Chapter 14
Smart Governance, Collaborative Planning and Planning Support Systems: A Fruitful Triangle?

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Abstract The scientific literature on smart cities has focused on innovative developments in information and communication technology (ICT) and on its consequences for urban life and policy making. In line with these, Batty et al. (Eur Phys J Spec Top 214:481–518, 2012) state that new technological developments are providing for new types of analysis, public participation and multi-actor collaboration, blurring the boundaries between smart cities and urban planning. We take this statement as a starting point for our discussion and put attention on the interplay between new ICT, smart cities and spatial planning. We focus in particular on the triangular relationship between smart governance as one of the areas of smart cities (Giffinger et al. in Ranking of European medium-sized cities, 2007), collaborative planning as a present form of spatial planning, and planning support systems (PSS) as a specific form of ICT dedicated to planning tasks. Collaborative planning is characterized by consensus building among distinctive stakeholders in participatory processes. Smart governance adds ICT-related components (e.g. efficient communication; data exchange) to the concept of collaborative planning. Finally, PSS involves the creation and use of tools to support professional planners' tasks, including introducing relevant geoinformation and facilitating participation. To illustrate this triangular relationship, we examine some practical case studies from China, Finland, and the USA that suggest how web-based and model-based PSS can fulfil a supportive role, to realize smart governance in spatial planning by promoting effective communication and collaboration between various actors, and by strengthening the transparency of the decision-making process. We conclude that collaborative planning can become a form of smart governance under two basic conditions, namely of recent developments in the applicable ICT and an appropriate institutional design.

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1 Introduction

In cities around the world, residents and government officials are increasingly inundated with the concept of the 'smart city' as they attempt to make decisions about how to utilize information and communication technologies (ICT) (Hollands 2008; Goodspeed 2015). The main focus of the concept of smart city is on ICT infrastructure, although increasingly research also examines the role of human capital, social and relational capital, and environmental issues as important drivers of sustainable urban growth (Caragliu et al. 2009). Batty et al. (2012) argue that new technological developments are providing us with new ways of public participation and collaboration in the decision-making processes, blurring the boundaries between smart cities and urban planning. They point out that the new technologies provide ways in which citizen groups, governments, businesses and various agencies can interact in augmenting their understanding of the city and providing essential engagement in the design and planning process (Batty et al. 2012).

This chapter explores the potential connections between collaborative forms of planning, smart governance and PSS, the latter as a component of the wider group of ICT dedicated to planning. However, until now, the existing literature has paid very little attention to this interrelationship. Remarkably, the focus still is put foremost on the achievements of upcoming ICT, leaving behind its more precise relationship to smart governance and with spatial or collaborative planning. It is the purpose of this chapter to shed more light on the triparted relationship between smart governance as one of the areas of smart cities (Giffinger et al. 2007), collaborative planning as a present form of spatial planning, and PSS as a specific form of ICT dedicated to planning.

After a brief discussion of these three areas, the chapter examines some case studies in China, Finland, and the USA. We find that the case studies have some unexpected similarities, although they are different in terms of political, social and institutional contexts. These similarities include the specific relationship between collaborative planning and smart governance. Under certain conditions, collaborative planning can become a form of smart governance. The first condition is appropriate institutional design, which encourages collaborative and inclusionary consensus building and makes clear ground rules to ensure the transparency of the planning process. This second condition is the introduction of ICT in general, and PSS in particular, in collaborative planning, which can help to form the link with smart governance. In the final part, the main findings are discussed, where we call for greater investigation of the use of ICT to foster connections between smart governance and planning.

2 Smart Governance, Collaborative Planning and PSS

Smart governance is a key component of a smart city. A city is smart when "investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance" (Caragliu et al. 2009, p. 70). The inclusion of participatory governance in this definition triggered our understanding of the links between the concepts of smart city and smart governance. According to Giffinger et al. (2007), there are six main areas under the umbrella of smart city, namely smart living, smart governance, smart economy, smart environment, smart people, and smart mobility. Therein, smart governance entails participation in decision-making processes, transparency of governance systems, the availability of public services and the quality of political strategies.

