glasgow City – this function is ceremonial (Campbell & Burrowes, 2016). The Leader of the Council has a strong position in the local government structure, in line with the “committee-leader” form described in the former section. This position was fulfilled by Gordon Matheson of the Labour Party in the period investigated in this paper. Matheson envisioned sustainable development to create a green and socially just city to “make life better for our most vulnerable citizens and communities” (Local Government Chronicle, 2011). These views on solidarity designate him as a left-progressive politician (Edward, 2017).

**4.1.1.3. Urban governance model.** The city of Glasgow is characteristic of the pro-growth model of urban governance owing to its business-oriented urban development, as manifested by large infrastructural projects, flagship events, and strong city marketing (Davidson, 2010; Pike, 2017). This also reflects the national context of deep-rooted liberalism (Wincott, 2006; Van Kersbergen & Becker, 2002; Crossan et al., 2016), although Scottish governance has widely been considered corporatist and interventionist — in contrast to the rest of the UK. This, however, is regarded by various scholars as a myth of national distinctiveness that has drawn attention away from the rising neoliberalization and the way successive ‘modernizing governments’ in both Westminster and Holyrood have emphasized economic competitiveness as an overriding goal (Inch, 2018; Gray & Porter, 2015; Henderson et al., 2018). This trend will arguably continue under the Scottish Nationalist Party

<sup>2</sup> To identify the institutional context of the three cities a wide range of sources were used. These sources comprise academic articles, book chapters, conference papers as well as gray material such as newspaper articles, statistics, reports, governmental websites and other relevant webpages. Finally, the information acquired during this literature review was validated by the research teams from the three cities.

(SNP) governments that, their social-democratic rhetoric notwithstanding, have deepened their neoliberal commitments (Davidson, 2010).

#### 4.1.2. Curitiba

**4.1.2.1. Intergovernmental state structure.** Brazilian federalism was defined at the onset of democratization by the 1988 Constitution that shifted power and resources to the municipal level. Municipalities have a constitutional status and are not subordinated to other government levels (Ter-Minassian & de Mello, 2016; de Almeida & Hermínia, 2006; Souza, 2015). Brazilian federalism has a high degree of political, functional and fiscal decentralization compared to other countries, which bestows a high degree of autonomy on the municipalities. The very considerable municipal spending responsibilities of the Brazilian municipalities include raising a huge portion of their total revenues themselves (Ter-Minassian & de Mello, 2016).

**4.1.2.2. Local political power relations.** In the Brazilian local government system, the executive and legislative functions, respectively the mayor and the city council, are separate branches. Brazilian mayors are directly elected and play an important political role as they have the highest legal, budgetary, and administrative authority (Rodríguez, 1997). This concentration of power in the hands of the mayor is seen by some as an impediment preventing municipal legislatures from significantly contributing to policymaking (Wampler, 2000). Some authors claim that this extensive mayoral authority has resulted in “a Brazilian democracy plagued by a ‘private’ state where most mayors continue to treat their municipal administrations as personal fiefdoms” (Wampler, 2004, p. 74). Nevertheless, there have also been various studies showing that Brazilian mayors from centre-left parties invest more in poor areas than those who represent traditional or right-wing parties (Souza, 2015; Marques & Mirandola Bichir, 2002). In general terms, therefore, the governmental structure of Curitiba is exemplary of the “strong-mayor form” outlined in the former section. The office of mayor in the period examined in this article was fulfilled by two different people. At the start of the study, the mayor was Gustavo Fruet from the left-progressive Democratic Labour Party. Fruet was committed to advancing ecological, social and economic sustainability by means of technologies and community-based participatory governance (Martínez, Boas, Lenhart, & Mol, 2016; Energy and Climate Studies, KTH, 2018; C40 Blog, 2014; Fruet, 2013). Fruet was defeated in 2016 by Rafael Greca, a member of the Party of National Mobilization which represents nationalistic, centre-right and conservative values (Jornal Agua Verde, 2018; G1 - G1 entrevista Rafael Greca (PMN), 2016).

**4.1.2.3. Urban governance model.** Curitiba is representative of the managerial model of urban governance, characterized by the long-standing top-down, technocratic approach cultivated by the military dictatorship (Irazábal, 2017). This style of urban planning is dominated by a group of well-trained specialists who control land use and transport. They provide a ‘comfortable’ environment for a population that returns the favour by not challenging the political status quo. Hence, it has never been the practice to consult the population during planning processes to preclude the difficulties and delays that participatory processes can cause (Follador et al., 2018). Urban development and the provision of public services in Curitiba often occur in close collaboration with businesses (Abrucio & Grin, 2015; Galvani, 2018; Lobato, 2016) to “custom-fit to the logic of financial capitalism” (Lavinás, Gentil, & Cobo, 2017). However, there are also scholars who feel that Brazil does not fit into the classical neoliberal mould but see it as a case of “neodevelopmentalism” (Morais & Saad-Filho, 2012) or “left neoliberalism” (Saad-Filho, 2013) — a state that implements both free-market policies and social programs.

### 4.1.3. Utrecht

**4.1.3.1. Intergovernmental state structure.** The Dutch intergovernmental relations are entrenched in a unitary-decentralized state system in which the relationship between national and local governments is based on a mix of supervision, co-governance, and autonomy (Broekema & Steen, 2016). Supervision implies that the national and regional governments approve the municipalities' developmental plans and annual budget (Breeman, van Noort, & Rutgers, 2012; Ladner, Keuffer, & Baldersheim, 2016b). Co-governance signifies that municipalities often carry out policies made at a higher, i.e., regional or national level. Consequently, the execution of these policies depends on the cooperation of local governments, which exemplifies the Dutch consensus culture (the so-called 'polder model') (Figuee, Eigeman, & Hilterman, 2008; Ramkema, 2008). In terms of autonomy, municipalities have a relatively large functional sovereignty since they are empowered and competent to define their own policies and service delivery (Ramkema, 2008; Heinelt et al., 2018; Broekema & Steen, 2016). Regarding financial autonomy, however, Dutch municipalities are very dependent on the central government since their income mainly stems from national resources (Feeley & Kesari, 2015; Figuee et al., 2008).

