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## A comparison of selected Western and Chinese smart governance: The application of ICT in governmental management, participation and collaboration<sup>☆</sup>



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### ABSTRACT

There has been increasing scholarly interest in the concepts and practices of smart governance. However, there is a lack of comparative studies of smart governance in different institutional contexts. This study develops a framework for comparing smart governance in different institutional and technological contexts. Comparative and discourse analyses are conducted to understand the similarities and differences of smart governance practices in selected Western countries and China. A key finding of this study is that different institutions have largely affected smart governance strategies, arrangements and outcomes. Smart governance is tightly linked with e-governance and e-democracy in some Western countries, while it officially emphasizes smart management and service in China. A common aspect is that the increasing use of social media, smartphones, portals, crowdsourcing platforms, and planning support systems have generally promoted smart governments and services, e-participation, and wider collaboration through both top-down and bottom-up approaches. This could lead to gradual changes in government organizations, new relations between governments, the private sector and citizens, and improvements in the city.

### 1. Introduction

Smart city pilot projects have been implemented in many countries in the past few years. However, the concepts and indicator systems of smart cities are often distinct in different institutional, social, economic and technical contexts. These differences have contributed to various conceptualizations and characteristics of smart governance. In Europe, an indicator system that includes smart economy, smart people, smart governance, smart mobility, smart environment, and smart living (Giffinger, Fertner, Kramar, Meijers, & Pichler-Milanović, 2007), has been widely used by researchers and policy-makers to measure smart cities. As a key component of smart cities, smart governance refers to participation in decision-making, public and social services, transparent governance, and political strategies and perspectives (Giffinger et al., 2007). In the United States, smart city pilot projects have been initiated to help communities tackle local challenges and improve city services through collaboration. A recent report from the National League of Cities (<http://www.nlc.org/>) shows that 66% of American cities are investing in smart city technology for municipal operations or services. Smart governance is smart, open and agile governmental institutions as well as stakeholder participation and collaboration

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on all levels and in all branches of the governing process (Scholl & Scholl, 2014). It is expected to help effectively address the key challenges to 21st century societal and individual well-being, such as the rapidity of change and the lack of timely and effective government intervention (ibid). In China, the central government has initiated three batches of smart city pilot projects with a total number of 277. Smart cities aim to integrate various information resources, improve urban management and service, and promote industrial transformation (National Development and Reform Commission, 2014). According to the official indicator system called “The Pilot Index System for National Smart Cities (District, Town) (For Trial Implementation)”, there is four key indicators for a smart city pilot project, including security system and infrastructure, smart construction and livability, smart management and service, smart industry and economy (MOHURD, 2012). It should be noted that the Chinese official indicator system doesn't have the term of “smart governance”. A related term is “smart management and service”, which emphasizes the integration, openness and use of datasets for governmental management and service, basic public services, and targeted application. This term is related to “public and social services”, which is a key factor of European smart governance (Giffinger et al., 2007).

However, the existing literature on smart governance is mainly attuned to Western countries. There is a lack of studies on comparing smart governance in democratic contexts with that in other institutional contexts. China is an interesting case for this comparative study, since it has authoritarian institutions that are different from democratic institutions of most Western countries. Although the rapid development of smart cities in China has attracted a lot of attention from international scholars, the private sector and policy-makers, many issues make the concepts and practices of smart governance in general unknown and questioned. On the one hand, smart governance in China is officially related to “smart management and service” (MOHURD, 2012). “Governance” is also an emerging new concept in China, referring to the increasingly collaboration between the government, the private sector and actors from society in urban regeneration (Lin, Hao, & Geertman, 2015). On the other hand, the reports of smart city development in China are often published in Chinese, leaving them unknown to the majority of international scholars.

Therefore, this study is an attempt to fill the gap by comparing the similarities and differences of smart governance in selected Western countries and China. The comparison focuses on several key components, namely of contextual factors (especially institutional contexts and Information and Communication Technologies (ICT) infrastructure), and smart governance strategies, managements, and outcomes. The results show that contextual factors such as specific institutions have largely influenced smart governance strategies and arrangements. Smart governance is tightly linked with e-governance and e-democracy in Western countries, while it officially emphasizes smart management and service in the Chinese context. Nevertheless, the increasing use of social media, smartphones, portals, crowdsourcing platforms, planning support systems, and other new technological products have generally promoted smart governments and services, e-participation and wider collaboration. This could lead to gradual changes in government organizations, new relations between governments, the private sector and citizens, and improvements in the city.

The article is structured as the following. It firstly has a critical review on the concept of governance and different smart governance conceptualization, and establishes a framework for the comparative study in section 2. The methodology is explained in section 3. This article then respectively studies contextual factors, smart governance strategies, arrangements and outcomes in some Western countries and China in section 4 and 5. It discusses the similarities and differences of smart governance in section 6.