Governance is the process of interaction and decision-making among the stakeholders involved in a collective issue (Hufty 2011). Smart governance involves the organizational and institutional embedding of ICT into urban governance (Komninos 2009). On the one hand, big data, data warehousing and monitoring tools are used to strengthen the information base of the government (Leydesdorff and Deakin 2011; Batty et al. 2012). On the other hand, social media and the Internet are used to enable various actors to collaborate (Hoon et al. 2013). Chourabi et al. (2012) summarize a range of characteristics of smart governance, including effective collaboration, leadership, public participation, transparency in decision making, public-private partnerships, efficient communication, data exchange and service and application integration. Since smart governance focuses on enabling—with the help of ICT—the participation and collaboration of various actors in the decision-making process and on supporting transparency in governance, it has an obvious connection with collaborative planning.

The notion of collaborative planning, a term popularized by Healey (1997), has become the dominant theoretical approach for understanding spatial planning processes. Spatial planning can be understood as the process of decision making in a society on the use of land and supporting infrastructure and facilities, based on assessing and balancing competing demands (Nuissl and Heinrichs 2011). The label "collaborative planning" has been used to describe a range of inclusive and participative governance processes in spatial planning over the last few years. According to Healey (1997), collaborative planning can be viewed as an activity which generates networks across society by engaging diverse stakeholders in consultation. The involvement and interaction of three spheres (the economy, civil society, the state) in governance process can generate ways of thinking and acting that may be carried forward into new relationships and new forms of governance (Healey 1997). To the traditional focus on deliberation, Healey argues for the importance of considering institutional structures that shape decision-making (Healey 2003). According to Innes and Booher (1999), consensus building among stakeholders can be considered a more systematic and sophisticated version of

collaborative planning. It refers to an array of practices in which stakeholders, selected to represent different interests, come together for face-to-face, long-term dialogue to address a policy issue of common concern (Innes 2004). However, collaborative planning processes may be more practically understood as fully interactive processes from which the outcomes may be fragile, incomplete and contestable (Healey 2003; Cheng 2013). Ansell and Gash (2008) identify several critical variables that determine the success of collaborative planning, including the prior history of conflict or cooperation, the incentives for stakeholders to participate, power and resource imbalances, leadership and institutional design.

Collaborative planning is often treated as a desirable mode of governance because it provides the necessary flexibility that was lacking in the traditional blueprint planning approaches. However, it is criticized as well: "Ironically the progressive credentials of spatial planning in terms of consensus building, policy integration, and the search for 'win–win–win' solutions may have helped script out oppositional voices" (Allmendinger and Haughton 2010, p. 803). Such an exclusionary effect will reduce the democratic legitimacy of the planning process. Democratic legitimacy may also be undermined by the incorporation of strong private interest groups into collaborative planning process as this may threaten attention to the public interest (Hartmann and Barrie 2012). Another challenge is identified by Rydin, who acknowledges that communication and collaboration are critical characteristics of planning, but who is also concerned about the validity of different knowledge claims posed by different stakeholders in the planning process (Rydin 2007). Conflicts are not automatically solved simply by bringing all stakeholders to a roundtable and expecting them to discuss the problem until it is resolved (Billé 2008; Davy 1997). Collaborative planning needs institutions to make its planning results robust and enforceable (Huxley 2000, p. 371). Healey (1997) elaborates on the notion of institutional design and identifies two distinctive levels. The first level is the soft infrastructure of individual efforts in planning, with a focus on stakes, arenas, routines and styles. The second level is the hard infrastructure. It is related to the design of the planning system, which needs to be critiqued and invented by a careful assessment of the constitution of rights and duties, of resource allocation mechanisms, of performance criteria and of competencies. Based on the distinction and the observation that consensus-building processes are not always effective and inclusive, Healey (1997) concludes that a proper institutional design is needed that has the capacity to encourage collaborative and inclusionary consensus building.

In recent years, with the development of ICT, the internet and social media, new forms of collaborative planning have emerged. Rather than face-to-face stakeholder meetings, online communication and interaction between different online actors (e.g. civic organizations and citizens) become crucial for consensus building (Cheng 2013; Deng et al. 2014). Batty et al. (2012, p. 19) identify in the concept of smart governance at least four modes in which ICT supports interactive collaboration and participation: "first, portals and other access points to [add] useful information about any aspect of routine living and working in cities, second, ways in which citizens can interact with software that enables them to learn more about

the city by engaging with other users online and actually creatively manipulating information, third, citizens engaging with crowd-sourced systems in which they are responding to queries and uploading information, and fourth, fully fledged decision-support systems which enable citizens to engage in actual design and planning itself in terms of the future city ".