**4.1.3.2. Local political power relations.** The division of responsibilities between the municipal council and the municipal executive provides the council with substantial decision power, including mayoral appointments (Figuee et al., 2008). The mayor is the chairman of both the municipal council and the municipal executive, although he/she has limited executive powers. Dutch mayors are the figureheads of the municipality and stand above the political parties. They do not participate in the political game but act as managers assigned an encouraging and binding role (Allers, 2015; Ramkema, 2008). This implies that Utrecht has the "collective form" of local government with a weak mayoral office in accordance with the classification described in the theoretical section (Heinelt et al., 2018). The present mayor of Utrecht is Jan van Zanen, a member of the right-liberal VVD party against the backdrop of a left-oriented council (DUIC, 2019).

**4.1.3.3. Urban governance model.** Utrecht is a typical example of the corporatist model of urban governance in line with the Dutch tradition of consensus democracy. This tradition stems from deep socio-cultural cleavages between Catholics, Calvinists and socialists in the past. Such a fragmented society necessitated the formation of grand coalitions, sprouting social partnership, compromise and cooperation between interest organizations, social groups and the state as a political culture (Bevort, 2016; Lijphart, 2012; Lijphart & Crepaz, 1991). The corporatist governance model aims at the distribution of public goods across society, which fits the longstanding social-democratic welfare system in the Netherlands (Sanandaji, 2013). However, changes in societal realities are increasingly promoting a more liberal, Anglo-Saxon style of governance. This has brought about reforms such as the tightening of the welfare state and an emphasis on competition, decentralization and individual responsibility (Arts & Gelissen, 2016; Bambra & Eikemo, 2009; Delsen, 2012).

### 4.1.4. Expectations

Based on the theoretical outlines of the relationships between institutional dimensions and smart governance (Table 1), the different contexts of Glasgow, Curitiba and Utrecht (Table 2) predict dissimilar configurations of smart governance.

With Glasgow's intergovernmental state structure classified as a unitary-centralized system, smart governance in Glasgow may be predicted to be aimed at societal goals of a more universal character. This institutional context furthermore predicts a narrowly composed collaboration base in which citizens have a passive role. Technology use is not likely to serve as an enabler of collaboration, but as a tool to

optimize urban management. By contrast, the unitary-decentralized structure of Utrecht and the federalism of Curitiba predict societal goals with a city-specific scope. In these cities, broad-based collaboration among multiple stakeholders can be expected in which citizens also have a more active role, such as consultation and citizen power. The technologies used will most likely foster collaboration although the design and purpose of tech-based tools may also be shaped by the specific actors involved.

Based on the institutional dimension of "local political power relations", all the components of smart governance in Glasgow and in Curitiba may be predicted to be influenced by the city leaders due to the prominent positions of power they occupy. Here, however, the formulation of more precise expectations is difficult as the political orientation of the incumbent city leaders will also play a vital role. In contrast to the leader supremacy model of Glasgow and Curitiba, the collective form of the local political system in Utrecht signifies that the actual configuration of smart governance will be the result of political compromise, although the political colour of the cabinet will likely also play a role.

Finally, the institutional dimension of "urban governance model" anticipates that Curitiba's managerial mode will generate societal goals that target the triple bottom line sustainability – i.e., economy, environment and people – for city-specific conditions. It furthermore suggests a narrow collaboration base in which mainly experts and businesses take part, with limited input from citizens. The managerial governance model in Curitiba predicts the use of technologies to efficiently manage the city. Utrecht, which is characterized by a corporatist model on this dimension will differ from Curitiba on some aspects, although in all probability, the societal goals will be similar. Societal goals in Utrecht are therefore likely to pursue urban sustainability integrating economic, ecological and social aspects, going beyond local, city-specific conditions. Collaboration in the corporatist model of Utrecht will tend to be broad-based, with citizens assuming more active roles. Consequently, technology use will be directed at stimulating collaboration, although other forms of tech-based instruments may also emerge, dependent on the contributions of the relevant actors involved. This institutional dimension in Glasgow (i.e. pro-growth model) envisages societal goals that link to local, city-specific conditions from a principally economic viewpoint. This also suggests a narrow collaboration base in which citizens have a passive role or function as consumers. In addition, technology use here is anticipated to focus on urban management and the development of commercial applications.

These expectations not only indicate differences in smart governance in the three distinct cities but also predict within-city contradictions. For example, in Glasgow, universal societal goals on the base of the intergovernmental state system (i.e., unitary-centralized) might be expected, whereas the urban governance model (i.e., pro-growth) suggests that goals will have a city-specific, local character. Another example is Curitiba, where the federalist intergovernmental state system would predict a broad collaboration, yet the managerial urban governance model would tend towards a narrow collaborative base. This study will therefore explore how these predicted, yet sometimes opposing, configurations of smart governance materialize in the three cities and how the institutional factors identified can account for shaping them.

## 4.2. Case selection

This study aims to investigate how smart governance is configured in three different cities positioned in distinct institutional contexts. For this purpose, the paper explores smart city initiatives that can suitably capture the approach to smart governance in these different urban contexts. Initiatives are appropriate for this purpose since they feature all the major dimensions – i.e. societal goals, collaboration, technologies – that constitute smart governance, which form the primary elements of the data collection. In addition, examining initiatives offers more advantages than zooming in on policy documents, since initiatives are tangible evidence of how the formulated strategies are implemented in



practice.

The smart city initiatives in the three cities were selected in line with the identified dimensions of smart governance in the theoretical section (Section 2). Three elements were required to be present: 1) societal goals, 2) collaboration, and 3) the use of technologies. In making the selection, the “smart” label was not an absolute criterium since many initiatives fit the abovementioned definition of smart governance without being labelled as such. In addition, it was important that the initiatives would reflect the smart governance strategies of each of the cities. Hence, the selection did not target comparable initiatives in view of their structural, profile and power-related characteristics but identified ones that reflected the smart governance patterns of the city. This was vital since the major goal of this study is to reveal the patterns of smart governance in the three cities. This can help to reveal similarities and differences in smart governance configurations and whether the institutional context play a role herein. The smart city initiatives selected are briefly introduced in the below section.

