The smart city and urban governance: The urban transformation of Barcelona, 2011–2023

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Abstract

This study explores the changes and stability of urban governance through the lens of smart city policy in Barcelona. It argues that the concept of smart cities is flexible and can be applied to both the neoliberal and participatory models of urban governance. Smart city policies undergo gradual rather than radical changes, with public–private relationships remaining stable despite fluctuations in the prominence of different actors. Comparing the smart city policy approaches of two ideologically opposite local governments, this study reveals similarities in the use of the scale, which is limited to local and global dimensions, and dismissal of metropolitan scale.

Introduction

Smart cities have been popular for years, with local governments across the globe striving to position themselves as smart cities, that is, as more efficient, sustainable, and participatory cities offering a better quality of life through the use of information and communication technologies (ICT). Every year, the best smart cities are indexed and classified into several rankings, while in international congress cities present their best practices. Indeed, what began as a concept patented and promoted by the multinational corporation, IBM (Söderström et al., 2014), has become an evocative slogan, cherished label, and city marketing instrument (Vanolo, 2014; Miller et al., 2021).

Initially, the study of smart cities fell under the purview of engineers and informaticians, who placed an emphasis on their organic vision. The urban space was

considered a system of systems, that is, as a flow of data requiring monitoring and optimization. The interest of political scientists and urban scholars in smart cities has grown exponentially. In this respect, Vanolo (2014) quickly noted that the belief in technology runs the risk of depoliticizing local management and making smart cities apolitical, while Bär et al. (2020:2) argued that smart cities are an ideological construct justifying the implementation of smart solutions in cities. Based on the premise that technology is never neutral (Smith and Prieto Martín, 2021), technopolitics has highlighted the role of mayors (Beal, 2009) and the institutional context (Bär et al., 2020) as key elements in understanding the implementation of smart city models. Certainly, conceptualizations of the smart city vary widely, with some stressing the issue of sustainability, and others the efficiency of service delivery or the use of ICT to promote citizen participation. Smart cities can be conceived as an integrated model or consist of isolated public policies, such as smart lighting or smart parking. Indeed, the vagueness and plasticity of the concept itself have facilitated its success (Gardner and Hespanhol, 2018; Smigiel, 2019). As Miller et al. (2021: 665) note, the smart city "takes very diverse forms, serves very diverse objectives, and is embedded in complex power geometries that vary from city to city."

Since the mid-2000s, the development of smart cities has been interpreted in one of two ways: cyberpessimism or cyberoptimism (Douay and Lamker, 2022). For optimists, the application of ICT in cities increases citizen's capacity to empower themselves. Such a view is largely based on research showing how the development of Local Agendas 21 in the mid-1990s and early 2000s provided a unique opportunity for citizen participation (Eckerberg and Lafferty, 1997). However, scholars are increasingly questioning the existence of smart citizens in smart cities (Sheldon and Lodato, 2019; Grossi et al., 2020; Calzada, 2021; Charnock et al., 2021), particularly insofar as most of the tools used for public involvement in smart city-making are "tokenistic" (Cardullo and Kitchin, 2019), that is, elitist and superficial. The first critics of smart cities considered it a high-tech version of the entrepreneurial city (While et al., 2004; Hollands, 2008; Kitchin, 2015). From this perspective, the development of smart cities serves to promote economic growth, serving the interests of big corporations at the expense of citizen needs. Nonetheless, both negative and positive interpretations recognize the relationship between smart cities and models of urban governance. The type of alliances between those in locally elected positions, civil servants, businesses, associations, and citizens will differ with the definition of the smart city (i.e., whether it focuses on efficiency, sustainability or citizen participation), as will the instruments of governance implemented (e.g., public–private partnerships and deliberation tools).

In their review of current themes and future priorities on urban governance' research, da Cruz et al. (2019) stress the importance to provide empirical evidence on the institutional arrangements that help cities to adapt to technological change. This study wants to address this gap by answering the following research questions: how the development of a smart city strategy affects urban governance? How the malleability of the "actually existing smart city" is materialized in a specific context? In order to do so, we focus on the case study of the City of Barcelona between 2011 and 2023. Barcelona has consistently appeared in the annual rankings and classifications of smart cities (UN-Habitat, 2022; Smart City Index Report 2022). As Joss et al. (2019) have shown, Barcelona is the only European non-capital city that stands out as a pioneer among smart cities. Moreover, political shifts over the last decade have made Barcelona an exceptional case of an urban governance laboratory (Blanco et al., 2020).