From this it can be seen that ICT can play a key role in linking collaborative planning and smart governance. According to Epp (2012), ICT, including PSS, can play an important role in supporting higher levels of public participation. Therein, PSS are envisioned as a subset of geo-information-based instruments that incorporate a suite of components (including data, information, GIS, statistical tools, and models) that collectively support a unique professional planning task (Geertman 2006). Epp (2012) points out that new types of GIS, Web 2.0 and mobile phone apps, as well as their precursors, rely on user generated content and are community based and are designed to harness and communicate a collective wisdom. For instance, web-based PSS can allow citizens, as either individuals or members of civil society organizations, to participate in public debates, to express their opinions and to hear about or develop new solutions to urban problems (Poplin et al. 2013). The application of PSS in collaborative planning can be seen to assist stakeholder participation and can be considered an alternative method of dealing with the wicked problems of planning practice (Goodspeed 2015). This coincides with the reflections by Klosterman (1997) in which he considers the increasing application of PSS in practice as continuing the planning trends from applied science to communication and collaboration, including broader concerns with intelligence and collective design. In fact, PSS are going more and more online. Online PSS can be used by citizens in social media on their smartphones, and make its wider application possible. Notwithstanding these positive signs, it should be noted that the actual application of PSS in planning practice is still lagging behind its potential (see Vonk et al. 2005; Brommelstroet 2011; Pelzer et al. 2014).

In retrospect, the well-known notion of collaborative planning, with its focus on public participation and on the collaboration of distinctive actors in decision-making processes, remains at the heart of many planning discussions. The related concept of smart governance puts its focus on the ICT-supported participation and collaboration of various actors in the decision-making process and on supporting transparency in governance processes. Furthermore, smart governance argues for the incorporation of a wide variety of ICT instruments (e.g. Batty et al. 2012), while collaborative planning highlights the need for proper institutional design to encourage collaborative and inclusionary consensus building (Healey 1997; Ansell and Gash 2008). Within the mentioned diversity of ICT instruments, the group of so-called PSS stands out and is expected to fulfil a distinctive supporting role in the establishment of smart governance. Given the debate about how to improve the adoption and performance of PSS, an examination of the relationship among collaborative planning, smart governance and PSS seems especially needed to inform developments in all three areas (see Fig. 1).

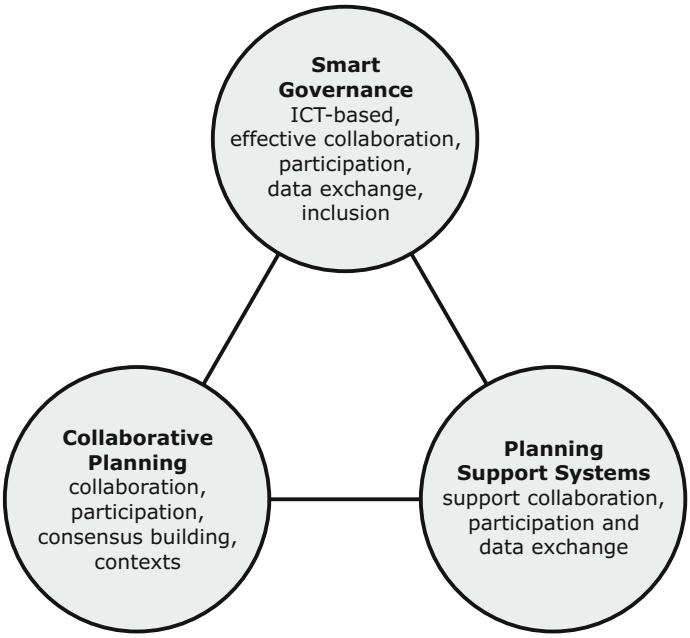

Fig. 1 The triangular relationship between smart governance, collaborative planning and planning support systems

In the next section, we illustrate our case through cases taken from three continents that differ substantially in political and cultural context and in spatial planning tradition.

3 Case Studies

To illustrate our argument, we present examples illustrating this relationship from three case countries—China, Finland, and the USA—that differ substantially in political and cultural context and in their urban planning traditions. Collaborative planning has been advocated in Finland and the USA since the 1970s but has emerged much more recently in China, where it exerts an increasing influence on both planning practice and theoretical planning research. In particular, the rise of collaborative planning in China has a strong relationship with the extremely fast development and implementation of the concept of smart cities. In Finland, web-based collaborative planning and e-participation have been promoted by the extensive investment in broadband Internet, which has resulted in the highest broadband coverage in Europe. Finally, a growing number of cities in the USA are offering smart city infrastructures that blur the boundary between collaborative planning and smart cities.