#### 4.2.1. Smart city initiatives

**4.2.1.1. Glasgow.** Glasgow City Council fosters an overarching, large-scale approach that it calls the “*Smart City Journey of Glasgow*” (Walker, 2018). This is reflected by the Future City Glasgow (FCG) programme that was established in 2013 after receiving £24 m in funding by winning the Technology Strategy Board’s Future Cities competition. It was “*an ambitious programme to open up Glasgow like never before*” to show “*how new technologies can make life in the city safer, smarter and more sustainable*” (<http://futurecity.glasgow.gov.uk/> para 1). It was a complex programme consisting of a range of projects, activities and applications (mruk, 2016; Glasgow City Council, 2015).

**4.2.1.2. Curitiba.** Curitiba does not have a long-term, documented smart governance strategy. Such visions are formulated by incumbent mayors, which can significantly alter the course of successive plans, as observed in the two different mayoral eras studied here. Mayor Fruet’s directive on Curitiba’s smart city model (Salles Gonçalves, Stoyanow, & de Almeida Oliveira, 2016; Municipal de Curitiba, 2016) failed to come to fruition due to his electoral defeat. Fruet’s approach to smart governance is mirrored by the Curitiba Collaborates (CC) initiative that was introduced in 2015. It is an open data programme aimed at stimulating society to address urban problems by using city data for socio-technological solutions (Fruet & de Mello Miranda, 2014).

Fruet’s successor, Rafael Greca envisions Smart City Curitiba as innovation-driven sustainability “*to develop economically and, at the same time, increase the quality of life of the population by generating efficiency in its services and stimulating the entrepreneurship of impact*” (Agência Curitiba de Desenvolvimento e Inovação, 2018 para 3). This vision is embodied by the flagship project Vale do Pinhão (VP) launched in 2017 as “*the movement of the City Hall and the ecosystem to bring innovation to the whole city*” (Agência Curitiba de Desenvolvimento e Inovação, 2018) (Development Agency of Curitiba, 2018 para 5). It aims to transform a degraded industrial area into a creative economic cluster of high-tech companies (Silveira, 2018).

**4.2.1.3. Utrecht.** The city of Utrecht has joined the National Smart City Strategy, which has as objective to exploit digital technologies to make Dutch cities more sustainable (Muis, 2018). Utrecht aspires to become an ecosystem of smart applications and solutions to create a Healthy Urban Living environment. However, the city does not have an overarching strategy for smart governance but a tangle of smart city activities launched by government, businesses or citizens (Maltha, Driesse, & de Boer, 2018). From these activities, a range of initiatives have been selected for this study: 1) Smart Solar Charging, a community-based sustainable energy and mobility system; 2) the spatial transformation of the Johan Wagenaarkade into a park zone; 3) the design of the long-

term spatial development of Vleuten; 4) the socio-economic and spatial restructuring of the Amsterdamsstraatweg; 5) the spatial restructuring of the Merwede Kanaalzone into a smart city district; and 6) the spatial redevelopment of Kanaleneiland Zuid into a smart energy district.

#### 4.3. Data collection

The data collection concentrated on gathering information and material about the three dimensions of smart governance identified in Section 2: 1) the societal goals, 2) collaboration, more precisely the breadth of the collaboration between stakeholders and the roles of the citizens therein, and 3) the way technology is used in these initiatives. These data were necessary to be able to define the smart governance configuration in the different cities. The case studies were explored through a long-term engagement of three locally based research teams in each city. The data were collected in the period between October 2016 and December 2018, and aimed at gaining thorough insights into the internal and external aspects of the development of the aforementioned initiatives in the three cities.

The three research teams included native speakers who gathered data in an iterative process of interviewing, analysing documents, and comparing case insights in online and face-to-face meetings. The first step in the data collection process entailed a comprehensive desk review of policy, project and legal documents, journal and newspaper articles as well as websites and social media. Secondly, in-depth interviews, ranging between 1 and 2 h, were carried out with a variety of actors representing different organizations: municipality officials, professors, citizens, communities, external professionals, businesses and members of societal organizations. Finally, data were also obtained during (collective) field observations and events to gain a deeper comparative understanding of the cases: (project) gatherings, conferences, listening to presentations, public hearings, workshops and hackathons, as well as engaging with case study actors in a dialogue. These various sorts of data sources, somewhat differing in their extent in the three cities, provided the necessary depth and scope of insights for the analysis. A quantified overview of the empirical data collection reflecting the various types of sources is displayed in Table 4.

#### 4.4. Data analysis

First, each local research team drafted a brief case description to condense the main findings, based on the material accumulated, initial data interpretations and works sessions for comparing preliminary results. Subsequently, the data collected were organized in a factsheet according to the smart governance dimensions identified in the theoretical section: the societal goals, the collaboration including the types and roles of participants, and the technologies used. This classification helped to define the actual configuration of smart governance in the three cities. Third, these patterns of smart governance configurations were examined in view of the three specific institutional dimensions identified in the theoretical section: the intergovernmental state system, the local political power relations, and the urban governance model. For this, the outcomes were positioned in the assumption framework (Table 1), which enabled comparisons between the expectations and the findings and thus revealed (dis)similarities. Fourth, the analysis took a deeper look to investigate the possible institutional causes of the outcomes: it sought after institutional dimensions responsible for the resultant configurations of smart governance in the three cities. These results were then contrasted with the expectations, which eventually helped to formulate conclusions. The results are presented in the next section.