## 2. Literature review

### 2.1. The concept of governance

The term of “governance” is crucial to understand the concept of smart governance. It is used in a variety of contexts, but generally refers to all forms of social coordination and patterns of rule (Bevir, 2012). According to Cariño (2003), governance is about management rather than control, “because its system is permeable, admits of outside influences, assumes no omnipotence or omniscience on the part of the decision maker, and subjects decision to the evaluation and critique of all those with a stake in them.” She indicates that the state is an enabler that provides the legal and regulatory framework and political order within which the market and civil society can plan and act. Governance is thus the process of interaction and decision-making among the stakeholders involved in a collective issue (Hufty, 2011). This process can take place on local or international levels, and affect different policy fields and multiple temporal scales (Lange, Driessen, Sauer, Bornemann, & Burger, 2013).

It is widely argued by scholars that there has been a shift from “government” to “governance” in western countries in the context of globalization and network society since the 1970s (e.g. Healey, 1997). China is often considered as having a top-down institution and dominated by government-led approaches. However, recent studies show that there are emerging modes of governance in urban redevelopment, which are formed based on the relationships between state, market and society (e.g. Lin et al., 2015).

### 2.2. A framework for understanding smart governance in different contexts

Several scholars attempt to formulate a definition of smart governance. However, the term is a fuzzy concept that is not used consistently within the literature. Some scholars define smart governance as ICT-based governance that presents a collection of technologies, people, policies, practices, resources, social norms and information that interact to support city governing activities (Chourabi et al., 2012), while others consider smart governance as good practices in involving citizens in transparent, participative and accountable governance activities (e.g. Van Winden, 2008). Although scholars have not yet reached agreement on the concept of smart governance, the existing literature reflects that there is an increasing influence of ICT on urban governance in the fields of governmental management and services, stakeholder collaboration and citizen participation (Pereira, Cunha, Lampoltshammer, Parycek, & Testa, 2017).

First, big data, data warehousing, and monitoring tools are used to strengthen the information basis of the central or local government (Batty et al., 2012; Leydesdorff & Deakin, 2011). Sensors and systems produce citizen-centered big data, which could support citizen-centered urban governance decision-making (Ju, Liu, & Feng, 2018). There are also emerging governmental portals to provide online services and managements. Many cities in the world claim that they have promoted e-administration, smart government, or smart services.

Second, ICT allows cities to empower and educate their citizens, who can have capable of engaging in a debate about their living environment (Allwinkle & Cruickshank, 2011). Social media, the Internet, and open data, are widely used to enable citizen participation in urban governance (Hoon, Phaal, & Lee, 2013). Ferro, Caroleo, Leo, Osella, and Pautasso (2012) argue that the combined diffusion of social media and computer-based simulation in policy making could lead to significant improvements in the management of smart cities by enabling value-driven, data-intensive and participative governance models. The use of ICT to enable citizen participation often refers to e-participation or online participation in practice.

Third, as pointed out by Batty et al. (2012), new technologies provide new ways for the interaction and collaboration of citizens, governments, businesses, and various agencies in augmenting their understanding of the city. Similarly, Kickbusch and Gleicher (2012) indicate that the main characteristic of smart governance is co-produced collaboration, in which government and all relevant actors in society scrutinize power and authority in order to increase resilience and adaptability. Torfing, Peters, Pierre, and Sorensen (2012) suggest that future research could strengthen the connection between smart governance and collaborative governance. Dameri and Benevolo (2016) study the roles of local governments, nongovernmental agencies, and administrative officials, and indicate that it may be useful for involving citizens and civil society in governing smart cities. Some scholars thus argue that smart governance can help to build a balanced relationship between state, market, and civil society, reconciling conflicting principles and values.<sup>1</sup>

The mentioned governmental managements and services, citizen participation and stakeholder collaboration are related to “smart governance arrangement”, which is one of the key dimension of smart governance addressed by Meijer and Bolivar (2016). Based on a critical review of the existing literature, Meijer and Bolivar (2016, pp.1) define smart governance as “a complex process of institutional change and acknowledge the political nature of appealing visions of socio-technical governance”. They find four types of conceptualization of smart governance in existing studies: 1) governance of a smart city; 2) smart decision-making processes and the implementation of these decisions; 3) smart administration; and 4) smart urban collaboration between various actors in the city. Bolivar and Meijer (2016) then identify several key elements of smart governance. The key elements include the use of ICTs, external collaboration and participation, international coordination, e-administration, and outcomes. They develop a new model of smart governance, which includes three main dimensions: strategies for implementing smart governance, smart governance arrangements, and outcomes of smart governance.

- *Strategies for implementing smart governance*: an integrated vision/idea and actions (e.g. legislation, policy, etc.) that are needed to transform the organization toward forms of smart governance.
- *Smart governance arrangements*: the use of technology and innovation capacity for collaboration and participation, international coordination, decision-making, and e-administration in connected organizational processes.
- *Outcomes of smart governance*: first order outcomes (changes to government organization), second order outcomes (changes in position of government and other urban actors), and third order outcomes (improvements to the city)

Bolivar and Meijer (2016) suggest that this model can be used to identify smart governance configurations, analyze the impact of smart governance, and explain differences in configurations. They indicate that all dimensions need to be adequately dealt with to generate not only first-order outcomes, but also second-order effects, and, most importantly, third-order outcomes. They recommend that future research should analyze how smart governance is influenced by contextual factors such as administrative cultures, political or demographic factors, and technological factors.

