Social media for collaborative planning: A typology of support functions and challenges

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ABSTRACT

In recent years, the widespread use of social media has increasingly impacted planning practice and policy making. Although a growing body of literature examines the impact of social media on urban governance and planning, there is a lack of theoretical understanding on the extent to which social media can support collaborative planning. This study identifies a typology of support functions of social media: information sharing refers to one-way information flows from government to citizens or from individuals and organizations to a wide audience in real time; social networking is about the networking of individuals and organizations, perhaps crossing geographical boundaries for collective actions; citizen participation is related to different levels of citizen power that may be enhanced by social media; and communication is diverse, characterized by multimodal, interactive and mass self-communication in various online public spheres. These support functions can be employed to assist different phases and scales of collaborative planning. Nevertheless, there are several potential challenges of using social media in urban planning, including population bias, privacy concerns, information credibility, (self-)censorship, and opinion polarization. The integration of social media, digital tools and traditional participation methods can help to support more inclusive planning processes.

1. Introduction

The widespread use of Twitter, Facebook, Instagram, WeChat, Weibo and other social media platforms has enabled groups and individuals to connect and share information relating to common interests and concerns (Alizadeh et al., 2019). Social media have generated a large number of volunteered data and new relations, e.g. the posting and forwarding of instant messages, the uploading of photos, and the connection between users. They have promoted real-time information dissemination and opened new channels of communication, participation and networking. In the past decade, there has been a growing scholarly interest in the impact of social media on urban governance and planning. First, many studies examine the role of social media in participation in different countries. In a top-down approach, social media are widely used by governments as a smart tool to gain public opinions, distribute and share information, and support citizen participation in Western countries, China and other contexts (Alizadeh et al., 2019; Kleinhans et al., 2015; Kowalik, 2021; Lin, 2018; Lin & Kant, 2021). In a bottom-up approach, they empower citizens, civil society and local communities to let their voices be heard and organize collective actions and social mobilization (Alizadeh et al., 2019; Kumar and

Thapa, 2015; Tayebi, 2013; Williamson & Ruming, 2019). They have the potential to fulfill many different participation needs, including informing, consulting, involving, collaborating and empowering citizens to influence in decision-making (Pflughoeft & Schneider, 2020). Second, a large number of studies explore the potential of social media big data for urban analysis and modelling, which examine individual activity patterns, spatiotemporal dynamics, urban land use, transportation behavior, landscape, resilience and other urban issues (e.g. Rashidi et al., 2017; Tieskens et al., 2018; Wang et al., 2020; Abdul-Rahman et al., 2021; Wu et al., 2022). However, there are also a lot of doubts and criticisms on social media technology. Through examining the content of several official social media profiles about smart city projects in Poland, Kowalik (2021) argues that social media are used as a tool for informing and the distributions of emotion, rather than participation and engagement. There are potential issues of using social media, such as population bias, opinion polarization, the spreading of fake news and misinformation, and the impact of social relations (Ruths & Pfeffer, 2014; Bakshay et al., 2015; Piccorelli & Stivers, 2019; Wu et al., 2022). Feeney and Porumbescu (2020) call our attention to the limitations of social media, especially the political and social bias and the unequal outcomes of their use.

Nevertheless, most of the existing studies are related to participation and the use of social media data for urban analysis. The discussions of social media features and issues are scattered in different bodies of literature, such as urban studies, media and communication studies, sociology, and political science. There is a lack of research on the support functions and challenges of social media for collaborative planning - a new paradigm of planning since the 1980s. Collaborative planning could be viewed as governance activities engaging diverse stakeholders in consultation (Healey, 1997). Grounded in Habermas's theory of communicative action, collaborative planning emphasizes rational communication in public spheres to achieve consensus building, which refers to an array of practices in which representative stakeholders come together for face-to-face and long-term dialogue to address a planning issue of common concern (Innes & Booher, 1999, Innes & Booher, 2018). Yet, the communicative approach to collaborative planning has been widely criticized for ignoring power relations and emotions, difficulties in consensus-seeking, lengthy and costly processes, and little room of citizen participation (e.g. Bond, 2011; Brand & Gaffikin, 2007; Huxley & Yiftachel, 2000). Therefore, some scholars have investigated an agonistic approach to collaborative planning in order to enable multiple forms of expression and communication (e.g. Brand & Gaffikin, 2007; Boonstra & Boelens, 2011; Mouat et al., 2013). Several recent studies have also explored the use of social media to assist the participation of citizens, local communities and other groups (e.g. Deng et al., 2015; López-Ornelasa et al., 2017; Mukhtarov et al., 2018; Williamson & Ruming, 2019, Williamson & Ruming, 2020). Yet, these studies are often case-specific and lack theoretical lens, leaving the support functions of social media in collaborative planning generally questioned. It is also unclear about the impact of social media on the agonistic approach There is an urgent need to bridge the gap between collaborative planning literature and social media research.

Therefore, this study is an attempt to fill the gap by identifying a typology of support functions of social media for collaborative planning and several challenges of using social media. It reviewed two major bodies of literature regarding collaborative planning and social media. Related journal articles, books and publications were accessed in the Web of Knowledge, Google Scholar, Scopus, ScienceDirect and other databases. The methodology approach had four major steps. First, an critical review of collaborative planning literature reflected the debate on the communicative and agonistic approaches. It identified key themes of collaborative planning, including citizen participation, communication, and social relations/networks. It also showed that some recent studies emphasized the influential role of social media in collaborative planning. Second, I searched the key word of "social media", or combined it with other terms such as "urban planning" and "participation" in the mentioned databases. I then selected a number of key references about the features and issues of social media technology as well as the use of social media data in planning and other domains. Through reviewing these references, I identified several features of social media (e.g. informing sharing, social networking, new forms of communication and participation) and potential issues (e.g. bias and censorship). Third, the integration of the outcomes of steps 1 and 2 led to discover the linkages between collaborative planning and social media functions, resulting in the identification of the various support functions and challenges. Fourth, several examples were selected from diverse social media platforms in different countries in order to elaborate the various support functions and challenges. The information of most examples was mainly from existing studies, while the data (e.g. figure, texts) of Nanning master plan, NCDOT, Utrecht Elektrisch project, and iBike campaign were mainly collected from social media platforms such as Facebook, Twitter and WeChat.

The sections are structured as following. Section 2 reviews the controversies on collaborative planning. Section 3 explains four types of support functions of social media, namely of information sharing, social networking, citizen participation, and communication. Section 4 addresses several challenges associated with social media, including bias, privacy concerns, information credibility, (self-)censorship and polarization. Section 5 discusses the support functions of social media for different stages and scales of collaborative planning.

2. Controversies on collaborative planning

A communicative turn of urban planning has occurred in Western countries especially in the context of urban regeneration and environmental protection since the 1980s (Healey, 1997). Innes and Booher (2018) present a theory of collaborative rationality including three conditions, namely of diversity of interests, interdependence of interests, and authentic dialogue. The conditions are largely related to Habermas's ideas of communicative rationality in its requiring for inclusion of all perspectives and its ideal speech conditions. Therefore, the communicative approach to collaborative planning assumes that participants are equally entitled to question and make objections and proposals, and that there are sincere, comprehensible and accurate discussions (rational communication) in the public sphere (Innes & Booher, 2015). The advantages of assuming a communicative approach aimed at conflict resolution are significant, i.e. fostering a greater inclusion of stakeholders in the decision-making processes and making possible a reshaping of expert-citizen relationships (Gualini & Bianchi, 2015). More importantly, collaborative planning practices define an important role of citizens as actors contributing to argumentations and of civil society as a vehicle for putting pressure on the state to act more responsively (Bäcklund & Mäntysalo, 2010; Watson, 2011). They are often developed at a neighborhood level, where face-to-face communication enables the emergence of shared imaginaries. However, the communicative approach to collaborative planning has been strongly criticized for ignoring power relations within consensus-seeking processes and "conflicting rationalities" in the context of social differences (Brand & Gaffikin, 2007; Huxley & Yiftachel, 2000; Watson, 2003). It has also been criticized for ignoring contexts that may facilitate or hinder the realization of collaborative qualities (Calderon & Westin, 2021).