Previous studies on Barcelona as a smart city have focused on the initial steps (Bakıcı et al., 2013; March and Ribera-Fumaz, 2016), multiscalar dimension (Calzada, 2021), and re-politicization of the project (Cardullo and Kitchin, 2019; March and Ribera-Fumaz, 2018). According to Charnock et al. (2021:3), the model has evolved "from a corporate-driven, top-down model to a citizen-centric, bottom-up one." This study agrees that a change in local government affects the development of the smart city model, bringing in new actors and tools for its development. However, our hypothesis is that this shift is more of a gradual transition than a sharp rupture due to the succession of "actually existing" local strategies (Shelton et al., 2015; Leitheiser and Follmann, 2020) built over time.

The rest of this study is organized as follows. The next section presents our analytical framework based on urban governance models and characteristics. The third section presents the research methodology and data. The fourth section analyzes the changes in urban governance models in relation to the smart city of Barcelona over the 2011–2023 period, during which there were two ideologically disparate municipal governments. The fifth section discusses the continuities and discontinuities in smart city policy, while the final section concludes this study by reflecting on the malleability and elasticity of smart cities.

Urban governance and smart cities: old models, new lenses?

The literature on urban governance is huge. Since the 1990s (Colebatch, 2014), the idea that urban policies are designed, thought and delivered by more actors other than local governments has been predominant. Agency is a key unit of analysis in urban governance research, which explores how various actors (e.g., public administrations, businesses, and civic associations) operate in a specific policy sector (Peters, 2014: 305). In respect to smart cities, urban governance provides a conceptual framework through which to address the following questions: Who defines the smart city? What relationships exist between the different actors, both public and private? How these relationships evolve?

To analyze how the development of smart cities affects urban governance, we engage into an institutional approach to urban governance. Quoting da Cruz et al. (2019: 8): "institutional design, mutability, and adaptability are central issues for urban governance". An institutional approach to urban governance considers the institutional embeddedness of cities, the context in which interactions between various actors occur (Mossberger and Stoker, 2001). Institutional context refers to the set of rules and norms as well as the organizations that shape the way in which urban policies, including those pertaining to smart cities, are developed and implemented. Institutional context comprises three core dimensions-namely, the legal and regulatory framework (i.e., the level of decentralization and local regulations related to land use and development), the cultural context (i.e., the values and beliefs of a society), and the historical context (i.e., the history of urban development and preceding policies, which reflect path dependency)—which influence urban policies and governance models. However, two conjunctural elements may alter some of these structural conditions and urban governance models: the political context (i.e., the political ideology and priorities of the ruling government) and the economic context (i.e., the state of the economy) (DiGaetano and Strom, 2003).

Different authors have provided ideal types and modes of governance (for a synthesis, see Howlett and Ramesh, 2014). From an institutional approach, Pierre (1999, 2011) distinguished four main models of urban governance: managerial, corporatist, pro-growth, and redistributive. These urban governance models comprised nine defining characteristics related to policy objectives, policy style, type of actors, the nature of the

exchanges between actors, the key instruments, and the evaluative criterion. However, these are ideal types, and may appear mixed or only work for a particular policy in practice. From our point of view, the major weakness of Pierre's (1999, 2011) classification is that it overlooks the key element of scale of governance (McCann, 2017; Gardner and Hespanhol, 2018).

Several studies have highlighted the importance of the "existing conditions" in which smart cities are developed (Shelton et al., 2015; McFarlane and Söderström, 2017). While the local level—that is, the city or neighborhood—is typically the first scale considered, it is not the only one. Indeed, the global scale (Charnock et al., 2021) has been crucial for the development of smart cities. Afterall, smart city ideas are typically spread through a combination of international collaborations and partnerships, knowledge-sharing initiatives, and the dissemination of information and best practices through conferences, workshops, and online resources. Governments, businesses, and organizations also play a role in promoting and implementing smart city solutions in different regions. Moreover, the development of smart city initiatives in one location can serve as a model or inspiration for similar projects in other cities across the world through policy learning and policy diffusion processes.

Another scale worth considering is that of urban agglomeration. Smart cities face various challenges beyond the municipal level, including transportation, energy, and environmental issues. In view of the commuting patterns and interrelations between the inhabitants of metropolitan areas, an analysis of smart city policies needs to consider the supramunicipal scale (Calzada, 2021). As metropolitan areas usually have larger populations and more diverse economies, they can provide the scale necessary to support the development and implementation of smart city solutions. Implementing smart city solutions on the metropolitan scale should also allow for the more efficient use of resources and shared infrastructure, such as transportation networks. Smigiel (2019) explains how smart city projects in Italy have been implemented together with metropolitan reforms. In this case, the national government has led a territorial reform replacing the second-tier of local government (the provinces) by new metropolitan authorities (*città metropolitane*), under the umbrella of smart city narrative. His research shows the multiscalarity of smart city strategies in Italy and their impact on the reconfiguration of territorial governance.