The mentioned model is helpful to understand the different configurations, characteristics and impacts of smart governance. However, since China and Western countries have distinct institutional, social and technological contexts, it is also important to consider the influence of contextual factors on smart governance. Therefore, this research adapts the model developed by Bolivar and Meijer (2016) by including two new dimensions, namely of “contexts” and “ICT” (Fig. 1), to understand empirical evidences in China and Western countries.

- *Contexts*: It is common knowledge that Western countries and China have substantial differences in term of institutional contexts. The former is often considered as having democracy institutions (with different forms of democracy in different countries), while the latter is recognized as having top-down institutions or being characterized by authoritarian deliberation which refers to government control with a certain degree of deliberation and participation (He & Warren, 2011). Moreover, social, economic and environmental challenges associated with urbanization are key drivers of the development of smart cities. They influence the choice of smart governance models and related strategies and actions. In planning literature, institutional and social contexts are often considered as important for innovation capacity of a place, including governmental arrangements (e.g. Healey, 1997).
- *Information and Communication Technologies (ICT)*: The existing ICT infrastructure (e.g. internet penetration rate, broadband)

<sup>1</sup> Smart governance’ enhances social cohesion in Korea. Accessed 24 August 2009, from <http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan043118.pdf>

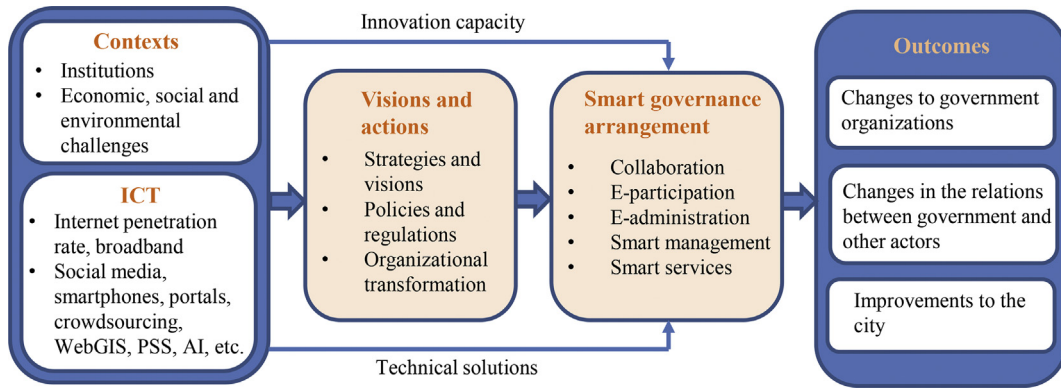


Fig. 1. A framework for understanding smart governance in different contexts.

provides a basic foundation for the implementation of smart governance. Western countries (especially Western Europe and America) have relatively good ICT infrastructure, while China have recently developed its ICT infrastructure. Although Chinese Internet is highly controlled by the state, the wide use of social media (e.g. Chinese Twitter –Weibo) in recent years has facilitated online participation and collaboration (Deng, Lin, Zhao, & Wang, 2014). As indicated by Bolivar and Meijer (2016), technical solutions are crucial to smart governance arrangements. New technological innovations (social media, smartphones, portals, crowdsourcing, web-based geographic information systems (WebGIS), planning support systems (PSS), etc.) have increasingly impacted on smart governance in an international context (Lin & Geertman, 2015). A recent report of Stanford University shows that Artificial Intelligence (AI) is already having or is projected to have the greatest impacts on several aspects of cities, including management and services.<sup>2</sup>

Besides, smart management and smart or e-services are also added as two important factors for the dimension of “smart governance arrangement”. They are emphasized by both Western and Chinese literature. Smart management and service is one of the key indicators of smart cities in China (MOHURD, 2012), while integrated urban management and e-services are crucial to smart governance in Europe (Paskaleva, 2009).

In sum, institutional, social, economic and environmental contexts as well as ICT infrastructure have influenced the adoption of strategies (visions and actions) by central and local governments. According to these strategies, a series of smart governance arrangements have then been implemented. Since China has more forms of top-down approaches and lack effective participation mechanisms, smart management and service may receive more official supports or institutionally embedded while collaboration and e-participation could be a big challenge to governance processes. These differences could also affect diverse outcomes of smart governance in both Western and Chinese contexts.

### 3. Methodology

This study is mainly based on an extensive review of key literature, research reports, index systems, national and local policies and documents, and smart city projects in some Western countries and China. These index systems provide the foundation for the comparative study. They include an indicator system that has been widely used by researchers and policy-makers to measure smart cities in Western countries (Giffinger et al., 2007), and the national index system in China - the Pilot Index System for National Smart Cities (District, Town) (For Trial Implementation) (MOHURD, 2012). A wide range of well-known case studies are used to elaborate the differences and similarities of smart governance in selected Western countries and China. Data for the case studies are mainly collected from governmental portals as well as smart city and smart governance project websites via Google and Baidu (the largest search engine in China). Other resources include digital newspaper archives, academic literature, and relevant published materials. In addition, this study includes the outcomes of observation of different practices of smart governance in both contexts.