The data for this section were mainly collected by searching the Internet and from semi-structured interviews with planners, PSS experts and citizens. It should be noted that these data are not the result of an extensive and elaborate case study research project. As a consequence, we are using this information simply as a means of exploring the relationship between collaborative planning, smart governance and ICT including PSS, in order to challenge existing thinking and guide further research on the topic.

3.1 China

In the last few years, the smart city concept has been widely advocated in many Chinese cities, which has resulted in strategic cooperation with big ICT firms like IBM and Cisco. The development of smart cities in China has largely focused on technological issues and improving ICT infrastructure. Collaborative planning is emerging together with the rapid development of the Internet and social media, which act as new platforms for public participation and communication among various actors.

For centuries, the institutional system of government in China was hierarchical and characterized by top–down approaches. In 2008, however, the Urban–Rural Planning Law was introduced, clearly stating the basic requirements for public participation in the planning process. As a consequence, Chinese planners needed to develop their skills in communicating with the public (Sun and Yin 2008). Recently, the rapid development of social media and the Internet have offered new participatory platforms for marginal social groups, citizens, and civic organizations to express their interests and take collective action (Cheng 2013; Deng et al. 2014). 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. The Internet and microblogs became the communicative and cooperative platforms where consensus was built concerning the conservation of the old trees and the adjustment of the project (Yan and Zhu 2013). In other cases, the combination of web-based PSS, social media and the Internet has recently impacted on several planning practices in China (e.g. Xu 2013).

The "Bell and Drum Tower" neighborhood regeneration project in Beijing illustrates this development. In 2010, the city initiated a project to regenerate the Bell and Drum Tower neighborhood. The project would lead to the demolishment of a number of valuable buildings along several historical streets in the city center of Beijing, near this famous, historic tower. However, the plans aroused a wide range of criticism from experts, planners, and citizens. A civic group (the Bell and Drum Tower Neighborhood Team) comprising experts, planners, and students was established and created an account on Weibo, China's Twitter-like microblogging service. This civic group took photos of historical buildings, mapped the neighborhood, interviewed local residents, and posted research reports on the Internet. The group also asked a PSS expert to create a web-based PSS called "The

protection of the north axis: community participation and communication website for Beijing's 'Bell and Drum Tower' neighborhood regeneration project" (Fig. 2). The web-based PSS shows the map and pictures of the neighborhood and offers users the possibility to add comments to specific locations. Besides this, many citizens criticized the original project plans via the local government's Weibo and via the civic group's Weibo. As such, the local government was faced with popular pressure, and as a result revised the project (Xu 2013). However, with reference to the discussion above concerning power imbalances in collaborative planning, although the local government revised the project, it did not fully consider the opinions of the participants and still demolished some of the historical buildings. Experts mapped the demolished buildings in the neighborhood and uploaded them in the civic group's Weibo. They pointed out that while these actions were legal, they produced undesirable results. This case illustrates the hierarchical Chinese planning system, which lacks an effective mechanism to guarantee public participation and require decision-makers to take input into account in the decision-making process (Lin et al. 2014).

This brief example illustrates how planning practices in China are evolving. New forms of collaborative planning are emerging, fueled by the rapid development of the Internet and social media, as well as by the development of new types of PSS. They are also facilitated by the recent development of smart cities which largely improve ICT infrastructure and support ICT-based public participation and governance in China. In other words, as a consequence of new technologies, projects like the Bell and Drum Tower neighborhood regeneration project feature a combinations of elements typically viewed as unrelated in the existing literature: collaborative planning through the Internet and social media, the emergence of new types of PSS, and the development of smart cities (particular smart governance).