Based on the outcomes of a university studio, Gardner and Hespanhol (2018) propose a conceptual model to analyze smart city initiatives in terms of engagement, which includes four scales: the metropolis, the community, the individual and the personal. While their study ignores the institutional embeddedness of smart city strategies, it reaffirms their multiscalar nature. This is why we argue that an analysis of smart cities and their impact on urban governance needs to include the scale dimension. In this study, we adapt Pierre's (1999, 2011) typology, delineating four models of urban governance: the managerial, participatory, pro-growth, and welfare models. As Table 1 shows, each model has six characteristics: the objectives, the key actors, the relationships between the actors (i.e., public, private, and civil society), the main tools used to develop the governance model, and the preferred scale of development (i.e., the local, neighborhood or city level and metropolitan and global scale). Note, this study substitutes the corporatist model with a participatory model. As the author argued, the adjective "corporatist" can be confusing in countries like Spain or Argentina, where corporatist regimes refer to pre-democratic regimes (Pierre, 1999: 391). Accordingly, this study refers to this model as participatory.

Characteristics	Managerial	Participatory	Pro-growth	Welfare
Policy objectives	Efficiency	Distribution	Growth	Redistribution
Public-private exe	change Competitive	e Concerted	Interactive	Restrictive
Public-citizen rela	ationship Exclusive	Inclusive	Exclusive	Inclusive
Key actor	Professionals	Civic leaders	Business	Local government
Key instruments	Contracts	Deliberations	Partnerships	Networks
Scale L	ocal/Metropolitan	Local Loc	al/Metropolitar	n/Global Local
Sauraa Adamtad	from Diamo (1000)			

Table 1. Models of urban governance and smart cities

Source: Adapted from Pierre (1999).

More specifically, inspired by the New Public Management philosophy, the managerial model seeks to maximize the efficiency of local management. This model focuses on costs, efficiency, and professional management, thus ensuring a significant role for professionals and the use of contracts as a governance instrument. Emphasis is placed on output performance in a competitive relationship with the private sector, while excluding civil society. The managerial model has both local and metropolitan

dimensions insofar as it pursues a market better suited to public service production and delivery. In contrast, the participatory model's main objective is citizen participation, cooperation with the private sector, and the inclusion of community groups. Therefore, civil society leaders are key actors and deliberative methods are used. While the managerial model prioritizes output legitimacy, the participatory model favors input and throughput legitimacy (Papadopoulus, 2003). The scale also changes, with participatory instruments implemented at the neighborhood or city level.

Meanwhile, the pro-growth model focuses on economic growth through a direct relationship with the private sector and excluding community groups. Public–private partnerships are the key tool, and their nature is multiscalar (local, metropolitan, and global). Indeed, both cities and metropolitan areas compete at the international level in seeking to attract investments, become the headquarters of international institutions, and hold international events. This urban governance model is clearly oriented toward boosting the local economy.

Finally, the welfare urban governance model aims to fight urban inequalities and redistribute available resources. This model is led by the local government and has inclusive relations with civil society and restrictive relations with companies. Governance networks are the key instrument through which redistribution on a local scale is achieved, although some funding comes from other levels of government.

These models express the different relationships that occur in specific policy areas, including smart city policy. However, following the institutional approach, all four models highlight the role of local government and are imbued by values and practices established over time. Although gradual change can occur, these urban governance models are shaped and stabilized by established rules, norms, and values. Following McCann (2017: 323), this urban governance study is concerned with "unpacking the conditions, interests and strategies" that frame the smart city. The case of Barcelona provides empirical evidence to capture the evolution of the smart city strategy and its impact on the model of urban governance.

Methodology

This study analyzes the models of urban governance for smart city development based on the case study of Barcelona between 2011 and 2023, a period comprising three electoral terms. According to Shelton et al. (2015), in order to understand "the actually existing smart city," it is necessary to analyze how the rhetoric of smart cities materializes in mature cities, rather than experimental cities created from scratch, and how such rhetoric is translated into the framework of existing actors and policies. The development of smart cities must be understood within the framework of the evolution of the city itself.