Therefore, some scholars have investigated the possible contributions of agonism (rather than communicative rationality) to collaborative planning (e.g. Brand & Gaffikin, 2007; Boonstra & Boelens, 2011; Mouat et al., 2013). Although some scholars view agonistic planning as a new planning paradigm (e.g. Bäcklund & Mäntysalo, 2010; Kühn, 2021), how to develop agonism in planning into a pragmatic planning theory is open to debate. The agonistic approach is based on the political concept of agonistic pluralism, which acknowledges the permanence of conflicts and considers it as necessary for democratic politics to function, transforming antagonism to agonism where the opponents are not enemies but adversaries (Mouffe, 2013). The differences between communicative and agonistic approaches can be reflected by the distinct forms of public spheres for communication. Different from Habermas's public spheres, the agonistic public sphere is understood as a space of the confrontation of diverse positions, enabling the expression of passions and mobilizing the passions to collective design rather than striving for rational consensus (Mouffe, 2000; Mouffe, 2013). Thus, an agonistic approach to collaborative planning seeks to validate the implications of the plurality by endorsing multiple forms of expression and communication (Brand & Gaffikin, 2007). Mouat et al. (2013b, p.150) argue that "using agonistic conflict in debating and deciding about site-specific projects and strategies offers new ways of reviewing and practising community engagement". Gualini and Bianchi (2015) point out that an agonistic approach is a response to the increasing interdependence between global and local conflicts and the rise of urban social movements in the contexts of social inequality and polarization. Contention and social mobilization are emergent, interactive-relational and co-evolutionary phenomena. They are "an indispensable source for democratization and may represent a potential for innovating planning and governance practices, provided policy processes define 'opportunity structures' that allow agonistic pluralism to be express and to develop

constructive and transformative potentials" (Gualini, 2015, p.22–23).

However, traditional collaborative planning practices have faced several key challenges. First, only a few stakeholders are selected as representatives to participate in the process. As argued by Brown (2015b, p. 199), "collaborative processes are constrained by the number of people that can participate, limiting the diversity and independence of planning participants resulting in suboptimal planning outcomes". Second, it is often a lengthy and costly procedure, which not only attributes to the controversy nature of these kinds of planning practices, but also is partly caused by the limitation of traditional participatory methods (e.g. interviews, public hearing and workshops) which are organized within fixed schedule and lack time efficiency. Third, the process may be led or controlled by strong stakeholders such as government and developers with a few inputs from citizens and civil society (Bond, 2011). To deal with the mentioned challenges, recent studies have thus investigated the application of digital tools such as social media and planning support systems to support collaborative processes (e.g. Goodspeed, 2014; Lin & Geertman, 2015, 2019b; Mukhtarov et al., 2018; Pelzer et al., 2014; Rotondo & Schäfera, 2010). The use of digital tools has been seen as a mechanism to overcome the shortcomings of traditional participation methods.

In particular, the digital platform for participation and communication seems much important for collaborative planning in authoritarian contexts, where there is a lack of maturing civil society and effective participation mechanisms. Collaborative planning theory was born in democratic contexts, with the assumption of deliberative-participatory democracy for free speech and equal power among individuals (Innes & Booher, 2015b, 2018b). The institutional context is thus very different from China. Due to the hierarchical institutions, the underdevelopment of participation mechanisms, and traditional culture, collaborative practices in China are often characterized by unequal power relationships - a strong government, powerless planners, and weak society (e.g. Cao et al., 2021; Hu et al., 2013; Yuan et al., 2021). Thus, some scholars investigate the role of the third sector to mediate power relations (Yuan et al., 2021), while others explore the role of the Internet and social media in empowering grassroots participants and planner professionals to establish new networks and reframe power relations (Cheng, 2013; Deng et al., 2015). Cao et al. (2021) argue that the difficult context for collaborative planning in China requires the establishment of a new communicative platform, using technical means to support lay participants to voice their opinions within the planning process. The recent smart city movement has contributed to the development of such a platform, which is comprised of social media, the internet, online participatory platforms, and other mediating sectors (Cao et al., 2021; Lin, 2018).

3. Support functions of social media

Social media allow individuals and organizations to connect with each other, upload photos and documents, post, share and forward messages. The wide user base, real time, and open characteristics make them possible to engage a large number of participants in planning processes. They have four types of support functions for collaborative planning, including information sharing, social networking, citizen participation, and communication (Table 1).

- *Information sharing* is one-way information flows from government to citizens or from individuals, civil society or other organizations to a wide audience in real time. It is characterized by the rapid spread and the accessibility of both top-down and bottom-up information about planning events and polices.
- *Social networking* is about the networking of individuals and organizations, perhaps crossing geographical boundaries for collective actions. The open and flexible structure enables any participant to be the node of the network, forming small or large scale networks which exercise differ forms of power.

Table 1
Support functions of social media.

Types	Support functions of social media
Information sharing	• Rapidly information distribution and sharing in real time (Osatuyi, 2013); • Enhance the accessibility of information (Chadwick & May, 2003); • Make the bottom-up information to be heard by a wider public (Deng et al., 2015); • Allow dispersed groups and individuals to share or promote information related to common interests and concerns (Alizadeh et al., 2019); • Better information exchange between the public and government (Wu et al., 2022); • Inform citizens about spatial planning and policies (Lin, 2018); • One-way information flows from government to citizens (Williamson & Ruming, 2020);
Social networking	• Expand the networks of individuals and organizations and build up digital social capital (Mandarano et al., 2010); • Promote emerging civil society organizations through individual networking and catalyze their movements (Khondker, 2011; Kumar and Thapa, 2015); • Harness large-scale online networks for collective actions (Gordon and Manosevitch, 2011); • Break physical boundaries and create more open and multicenter networks, since any citizen could be the center/node of a network (Zhao et al., 2018); • Different forms of power exercised through various types of networks (Castells, 2011);
Citizen participation	• Shift the intensity and nature of participation (Mukhtarov et al., 2018); • Mobile participation: using social media in mobile phones for participation anytime anywhere (Ertiö, 2015); • Augmenting public participation that captures a wider audience of participants (Fredericks & Foth, 2013); • Engage young citizens and marginalized social groups who do not formally participate in urban planning, but exclude certain groups (Lin & Geertman, 2019); • Claim marginalized citizens' right to the city (Tayebi, 2013); • Empower citizens and enhance social inclusion in specific contexts (Lin & Kant, 2021); • Meet different levels of participation needs and increase inclusive deliberative democracy (Pflughoeft and Schneider, 2020);
Communication	• Enable easier and more direct interaction between government, citizens and other actors (Van Dijk, 2006); • Enable social interaction of learning and co-creation of meaning (Lewis et al., 2010) ; • Widen the range of communication from desktop-based interaction to a communication on-the-go (Hoffken & Streich, 2013); • Transform one-way or two-way communication into interactive and networked all-to-all communication (Alizadeh et al., 2019); • New platforms for both alternative and dominant discourses (Mancilla-Garcia, 2015); • Mass self-communication: multimodal, a large audience, and self-generated (Castells, 2007); • Enormous and diverse communication in multiple forms of online public spheres (Rauchfleisch & Schäfera, 2015); • Form an agonistic public sphere for conflicting interests to express and contest (Tong, 2015).

- *Communication* is diverse, characterized by multimodal, interactive and mass self- communication in various online public spheres. It doesn't necessarily lead to critical-rational debates, emotions and collective passions can take place in more agonistic public spheres and affect planning outcomes.

To some extent, these four types of support functions are overlapped and interacted with each other. Besides, social media may combine with WebGIS, public participation geographic information systems (PPGIS) and other digital tools to assist specific planning tasks.