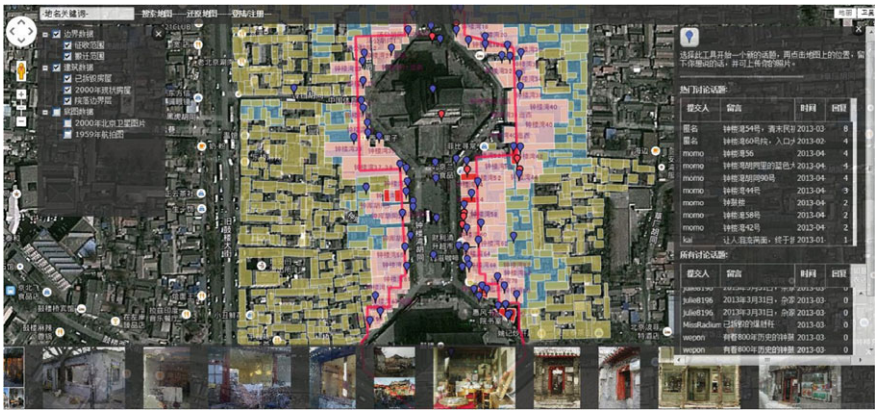

Fig. 2 A web-based PSS: protection of the north axis: community participation and discussion website for Beijing's "Bell and Drum Tower" neighborhood regeneration project (http://archlabs.hnu.cn/bj/index.php)

In summary, the case study of Beijing's Bell and Drum Tower neighborhood regeneration project suggests that there is a need to have a close look at the relationship between three conceptual categories (collaborative planning, smart governance and PSS) which are separated in literature, and analyze how institutions should be adapted for this new planning context.

3.2 Finland

Within Europe, Finland possesses a very high level of broadband coverage, and partly as a result is noted for ICT-based collaborative planning. As of 2011, 98 % of homes in Finland have access to basic broadband and almost 68 % can have access to superfast broadband, also known as for Next Generation Access (European Commission 2011). This is the highest total superfast coverage in Europe and one of the highest levels for rural areas in Europe. The extensive coverage of broadband Internet in Finland makes the web a natural platform for public participation and communication between various actors in the planning process. As a parliamentary democracy, citizens can vote and run in parliamentary, municipal and presidential elections. Collaboration in Finland is supported by European Union (EU) directives, and the Finnish Building and Land Use Act (1999) which aims to ensure wide participation and support open and high-quality planning decisions and processes.

Nuojua et al. (2008) examined web-based participation methods by taking Pyhäjärvi (a town in the south of Northern Ostrobothnia region, Finland) as a case study. A web mapping application called WebMapMedia (WMM), which was based on Google Maps, was developed to help planners to acquire local knowledge from the citizens in the form of comments and pictures. WMM can be considered a virtual combination of two traditional participation methods: (1) PhotoVoice, a technique where which citizens identify, represent and enhance their community through photography (Wang and Burris 1997); and (2) sticker-map method that enables citizens to mark locations with personal significance by placing colored symbols on the map. In the WMM tool, when citizens click a marker on the map, a bubble opens with a thumbnail of the picture and hyperlink to the discussion about the place. Moreover, RSS feeds are provided by WMM for the planners in order to monitor the continuous flow of local data. Nuojua et al. (2008) found that such a web-based application was especially suitable for acquiring local knowledge and that it was an easy and inexpensive way to enlarge and diversify the group of participants. However, with reference to the discussion above on the pitfalls of collaborative planning, Nuojua et al. (2008) also identified a big challenge for web-based participatory planning was combining local knowledge with the knowledge of planning professionals. The interviews with the planners showed that the proposals made by citizens were often considered to be too general to be useful in the specific planning work (Nuojua et al. 2008). In addition, the planners appeared to be

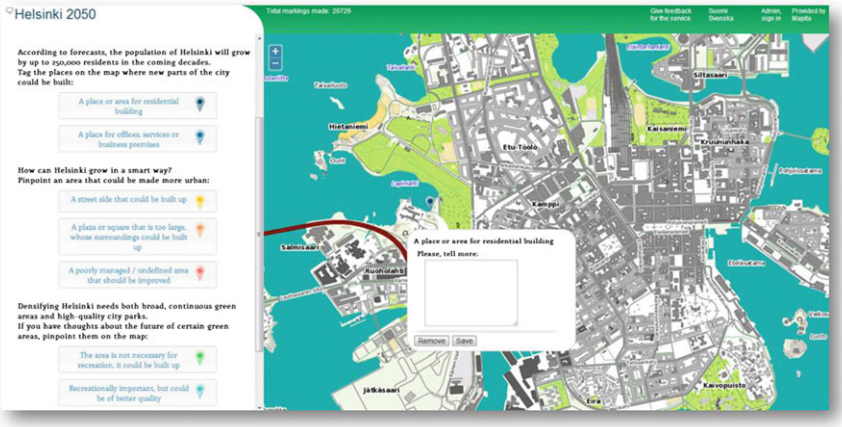

Fig. 3 SoftGIS tool created for Helsinki 2050 master planning process (Kahila et al. 2014)

unwilling to participate directly in the discussions on the WMM forum. In other words, this web-based collaborative planning hasn't led to effective and equitable collaboration between citizens and planners. On the one hand, clear ground rules may be needed to facilitate more equitable relationships and conversation between planners and citizens. On the other hand, the improvement of the PSS from a technological perspective (such as the visualization of the planning sketches) may be required to facilitate truly two-way communication between the planners and local people, and further integrate the professional knowledge of the planners and local knowledge of citizens.