Discourse analysis, which unravels the meaning of texts and other forms of communication in their social and institutional contexts, is adopted to analyze smart governance contexts, strategies and arrangements in some Western countries and China. This research employs two key dimensions of discourse analysis developed by Fairclough's approach (1995). First, text analysis entails the study of the texts of documents, policies, reports and other materials. Second, social practice requires a study of discourse in relation to wider power structures and social and cultural contexts. A comparative analysis is also conducted to understand the similarities and differences of Western and Chinese smart governance. The comparison of empirical works is guided by the mentioned conceptual framework.

<sup>2</sup> Artificial intelligence and life in 2030. Accessed 6 September 2016, from [https://ai100.stanford.edu/sites/default/files/ai100report10032016fnl\\_singles.pdf](https://ai100.stanford.edu/sites/default/files/ai100report10032016fnl_singles.pdf)

## 4. Smart governance in selected western countries

### 4.1. E-democracy and e-governance

Since many Western countries often have democracy institutions, smart governance is related to democracy or “e-democracy” (through e-governance and e-participation). Based on the survey of 70 medium-sized cities in Europe, Giffinger et al. (2007) point out that smart governance comprises aspects of political participation, services for citizens, and transparency governance. “E-governance” has emerged as an important factor for driving urban transformation. It generally referred to as rules, processes and behavior that affect the way in which powers are exercised at different levels, particularly as regards openness, participation, accountability, effectiveness and coherence. For instance, a detailed stakeholder requirement analysis undertaken by the *IntelCities* Consortium between 2004 and 2007 had consolidated the work in the area as the basis of developing a city e-governance framework, which is regarded representative of the specifics of all user groups and relevant to a range of strategic policy agendas (Paskaleva, 2009). This framework is closely linked with “e-government”, which EU regards as a means of achieving world class administration and services, as well as a major economic boost, and “e-democracy” which calls for more public participation in governance and community development (ibid).

Recent EU reports show that smart cities with a focus on smart governance have been only implemented in some countries such as France, Spain, the Netherlands, the United Kingdom, Germany, Italia and Swiss, whereas other western countries emphasize other pillars of smart cities (e.g. smart mobility, smart energy) (Manville et al., 2014). Smart governance solutions include open service platforms where the government creates an interface to open government data and services for entrepreneurs and citizens (ibid). It addresses poverty and social exclusion through measures, e.g. using e-government services and open data to improve quality of life, citizen connectivity and participation. It seems that smart governance in Europe have increasingly emphasized on more democratic and participatory processes. Nevertheless, a new issue is properly that how the results of a participatory process (direct democracy) can be united with the existing political settings of government (representative democracy) (Geertman, de Klerk, Radstaak, & van Straalen, 2018).

### 4.2. E-government and e-services

E-government is one of key components of smart cities in European cities (Caraliu, Bo, & Njikamp, 2011). For instance, government forms can be downloaded from the website of the municipal authority, and administrative forms can be submitted electronically. As addressed by Meijer and Bolivar (2016), the main aspired outcome produced by the smart governance system is efficient public administration, with a focus on more efficient government, and citizen-centric services. The outcomes are expected to promote economic growth, a more participatory government, and a citizenry increasingly aware of the need of environmental protection.

For instance, the City of Edinburgh Council's Smart City Vision (<http://www.smartcities.info/edinburgh>) focuses on e-government infrastructure to improve the performance and delivery of public services while supporting access and participation. A number of projects are underway in the Council, including smart cities pilots to deliver customer services strategy and improve the council's services. One of the examples is that Web Service Pilot replaces the web content management system of the council and develops a new council website and intranet to develop its web presence and deliver both financial and time efficiencies and an improved customer experience. The Business Process Change pilot incorporates both lean thinking and customer journey mapping approaches into a strategy to improve internal business processes.

### 4.3. Collaboration, community engagement, and e-participation

According to Batty et al. (2012), there are at least four modes in which ICT supports citizen participation; 1) portals to add useful information about living and working information; 2) interaction with software that enables citizens to learn about the city; 3) crowd-sourced systems for queries and uploading information; 4) decision-support systems for citizen participation in making planning proposals. Recent practices show that there is an increase in e-participation, community engagement, and collaboration in western countries.

For instance, Amsterdam Smart City (<https://amsterdamsmartcity.com/>) is based on a business, government, and community partnership pursuing a project portfolio with a focus on energy saving in the form of “Sustainable-Work, Living, Mobility, and Public Spaces”. This platform organizes smart collaboration between municipalities, knowledge institutions, enterprises, and citizens to develop creative, innovative and sustainable solutions. One of the projects is societal interface lab which refers to effective inclusion of citizens in urban innovation through playful dialogue. Another project is to create a coalition of solar experts to realize a floating solar platform for powering Startup Village with floating solar panels in the Amsterdam Science Park. It allows the participation of all institutes, companies, students and researchers in the science park in the process.