3.1. Information sharing

Social media such as social networking sites, blogs, forums and microblogging are becoming a reliable and effective platform for rapidly information distribution, sharing and broadcasting to a wide audience in real time (Osatuyi, 2013). This is mainly because that they have the wide user base and offer the rapid spread of information to their users. Social media distribute and share four types of information, including personal information, casual information, sensational information (breaking news), and political information (government-related events and news) (Osatuyi, 2013), the last two types of which are more related to urban planning. Information is dynamic when it generates multiple conversations, while it is static when it does not get response or reactions (Osatuyi, 2013). Different from the traditional top-down model with a single source and a single direction, social media enable real-time information exchange in networks allowing more bottom-up information to be heard by a wider public in urban planning (Deng et al., 2015). The forwarding and sharing function of social networking sites provides an opportunity for individuals and social groups to share or promote information related to common interests and concerns (Alizadeh et al., 2019). Breaking news about collective actions or planning events could be distributed rapidly through social networking sites such as Facebook, Twitter and Weibo which have a large number of users. Even in more authoritarian contexts, sensitive information which are not publicly discussed in formal information channel can be spread over social media, often thousands of times, before they are removed by censors (Rauchfleisch & Schäfera, 2015). Social media can enhance the accessibility of information through sharing information among users, generating alternative information to official discusses over planning issues, and disseminating government information to the public (Hernandez-Mora et al., 2015). They can provide opportunities for citizens to seek or receive information that they need to know, and enable better information exchange between the public and government (Wu et al., 2022). The availability of more information can facilitate more transparent and accountable public decision-making process (Chadwick & May, 2003). Many local governments in Western countries and China use social media to inform citizens about spatial planning and policies in the planning process (Lin, 2018).

Government agencies often use social media to distribute information to citizens, characterized by one-way information flows rather than two-way communication (Williamson & Ruming, 2020). For instance, a large number of government agencies in China have created public accounts on WeChat to serve about 570 million citizens through inquiry and information sharing (CNNIC, 2019). Fig. 1 (left) shows a public WeChat account (Nanning 2035) of Nanning city in China. This social media account was created by the Nanning Municipal Planning Management Bureau. It released the information of the new master plan and other plans of the city as well as related activities and reports. It also published the QR code for citizen survey for the plan. In short, it is a platform for local government to inform citizens about urban plans, policies, governmental activities, and the channels for participation. In USA, similar effects have been done by government. The Department of Transportation in the State of North Carolina created public accounts in Twitter, Facebook, Instagram, LinkedIn and other social media (Fig. 1, right). The social media accounts distribute the information of transportation plans and traffic conditions. The Twitter account (@NCDOT) shows that most of posts were published by the department, with few comments from citizens. The public social media account thus provides one-way or static information (e.g. announcement, project information, news) rather than dynamic information that generates multiple conversations between government and citizens.

3.2. Social networking

The development of information technologies has facilitated the emergence of network society: "networks constitute the new social

Fig. 1. Left: WeChat account of Nanning city in China distributes the information of the master plan 2035; Right: NCDOT in USA created public Twitter accounts to inform citizens about transportation plans and traffic conditions.

morphology of our societies, and the diffusion of networking logic substantially modifies the operation and outcomes in processes of production, experience, power and culture" (Castells, 1996, p.500). Network society are characterized by more openness of social structure and decentralization, minimizing the administrative hierarchy and thereby enhancing participatory democracy in urban planning (Albrechts & Mandelbaum, 2005). Social networking sites make it easy for citizens to expand the networks of individuals and organizations and build up digital social capital (Mandarano et al., 2010). They can break traditional social boundaries and create relatively open and multicenter networks, in which any individual could become the power center or node of a network (Zhao et al., 2018). The information flow and exchange in the networks can facilitate creativity and knowledge circulation, and provide participants with access to material resources, knowledge and power. Therefore, social media can harness large-scale online networks that could be used for collaboration and collective action (Gordon & Manosevitch, 2011). As argued by Tayebi (2013), planning activists could use social media to establish and expand local-based networks to call for direct actions on the streets. The open and interactive nature of social networks enables new roles of planning professionals such as activists, initiators, organizers and mediators, besides their traditional positions as experts.

Social networking sites enable a group of people to connect with each other, creating new meanings, and representing a collective identity. Scholars in the field of media studies have considerable debate on how social networking sites promote emerging civil society organizations and catalyze their movements in different contexts (Khondker, 2011; Kumar & Thapa, 2015). The connection and networking of Facebook, YouTube, and Twitter and the occupation of urban space is crucial to social movements in Tunisia, Iceland, Spain and other countries (Castells, 2012). Besides, social networking can transcend the physical boundary and incorporate nonlocal actors who have similar interests, values and backgrounds (Zhao et al., 2018). For instance, URBACT

program (the European Territorial Cooperation program), which aims at fostering sustainable integrated urban development in cities across Europe, engages citizens through several social media platforms such as Twitter, Facebook and LinkedIn (https://urbact.eu/). It forms a large network in which citizens in different countries can share information and influence urban changes.

However, few studies have paid attention to the impact of social networking on urban planning. Mancilla-Garcia (2015) investigate how Facebook and Twitter are used to establish advocacy networks for water issues in Europe, such as Righ2Water – a platform used to collect nearly 1.9 signatures for putting human right to water on European Commission's agenda. The research of Deng et al. (2015) and Zhao et al. (2018) show that citizens, civil society organizations and planning professionals use Weibo to establish large-scale social networks to perform collective actions in urban regeneration projects in China. For instance, Zhao et al. (2018) elaborated how social networking sites affected the adjustment plan of a bus route in Shanghai. The original adjustment plan, which did not sufficiently involve citizen participation, were published online by government. A popular magazine posted on a Weibo message about the original adjustment plan, and the message was then forwarded about thousand times by Weibo users. Citizens and experts from Shanghai and other Chinese cities posted their comments on the plan and quickly created a large interconnected network for information dissemination. The structure of this network was open and flexible, so every participant could become the node of the network and transmit the information to their followers, who might also become the new nodes. This large-scale social network affected the final decision of the project, because government revised the plan according to participants' opinions at the end. These studies reflect that social networking can break the physical boundaries, empower individuals and create new social capital from bottom-up initiatives. However, strong leaders and elites can easily become power centers of a network, leading to unequal power. More research is required to understand the effects of the networks on different forms of power (networking power, network power, networked power, and network-making power) under different social and technological conditions (Castells, 2011).

3.3. Citizen participation

Citizen participation is "the redistribution of power that enables the have-not citizens, presently excluded from the political and economic processes, to be deliberately included in the future" (Arnstein, 1969, p.216). Citizens could have different levels of power regarding informing, consultation, placation, partnership, delegated power, and citizen control (Arnstein, 1969). It is expected that citizen involvement and empowerment will contribute to social coherence in an increasingly fragmented society and improve the spatial quality of certain areas. However, the traditional collaborative practices only selected a small amount of stakeholders as representatives resulting in limited citizen participation (Bond, 2011). In recent years, technologies have played an important role in shifting the intensity and nature of participation (Mukhtarov et al., 2018). Compared with traditional participation methods, social media are more accessible to the majority of citizens, because citizens can use them in mobile phones for participation anytime anywhere – the so-called "mobile participation" (Ertiö, 2015). *E*-participation through social media and other digital tools could overcome constraints associated with traditional participation methods and meet different levels of participation needs, and thereby increasing inclusive deliberative democracy, public trust and planning success (Pflughoeft & Scheneider, 2020). Particularly, social media enables augmenting public participation that "captures a wider audience by including people who are unable to attend physically" (Fredericks & Foth, 2013, p.12). They provide opportunities for the engagement of young citizens and marginalized social groups who do not formally participate in urban planning, though properly exclude certain groups (Lin & Geertman, 2019). The retweet features of Twitter and the

forwarding or sharing function of Weibo and other social networking sites provides an opportunity for citizens to raise a voice and make a specific concern reach a large audience.