As another example from Finland, professionals have adopted the PSS SoftGIS to facilitate online participation (Kahila and Kyttä 2009). It is an example of a Public Participation GIS (PPGIS) with its main purpose being to enhance participation and collaboration by allowing residents to share their knowledge about their living environment with that of urban planners and researchers. SoftGIS methods build a bridge between residents and urban planners by allowing residents to produce and distribute local knowledge through user-friendly internet-based applications and not by attending in-person events. Citizens can use SoftGIS tools to fill in online questionnaires about topics like everyday modes of transport, and preferences for future living environment, as well as make planning proposals by pinpointing appropriate locations for new building sites or identifying areas in need of improvement (see Fig. 3). Kahila et al. (2014) built upon and examined the application of these SoftGIS methods in supporting the Helsinki 2050 master planning process, documenting how 3745 citizens participated in this planning process through SoftGIS.

3.3 USA

There is a growing number of cities in the USA making efforts to offer smart and more efficient city infrastructures (Michelle 2014). For instance, New York City has initiated 'City 24/7', an interactive platform that integrates information from government programs, local businesses, and the city's citizens to provide knowledge to anyone, anywhere (Frazier and Touchet 2012).

In addition to smart infrastructure, some cities are also using advanced PSS tools. Calthorpe Associates (2012) has created two novel PSS, which are mainly used by government agencies within specific projects to support collaboration between government agencies and other stakeholders in the planning process. These two tools for scenario development and modeling, named RapidFire and Urban Footprint, are able to express the varying impacts of developments and infrastructure investments on a variety of spatial scales (http://www.calthorpe.com/scenario_modeling_tools). The first one, RapidFire, is a user-friendly, spreadsheet-based tool that is used to produce and evaluate scenarios at different scale levels (statewide, regional, county, and jurisdiction-level). It emerged out of the need for a comprehensive modeling tool that can inform state, regional and local agencies and policy makers when evaluating climate, land use and infrastructure investments. In the "Envision Bay Area" project, RapidFire is used to build regional scenarios that depict the land use and transportation choices the future of the region faces, and the consequences of those choices for a range of critical indicators. With the support of RapidFire, residents and community leaders can make informed decisions about building activities that will shape the future environment. The second open-source geo-spatial model mentioned, Urban Footprint, was first developed and deployed across California's major regions as part of the Vision California process (Fig. 4). It serves as a scenario development and analysis system, which includes powerful data organization, scenario building and analytical capabilities. This model is designed to work via a web-based interface, allowing for detailed mapping and

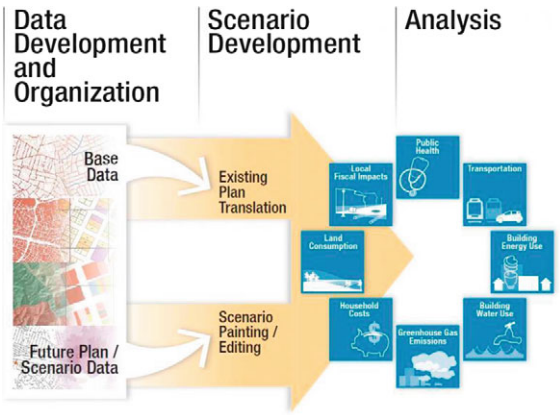

Fig. 4 UrbanFootprint painting tool screenshot (*Source* http://www.calthorpe.com/scenario_modeling_tools)

"painting" of land use and transport futures and for working at regional, sub-regional and local planning levels. Urban Footprint includes the ability to analyze scenarios based on a full range of fiscal, environmental and public health metrics. However, the previous version of Urban Footprint was mainly operated by experts and difficult to be used by other stakeholders who lacks technical knowledge. Calthorpe Associates (2012) completed the first fully-operational version of the model in 2012 and is now working to advance the model for use by a broad range of public agencies and organizations.