### 5. Findings and analysis

This section presents and analyses the findings for each city according to the three components of smart governance, which are

**Table 4**  
: Empirical data collection.

City	Documents	Interviews (total)	Municipality officials	Citizens	Other actors (e.g. societal organizations, universities, entrepreneurs, professionals)	Websites, social media	Events	Field observations
Glasgow	23 (D65–87)	19 (incl. double interviews)	8 (R40–47)	1 (R48)	6 (R49–54)	11 (W41–51)	9 (E17–25)	2 (F10–F11)
Curitiba	23 (D42–64)	13	5 (R12–16)	5 (R22–26)	3 (R37–39)	20 (13 + 7) (W21–40)	4 (E13–16)	3 (F7–9)
Utrecht	41 (D1–41)	26	11 (R1–11)	5 (R17–21)	10 (R27–36)	20 (W1–20)	12 (E1–12)	6 (F1–6)
Total	83	58	24	11	19	50	30	10

necessary to specify the patterns of smart governance initiatives in the different cities: 1) the societal goals, 2) collaboration, and 3) the technologies used. Each city section ends with relating the research finding about the patterns of smart city initiatives to the three institutional dimensions identified in this study as potential factors: 1) the intergovernmental state structure, 2) the local political power relations, and 3) the urban governance model. Linking smart governance configurations revealed in the empirical study to the institutional context in the relevant city, previously detailed, helps to discover their relationship, namely the extent to which the particular institutional dimensions account for the particular forms of smart governance. The section concludes by synthesizing all these research findings, also visualized in a heuristic framework.

## 5.1. Glasgow

### 5.1.1. The patterns of smart governance

**5.1.1.1. Societal goals.** Future City Glasgow (FCG) was made possible by the resources of the national competition (W44; E17). Shaped by the competition guidelines, the programme was designed to showcase how the city could advance the local and the UK's economy and citizens lives by using data and technologies (D75; D84). These goals were specified in the themes of energy, transport, public safety and health (D80; W43). Although health deprivation is a serious issue in Glasgow (F10;W51) the objectives of FCG tended to be more universal, aiming to “solve some of the challenges that every large city faces” (W46) or as a governmental official phrased it: “the key part of it was about growing economy, being smart, green” (R40). This also became apparent in the first bidding round, where it was seen that competitor cities used a similar language, identified the same problems and barriers, and gravitated towards similar solutions (D67). FCG was also linked to the Glasgow City Council's ongoing broader reform agenda to improve public services by doing more in a cost- and time-saving way (R40; R41).

**5.1.1.2. Collaboration.** FCG promoted multiparty collaboration in which various roles were envisioned for various actors (W43; E20). The leadership role was assumed by Glasgow City Council, who took responsibility for managing and facilitating the programme in line with one of the tenets of the city's award-winning proposal: “smart cities are led from the top by a strong and visionary champion” (D84). This top-down approach was considered necessary because of the two-year timetable set for implementation by the grant-maker, the Technology Strategy Board (D71; E18; D86; R40, 41, 42). At the same time, an external supervisory team of technological consultants was installed, although not integrated within the City Council. This gave some government officials the feeling that the FCG was done ‘to’, rather than ‘with’, the Council (R41).

The programme aimed to “empower everybody – the public, voluntary, academic, private sectors, and communities – to harness, use, and combine [data and technologies] in new ways” (W46). It emphasized the need for citizens' contributions, described as “putting people at the heart of the process” (W46). Citizens of all sorts were sought, not merely the “brainiac

student programmers” and “hi-tech and smartphone-powered people” but also the “low-tech and people-powered” ones (D78). Collaboration was considered by the coordinators to be an obvious consequence of opening city data, which would mobilize people to take societally transformative initiatives (R40; R42).

However, the broad collaboration envisioned did not materialize in practice. Instead, technological companies predominated, first by co-developing the national bid and then by creating tech-based infrastructure, services and applications. The small- and medium-sized enterprises considered crucial to the economic growth strategy of Glasgow were not sufficiently plugged in (R41). Similarly, actual citizen engagement was generally low (D69; D70; D86) as citizens mostly functioned as users of new applications or as passive data providers (D66; E21). Citizens were commonly referred to as actors for whom the FCG intended to design a better city, thereby rendering them service receivers rather than city transformers. Although participatory types of activities such as hackathons were organized, they were one-off events. Nor did they add an element of diversity as the participants were students and members of the IT community (D78; D67). The four hackathon events had an “isolated” (R41) character as only hackers attended and no council representatives. This resulted in insufficient data availability and a lack of reflection on the relevance of emergent ideas.

Further participants in the FCG project included the universities involved in the co-authorship (University of Strathclyde) of the national bid, and in research related to the programme (E18; R41; R52).

**5.1.1.3. Technologies.** Technology rollout was a core element of the FCG programme, which required the collection of as many datasets as possible across the council (R41; R53). These datasets created an infrastructure for the Glasgow City Management System, a scalable and modular digital city platform built on three pillars: 1) the Glasgow Operations Centre; 2) Open Glasgow; and 3) four demonstrator projects (D71; D84; R43; mruk, 2016). The first pillar, the “Glasgow Operations Centre”, integrated city systems such as public-realm CCTV networks, traffic management services, and planning functions. The “Open Glasgow” pillar united urban systems and data to improve public services and to accommodate citizen engagement. This platform sought to enhance the existing MyGlasgow app with information about air pollution, traffic congestion, cycling paths and the City Observatory. Community-engaging tools were designed for hackathons, “Future Makers”, community mapping and area regeneration, although they were orchestrated from a technical viewpoint rather than user experiences (R41).

Finally, the demonstrator projects developed applications for various policy domains (D68; E17; E20) such as: *Integrated Social Transport* with a route optimisation software in minibuses for home care services; the *Active Travel Spatial Analysis App* for walkers and cyclists; *Energy Efficiency in Buildings & Housing*, a smartphone app to collect data and to advise homeowners on energy consumption; *Sustainable, Social & Safe Street Lighting*, energy-efficient lamps (D83; D71; W48).

Throughout all its phases, the FCG programme was strongly supported by the Leader of the City Council, Gordon Matheson (D70; E18), who oversaw the bid procedure and the programme implementation,

while enthusing colleagues and fronting associated public events (R40). This political commitment has continued under the subsequent leadership of the Scottish National Party, which has carried on with the achievements of Future City Glasgow and evolved activities in its wake (E21; D82).