There are emerging government-led social media participation, which reflects different levels of citizen power. In the Netherlands, Facebook and Twitter have been used by several municipalities to enhance citizen participation as a response to the new Environment and Planning Act (Omgevingswet) (Kant, 2020; Lin & Kant, 2021; Thomas, 2020). For instance, the iBike campaign was launched by the Municipality of Alkmaar in 2015 (Fig. 2). The Facebook profile @ibikeAlkmaar was created, with more than four hundreds of followers. The municipality posted six messages that called upon citizens to submit their ideas and solutions for solving cycling problems of the city. Since Facebook is the most popular social media platform in the Netherlands, the messages reached a large group of users. As a consequence, the six messages received 491 likes and 575 comments from citizens and other actors, which were then evaluated by the government regarding costs, feasibility, and possible difficulties with policies or legislation (Kant, 2020). The number of participants through Facebook was larger than that through traditional methods such as walk-in events and newspapers. However, there was a lack of in-depth discussions between government and citizens, i.e. citizens posted many ideas and comments, while there was no substantive discussion or interaction. Another project is Utrecht Elektrisch project, which is about the distribution of charging stations for electric cars in Utrecht. This project used both Twitter (@030Elektrisch) and a web-based PSS platform (030laadpaal.nl) to support citizen participation (Fig. 3). The Twitter account had more than 2300 followers and over 2000 tweets. It enabled urban planners and government officials to well inform citizens or respond to their questions about the project. Social media offers a low cost participatory platform for government. It is also easy for participants, because many citizens already have social media accounts and do not need register it firstly. The web-based PSS platform showed the existing and planned locations of charging stations. It allowed citizens to give comments on the preliminary plan and express their preference of the new charging stations. The platform collected more than 2800 responses in 634 planed charging locations, which led to change the locations of 273 charging stations (Thomas, 2020). This case study shows that the combination of social media and the interactive PSS (with location-based features) is effective to engage a large amount of citizens, incorporate citizen inputs in the planning process, and improve the planning outcome. Nevertheless, the power of citizens are still low and mainly at the levels of consultation and placation, according to Arnstein's ladder of citizen participation. Citizens can provide feedback and even solutions, but the final decision is still in the hand of government and experts. This finding is similar to a recent study conducted by Williamson and Ruming (2020) on a metropolitan-wide public engagement campaign in Sydney, which was based on several social media platforms and PPGIS. Williamson and Ruming (2020) argue that using social media gave the impression that engagement is open and far reaching, but in reality the engagement was at the levels of consultation and placation due to a lack of interactions between government and citizens. They also indicate that it was difficult to moderate social media participation and that government should be more active to respond to citizen's comments in order to avoid citizen activism and build consensus. To increase the levels of citizen power (from tokenism to partnership or delegated power) and improve the management of social media participation, governments can set up certain rules and mechanisms, and empower citizens (to a certain extent) to present and implement their ideas for solving planning problems (Lin & Kant, 2021).

3.4. Communication

Communicative planning assumes that rational communication takes place in Habermasian public sphere (Healey, 1997; Innes & Booher, 2018). However, Brand and Gaffikin (2007) argue that power
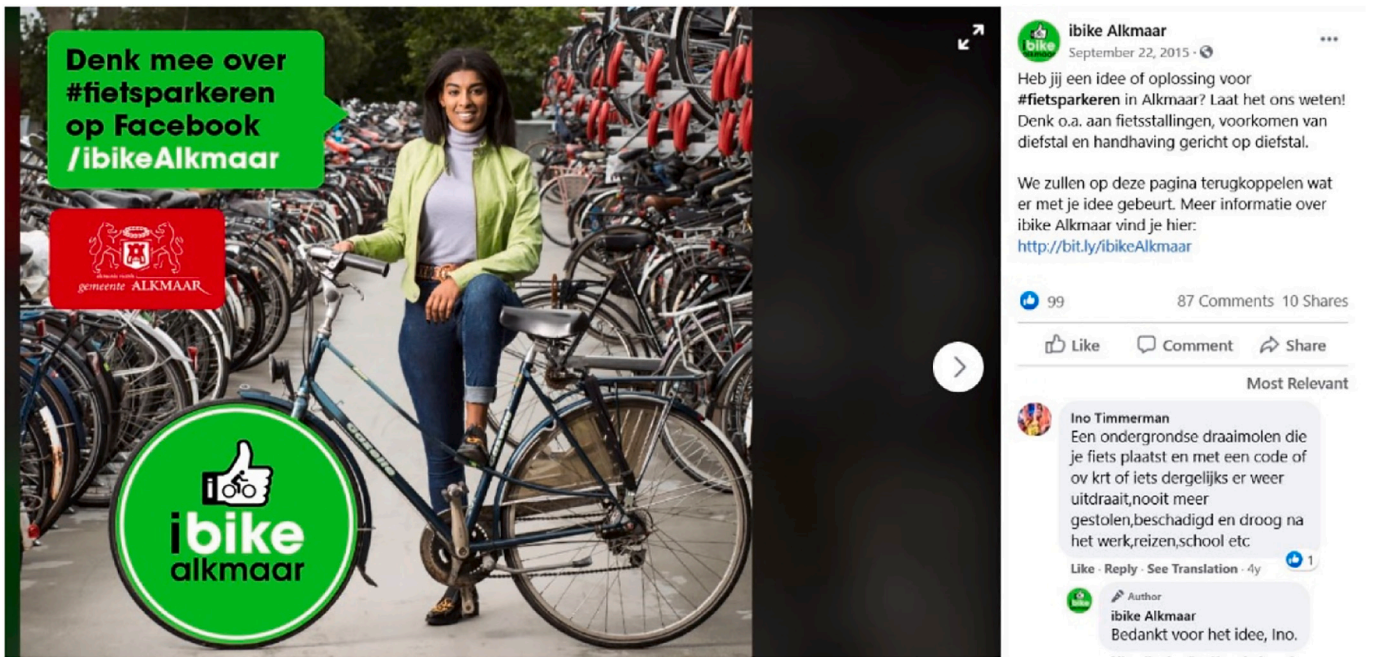
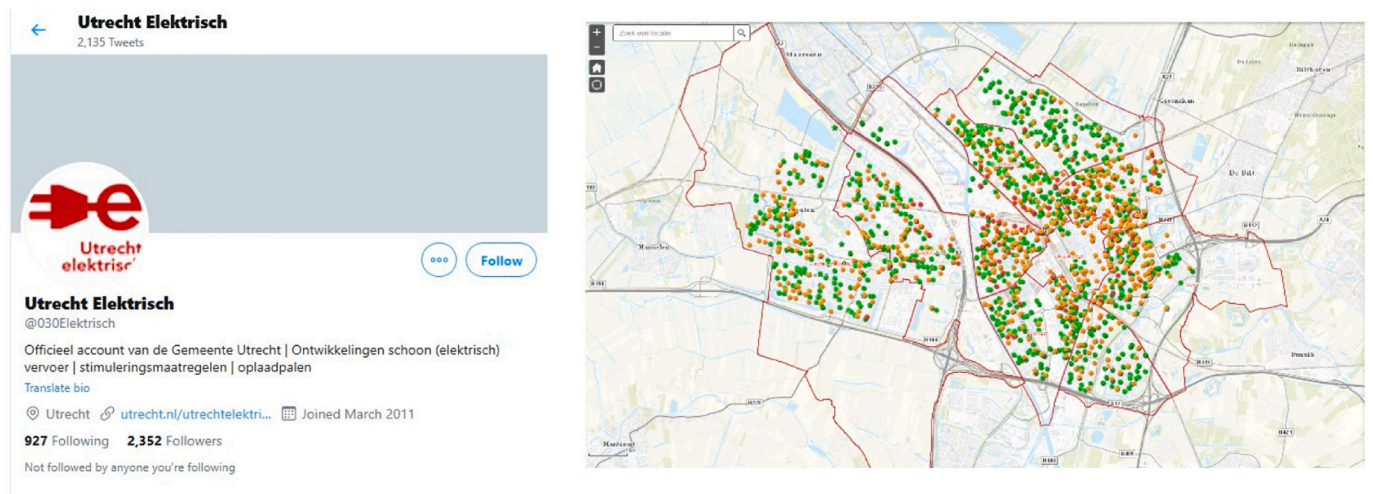Fig. 2. Facebook profile of iBike campaign in Alkmaar.

Fig. 3. Left: Twitter profile of Utrecht Elektrisch; Right: A web-based PSS for participation.

differentials cannot be dissolved through logical argumentation, and the role of emotion and conflict should be recognized in communication. In recent years, the widespread use of mobile phones, social networking sites, blogs and online forums have led to new forms of communication and interaction. Social media enable social interaction of learning, since people could share different experiences, co-create meaning and generate new ideas (Lewis et al., 2010). They allow easier and more direct interaction between citizens, decision-makers and other actors (Van Dijk, 2006). The mobile version of social media widens the range of communication from desktop-based interaction (mainly at home) to a communication on-the-go (in the public space) (Hoffken & Streich, 2013). Social media can facilitate communication among geographically distant participants, generate a common understanding and opinion of the issues they face, and enabling the organization of collective actions (Hernandez-Mora et al., 2015). They not only provide platforms for dominant discourses to consolidate themselves, but also important tools for alternative discourses (Mancilla-Garcia, 2015).