The Administration of USA also announced new smart cities initiative to help communities tackle local challenges and improve city services in 2015. One of the key strategies is to collaborate with the civic tech movement and forge intercity collaborations. This announcement indicates that there is a growing body of individuals, entrepreneurs, and nonprofits interested in harnessing technologies to tackle problems of communities and work directly with municipalities. Collaborations across communities are likewise indispensable in order to help cities level their data to develop new capacities. International collaboration is also required to develop smart approaches to enhance the future of cities and improve the quality of life.



More importantly, recent technical innovations (e.g. WebGIS, PSS, smartphones, crowdsourcing platforms, AI) provide new ways of interaction, participation and collaboration. For example, professionals in Finland have developed SoftGIS (a type of WebGIS) to facilitate online participation and collaboration in urban planning. A number of cases could be found in Maptionnaire Map ([www.maptionnaire.com](http://www.maptionnaire.com)). The extensive coverage of broadband Internet, i.e. 98% of homes in Finland have access to basic broadband (European Commission, 2011), makes the web an ideal platform for public participation and collaboration. In the Helsinki 2050 master planning, citizens can use SoftGIS tools to fill in online questionnaires about topics such as preferences for living environment and make planning proposals by pinpointing appropriate locations for new building sites (Kahila, Broberg, Kytta, & Taylor, 2016). Since the links of these tools could be opened in smartphones and forwarded in social media, they attracted a large number of citizens to participate in the planning process.

There are also emerging forms of community governance, which are based on neighborhood blogs and forums established on social media (e.g. Twitter, WhatsApp, and Facebook) and websites. Due to the economic crisis, several European countries are implementing austerity measures, alongside longstanding trends of welfare retrenchment (Kleinhans, van Ham, & Evans-Cowley, 2015). As a result, many cities are experiencing a surge in place-based technical initiatives, including government initiated, grassroots activism, and collective networked actions to foster civic engagement in urban regeneration (ibid). Citizens are organizing themselves around a wide range of societal themes through social media platforms. New forms of social organization arise that are sometimes referred to as the civic economy and the participating or sharing economy, resulting in new patterns of urban transformation. New challenges may include the requirement of new policies to support community engagement and solve social exclusion, and the understanding of new roles of citizens, decision-makers and other actors.

Simultaneously, government and institutional organizations in Europe are increasingly using social media and social networking sites (SNS) to communicate with citizens.<sup>3</sup> Especially local governments use SNS to create a new channel for two-way communication and collaboration with citizens, engaging them in the design and delivery of policies. However, governments are facing several new challenges that undermine their own efforts and limit the potential and effectiveness of SNS to deliver improved communication and collaboration (ibid). These challenges include guaranteeing privacy, data protection and defining clear roles and responsibilities.

## 5. Smart governance in China

### 5.1. Contexts, ICT infrastructure, and smart city initiatives

China is often considered as having top-down institutions and dominant by government-led approaches. However, increasing social, environmental and economic issues associated with rapid urbanization have pushed the Chinese government to adopt public deliberation as supplements to authoritarian decision-making (He & Warren, 2011). Three decades of economic transition, which is a triple process of decentralization, marketization and globalization (Li & Wei, 2010), have produced internal migrations, generated severe environmental and social problems, and reduced the overall capacities of the state to engage in command and control government (He & Warren, 2011). Urban planning practices have increasingly confronted with complex issues, such as social conflicts owing to complicated property rights and displacement of marginalized groups (Lin et al., 2015). In order to solve these issues, the Chinese government has adopted “authoritarian deliberation” (He & Warren, 2011) that refers to two trajectories of political development: the increasing use of deliberative practices stabilizes authoritarian rule, and deliberative practices serves as a leading edge of democratization. The Urban-Rural Planning Law was thus enacted in 2008 to legalize public participation. It has facilitated a shift in planning paradigms, from top-down approaches to the coexistence of top-down and collaborative approaches.

With the rapid development of ICT, the Chinese Internet becomes the world's largest network in terms of users and number of websites. The internet penetration rate rapidly increased from 1.8% in 2000 to 52.2% in 2016; China's netizen population reaches 721 million.<sup>4</sup> Digital disparities in China have dramatically decreased at the provincial level, but the urban-rural digital gap has widened (Loo & Wang, 2017). The websites and social media (particularly Weibo and WeChat) become important platforms for the interaction and communication between the government and citizens (Zhou & Wang, 2014), citizen participation, and collaboration (Lin & Geertman, 2015).

Since 2009, smart cities have been promoted in China, initially relying on strategic cooperation with big ICT firms like IBM and Cisco. In 2012, the Ministry of Housing and Urban-Rural Development (MOHURD) released “The Notice on Carrying out National Pilot Smart Cities” and issued “The Interim Measures for the Administration of National Smart Cities” and “The Pilot Index System for National Smart Cities (District, Town) (For Trial Implementation)” to start the application of pilots cities in the national scale. During 2013–2015, the central government had approved about 290 smart city pilot projects. About 210 cities of the total 670 cities in China had smart city pilots.