Home to some 1.6 million people, Barcelona is the second largest city in Spain and the capital of the Autonomous Community of Catalonia. Barcelona holds the highest position in several rankings, including innovation, presence of start-ups, and attractiveness for foreign investment in R&D (Barcelona City Council [BCC], 2021a:7). The city comprises 10 districts and 73 neighborhoods, although the only elected representatives are 41 councilors at the city level, who choose the mayor from among their ranks. The city is the core of the broader Metropolitan Area of Barcelona (MAB), which comprises 36 municipalities and 3 million inhabitants. The MAB is an indirectly elected second-tier local government with competencies in urbanism, water and sewage management, and mobility. The MAB has other minor responsibilities in economic development, social cohesion, international relationships, and cooperation. The MAB was created by law from the Parliament of Catalonia in 2010, and constituted after the local elections in May 2011. The metropolitan council consists of 90 members: 36 mayors, and a variable number of councilors determined by municipal population. Leadership over this system has been in the hands of the mayor of Barcelona since 2011. Therefore, the mayor of Barcelona plays a key role in this system, which is characterized by weak decentralization at the city level and weak political construction at the metropolitan level (Vallbé et al., 2017).

To examine the Barcelona case, this study conducted documentary analysis of institutional documentation and plans and 63 semi-structured in-depth interviews with local representatives, public employees, different interest groups, and citizens in a three-phase project.¹ The first phase, 2011–2015, included 25 interviews with practitioners, locally elected councilors, and representatives of civil society. Interviews were conducted in 2015 and focused on identifying changes in urban policies. Specific documentary research on public–private partnerships relating to smart cities was also conducted during this phase. The second phase, 2015–2019, included 23 interviews with practitioners, civil servants, and makerspace users between 2017 and 2018. The third phase, 2019–2023, focused on the metropolitan scale of urban governance and smart

cities and included an additional 15 interviews conducted with practitioners, locally elected representatives and representatives of civil society in 2022.

From the MESSI strategy to citizen's technological empowerment

Smart city policy, 2011–2015

The city of Barcelona underwent significant urban transformation between the democratic transition and celebration of the Olympic Games in 1992. Despite including generous social policies and a complex set of citizen participation tools, since the 1990s, urban policies have been oriented toward economic competitiveness and tourism (Martí-Costa and Tomàs, 2017). The tension between the existence of critic urban social movements and a stable coalition of public-private actors has been deeply analyzed (see for instance Blanco, 2015; Tomàs and Négrier, 2018).

Mayoral leadership was consistently socialist between 1979 and May 2011, when a conservative coalition was elected into power—Mayor Xavier Trias heading the minority coalition government from May 2011 to May 2015. Amidst economic crisis, the MESSI strategy—named after footballer Lionel Messi—became the motto of the new government. Standing for Mobility, E-Government, Smart City, Information and Innovation Systems, MESSI was a city-branding strategy intended to transform Barcelona into a global reference of a smart city. The Trias government began with internal reorganization, merging several departments (infrastructure, urban planning, housing, environment, and TIC) into a single body, Urban Habitat, under chief architect Vicente Guallart.

Here, the BCC's smart city vision was "a self-sufficient city, with productive neighborhoods, human speed, and zero emissions. A productive, open, inclusive, and innovative city, a city alive with enterprising people and organized communities." Simply put, they wanted to create "Many slow cities inside the same Smart City" (BCC, 2013). This strategy was inspired by the EU 2020 strategy on urban innovation and digital agenda, and debated publicly through "Citizen Commitment to Sustainability 2012–2022," which sought to achieve a more equitable, rich, and self-sufficient Barcelona. According to Guallart (2013), the smart city vision was an organic one: the city as a network of networks, a system of systems, an ecosystem with various actors working in collaboration, and different flows monitored through sensors supervised by

a control panel at the City Hall. The Trias government committed to this vision through various projects, including a new orthogonal bus network, teleassistance service for the elderly, open government, a city protocol to set the standards of the smart city, smart parking, a bicycle-sharing system (Bicing), smart school routes, and the creation of a network of Fab Labs (BCC, 2013: 29-31). Although projects like Bicing, teleassistance, and school routes already existed, new technological features were introduced. As technology plays a key role in the implementation of smart cities, so companies able to provide such technology are vital.

This raises the question of the model of urban governance and how the smart city during this period exemplified the specific model's characteristics, namely, the objectives, key actors, relationships between actors (public, private, and civil society), the main tools to develop the governance model, and the preferred scale of development. First, smart city policy during this period sought to achieve three goals: a) greater efficiency in the management of services and resources, b) sustainability, and c) greater opportunities for citizens and companies (BCC, 2013: 26). In the context of economic crisis, the BCC advanced arguments for efficiency and the need to generate wealth and employment. As detailed by two top civil servants at the City Government, in addition to saving taxpayer costs, the development of a smart city would open up new business avenues and opportunities. Here, an alliance between local governments and companies was mutually beneficial. Technology companies offered to test their applications at no cost to the council, which prioritized innovation, thereby transforming the city into a laboratory for testing the pilot projects of utility companies (e.g., water, gas, electricity, and waste removal). In other words, companies anticipated that positive results would be rewarded with further council investment, particularly in a favorable economic context. Consequently, and following Vanolo (2014), the smart city has become a lucrative business with cities as the main customers. Indeed, according to our interviewees, the access of technological and energy companies to city representatives increased under the Trias government, facilitated by the government's desire to make Barcelona a leading example of the smart city (García et al., 2015). In this case, both companies and mayors were the main actors exporting the smart city paradigm (Shelton et al., 2015).