The growing interest of corporate media for internet-based forms of

communication reflects the rise of mass self-communication, which is "multimodal", "reaches potentially a global audience" and "is self-generated in content, self-directed in emission, and self-selected in reception" (Castells, 2007, p. 248). This new form of communication is based on horizonal networks of interactive communication that are more difficult to control by governments (Castells, 2012). Citizens can easily engage in urban issues and express their collective voices via networked all-to-all communication channels in social media (Alizadeh et al., 2019). This has led to "a historical shift of the public sphere from the institutional realm to the new communicative space" (Castells, 2007, p.238). Although rational-critical debate may be found in social media, it is questionable whether Habermasian public sphere exists online (e.g. Bimber & Zúñiga, 2020; Bruns & Tim, 2016; Kruse et al., 2018). Habermasian public sphere is framed and structured by the operation of old media (primarily print and broadcast), where mediated political communication is carried on by elites and public actors (Bruns & Tim, 2016). Nevertheless, the diffusion of interactive technology enriches a plurality of publics, that is, distinct groups organize around affinity and

interest (Gitlin, 1998). Besides elites and public actors, ordinary citizens actively participate in online debates and transform the public sphere. Bruns and Tim (2016) point out that there are the coexistence, intersection and overlapping of public sphericules (for particular thematic debates rather than public discourse within entire domains) and micropublics in social media. Based on a study on China's Weibo, Sleeper et al. (2013) argue that enormous and diverse communication exist in the social media platform, and that there are various forms of online public spheres with different degree of censorship and citizen participation. Tong (2015) indicates that an agonistic public sphere can be formed online for conflicting interests to express and contest, demonstrating communication processes (Tong, 2015). Different from Habemasian public sphere that is characterized by rational communication, the agonistic public sphere enables the expression of collective passions and multiple forms of communication (Mouffe, 1999).

Although there has been considerable debate on the possible contributions of an agonistic approach to collaborative planning (e.g. Bäcklund & Mäntysalo, 2010; Boonstra & Boelens, 2011; Innes & Booher, 2015), few studies have investigated the influence of social media on agonistic forms of planning. Due to the spread of digital democracy, public arenas for conflict resolution are increasingly found in the new media and social networks (Kühn, 2021). Hernandez-Mora et al. (2015) research how citizens in Spain used Twitter to create a critical opinion, contested official proposals, and organized collective actions on water management. Williamson and Ruming (2019) study how social contestation and resistance influenced an urban renewal project resulting in conflicting consensus. They indicate that the local community not only used traditional media channels, but also adopted social media as a significant component for their communication and resistance strategy. The local community developed a consultation approach to trigger constructive conversations between various stakeholders (e.g. representatives of government landowners, community and business groups). They also utilized Twitter to seek alliances with other community groups and rescaled their resistance from the local level to the metropolitan level. A recent study of Zhang et al. (2019) show that civil society organizations and citizens in Beijing use new media and Web-based PSS to organize the built-heritage stewardship movement, so local government was forced to adjust the original plan from large-scale demolition to small-scale regeneration. To some extent social media enable social groups to express their emotions and needs through online debate but they might be excluded from the crucial offline discourse, and thereby having limited influence on the final decision. Future research should pay more attention to which extent the interaction between online and offline discourse may (or not) mobilize different types of actors to develop a sharing understanding of problems and collectively design solutions. Besides the agonistic public sphere, social media has also enabled the coexistence of other public spheres, which may have an impact on collaborative planning.

4. Challenges

Social media have provided new ways of information sharing, participation, networking and communication. Nevertheless, online information may be bias and unreliable under some circumstances. There are several potential challenges, including bias, privacy, credibility, (self-)censorship and opinion polarization. Since collaborative planning emphasizes participation and dialogue, they may be affected more by these issues than other forms of urban planning.

First, substantial *population biases* exist across different social media platforms due to the digital divide (Ruths & Pfeffer, 2014). Social media is widely used by young people, leading old generations and those people lacking internet access out of online discourse (Lin & Geertman, 2019). A world-wide report shows that the largest group of Facebook and Instagram users are among 25- to 34-year-olds (Chaffey, 2020). Even within a country, the spatial distribution of social media data could be highly heterogeneous, i.e. data is mostly concentrated within cities while rural areas have less data (Zhan et al., 2014), especially in developing countries where resources are unequally distributed (Loo & Wang, 2017). However, this bias can become less severe, when the number of social media users are growing and the sample becomes a close representative of the population (Lin & Geertman, 2019). Currently, the combination with traditional methods such as workshops to engage offline participants in the planning process could alleviate this problem. A recent study in the Netherlands shows that the combination of social media participation and offline participatory methods is an effective way to engage different social groups in the planning process (Lin & Kant, 2021).

Second, social media contain users' profiles, messages, comments, photos and connectors, so there is a *privacy concern* on using social media data in research. "Privacy implications associated with online social networking depend on the level of identifiability of the information provided, its possible recipients, and its possible users" (Gross & Acquisti, 2005, p.73). Even social media that do not openly expose their users' identities may provide enough information to identify the profile's owner. Therefore, any analysis conducted on personalized social media data requires careful attention to aggregate the geotagged information of people that is not identifiable (Rashidi et al., 2017).

Third, an uncertainty associate with the use of social media is *information credibility*, i.e. "the credibility of both the information shared and that of the information source" (Osatuyi, 2013, p.2622). This is because information provided in this new channel often lacks professional gatekeepers to check content and determine source credibility (Westerman et al., 2014). Information may also be interpreted differently, which leads to misunderstandings and distortions in dialogues (Afzalan & Muller, 2014). Besides, the contents of communication that include short texts, images or video may cause ambiguous meaning and not in-depth conversation. However, credibility could be mitigated by cognitive elaboration which refers to active participation in information processing such as discussing and sharing contents (Westerman et al., 2014).

Four, media studies emphasizes the potential issues of *self-censorship*. Social media offer users the ability to filter their thoughts prior to share them, which is not available in face-to-face communication (Das & Kramer, 2013). Social media users can choose not to post and share content with some people and block other people from viewing content due to a variety of reasons such as privacy and political concern (Sleeper et al., 2013). They can stay away from posting political content for fear of offending others on their social network (Rainie & Smith, 2012). Besides, users manage multiple identities and behave differently based on the virtual social group (Farnham and Churchill, 2011). Nevertheless, this issue may be less serious in more democratic contexts, where individuals are empowered for free speech. Self-censorship is often linked with the issue of *censorship*, especially in authoritarian contexts. China has attracted a lot of scholarly attention on social media censorship, which is regulated by Internet infrastructure, government officials and technology companies (Tai & Fu, 2021). Some scholars argue that censorship and state control undermine online debates and demobilize online activism (e.g. Stockmann & Luo, 2015; Yang, 2017). However, many others indicate that a large number of sensitive topics have existed in Chinese social media (e.g. King et al., 2013; Tai & Fu, 2021), and that open and critical debates can occur under specific circumstances (Rauchfleisch & Schäfera, 2015). To some extent, the central government uses online information to monitor local officials and solve local problems (Rauchfleisch & Schäfera, 2015), which can decrease the probability of large regime-threatening protests and improve the legitimacy of the state (Qin et al., 2017). Reason is a recent approach of censorship to regulate the emotion in online public spheres in China (Yang, 2017). More research is required to understand the extent to which this affects rational or agonistic public spheres. The different degrees of censorship on various social media platforms in democratic and authoritarian contexts also suggest that there is a need to carefully examine the boundaries of open debates defined by the state and the

potential different forms of online public spheres in collaborative practices.