Chinese governments play a major role in financing, developing and operating smart city projects (Li, Lin, & Geertman, 2015). There are two main modes of finance and operation: 1) the government is fully responsible; and 2) public-private partnerships (PPPs) are used (Qiu, 2013). The first mode is the dominant one, in which the government purchases smart city products and services from the private sector and is responsible for all other aspects of smart city projects. In PPPs, national, provincial and municipal

<sup>3</sup> Policy recommendations for government use of social media for collaboration with citizens. Accessed December 2017, from <https://jpi-urbaneurope.eu/app/uploads/2017/12/Policy-Brief-SmartGov-171215-1.pdf>

<sup>4</sup> China Internet Users. Accessed 1 July 2016, from <http://www.internetlivestats.com/internet-users/china/>

**Table 1**  
Three sub-indicators of smart management and service (MOHURD, 2012).

Smart management and service	Governmental services	The leading role of government in establishing ICT-based governmental service systems
	Basic public services	The use of information technology to enhance the basic public education, the management of urban employment, social security, social services, health cares, entertainments, and the provision of social housing
	Specific applications	Smart managements and services in the fields of transportation, energy, environment, land, security, logistics and communities

governments have respectively collaborated with the private sector in financing, constructing and operating smart city projects.<sup>5</sup> The public and private sectors share the risks, costs and benefits of projects. There are several modes of PPPs, such as build-operate-transfer (BOT), build-transfer (BT), build-own-operate (BOO), and build-transfer-operate (BTO) (Li et al., 2015). For instance, in the mode of BOT, the private sector funds, constructs and operates the projects, which will be then transferred to the government after some years. However, even in PPPs, the governments especially the national government still play a main role in finance (Shi, 2018). In the future, the private sector will play a more important role in the construction of smart cities, while the government will mainly focus on making related regulations, plans and policies (Li et al., 2015).

## 5.2. Smart management and service

The Pilot Index System for National Smart Cities (MOHURD, 2012) shows that smart management and service is one of the key indicators of smart cities in China. This indicator has three sub-indicators, namely of governmental services, basic public services, and specific applications (Table 1). In practice, smart city pilot projects in China mainly focus on smart government affairs, smart transportation, and smart public services (CETSRI, 2013). In particular, smart government affairs have been widely advocated and implemented. Many local governments have established e-government infrastructure to integrate information resources of the city, districts, and work units in order to promote interconnection and share information. There are increasingly cross-sectoral linkage businesses and online administrative approvals to optimize the processes of government works.

In a recent report of Chinese Academy of Social Sciences, “smart management” and “smart service” were used as two important indicators for assessing smart cities in China (CASS, 2015). Smart management refers to online governmental management and services, public resource exchange platforms, and the participation degree of social media; while smart service is related to the service level of socialized people’s livelihood and open data. This assessment indicator system was applied to assess smart city construction in 151 Chinese cities in the past five years. The evaluation outcomes show that smart management has been widely implemented by local governments, while smart service has received less attention. Only the top 10 smart cities (Wuxi, Shanghai, Beijing, Hangzhou, Ningbo, Shenzhen, Zhuhai, Foshan, Xiamen and Guangzhou) have a balance in the implementation of smart management and smart service. Local governments in these cities have cooperated with the private sector and institutions to integrate information service platforms and urban databases for smart management and service. Here are two examples.

**Smart City Housekeeper in Foshan:** The local government of Zhangcha district in Foshan city has cooperated with a property management company to establish a “Smart City Housekeeper” system since 2014. “Smart City Housekeeper” has established a smart urban service management system, a cooperative and integrated Smart City Housekeeper Command Center, and a specialized service team for Zhangcha district. The local government also cooperated with several departments of the municipal, district and street governments to establish an integrated operation system of multi interactive public service.

**Smart Governance for Lujiazui Community in Shanghai:** New technologies were used to integrate public services and management, community activities, and local resident participation. More specially, the local government of Lujiazui in Shanghai cooperated with ARUP and technological companies to establish an integrated information service platform for community governance and service. This platform integrates home affairs, public services, business, and life information (Shi, 2018). It has four sub-platforms:

- Integrated information platform of the community: this platform effectively collects the information of residents, buildings, properties, events, and work units in the community, and exchange and share the information;
- Smart city card: local residents can use this card to access the services of the community;
- Public service platform (e.g. health, elderly care, education, public affairs, etc.): community residents can use computers and smartphones to acquire the information of public services and participate in interactive activities;
- Community public management platform (real-time monitoring of community operation and response to community affairs, combined with Internet of Things): it includes geographic information system, public facility management systems, and parking management system.

Therefore, smart governance in China is officially related to smart management and service, rather than the interaction and collaboration of various actors and the engagement of citizens in decision-making processes. This is influenced by the existing Chinese political and institutional system. The Chinese government uses new technologies as tools to effectively manage government

<sup>5</sup> CMIC: Smart city PPPs like “loud thunder, little rain”. Accessed 12 April 2017, from <http://www.ccidreport.com/market/article/content/3726/201704/635793.html>

affairs, provide public services, and systematically integrate datasets of different sectors.