Another key dimension of urban governance is the relationship between the local government and the private sector and civil society. Analysis of the agreements between

the City of Barcelona and technology companies revealed that large companies including Cisco, GDF Suez, Schneider Electric Telvent, Abertis, HP, IBM, Telefónica, Indra, Philips, Ros Roca, and Etra Y+D—received privileged treatment (Tomàs and Cegarra, 2016). As noted, in this urban governance model, the main actors are the local government and companies, which have direct relationships and collaborate through public–private partnerships. However, during this period, the position of the smart citizen was residual. Plans for the creation of a network of public Fab Labs were announced, two of which were opened before 2015.

Finally, in respect to scale, the initiatives of the Barcelona Smart City Project were developed and enacted on a global and local scale. Locally, there were several initiatives related to industrial and talent promotion, including smart city campuses, cluster SC, and urban labs. The primary area targeted by the initiative to establish sensors and attract tech companies was 22@—the old industrial district of Poblenou, which became a technological district in the 1990s (BCC, 2013: 68). Globally, significant efforts were made to attract attention to Barcelona Smart City, including international agreements with the World Bank and the UN to develop projects in the city. The most successful initiatives were the creation of the Smart City Expo World Congress (SCEWC) in 2011, and Mobile World Capital Barcelona in 2012. Every year, both the SCEWC and the Mobile World Congress Barcelona attract executives from the most influential mobile operators, software companies, equipment and utilities providers, and internet companies and organizations, as well as government delegations from across the globe. They have become imperative events for all the global actors interested in smart cities².

However, there was no metropolitan conception of the smart city during this period. Although the Metropolitan Area of Barcelona (MAB) has existed since 2011, the Trias project was limited to the administrative city. As the public employee responsible for smart projects in the MAB comments, some apps and projects were developed in the areas of metropolitan competence (e.g., the management of metropolitan beaches and parks). Nonetheless, there was no metropolitan coordination of the projects in each city, which contrasts with other smart cities like Sant Cugat del Vallès, Viladecans, and Castelldefels, where simultaneous projects were being developed.

In conclusion, between 2011 and 2015, the development of the smart city in Barcelona resembled a pro-growth model with some elements of the managerial model.

The digital city, 2015–2023

The results of local elections in May 2015 reflect the process of political renovation or "the new municipalism" in many Spanish municipalities, including Barcelona, Madrid, Valencia, and Zaragoza. New political formations at the local scale, such as Barcelona en Comú (BeC), and at the national scale, like Podemos, emerged after the 15-M protest movement in 2011, a response to the austerity policies implemented since 2008. BeC is led by Ada Colau, a former housing activist, who formed a minority government, holding just 11 of 41 the councilor seats. Based on the pillars of government transparency and citizen participation, the BeC objectives focus on ameliorating social exclusion and social inequalities, particularly in respect to housing, as well as on democratic regeneration. In terms of structural organization, the BeC uses horizontal decision-making tools that are both thematic and territorial (Eizaguirre et al., 2017). Rather than a mere political party, the BeC presents itself as a movement of confluence with an antiestablishment tendency. Unsurprisingly, Colau's victory was poorly received by the city's private sector, particularly the tourism sector. The BeC has played a critical role in international events, construction of new hotels, expansion of tourism, and proliferation of tourist apartments (Blanco et al., 2020).

Soon after coming to power, the new government altered the orientation of the smart city—no longer deeming it a priority of the municipal government, changing the smart city model. Indeed, the 2016–2019 Municipal Action Program made no mention of the smart city. Instead, the government gradually began promoting the concept of the digital city within the framework of a Digital Transformation Plan entitled, "Transition Toward Technological Sovereignty: 'Barcelona Digital City' Plan" (BCC, 2016). This conceptual change entailed the internal reorganization of the city hall, with the Urban Habitat created by the previous government dismantled and its responsibilities dispersed to other departments. Consequently, the Ecology, Urban Planning, and Mobility Area took responsibility for all issues related to sustainability and mobility, including the superblock initiative, while the Municipal Institute of Informatics was put in charge of implementing the Digital Transformation Plan (Diaz et al., 2021).