Finally, there has been considerable debate on *opinion polarization* on social media. Some scholars argue that social media enable individuals to encounter more diverse views and thereby having more moderate positions on controversial issues (Bimber, 2004). But other scholars argue that people attempt to interact with like-minded individuals, resulting in intensifying the phenomenon of polarization (Bakshay et al., 2015). A social network is polarized if nodes can be partitioned into two highly cohesive subgroups, reflecting two contrasting viewpoints. Polarization could separate individuals into sides that have little or no communication with each other. A collaborative planning practice in China shows that online participants were divided into different groups (the public, developers, etc.) holding conflicting opinions, driving the interaction away from consensus building (Cheng, 2013). Future research could apply sentiment analysis to understand the potential of opinion polarization through social media participation.

5. Discussion and conclusion

This study identifies four types of support functions of social media for collaborative planning, including information sharing, social networking, citizen participation, and communication. These support functions have the potential to assist different phases of collaborative processes. Innes and Booher (2018) explain several stages of a collaborative process, including assessment/planning, organization, education, negotiation/resolution, and implementation. First, *the assessment and planning stage* is to identify the planning problems and all affected stakeholders. Second, *the organizational stage* is to establish the process of communication and accountability by representative stakeholders to their respective constituencies. Third, *the educational stage* is crucial for stakeholders to learn about the interests and perspectives of other stakeholders, develop common understandings of planning problems, and build a common information base through a method of joint fact-finding. Fourth, *the negotiation stage* is to turn interests into decision making criteria, generate options that meet the criteria, link and package agreements. Lastly, "activities in *the implementation stage* will vary depending upon the specific context of the collaborative process and the nature of the agreement" (Innes & Booher, 2018, p.93). The various support functions of social media can be employed to assist several stages of collaborative planning, but it seems less useful for the organizational stage.

- In *the assessment and planning stage*, social media can help to identify problems through citizen participation, such as collecting feedback or data from a wide range of citizens about specific planning problems (Fredericks & Foth, 2013; Lin & Kant, 2021). Early involvement of citizens not only enables the effective use of local knowledge, but also supports the acceptability of the plans by fostering trust among participants (Innes and Booher, 2004). Social networks among participants can also be established to support information exchange and facilitate the creation of new social capital, which may be helpful for co-creation in the later stages (Mancilla-Garcia, 2015).
- In *the educational stage*, the communication and interaction through social media platforms may help stakeholders to learn the interests and perspectives of other stakeholders. Innes and Booher (2018b, p.93) argue that "skipping this phase will most likely be fatal to the process". However, the communication between different stakeholders may be controversial and require sufficient efforts from organizers such as government and planning agencies for mediation and reaction.
- In *the negotiation and resolution stage*, there are different possibilities of using social media in various planning contexts. For instance, social media accounts of government and planning agencies as well as local communities can be used for information sharing (e.g. sharing the alternative proposals) and citizen participation (e.g.

getting comments from citizens for the proposals, and even collecting solutions from citizens) (Williamson & Ruming, 2020; Lin & Kant, 2021). In some difficult planning contexts, social media may also be used by citizens, local communities or civil society to against the government-led proposals and organize collective actions through citizen participation, social networking and communication (e.g. Williamson & Ruming, 2019; Zhao et al., 2018).
- In *the implementation stage*, social media may be used for informing citizens about the implementation process and assisting the communication between local residents and stakeholder managers or implementation agencies. Digital tools make citizens' quick report of implementation issues and real-time communication with stakeholder managers possible, reducing the risk of conflicts especially in regeneration projects that severely affect the daily lives of local residents (Lin & Kasper, 2021).

However, the framework of collaborative stages proposed by Innes and Booher (2018) is normative and general, and may not be fit to specific planning contexts. For instance, the research of Lin and Kasper (2021) shows that the collaborative planning process can be divided into the planning phase and the implementation phase in regeneration projects in the Dutch context. More research is required to understand the different stages of collaborative planning in specific local contexts and the role of social media in supporting these stages.

Social media also have the potential to support different scales of collaborative planning. Most of the existing studies focus on the capacity to facilitate citizen participation, communication, and networking at city and community levels (e.g. Kleinhans et al., 2015; Lin & Kant, 2021; Zhao et al., 2018). At the city level, public social media accounts of local government and planning agencies have been used for information sharing and citizen participation. At the community level, there may be existing social media platforms of local residents. These platforms provide opportunities for the dissemination of planning information and the communication between government and citizens (Lin & Kant, 2021). Local residents can also use social media to build alliances with other community groups and engage various stakeholders to rescale their collective actions from the local level to the metropolitan level (Williamson & Ruming, 2019). Besides, a large-scale network across regions and countries can be established through Facebook and Twitter (Mancilla-Garcia, 2015). However, the management of social media participation especially at the large scale is very complex and difficult, and requires more efforts from government such as actively responding to citizen's comments (Williamson & Ruming, 2020). Without proper management and effective communication, social media participation has less value for the planning process and even has the risk to become citizen activism (Williamson & Ruming, 2020).

Additionally, Calderon and Westin (2021) call our attention to the influence of contextual factors on collaborative planning practices. Feeney and Porumbescu (2020) indicate that the use of social media platforms has the potential to reinforce existing power differentials and create new social and political bias. I argue that specific institutional, social and technological contexts have the potential to affect the use of social media in collaborative planning. For instance, the forms and quality of government-led or bottom-up citizen participation and communication through social media can be different in democratic or authoritarian contexts, due to different institutional settings and internet censorship. The levels of population and social bias about using social media are also various in different regions with distinct internet and social media penetration rates. More research are required to understand the impacts of local institutional, social and technological factors on using social media in urban planning.

Social media allow government and urban planners to inform and involve more citizens ever before. Generally speaking, the increasing use of social media and digital tools have provided more opportunities for social interactions and communications between citizens, civil society, government and other actors in planning practices. However, there are

several potential issues regarding the use of social media in collaborative planning, such as bias, self-censorship and opinion polarization. There may also lack in-depth social interaction and dialogue. Besides, wider engagement only "materializes", if virtual connections manifest themselves in real space through concrete actions by using both online and offline engagement methods (Kleinhans et al., 2015). The integration of social media, other participatory tools, and traditional offline methods may be necessary to support more inclusive collaborative processes. But there is no one-sized-fits-all solution, since projects could be different in terms of specific institutional contexts and socio-economic challenges. Attention should be paid to these potential differences that required different participatory approaches.

The communicative and contested effects of social media also reflect the debate on communicative and agonistic approaches to collaborative planning. Collaborative planning practices are often guided by governments and experts, and expected to be characterized by a more rational and communicative approach (Innes & Booher, 2015). Nevertheless, urban social movements have recently risen in the context of neoliberalization, gentrification, and environmental degradation. This contested context requires a more agonistic approach for multiple expressions and communications (Gualini & Bianchi, 2015). In the context of social injustice or other difficult planning situations, social media may facilitate agonistic public spheres, where grassroots participants express their emotions and passions(Tong, 2015). Citizens adopt a more radical approach to interact with government, reflected by citizen activism and resistance in the planning process (e.g. Williamson & Ruming, 2019; Zhang et al., 2019). More research are required to understand the influence of social media on communicative or agonistic approaches to collaborative planning.

Author notes

I have conducted intensive research on the application of social media, planning support systems and other digital tools in supporting participation and collaboration in urban planning.

Declaration of competing interest

The author confirms sole responsibility for the following: study conception and design, data collection and analysis, and manuscript preparation.

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References

Abdul-Rahman, M., Chan, E. H. W., Wong, W. S., Irekponor, V. E., & Abdul-Rahman, M. O. (2021). A framework to simplify pre-processing location-based social media big data for sustainable urban planning and management. *Cities, 109*, Article 102986.

Afzalan, N., & Muller, B. (2014). The role of social media in green infrastructure planning: A case study of neighborhood participation in park siting. *Journal of Urban Technology, 21*(3), 67–83.

Albrechts, S., & Mandelbaum, S. (2005). *The network society: A new context for planning*. London: Routledge.

Alizadeh, T., Sarkar, S., & Burgoyne, S. (2019). Capturing citizen voice online: Enabling smart participatory local government. *Cities, 95*, Article 102400.

Arnstein, S. (1969). A ladder of citizen participation. *Journal of the American Planning Association, 35*(4), 216–224.

Bäcklund, P., & Mäntysalo, R. (2010). Agonism and institutional ambiguity: Ideas on democracy and the role of participation in the development of planning theory and practice. *Planning Theory, 9*(4), 333–350.