### 5.3. Online participation and collaboration

In practice, the implementation of “smart management and service” as well as the construction of “public platforms and databases” which is a sub-indicator of smart cities (MOHURD, 2012), not only help the government to manage data and inform citizens through online platforms, but also facilitate online public participation as well as more interactive and collaborative governance in urban planning.

An example of formal participation is the “Online Public Participation Platform (WebGIS) of Wu Town”, which was established in smart planning of Wu town in 2015 (Wang, 2018). Citizens could access to the platform by using their social media (WeChat) in smartphones. They could view the information of the planning, and posted their comments on it. These comments were then used by local governments and urban planners to adjust the planning. Another case is the “Wuhan Crowdsourcing Planning Platform” (<http://zg.wpdi.cn/>), which is owned by Wuhan Land Resource and Urban Planning Bureau and supported by a local research institute. Through this platform, citizens could participate in urban planning. For example, in the Donghu's Greenway Planning, citizens could see the information of the site and map the desiring greenways as well as the location of parking places, entrances and amenities. Generally speaking, there is an increase in formal online participation platforms in planning practice in China. This new trend has been largely facilitated by the widespread use of social media and smartphone apps, growing possibilities for data exchange, expanding cloud computing, emerging WebGIS and PSS in recent years. It is also promoted by local governments, technical experts, and urban planners.

Besides, there is increasingly bottom-up participation and collaboration based on the platform of the Internet and social media. Marginal social groups, civil society organizations and experts use online forums and social media to interact with the government in planning practices, especially those related to environmental and heritage protection. For example, citizens in Nanjing used microblogs and city forums to oppose the felling of old trees to make way for a new subway project, and forced the local government to communicate with them and adjust the project (Yan & Zhu, 2013). Another example was the adjustment of No.55 bus route which was a historical bus route in Shanghai. A Weibo message about the abolition of the bus route was forwarded by a popular magazine called WOW to about one thousands of followers (including citizens, experts, etc.) ([http://www.weibo.com/1945139410/yaatAsdh6?type=comment#\\_rnd1455891039424](http://www.weibo.com/1945139410/yaatAsdh6?type=comment#_rnd1455891039424)). Since a large number of citizens posted their comments on this message and expressed their nostalgia for the bus route, the local government was pushed to interact with citizens and revise the transportation plan (Zhao, Lin, & Derudder, 2017). In sum, grassroots participants have increasingly used social media, SNS and the Internet to communicate, and interact with the government. Although many bottom-up approaches have failed to change decision-making, some of these participative processes have created new institutional capital and reframed new power relations between the government and grassroots participants.

## 6. Discussion and conclusion

This study contributes to theoretical and empirical research on smart governance. It establishes a framework for understanding smart governance in different contexts and investigates case studies in selected Western countries and China. In the framework, contextual factors are considered to have an effect on smart governance strategies, arrangements, and outcomes. Smart governance arrangements include smart government and services or e-administration, collaboration and participation, while the outcomes could be changes in government organizations, the relations between government and citizens, or urban improvements. This framework guides the empirical study on Western countries and China. A number of differences and similarities of smart governance in these two contexts are finally identified (Table 2).

There are different contextual factors of smart governance in selected Western countries and China. The former is often characterized by democracy institutions and have issued regulations and policies to support participation and collaboration for a long time, while the latter is dominated by top-down institutions and citizen participation has recently been legalized in the planning system. Furthermore, smart governance is response to different social, economic and environmental challenges. In China, smart city practices are generally considered as new solutions to solve increasingly environmental and social issues and challenges of economic transformation and industrial upgrading. In Europe, they are conducted to deal with problems of economic crisis and challenges of sustainability and social inclusion.

The contextual factors have largely affected smart governance strategies and arrangements. In selected Western countries, diverse strategies and visions have been adopted and smart governance is often linked with e-democracy and e-governance. Previous studies indicated that local governments often promoted e-administration and e-services rather than e-participation, while recent empirical evidence shows that local governments have increasingly promoted online participation and collaboration through the platform of the Internet, social media, SNS and WebGIS platforms. Many smart city projects are developed based on wider collaboration between all kinds of stakeholders, including governments, research institutions, companies and citizens. Community engagement is also a key component of many smart initiatives, which aims to solve local issues and promote social inclusion. In China, the institution was traditionally organized in a top-down structure, while citizen participation and collaborative governance are relatively new phenomena. As a consequence, the official indicator system of smart cities emphasizes “smart management and service”. In practice, only top smart cities have well implemented both smart management and smart service, while many local governments paid less attention to smart service. Bottom-up participation has recently emerged, due to the increasingly diverse interests and a lack of effective mechanisms for citizen participation within the existing institutions. Civil society organizations, experts and citizens have used the