Besides model-based PSS for collaboration between government agencies and other stakeholders, there is also web-based PSS for supporting public participation. One of the case studies is CitySourced (http://www.citysourced.com/), which is a real time mobile civic engagement platform. CitySourced can be downloaded to mobile phones (e.g. iPhone, Android, Windows Phone7 and BlackBerry). The mobile phone applications allow data from a range of sources, including social networking sites, to be tied to the physical world, allowing devices such as mobile phones to instantly overlay information about a location or object (Epp 2012). The primary applicability of CitySourced is the crowd-sourcing of place-based issue identification. Through having CitySourced on their mobile phones, citizens can identify civic issues and report them to city hall for a quick resolution. For instance, citizens can report a problem with a sidewalk by pinpointing the location and adding text to explain the issue. CitySourced supports "citizens engaging with crowd-sourced systems in which they are responding to queries and uploading information" (Batty et al. 2012, p.19). With the help of this app, local government can identify problems in the city in a timely fashion and find prompt solutions, improving accountability to the citizens. Therefore, CitySourced has supported collaborative process and promoted smart governance by facilitating a more effective exchange of information between citizens and the government and can become a cooperative platform for real action. However, to date the focus has been on automating customer service requests to municipalities, although the software can also be applied to record planning issues (Epp 2012). The effort and support of the government seems necessary to further use and integrate the outcomes of CitySourced in specific planning tasks. A remaining question is how to integrate the knowledge of planners with the input of citizens obtained through Citysourced. This problem is related to the improvement of PSS and quite similar to that of the mentioned Web mapping application (WMM) in Finland.

4 Discussion

The case studies in China, Finland and the USA illustrate interesting relationships between collaborative planning, smart governance and ICT including PSS. Although they differ in term of context, they show some interesting similarities. In general, PSS play an important role in supporting collaborative planning and facilitating smart governance. However, collaborative planning cannot become

smart governance without appropriate institutional design and ICT supports (PSS, social media, smartphone, ICT infrastructure, etc.).

The Chinese case studies show that collaborative planning is emerging together with the rapid development of smart cities and ICT including PSS. The recent development of smart cities has largely improved overall ICT infrastructure. The Internet and social media have become two of the most influential collaborative platforms through which urban planning conflicts are anticipated to be resolved (Cheng 2013; Deng et al. 2014). Grassroots participants have had an impact on planning practices by using the Internet and enlightened the public's engagement in planning participation (Cheng 2013). The emergence of web-based PSS, together with the rapid development of ICT and social networking sites, assist community participation and the communication between the local government, civic organizations and citizens, with the Bell and Drum Tower neighborhood regeneration project being a good example. Therefore, ICT can improve transparency in decision-making processes and can lead to more efficient communication between citizens, planners and public authorities.

However, the case study shows that an appropriate institutional design is required too. The associated question is that: how do you develop an effective mechanism to guarantee an appropriate synthesis of bottom–up and top–down approaches to public participation, to improve transparency in decision-making processes, and to take into account the outcomes of such participation and processes in the actual decision-making process? We believe the Chinese case studies show that in addition to new PSS, new forms of collaborative planning and smart governance require appropriate "institutional design" (Healey 1997) that ensures transparency and collaboration.

ICT-based collaborative planning in Finland has been supported by a very high standard of broadband coverage, the development of web-based PSS, and the widespread use of social media and smartphones. Furthermore, formal national regulations ensure wide participation in planning decisions and processes. In the case study of Pyhäjärvi, a web mapping application was developed to help planners to acquire local knowledge from the citizens in the form of comments and pictures. However, this web-based collaborative planning hasn't led to effective and equitable collaboration between citizens and planners. To achieve smart governance, clear ground rules which is a key component of institutional design (Ansell and Gash 2008) may be needed to facilitate more equitable relationships between planners and citizens, and the improvement of the PSS from a technological perspective is required to visualize the planning sketches and thus facilitate a truly two-way communication. In response to this last mentioned requirement, a new type of web-based PSS called SoftGIS was recently developed and applied in supporting online public participation in the Helsinki 2050 master planning process. Toolsets that could easily be used on smartphones were designed to support citizen participation and their outcomes were then used by planners to (re-)formulate the plan. This form of collaborative planning which is based on SoftGIS is much closer to smart governance, since it features transparency, effective uses the outcomes of

public participation in decision-making, and leads to effective cooperation between citizens, planners and other stakeholders.