Bakshay, E., Messing, S., & Adamic, L. (2015). Exposure to ideologically diverse news and opinion on Facebook. *Science, 348*(6239), 1130–1132.

Bimber, B. (2004). The internet and political fragmentation. In *Conference proceedings of the Democracy in the 21st Century ConferenceUrbana-Champaigne, IL*.

Bimber, B., & Zúñiga, H. G. (2020). The unedited public sphere. *New Media & Society, 22*(4), 700–715.

Bond, S. (2011). Negotiating a "democratic ethnos": Moving beyond the agonistic-communicative divide. *Planning Theory, 10*(2), 161–186.

Boonstra, B., & Boelens, L. (2011). Self-organization in urban development: Towards a new perspective on spatial planning. *Urban Research & Practice, 4*(2), 99–122.

Brand, R., & Gaffikin, F. (2007). Collaborative planning in an uncollaborative world. *Planning Theory, 6*(3), 282–313.

Brown, G. (2015). Engaging the wisdom of crowds and public judgement for land use planning using public participation geographic information systems. *Australian Planner, 52*(3), 199–209.

Bruns, A., & Tim, H. (2016). Is habermas on Twitter? Social media and the public sphere. In G. Enli, A. Bruns, A. O. Larsson, E. Skogerbo, & C. Christensen (Eds.), *The Routledge companion to social media and politics*. United States of America: Routledge.

Calderon, C., & Westin, M. (2021). Understanding context and its influence on collaborative planning processes: A contribution to communicative planning theory. *International Planning Studies, 26*(1), 14–27.

Cao, K., Zhu, J., & Zheng, L. (2021). The "collaborative planning turn" in China: Exploring three decades of diffusion, interpretation and reception in Chinese planning. *Cities, 117*, Article 103210.

Castells, M. (1996). *The rise of the network society: The information age: Economy, society and culture*. Oxford: Blackwell.

Castells, M. (2007). Communication, power and counter-power in the network society. *International Journal of Communication, 1*, 238–266.

Castells, M. (2011). A network theory of power. *International Journal of Communication, 5*, 773–787.

Castells, M. (2012). *Networks of outrage and Hope: Social movements in the internet age*. Chichester, UK: Wiley.

Chadwick, A., & May, M. (2003). Interaction between states and citizens in the age of the internet: "E-government" in the United States, Britain, and the European Union. *Governance, 16*, 271–300.

Chaffey, D. (2020). Global social media research summary 2020. https://www.smartin sights.com/social-media-marketing/social-media-strategy/new-global-social-me dia-research/.

Cheng, Y. (2013). Collaborative planning in the network: Consensus seeking in urban planning issues on the internet – The case of China. *Planning Theory, 12*(4), 351–368.

CNNIC. (2019). Statistical report on the development of China's internet. http://www. cac.gov.cn/2019-02/28/c_1124175677.htm.

Das, S., & Kramer, A. (2013). Self-censorship on Facebook. In *Proceedings of the seventh international AAAI conference on weblogs and social media*.

Deng, Z. H., Lin, Y. L., Zhao, M. X., & Wang, S. F. (2015). Collaborative planning in the new media age: The Dafo Temple controversy, China. *Cities, 45*, 41–50.

Ertiö, T. P. (2015). Participatory apps for urban planning – Space for improvement. *Planning, Practice & Research, 30*(3), 303–321.

Farnham, S. D, & Churchill, E. F. (2011). Faceted identify, faceted lives: Social and technical issues with being yourself online. In *Proceedings of the ACM 2011 conference on the Computer Supported Co-Operative Work* (pp. 359–368).

Feeney, M. K., & Porumbescu, G. (2020). The limits of social media for public administration research and practice. *Public Administration Review, 81*(4), 787–792. https://doi-org.proxy.library.uu.nl/10.1111/puar.13276.

Fredericks, J., & Foth, M. (2013). Augmenting public participation: Enhancing planning outcomes through the use of social media and web 2.0. *Australian Planner, 50*(3), 244–256.

Gitlin, T. (1998). Public sphere or public sphericules? In T. Liebes, & J. Curran (Eds.), *Media, ritual, identify*. New York and London: Routledge.

Goodspeed, R. (2014). Smart cities: Moving beyond urban cybernetics to tackle wicked problems. *Cambridge Journal of Regions, Economy and Society*. https://doi.org/10.1093/cjres/rsu013

Gordon, E., & Manosevitch, E. (2011). Augmented deliberation: Merging physical and virtual interaction to engage communities in urban planning. *New Media & Society, 13*(1), 75–95.

Gross, R., & Acquisti, A. (2005). *Information revelation and privacy in online social networks (the Facebook case)*. Virginia: ACM Workshop on Privacy in the Electronic Society.

Gualini, E. (2015). Conflict in the city, democratic emancipatory – And transformative? In search of the political in planning conflicts. In E. Gualini (Ed.), *Planning and conflict: Critical perspective on contentious urban developments*. New York and London: Routledge.

Gualini, E., & Bianchi, I. (2015). Space, politics and conflicts: A review of contemporary debates in urban research and planning theory. In search of the political in planning conflicts. In E. Gualini (Ed.), *Planning and Conflict: Critical Perspective on Contentious Urban Developments*. New York and London: Routledge.

Healey, P. (1997). *Collaborative planning: Shaping place in fragmented societies*. London: Macmillan.

Hernandez-Mora, N., Cabello, V., de Stefano, L., & De Moral, L. (2015). Networked water citizen organisations in Spain: Potential for transformation of existing power structures in water management. *Water Alternatives, 8*(2), 99–124.

Hoffken, S., & Streich, B. (2013). Mobile participation: Citizen engagement in urban planning via smartphones. In C. Silva (Ed.), *Citizen E-participation in urban governance: Crowdsourcing and collaborative creativity*. Information Science Reference: Hershey.

Hu, Y. J., de Roo, G., & Bin, L. (2013). "Communicative turn" in Chinese spatial planning? Exploring possibilities in Chinese contexts. *Cities, 35*, 42–50.

Huxley, M., & Yiftachel, O. (2000). New paradigm or old myopia? Unsettling the communicative turn in planning theory. *Journal of Planning Education and Research, 19*, 333–342.

Innes, E. J., & Booher, D. E. (1999). Consensus building and complex adaptive systems: A framework for evaluating collaborative planning. *Journal of the American Planning Association, 65*(4), 412–423.

Innes, J., & Booher, D. E. (2004). Reframing public participation strategies for the 21st century. *Plan. Theory Pract., 5*, 419–436.

Innes, E. J., & Booher, D. E. (2015). A turning point for planning theory?Overcoming dividing discourses. *Planning Theory, 14*(2), 195–2013.

Innes, E. J., & Booher, D. E. (2018). *Planning with complexity: An introduction to collaborative rationality for public policy* (2nd ed.). London and New York: Routledge.

Kant, S. (2020). *Social media for citizen participation*. Utrecht University. Bachelor thesis of Human Geography and Spatial Planning.

Khondker, H. H. (2011). Role of the new media in the Arab spring. *Globalizations, 8*(5), 675–679.

King, G., Pan, J., & Roberts, M. (2013). How censorship in China allows government criticism but silences collective expression. *American Political Science Review, 107*(2), 326–343.

Kleinhans, R., Van Ham, M., & Evans-Cowley, J. (2015). Using social media and mobile technologies to foster engagement and self-organization in participatory urban planning and neighborhood governance. *Planning, Practice & Research, 30*(3), 237–247.

Kowalik, K. (2021). Social media as a distribution of emotions, not participation. Polish exploratory study in the EU smart city communication content. *Cities, 108*, Article 102995.

Kruse, L. M., Norris, D. R., & Flinchum, J. R. (2018). Social media as a public sphere? Politics on social media. *The Sociological Quarterly, 59*(1), 62–84.

Kühn, M. (2021). Agonistic planning theory revisited: The planner's role in dealing with conflict. *Planning Theory, 20*(2), 143–156.

Kumar, R., & Thapa, D. (2015). Social media as a catalyst for civil society movements in India: A study in Dehradun city. *New Media & Society, 17*(8), 1299–1316.