**Table 2**  
Differences and similarities of smart governance in Western countries and China.

Key components		Western countries	China
Institutional contexts		Democracy institutions, supporting policies for governance, participation and/or collaboration; self-organization and citizen engagement due to welfare state retrenchment	Top-down institutions, state control with a certain degree of deliberation; recent policies for supporting public participation in decision-making and planning processes
Social, economic and environmental challenges		Economic crisis, challenges of ensuring prosperity, sustainability, social inclusion, public health, and safety	Environmental and social issues associated with rapid urbanization, challenges of economic transformation and industrial upgrading
ICT		<ul style="list-style-type: none"> <li>Existing good ICT infrastructure (e.g. the extensive coverage of broadband Internet)</li> <li>The wide use of social media (e.g. Twitter, WhatsApp, Facebook), SNS, smartphones, portals, crowdsourcing platforms, WebGIS, and planning support systems</li> <li>Technical innovation</li> </ul>	<ul style="list-style-type: none"> <li>Rapid development of ICT infrastructure in recent years</li> <li>An increasing use of social media (e.g. Chinese Weibo, WeChat), SNS, smartphones, portals, crowdsourcing platforms, WebGIS, planning support systems an integrated platforms</li> </ul>
Visions and actions		<ul style="list-style-type: none"> <li>Technical innovation</li> <li>Diverse strategies (consistent with smart city visions, e.g. promoting economic growth, citizen awareness of environmental protection, and e-democracy)</li> <li>Cross-border frameworks</li> <li>A widely used indicator system (with a focus of participation, public services, transparent governance, political strategies)</li> </ul>	<ul style="list-style-type: none"> <li>Technical acceleration</li> <li>National strategies (according to smart city visions aiming at integrating various information resources, improve urban management and service, and promote industrial transformation)</li> <li>A national indicator system (with a focus on smart management and service)</li> </ul>
Smart governance arrangements	Governmental management and services	<ul style="list-style-type: none"> <li>E-administration/e-government</li> <li>E-services</li> <li>E-government infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Smart management and service at national, city and community levels</li> <li>E-government infrastructure</li> </ul>
	Collaboration	<ul style="list-style-type: none"> <li>Collaboration of a wide range of stakeholders in smart city initiatives</li> <li>International and internal collaboration</li> <li>Formal collaboration in planning processes</li> </ul>	<ul style="list-style-type: none"> <li>Public-private collaboration in smart city initiatives</li> <li>Top-down and bottom-up collaboration and communication in urban planning practice and decision-making processes</li> </ul>
	Participation	<ul style="list-style-type: none"> <li>Formal citizen participation through WebGIS and other online platforms in decision-making processes</li> <li>Community engagement in smart city initiatives</li> <li>Self-governance of communities through social media</li> <li>Challenges of direct democracy</li> </ul>	<ul style="list-style-type: none"> <li>Top-down approaches in supporting citizen participation through crowdsourcing, WebGIS and other platforms</li> <li>Bottom-up participation in environmental protection and urban regeneration through social media and smartphones</li> <li>Challenges of incorporating outcomes of participation</li> </ul>
Outcomes		Diverse outcomes (changes of government organization, new relationships between the government, the private sector and communities, and improvements to the city)	Diverse outcomes, including unexpected outcomes (e.g. bottom-up approaches in changing the relations between government and society as well as improving the city)

Internet and social media as new platforms to interact with local governments in urban regeneration and environmental protection. Although the collaboration between public and private sectors has become increasingly important in developing smart city projects, national, provincial and municipal governments are still playing a main role in finance and operation. This reflects the influence of traditional institutions on smart governance arrangements.

This study also illustrates some commonalities of smart governance. New technological innovations have generally facilitated wider participation, self-organization of communities, and new relations between the government and actors from society through both top-down and bottom-up approaches. In particular, the recent development of social media, smartphones, crowdsourcing platforms, WebGIS, PSS, and other devices make participation, interaction and collaboration in real time possible. There is increasingly collaboration between public and private sectors in developing online platforms for participation and collaboration in planning practice and decision-making processes. There is also emerging self-governance of communities through social media platforms. In both contexts, there is an increasing in mobile participation, which is facilitated by the wide use of smartphone networking applications. Mobile participation can attract a much wider interest group (particularly young people), but it may exclude old people who are not familiar with new technologies (Kleinmans et al., 2015). In some cases, online participation and interaction leads to the changes of power relations between the government and grassroots participants. Although it is different to reach a conclusion on whether smart governance has dramatically improved our cities and the quality of life, it is clear that people now have more online tools and channels to express their interests and participate in urban development.

With technological acceleration, new technologies will increasingly influence on the way how people are communicated and collaborated with each other, and how the city is organized and governed in response to social, economic and environmental challenges. This will significantly affect smart governance through top-down, bottom-up or even automated approaches. Despite this research has conducted an extensive review of literature, reports, policies and projects on smart governance, it is limited to key references and projects in some

Western countries and case studies in some Chinese cities. It respectively addresses the influence of democratic institutions and top-down institutions at the national level on smart governance practices, while there is few evidence on the role of local institutions and cultures. More research is required to understand diverse forms, strategies, arrangements, and outcomes of smart governance in different local contexts, and explore the linkages between smart governance, participation and collaboration.

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