The shift from a smart to digital city necessitated a change in public policy objectives. During this period, public policy sought to enhance citizen participation and digital innovation. Although various instruments were used to promote citizen participation, we highlight two: Decidim and the Ateneus de Fabricació. A new opensource software for citizen participation, Decidim—or "We Decide" in Catalan— is a virtual space complementing traditional offline citizen participation processes. The use of online platforms became crucial during the COVID-19 pandemic, and since then it has been expanding. Indeed, according to Borge et al. (2023), the Decidim platform is now used by many other public administrations in Spain and other 19 countries, up to 311 implemented instances. The particularity of Decidim is its collaborative philosophy of free and open-source software, creating a network of developers and users. Since 2016, four versions and many new functionalities have been implemented.

Meanwhile, to strengthen citizens' technological sovereignty and the maker culture, the local government supported the creation of the Ateneus de Fabricació or Fab Labs. These digital manufacturing spaces are equipped with machines and organized in the form of a network, with their management philosophy based on the implementation of a broad system of reciprocal services to help develop projects carried out by groups, individuals, institutions, or companies. In exchange for a service decided jointly by the supervisory staff and the person concerned, anyone can use the tools and machines of Ateneus de Fabricació free of charge (see Diaz et al., 2021).

Digital innovation has become the second pillar of the digital city, especially between 2019 and 2023. Results of the May 2019 elections were close: holding just 10 of the 41 available seats, the BeC formed a coalition government with the Socialist Party of Barcelona to ensure political stability. While the ecology, urban planning, and mobility policy areas remained in the hands of the BeC, the Socialist Party oversaw a new policy area comprising the 2030 Agenda, digital transition, sports, and territorial and metropolitan coordination. This policy area covers all initiatives related to digital innovation, including the creation of the Barcelona Institute of Technology for the Habitat and the Urban Innovation Platform, which united the main actors in the city's innovation ecosystem. Poblenou became the Center for Urban Innovation. Moreover, the implementation of the 2030 Agenda involved a complex system of indicators monitoring the implementation of SDGs at the local level (BCC, 2021a).

In terms of the actors involved, there was a change in interactions from the model of public–private partnerships (PPP) to public private–communitarian partnerships (PPPC). According to Charnock et al. (2021) and Calzada (2021), while the pressure of grassroots movements regarding the development of technological solutions and the governmental approach to ICT were significant under the previous mandate, their ramifications were short-lived. In contrast, after 2015, local representatives were more susceptible to their demands. Indeed, the development of participatory tools and the Fab Lab network was based on the involvement of citizens and non-lucrative associations who manage public makerspaces. Bua and Bussu (2021) argue that the BBC implemented a democracy-driven governance model to institutionalize individual participation. Meanwhile, startups and technological companies have been invited to develop initiatives related to innovation, as have other public administrations, academics, and civic leaders.

The digital city strategy has been implemented on two scales: local and global. Parallel to the development of local programs, Barcelona's presence in international networks and participation in European projects continues to grow. Both the Mobile World Congress and Smart City World Congress Expo (SCWE) have enjoyed a greater number of exhibitors and participants each year. However, the orientation of these congresses has shifted toward social content, with more side events related to citizen technological empowerment and greater diversity in the invited speakers. For instance, the invited speaker at the SCWE 2017 event was the neo-Marxist geographer David Harvey, while previous conferences were led by representatives of leading technological multinationals. The conferences of the congress have increasingly included the topics of democracy, empowerment and citizen participation³. In other words, while remaining an international event, the message and orientation of these congresses have changed. Meanwhile, Barcelona hosted the EIT Urban Mobility (an initiative of the European Institute of Innovation and Technology) in 2018, and is set to become the European Capital of Democracy in 2023.

Table 2 presents changes in the urban governance model with respect to the previous mandate. As Table 2 illustrates, there was a shift from a smart city model based on the promotion of technological projects by the BCC and the leading role of private actors, to one seeking the technological empowerment of citizens and promoting a more participatory governance model.

Characteristics	Smart City (2011–2015)	Digital City (2015– 2023)	
Policy objectives	Economic growth, efficiency	Citizen participation, digital innovation	
Public–private exchange	Interactive	Concerted	
Public–citizen relationship	Exclusive	Inclusive	
Key actor	Local government, business	Local government, citizens and civic leaders	
Key instruments	Public–private partnerships	Public–private– communitarian partnerships	
Scale	Local/global	Local/global	

Table 2. Characteristics of the models of urban governance from the smart city to the digital city, 2011–2023

Source: Own elaboration.