### 5.1.2. The influence of the institutional context

The findings reveal that the central, UK-level strategies of the demonstrator programme were decisive in shaping all components of smart governance within the scope of the FCG project. In the first place, the entire programme was able to be implemented thanks to the funding received from the UK government. In line with this, the goals that were set – the universal scope and the focus on both economic growth and large-scale technology rollout – echo the national programme guidelines and the UK’s liberal, market-oriented tradition. Likewise, the range of collaborating partners was also predetermined by the guidelines of the national bid. This meant the designation of the City Council as leader of the FCG programme together with an exterior leading team within the local government. As may be expected, in view of the aforesaid goals, technological companies were core players while citizen engagement was modest. This narrow collaboration mode was probably also the result of the projected use of technology as formulated in the proposal submitted in the national competition, which mainly targeted urban management, infrastructural systems and commercial applications. The modest roles allocated to citizens did not prioritize the use of participatory tools. These insights demonstrate, as expected, that the inter-governmental state system (i.e. unitary-centralized) had a pivotal role. The other institutional factor, namely the local political power relations, appears to be less important than assumed. This factor had been hypothesized to shape smart governance in conformity with the preferences of the Leader of the City Council. Yet, rather than using this leadership role to alter the direction and configuration of FCG smart governance, the Leader instead chose to provide support for the project across the board. Moreover, this support has proven not to be contingent on political orientation, as subsequent administrations with different values continue to recognize and build on the accomplishments of FCG.

## 5.2. Curitiba

### 5.2.1. The patterns of smart governance

**5.2.1.1. Societal goals.** Curitiba Collaborates (CC) is an initiative designed to tackle city challenges identified by inhabitants. The hoped-for solutions were also expected to create an innovative economic environment (R12–14; D42–44).

“Vale do Pinhão” (VP), inspired by the spirit of Silicon Valley and the Intelligent City, builds on five pillars: entrepreneurial education, technologies, re-urbanization and development, an integrative innovative ecosystem, and economic stimulation (W35; W40; E15). VP specifically aims to regenerate a degraded industrial area and to attract technological firms and start-ups. This neighbourhood transformation is expected to bring about an innovative ecosystem and to boost the “smart” reputation and socioeconomic performance of Curitiba (W34; W37).

**5.2.1.2. Collaboration.** The municipality, as the initiator of the CC project, had two major motives for collaboration. First, it realized that releasing public data would not automatically lead to urban solutions; an actively engaged society was also required. Second, deprived as it was of resources, the municipality needed external knowledge about technologies and city problems (R12; R15; D48–49).

The mayor and his team therefore stimulated a collaborative milieu by various means, including providing meeting locations for urban activists. The municipality encouraged citizens, communities, universities, and local entrepreneurs to make use of the publicized data to generate applications (R13; R16; W50–53). Input from citizens was deemed

crucial for mapping societal demands and devising technological solutions for these demands. This resulted in a stable community of civic hackers, software developers, and students (R12; R22; W21; W24) led by the bottom-up initiative Code for Curitiba comprising “*passionate and competent citizens who work with the government to develop technology-based solutions that solve urban issues*”, who believed that through their work they could “*foster collaboration and transparency, accelerate economic growth and revive citizenship*” (W31). Code for Curitiba took over the CC leadership and has sustained the activities despite the municipality’s post-election project exit (R1–R5; W23).

Other CC participants were “common” citizens although their engagement was limited (R12; D55–56). Furthermore, universities also participated in a number of research activities as part of the project.

VP is managed by professional planning authorities, namely the Curitiba Development Agency and the Institute of Research and Urban Planning of Curitiba (IPPUC). Their task is to create facilities and infrastructures that foster the formation of an economic cluster. They also assist companies in networking and promote this up-and-coming area to attract businesses (E15–E16; W36). Non-governmental actors primarily consist of businesses, especially tech-based companies and start-ups, who, in the future, will be housed in the regenerated area to jumpstart the development of a new metropolitan centre (E15–E16; W37; F9). Furthermore, various universities are official partners of the programme and have a supportive role, which includes attending events and conducting research on new technological applications (W35; W39). Citizens have not been part of this alliance citizens as the local authorities plan to inform them about the project in a more advanced phase (E15–E16).

**5.2.1.3. Technologies.** As part of the CC initiative, twenty-six datasets were opened to provide a basis for potential application developers (D44–R45; R13–R14). The next step was the organization of three public hackathons. Some 400 contestants took part, who mapped a number of societal problems and evolved apps to address these, including a public transport timetable and mobility support for blind people. However, to date the societal use of these apps has been limited (D55–58; E13–14).

The technologies used within the scope of the VP project primarily relate to the economic profile of the urban space under revitalization. This space represents an innovative cluster of technological companies, which accentuates the “smartness” of Curitiba (W34; E15–E16).

### 5.2.2. The influence of the institutional context

It is clear from the above that the intergovernmental state system, as expected, is an important influence in Curitiba. In the Brazilian federalist structure, smart governance is shaped at the local governmental level. Hence, top-down, overarching guidance with the corresponding resources provided by the federal or regional governments, as seen in Glasgow, is lacking, with, as a result, fluctuating and project-based approaches to smart governance. Moreover, the importance of the local level is also reflected by the scope of the societal goals that focus on city-specific issues.

The local political power relations (i.e. mayoral authority) dimension would appear to act as a highly pervasive influencer, as forecast. In fact, mayors were found to determine the entire course of the project. Hence all the various dimensions of smart governance were configured in line with their (political) preferences. This became obvious in the post-election power switch that resulted in the cancellation of all activities launched by the previous administration and a swerve in an entirely different direction. Accordingly, the focus of the societal goals also changed: whereas sustainability was pursued by Fruet through participatory governance, under Greca this has been advanced through an emphasis on a competitive economy. The type of collaboration changed as well: the CC project initially broke with the “business as usual” model of managerial urban governance, and strove for primarily allying with civil communities, which eventually seized the leadership.