The case studies in the USA show that the development of improved PSS are on its way to support the effective collaboration among government agencies and institution, and crowdsourcing-based PSS has become a new cooperative platform between the government and citizens. RapidFire and Urban Footprint are two scenario building tools that show to support the communication and collaboration between government agencies, organizations and other stakeholders. These tools contribute to the communication and collaboration between different key stakeholders through scenario building, modelling and visualizing, and thereby linking collaborative planning with smart governance. The form of collaborative planning based on this model-based PSS however is difficult to be used by stakeholders who were lacking the technical knowledge. How to advance the model for use by a broad range of public agencies and organizations is a key concern in achieving smart governance which requires inclusive and effective cooperation. CitySourced in the USA supports citizens to engage with crowd-sourced systems in which they identify civic issues in the city and help the local government to become aware of problems and improve its accountability. Although CitySourced shows the potential to promote inclusive collaborative planning and smart governance by supporting effective information exchange between citizens and the government and acting as a cooperative platform for real action, its focus has still been on automating customer service requests to municipalities. The further application of this type of web-based PSS in assisting collaborative processes and smart governance requires not only continued efforts by cities, but also technical changes to enable the integration of participation and planners' expertise.

5 Conclusions

In the introduction to this chapter, we referred to the argument by Batty et al. (2012) that technical developments are eroding the distinction between planning and smart cities. According to these authors, new technologies provide ways in which citizen groups, governments, businesses and other stakeholders can interact in order to augment their understanding of the city and provide essential engagement in the planning process. Although, this all sounds exciting, many of these authors fail to elaborate more closely on the relationships between smart cities, planning and ICT due to a lack of empirical evidences. This chapter is a first attempt to take a closer look at the triangular relationships between smart governance, collaborative planning and ICT, in particular by studying case studies in China, Finland and USA. We find that the case studies have some similar aspects, although they have different political, institutional and social contexts. The similarities include the special relationship between collaborative planning and smart governance. Under certain conditions, collaborative planning can become a form of smart governance. These conditions are twofold.

First, the introduction of ICT in general, and PSS in particular, to collaborative planning can help form a link with smart governance. The Internet, mobile communication, cartography and visualization are converging rapidly to develop new means of collaboration and of displaying geographic information (Epp 2012). New forms of ICT (portals, crowd-source websites, online decision support systems, etc.) can assist in formulating new forms of participation that can help with developing smart cities (Batty et al. 2012). Web-based PSS, in particular, can play a crucial role in assisting with choice processes and enabling citizens to negotiate and engage in trade-offs with traditional power holders and in assisting the cooperation between various stakeholders (Epp 2012). Besides web-based PSS for supporting public participation, the case studies also showed that there are emerging model-based PSS for scenario building and spatial modelling. In the USA, the successful application of RapidFire and Urban Footprint is largely due to the integration of resources and data exchange at all levels and the collaboration between government agencies and institutions. This model-based PSS contributes to the communication and collaboration between key stakeholders through scenario building, modelling and visualizing, and thereby linking collaborative planning with smart governance.

Second, the institutional design of the specific planning practice needs to have the capacity to encourage collaborative and inclusionary consensus building, and has to ensure the transparency of the planning process. It should be pointed out that the introduction of ICT/PSS alone is not sufficient to arrive at smart governance. Institutional design is another important factor that helps to build this relationship. Collaboration and public participation in the planning process in Finland have been supported in the long term by policies and regulations at EU and national levels: "the Internet offers new possibilities for involving citizens in political decision-making through e-democracy" (Christensen 2012, p. 1). However, the case study of web-based participation methods in Pyhäjärvi shows that clear ground rules may be needed to facilitate more equitable relationships and conversation between planners and citizens. In the Chinese context, further changes to institutions seem necessary to arrive at smart governance. Effective collaborative governance requires a commitment to a positive strategy of empowerment and the representation of weaker or disadvantaged stakeholders (Ansell and Gash 2008).

In summary, drawing on our discussion of the literature and a reflection on the case material, it can be seen that at least two preconditions should first be fulfilled in order to arrive at smart governance. On the one hand, recent developments in ICT, such as the growing and extensive coverage of broadband Internet, expanding use of social media, widespread use of smartphone apps, growing possibilities for data exchange, and expanding cloud computing and online GIS, are important preconditions for smart governance. In addition, an appropriate institutional design is needed in order to arrive at truly smart governance. Further research can shed more light on the triangular relationship between smart governance, collaborative planning and ICT/PSS to enhance the potential role of the new technologies to arrive at smart governance and be of added value to planning practice.

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