Although these models appear to oppose each other (Charnock et al., 2021), they share several features, namely, the issue of scale and the key role of local government. Bua and Bussu (2021) analyzed the broad changes in the conception of governance introduced by the BeC after 2015. In regard to Smart City policy, they argued that the new government was against neoliberal smart city models and sought to reclaim technological infrastructure and services for socio-communitarian purposes. However, Bua and Bussu (2021: 725) viewed this shift as a gradual one. Accordingly, this study examines the continuities and discontinuities in Barcelona's urban governance models and smart city policies.

Inherited policies: Change with choice

The neo-institutional approach considers radical changes in policies as difficult to achieve. According to this perspective, policy changes are influenced by the norms, rules, and practices of the institutions in which they occur. Neo-institutional theory argues that policy change is not always a linear process but rather a dynamic and contested one. Policy changes can be influenced by different actors or policy entrepreneurs—such as interest groups, political parties, and bureaucrats—who compete for influence and have different agendas (Sabatier, 1999). The election of a new government, such as that led by Colau in 2015, represents a window of opportunity for change. However, studies conducted in Barcelona agree that radical change is fraught with difficulty. Such resistance to change can be understood in terms of the relationships between public and private actors based on a sedimented model of urban governance (Blanco et al., 2020). Indeed, this idea is recurrent in the analysis of specific public policies, such as culture (Barbieri, 2017), citizen participation (Borge & Santamarina Sáez, 2016), and tourism (Russo & Scarnato, 2018).

In the case of smart cities, the approach has shifted toward a more inclusive and participatory digital city. However, rather than scrapping all smart city strategies, the BBC chose to adapt and transform existing policies to cohere with the new vision of the smart city. Inherited policies are often retained because they reflect a consensus established by previous policymakers, due to a perceived need for stability and consistency, or because they are considered effective (Rose and Davies, 1994). Governments have some degree of choice regarding whether to reproduce inherited policies or make changes. This choice is shaped by a number of factors, including political constraints (e.g., having a minority government), institutional structures (e.g., bureaucracy), interest group influence (e.g., policy entrepreneurs), and ideological considerations (i.e., a change of values). In the case of Barcelona, our analysis based on interviews and institutional documentation and plans illustrates that there was a political desire to change the smart city orientation while maintaining some key policies. This is particularly evident in the case of two specific policies, which were inherited but significantly reformed by subsequent governments: namely, superblocks and the network of public Fab Labs.

Superblock policy was developed by the Trias government and developed under Colau. Trias' superblock policy was based on the idea of building self-sufficient neighborhoods through the pedestrianization of large areas, the inclusion of smart urbanism (e.g., sensors for lighting, parking, and air quality), and the increase in green spaces in the city (BCC, 2014). The Trias government designed five superblocks that were developed under Colau's government, with the latter making significant changes in urban design and privileging green axes instead of pedestrian units (BCC, 2021b). This change saw the dismissal of Salvador Rueda, the Director of the Agency for Urban Ecology, 2000–2020, and originator of the superblock concept. Indeed, the debate regarding mobility and "the right to private mobility" was one of the most polemical issues during Colau's last term.

Fab Labs provide the second example of inherited policies with choice (Rose and Davies, 1994). Indeed, the creation of a network of Fabs Labs or a Fab City originated under the Trias government (Guallart, 2013), with significant changes in approach under the Colau administration. Simply put, the idea of developing a network of manufacturing workshops in Barcelona was redesigned to create a privileged space for technological empowerment. As libraries were the key public equipment to alphabetize citizens, Fab Labs are intended to serve as a public space in which to educate citizens regarding the use of ICT and guarantee free access to digitally controlled tools and machines traditionally only available in professional workshops. There are five Fab Labs with different focal areas: social inclusion, employment, environment, entrepreneurship, and innovation. The analysis done by Diaz et al. (2021) shows that these fabrication practices have the potential to enhance the empowerment of the inhabitants of Barcelona.

In contrast, the scale of smart cities remained consistent over the study period, with both governments privileging the local and global scales. Some technological developments occurred at the metropolitan level, such as public apps for information public transportation mobility and parking in metropolitan municipalities. However, metropolitan areas lack a shared vision of "smartness," as evidenced by the bicycle-sharing system. The City of Barcelona implemented its own service bicycle-sharing system, Bicing, in 2007. However, to enable mobility throughout the metropolitan area, a bicycle-sharing system called AMBici is set to be implemented in six metropolitan municipalities in 2023. In view of Bicing, AMBici will not be available in Barcelona. Consequently, someone from another municipality will be unable to enter the City of

Barcelona using AMBici, the change in service requiring that they leave the AMBici bicycle at a station and swap to a Bicing model instead.