By contrast, Greca returned to a managerial governance tradition that positioned experts and businesses as key partners. At the same time, none of the initiatives gave rise to the type of broad-based collaboration that might have been expected due to the influence of the intergovernmental state system, namely federalism. Finally, the technological dimension of smart governance in Curitiba should also be understood in relation to mayoral power and the ensuing political choices, with either a focus on social interactions and collaboration (CC) or on urban management and infrastructural elevation (VP).

This mechanism also affects the impact of the institutional dimension “urban governance model” on Curitiba’s smart governance development. The traditional managerial mode of governance was resisted by mayor Fruet, but reinstated under Greca. This produced differing smart governance configurations in the two mayoral eras.

### 5.3. Utrecht

#### 5.3.1. The patterns of smart governance

**5.3.1.1. Societal goals.** The projects involved in this study have their own specific objectives, such as spatial restructuring, developing “smart”, low-carbon neighbourhoods or creating a long-term developmental vision. Despite this diversity, these projects have the overarching aim of promoting urban sustainability, healthy urban living, and improving the economic and innovation performance of Utrecht (E5; E12; R2; R5; R6; R8; R10). The ecological aspect of sustainability and the realization of a carbon-neutral urban environment have, in particular, been accentuated by the “green” social-democratic governing coalition (R1; W2; W17; E10).

**5.3.1.2. Collaboration.** The focus on spatial development in these projects shaped the range of collaboration partners and the roles of the various actors. The role of the municipality was fundamental due to its legal, regulative and sometimes co-proprietorship responsibilities. The municipality, therefore, led the way, managing and providing resources such as staffing, knowledge, funding, technologies, networks, and actor mobilization (R1–R4; R5–R11). It has furthermore supported “smart” grassroots initiatives that accord with its policy objectives (i.e. Smart Solar Charging) (R1; R17; W2).

Collaboration in these projects targets broad societal inclusion that fits the Dutch tradition of participatory planning and consensus-seeking (W1–20; E1–E3; E8–E9). As a consequence, different stakeholders such as citizens, communities, businesses, and other organizations take part (R3; R5; R7; R20–R21; R10). There are two major ways in which citizens contribute. One is consultation, in which citizens are invited to express their opinions and make suggestions about plans such as the spatial development of Amsterdamsstraatweg, Johan Wagenaarkade and Vleuten (D11; D17; D26; D33). The other relates to citizens as consumers and users. Consumerism can trigger changes in citizen behaviour aimed at societal transformation, for example through the use of new products and services such as the Smart Solar Charging or IRIS Kanaleneiland Zuid projects (D1; D41; E1–E7).

Businesses also play a role, especially in projects labelled as being smart. They contribute to technological innovation and the development of new applications, products and services (R1; R17; R27; R11). Businesses are also essential partners in some urban transformations as project developers and/or landowners (W17; E8).

Finally, universities and knowledge institutes also collaborate in smart city-labelled (EU) projects (i.e. Smart Solar Charging, Kanaleneiland Zuid) to research the activities and to promote these in society (R30; W3; E5).

**5.3.1.3. Technologies.** The initiatives in Utrecht view and use technologies in different ways. For instance, in smart-labelled projects (i.e. Smart Solar Charging, IRIS Kanaleneiland Zuid) technologies form the

very basis for collective practices such as smart grids, electric vehicles, smart meters, solar panels, smartphone apps and open data platforms (D5–7; W18–19; R17). These technologies form the backbone of each of these projects and are presented as essential means to reach the societal goals, in pursuit of a healthier city. In the more “traditional” types of spatial planning, technologies serve as standard tools to support collective engagement. This technology use is therefore not heavily publicized and not framed within the urban smartness discourse. These projects utilize websites, online fora, social media, as well as 3D models such as a scenario model and a geo-referenced map (R5–R9; W5–W13).

#### 5.3.2. The influence of the institutional context

In Utrecht, just as in the other two cities and in line with what was predicted, the “intergovernmental state system” was found to have a considerable impact. Utrecht is positioned within a unitary-decentralized system that makes city governments responsible for urban development such as smart governance initiatives. This automatically translates into city-specific goals, since locally evolved smart governance initiatives target specific issues within the city confines. This institutional factor is seemingly also responsible for the fragmented character of the city’s smart governance approach, similar to that in Curitiba. Furthermore, local political power relations also play a role in Utrecht, as the joint decisions taken by the municipal cabinet set the course for the societal objectives for the city as a whole. However, contrary to Curitiba, the cabinet does not play a direct role in ongoing projects, for example, by initiating these or specifying their objectives and means. These tasks are carried out by local government officials from the relevant policy domains and their societal partners. As a result of these two institutional aspects, the corporatist mode of urban governance in Utrecht plays a significant role in shaping smart governance initiatives. The tradition of consensus-seeking among a varied range of societal actors and the resulting multiparty cooperation have a tangible influence on the three components of smart governance. This resonates in the goal setting of the projects, in that, consequently, a more widespread societal wellbeing and the realization of public values is aspired to. The corporatist tradition is also apparent in the broad-based collaboration characterizing Dutch urban planning, in which citizens often have a consultative role while the functions of consumers and users are emergent engagement forms. This latter development and the increasing role of businesses jibe with the arguments about nascent market-oriented tendencies in Dutch urban development. Finally, the technologies used follow these smart governance patterns, conditioned by both the corporatist tradition and the increase of market forces. This means that on the one hand, technologies are employed to facilitate exchanges and collaborative actions. On the other hand, they serve commercial purposes, urban management and infrastructural transformation.