Lewis, S., Pea, R., & Rosen, J. (2010). Beyond participation to co-creation of meaning: Mobile social media in generative learning communities. *Social Science Information, 49*(3), 1–19.

Lin, Y. L. (2018). A comparison of selected Western and Chinese smart governance: The application of ICT in governmental management, participation and collaboration. *Telecommunications Policy, 42*(10), 800–809.

Lin, Y. L., & Geertman, S. (2015). Smart governance, collaborative planning and planning support systems: A fruitful triangle? In S. Geertman, J. Stillwell, J. Ferreira, & R. Goodspeed (Eds.), *Planning support systems and smart cities*. Heidelberg: Springer.

Lin, Y. L., & Geertman, S. (2019). Can social media play a role in urban planning? A literature review. In S. Geertman, Q. M. Zhan, A. Allan, & C. Pettit (Eds.), *Computational planning and management for smart cities*. Heidelberg: Springer.

Lin, Y. L., & Kant, S. (2021). Using social media for citizen participation: Contexts, empowerment, and inclusion. *Sustainability, 13*(12), 6635.

Lin, Y. L., & Kasper, B. (2021). Assessing collaborative planning and the added value of planning support apps in The Netherlands. *Environment and Planning B: Urban Analytics and City Science*. https://doi.org/10.1177/23998083211009239

Loo, B. P. Y., & Wang, B. (2017). Progress of e-development in China since 1998. *Telecommunications Policy, 41*(9), 731–742.

López-Ornelasa, E., Abascal-Mena, R., & Zepeda-Hernández, S. (2017). Social media participation in urban planning: A new way to interact and take decision. In *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*. XLII-4/W3.

Mancilla-Garcia, M. (2015). Does social media benefit dominant or alternative water discourses. *Water Alternatives, 8*(2), 125–146.

Mandarano, L., Meenar, M., & Steins, C. (2010). Building social capital in the digital age of civic engagement. *Journal of Planning Literature, 25*(2), 123–135.

Mouat, C., Legacy, C., & March, A. (2013). The problem is the solution: Testing agonistic theory's potential to recast intractable planning disputes. *Urban Policy and Research, 31*(2), 150–166.

Mouffe, C. (1999). Deliberative democracy or agonistic pluralism. *Social Research, 66*(3), 745–758.

Mouffe, C. (2000). *The Democratic Paradox*. London: Verso.

Mouffe, C. (2013). *Agonistics: Thinking the world politically*. London: Verso.

Mukhtarov, F., Dieperink, C., & Driessen, P. (2018). The influence of information and communication technologies on public participation in urban water governance: A review of place-based research. *Environmental Science and Policy, 89*, 430–438.

Osatuyi, B. (2013). Information sharing in social media. *Computers in Human Behavior, 29*, 2622–2631.

Pelzer, P., Geertman, S., van der Heijden, R., & Rouwette, E. (2014). The added value of planning support systems: A practitioner's perspective. *Computers, Environment and Urban Systems, 48*, 16–27.

Pflughoeft, B. R., & Schneider, I. E. (2020). Social media as e-participation: Can a multiple hierarchy stratification perspective predict public interest? *Government Information Quarterly, 37*, 101–422.

Piccorelli, J. T., & Stivers, C. (2019). Exiled to main street: How government's use of social media diminished public sphere. *Journal of Public Affairs*. https://doi-org.proxy.library.uu.nl/10.1002/pa.1955.

Qin, B., Stromberg, D., & Wu, Y. (2017). Why does China allow freer social media? Protests versus surveillance and propaganda. *Journal of Economic Perspectives, 31*(1), 117–140.

Rainie, L., & Smith, A. (2012). Social networking sites and politics. https://www.pewinternet.org/2012/03/12/social-networking-sites-and-politics/.

Rashidi, T. H., Abbasi, A., Maghrebi, M., Hasan, S., & Waller, T. S. (2017). Exploring the capacity of social media data for modelling travel behavior: Opportunities and challenges. *Transportation Research Part C: Emerging Technologies, 75*, 197–211.

Rauchfleisch, A., & Schäfera, S. M. (2015). Multiple public spheres of Weibo: A typology of forms and potentials of online public spheres in China. *Information, Communication & Society, 18*(2), 139–155.

Rotondo, F., & Schäfera, F. (2010). E-democracy in collaborative planning: A critical review. In B. Murgante, O. Gervasi, A. Iglesias, D. Taniar, & O. B. Apduhan (Eds.), *Computational science and its applications – ICCSA 2011*. Heidelberg: Springer.

Ruths, D., & Pfeffer, J. (2014). Social media for large studies of behavior. *Science, 346*(6213), 1063–1064.

Sleeper, M., Balebako, R., Bas, S., McConahy, A. L., Wiese, J., & Cranor, L. F. (2013). The post that wasn't: Exploring self-censorship on Facebook. In *CSCW '13 Proceedings of the 2013 conference on computer supported cooperative work* (pp. 793–802).

Tai, Y., & Fu, K. (2021). A systematic investigation into social media censorship in China. *Journal of Communication, 70*, 842–867.

Tayebi, A. (2013). Planning activism: Using social media to claim marginalized citizens' right to the city. *Cities, 32*, 88–93.

Thomas, B. (2020). *Social media and online participatory tools for urban planning: What is the added value of social media and online participatory tools on urban planning?* Utrecht University. Bachelor thesis of Human Geography and Urban Planning.

Tieskens, K., Van Zanten, B. T., Schulp, G. J. E., & Verburg, P. H. (2018). Aesthetic appreciation of the cultural landscape through social media: An analysis of revealed preference in the dutch river landscape. *Landscape and Urban Planning, 177*, 128–137.

Tong, J. R. (2015). The formation of an agonistic public sphere: Emotions, the internet and news media in China. *China Information, 29*(3), 333–351.

Van Dijk, J. (2006). *The network society: Social aspects of new media* (2nd ed.). London, Thousand Oaks, and New Delhi: SAGE.

Wang, B., Loo, B. P. Y., Zhen, F., & Xi, G. L. (2020). Urban resilience from the lens of social media data: Responses to urban flooding in NanjingChina. *Cities, 106*, Article 102884.

Watson, V. (2003). Conflicting rationalities: Implications for planning theory and ethnics. *Planning Theory & Practice, 4*(4), 395–407.

Watson, V. (2011). Communicative planning: Experiences, prospects and predicaments. In H. S. Geyer (Ed.), *International handbook of urban policy: Issues in the developing world*. Edward Elgar Publishing.

Westerman, D., Spence, P. R., & van Der Heide, B. (2014). Social media as information source: Recency of updates and credibility of information. *Journal of Computer-Mediated Communication, 19*, 171–183.

Williamson, W., & Ruming, K. (2019). Urban renewal and public participation in Sydney: Unpacking social media strategies and use for contesting consensus. *Urban Policy and Research, 37*(3), 350–366.

Williamson, W., & Ruming, K. (2020). Can social media support large scale public participation in urban planning? The case of the #MySydney digital engagement campaign. *International Planning Studies, 25*(4), 355–371.

Wu, G. B., Deng, X. P., & Liu, B. S. (2022). Managing urban citizens' panic levels and preventive behaviours during COVID-19 with pandemic information released by social media. *Cities, 120*, Article 103490.

Yang, G. B. (2017). Demobilizing the emotions of online activism in China: A civilizing process. *International Journal of Communication, 11*, 1945–1965.

Yuan, Y., Chen, Y., & Cao, K. (2021). The third sector in collaborative planning: Case study of Tongdejie community in Guangzhou, China. *Habitat International, 109*, 102327.

Zhan, X. Y., Ukkusuri, S. V., & Zhu, F. (2014). Inferring urban land use using large-scale social media check-in data. *Networks and Spatial Economics, 14*, 647–667.

Zhang, L., Hooimeijer, P., Lin, Y. L., & Geertman, S. (2019). Strategies of the built-heritage stewardship movement in urban redevelopment in the internet age: The case of bell-drum towers controversy in Beijing, China. *Geoforum, 106*, 97–104.

Zhao, M. X., Lin, Y. L., & Berudder, B. (2018). Demonstration of public participation and communication through social media in the network society within Shanghai. *Environment and Planning B: Urban Analytics and City Science, 45*(3), 529–547.