While Smigiel (2019) argues that Italy's smart city project prioritizes metropolitan reforms, this does not appear to be the case in Barcelona. Although Calzada (2021) confirmed that the deployment of smart cities occurs at multiple scales, including the metropolitan area, this study found that smart city development in Barcelona remains firmly rooted at the local scale. The City of Barcelona has traditionally been the front-runner in designing and implementing innovative urban policies. This role has not been developed by the national or regional governments, for many reasons, but mainly because urban and especially metropolitan issues are marginal in national and regional politics (for details, see Tomàs, 2023). Although there are several smart city projects scattered across the metropolitan area, there is no metropolitan coordination. Indeed, interviewed for this study, the manager of the MAB agreed that the building of a metropolitan vision has been remarkably slow due to the strength of localisms. This argument was supported both by a City of Barcelona councilor responsible for overseeing digital city and metropolitan coordination and by a municipal councilor outside the government, as well as the other interviewees from the private sector and NGOs. The Decidim platform provides another example insofar as it is intended to facilitate participatory processes with a metropolitan dimension, similar to recent strategic planning processes. According to the general coordinator of the strategic metropolitan plan, although citizens use the Decidim platform to debate local issues, they do not consider it a suitable for metropolitan issues.

This study contends that the failure of a smart metropolitan area is due to a distinct lack of policy entrepreneurs, in contrast to the Italian case, where the national government has led metropolitan territorial reforms (Smigiel, 2019). As Charnock et al. (2020) and Calzada (2021) show, grassroots movements were active during the Trias government, prompting a more democratic and inclusive vision of the smart city. Under the mayorship of Ada Colau, civic leaders were able to influence the government. However, there have been no such figures advocating metropolitan smart areas or channels through which to influence metropolitan-level policy. Indeed, the MAB is an unknown entity to the public and generally perceived as a technical administration (Vallbé et al., 2017). Smart city policy reflects this lack of a metropolitan vision.

Conclusion

The development of smart city strategies is a challenge for urban governance. As da Cruz et. al (2023: 2) point out: "urban governance research has been dominated by case studies or by theoretical claims with little empirical support". This study addresses a hitherto overlooked relationship in smart city development, namely, the linkages between governance model, urban politics, and smart city policy (Smigiel, 2019: 337). Although based on a single-case work, this research provides empirical insights for the analysis of urban transformations by smart cities, contributing to the literature both on urban governance and smart cities. The analysis on Barcelona confirms the idea that "governance is by no means a one-size-fits all proposition, but the number and character of sizes in which it comes is an empirical question" (McCann, 2017: 321).

This study posits the following observations. First, the concept of smart cities is plastic and malleable, and can adapt to opposing models of urban governance. Indeed, the case of Barcelona demonstrates its ability to suit both a neoliberal project and participatory model. Second, smart city policies are characterized by gradual change rather than radical change. Even if some actors are more predominant in one phase than another (e.g., business versus civic leaders and citizens), public-private relationships tend to remain stable. For instance, the Colau government adapted existing policies to serve its objectives of technological empowerment and digital innovation.

Another contribution of this study is its adaptation of Pierre's (1999, 2011) typology to highlight the importance of scale in urban governance. In the case of Barcelona, the metropolitan dimension remained absent in both governments, with smart and digital cities implemented at a local scale while simultaneously seeking international recognition. Indeed, following the comparative analysis of Joss et. al (2019: 24), the case of Barcelona displays a strong international narrative, which reinforces the smart city as globalizing activity. In contrast, and differently to other contexts, like Italy (Smigiel, 2019) there has been neither a competing narrative nor a policy entrepreneur at a metropolitan scale. This raises the question of the development of smart cities beyond municipal borders, underscoring the need for further research on the question of scale, especially metropolitan scale.

Further research is also needed to understand the impact of smart cities on citizens. One of the first projects launched by the Trias government was the creation of a platform for open-source sensors known as Sentilo, which collects real-time data on environmental and mobility issues that are available to the public through open-source software. The proliferation of sensors has transformed the city into a monitored and measured environment. In this respect, it is worth probing whether the change in government and perspective on smart cities has resulted in a shift from a city monitored by sensors to citizens-as-sensors (Sheldon and Lodato, 2019), or if there has been a rise in technological empowerment since 2015. A recent study based on the case of Hong Kong' protests argues the existence of the "insurgent smart city" (Stokols, 2023), as the next form of smart city where there is a real digital citizenship. Here again, the question whether this democratic potential is multiscalar or rests anchored in the municipal scale is to be explored.

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- ² In the SCWE 2022 edition, there were 20,423 in-person attendees; 28,621 online attendees; 853 exhibitors; more than 400 speakers and 149 side events. Information available at: https://www.smartcityexpo.com/2022-highlights/ Accessed 25th July 2023.

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