The aforementioned findings are summarized in a heuristic framework (Fig. 1) that helps to understand the influencing mechanism of the institutional context. It illustrates how institutional dimensions co-existing on different spatial scales affect the three cities’ smart governance. The framework visualizes how each institutional factor influences the different urban contexts in terms of their smart governance configurations. Hence, the dimension “intergovernmental state system” is recognized on the national scale as the initial influence for all the three cities because it defines the locus of responsibility and decision-making for smart governance, and thereby the approach to configure this. In the “unitary-centralized” Glasgow this appears to be such a decisive factor that it overshadows the two other institutional dimensions: the UK-level smart city strategy is so imperatively manifest that it prevents the aspects “local political power relations” and “urban governance model” from playing even an elementary role. They are, therefore, have not been included for Glasgow in the framework. In the case of the two other cities – Curitiba and Utrecht – the national setting of “the intergovernmental state structure” defines their decentralized and federal state system. This renders local governments self-reliant in terms of policy-

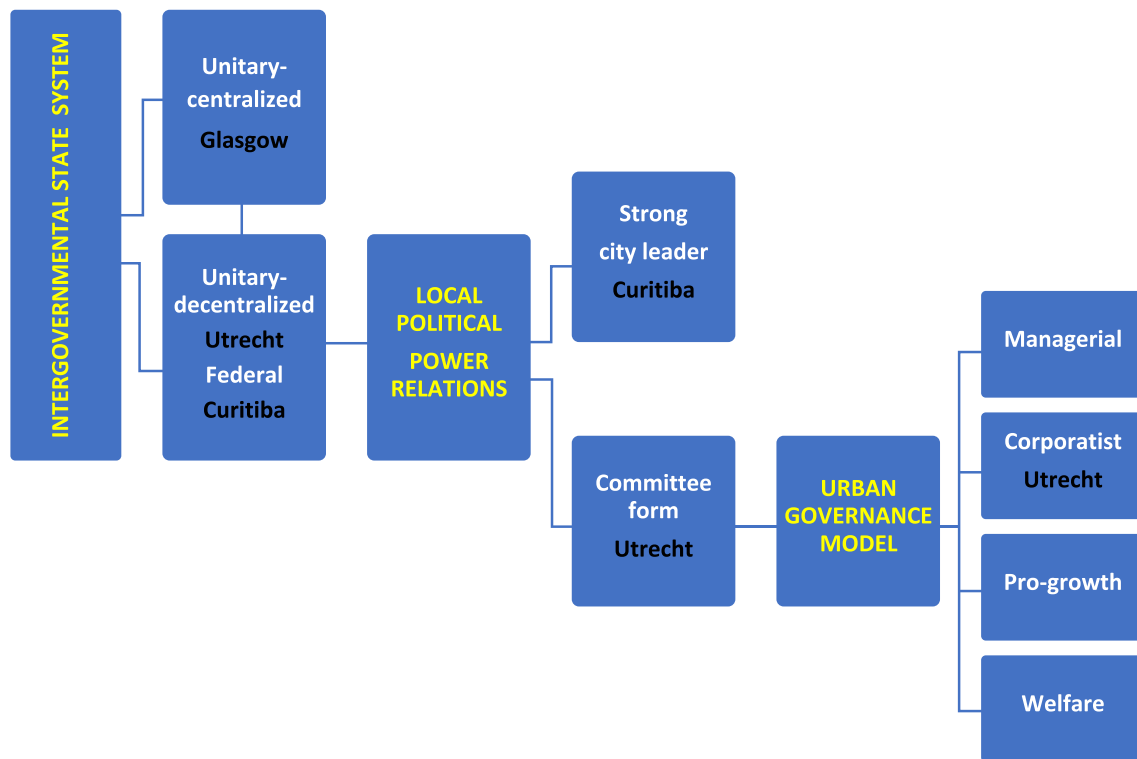


Fig. 1. Institutions influencing smart governance in the three cities.

making and/or resource collection, thereby enhancing the significance of the city level and that of the local political power relations in smart governance processes. The aspect “local political power relations” emerges as the central factor in Curitiba due to its mayors’ almighty status, which determines whether and how the third institutional aspect – i.e. the urban governance model – can play a role. In Utrecht, the institutional dimension “local power relations” has a different impact due to the city’s collective system of city government — it does not allow a single actor to be the ruler of urban development. This in its turn sets the influence of the third institutional aspect in motion, namely the (corporatist) urban governance model that eventually shapes the actual configuration of smart governance in the city.

The assessment of the societal outcomes of these smart governance practices is beyond the scope of this study, requiring both a long-term research time span and a different approach. However, some provisional observations can be made. The study displays that a centralized intergovernmental system – such as Glasgow – tends towards economic and environmental gains through the city-wide adoption of an advanced technological infrastructure. In such contexts, the creation of a technology-driven smart city is more within reach. By contrast, decentralized state structures seem to be more conducive to also realize social achievements by more intensely engaging citizens — building the human smart city is more likely. This, however, will not necessarily occur as institutional circumstances – e.g. power, governance traditions, resources, actors’ agency – on the local level also play a role. Therefore, it seems palpable that smart governance arrangements in cities with collective forms of local power structure and governance tradition, embedded in a decentralized state system – like Utrecht – may bring about societal outcomes on a wider scale. In such environments a variety of actors and resources – including governmental support – are mobilized, and citizens are more accustomed to contribute to public affairs or launch their own initiatives.

## 6. Conclusions

The aim of this study was to explore the relationship between the urban context and smart governance, particularly if and how the specific institutional settings in which cities are ingrained affect patterns of smart governance, such as the societal goals, the use of technologies and the ways in which citizens and other actors engage. This research objective is driven by the growing recognition that different cities display different configurations of smart governance, which to date has not received a systematic, empirical academic attention. To remedy this knowledge gap the present study has drawn on insights from institutional theory and analysed smart governance initiatives in three cities from different countries, embedded in distinct institutional environments by asking: “How does the institutional context shape the actual configuration of smart governance in cities?”. The three cities were examined as exemplary cases in an open, exploratory investigation that enabled to enhance the theorization of the topic of smart governance, increasingly receiving widespread interest from different societal domains.

The findings suggest that the institutional context plays an important role in shaping smart governance in terms of societal goals, collaboration and technology use. These empirical outcomes have resulted in a heuristic model of institutional influencing, which helps to better understand patterns of smart governance and their variances across cities. This model also indicates that the institutional influencing is not straightforward but – as suggested by the idea of embeddedness in institutional theory – has a multi-layered character that rises from the interfaces between different institutions on multiple scales. Consequently, institutional aspects modify – either reinforce or neutralize – each other’s impact on how smart governance arrangements evolve. This multilevel influencing mechanism appears to logically determine which institutional factors are pivotal in shaping smart governance in different city contexts, which may also apply to other urban settings. For instance, the “intergovernmental state structure” has proven to be a determinant factor in all the three cities inspected since it functions as a

“scene-setter” determining the locus and hence the approaches to smart governance: in Glasgow it renders the role of the national administration essential while in Utrecht and Curitiba the venue of these responsibilities is positioned on the level of local governments. Similarly, the interplay between informal and formal institutions, resonating the insights from institutional theory, is part of these reciprocal dynamics of influencing — for instance, the consensus-based value system in the Dutch urban governance tradition prevents city leaders from predominating the formulation of urban strategies. Likewise, the agency of individual stakeholders transforming or maintaining institutions is another facet in this reciprocated impact — mechanism as demonstrated in this study illuminating the substantial role that mayors in Curitiba play in this regard.

This international comparative study firmly embedded in a theoretical perspective is an addition to the domain of smart governance and more generally to the scientific landscape on smart cities, urban planning, collective governance and citizen participation. This contribution can be recognized in a thematic sense since the study set out to open up the black box of the institutional context in urban development, and in particular in smart governance. Since this theme has to date been underexplored the present study is an enriching addition by advancing the conceptualization of technology-enabled urban collaboration in public matters by drawing attention to its context-contingent nature. On the other hand, the contribution of this article can also be valued in a methodological sense. Especially the empirical approach embarking on a comparative exploration of multiple, cross-country cases and inspecting actual practices of smart governance is a refreshing academic contribution since the literature mostly contains hypothetical claims and expectations on the relationship between institutions and smart governance, frequently only on the basis of policy documents and ambitions. In addition, the use of the institutional lens appeared to be an appropriate and original method as it allowed to carefully trace the working and the effect of specific institutional factors in view of the development of smart governance arrangements in each city. This is a unique method since it enabled the present research to take a deeper look into how the institutional factors actually work out in shaping the patterns of smart governance. This contrasts most comparable studies for which doing research in diverse urban settings suffices to claim that “context matters”. Also, the institutional lens helps to elucidate the intricate working of institutions in cities while also indicates that some settings can be more conducive than others to smart governance and to delivering meaningful societal outcomes. For example, cities with collective forms of power relations and urban governance traditions, positioned in a decentralized state structure seem to be more favourable settings. These insights can support understanding or predicting the patterns and outcomes of smart governance in cities. So, studying the national policies in a unitary-centralized state structure or the political intentions of a powerful city leader will enable to better forecast how smart governance initiatives in those specific contexts will evolve.

Another interesting outcome that this research has shown is that institutional aspects cannot be viewed as separate dimensions, rather, they need to be examined in relation to their broader contextual setting. In other words, institutional dimensions are differently understood in different contexts as, for instance, the idea of powerful city leadership displays. In Glasgow, it implies the general support by the Leader of the City Council for smart city strategies but also that succeeding administrations build on the smart governance policies and achievements of the previous powerholders regardless of their political identity. By contrast, Curitiba’s omnipotent mayors regulate the course of smart governance, including the erasure of programmes launched by politically different predecessors.

The research outcomes also offer insights for policy-making and practice. The study points up that public officials need to be more conscious of their ubiquitous institutional environment and how these influence their policies and activities. This context-sensitive awareness makes them recognize that no blueprint for smart governance strategy

exists and that chasing illusory “best models” would merely reinforce the distance between wished-for and actual patterns and outcomes of smart governance. Therefore, local governments need to deliberate on smart collaborative methods that fit place-specific conditions and needs, thereby capitalizing on advantageous contextual circumstances while circumventing those throwing up obstacles. A case in point is liaising with citizens, a cornerstone of the notion of smart governance: in contexts where citizens are less accustomed to participating in urban development municipalities need vigorous and inventive approaches to motivate inhabitants to involve in public matters. Another example is the place-based implementation of smart governance visions in cities entrenched in a centralized intergovernmental state scheme — here, local politicians should make more efforts to convert general objectives devised on the national level into specific local issues, aspirations and work methods.

The heuristic model developed in this study serves as an exploratory framework that sets out to connect smart governance to the institutional context and to incite theorization about their interrelationship. Future work should build on the systematic approach started in this study to sharpen the context-sensitive conceptualization of smart governance. For this, much more empirical work is needed, in which actual patterns of smart governance are compared across various different places with (dis)similar institutional designs. This would enable to determine whether certain environments are more conducive than others to creating public value through smart governance and whether context-adaptive strategies can counteract institutional hindrances. This also implies evaluation of societal outcomes in future research, systematically disclosing how various configurations of smart governance in specific urban settings affect society at large. Besides, investigating the role of individual actors would be a refreshing addition to the research landscape as it could reveal how and under which conditions actors can shape the institutional milieu, potentially contributing to smart governance.

#### CRediT authorship contribution statement

**Zsuzsanna Tomor:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing, Validation, Visualization, Supervision. **Erico Przybilowicz:** Investigation, Methodology, Project administration, Validation. **Charles Leleux:** Investigation, Methodology, Project administration, Validation.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### Acknowledgment

The research presented in the article derives from the ‘SmartGov’ project: ‘Smart Governance of Sustainable Cities’, a four year collaborative transnational, multi-disciplinary research project, on the value of ICTs for engaging citizens in governance of sustainable cities (2015–2019).

The co-funding organizations are: in the Netherlands: the Netherlands Organisation for Scientific Research (NWO; Grant Number 485-14-036); United Kingdom: Economic and Social Research Council [Grant number ES/N011473/1]; and Brazil: The São Paulo Research Foundation, FAPESP.

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