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The influence of information and communication technologies on public participation in urban water governance: A review of place-based research

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ABSTRACT

Public participation is a central topic in urban water governance. With the spread of Information and Communication Technologies (ICT), urban water governance has undergone prominent changes, including the process and outcomes of public participation. This paper aims to systematically review existing scientific and grey literature on the use of ICT to facilitate public participation in urban water governance. Based on a search in Google Scholar, we have collected 33 published texts and discerned 32 case studies, which we analysed according to the Cochrane systematic review methodology. We found that ICT tools allow many citizens to be better informed and co-produce water services with a government. Furthermore, ICT tools have the potential to help in efficiency and effectiveness of urban water service provision. However, such tools provide few opportunities for higher modes of discussion and deliberation, and grant limited authority to participants to influence decision-making processes. This finding raises concerns about the unwarranted optimism of “digital democracy” proponents in the urban water sector. Public participation at the end of the day is political by nature, which cannot be cancelled out by ICT tools alone.

1. Introduction

Public participation and deliberation are key components of democratic decision-making (Ingram and Rathgeb-Smith, 1993; Huitema et al., 2009; Pahl-Wostl et al., 2012). In addition to advancing democracy, public participation may contribute to effective, efficient and legitimate decision-making, (Fung et al., 2013; Glucker et al., 2013). In environmental and water governance, public participation has been strongly advocated within such concepts as Integrated Water Resources Management (IWRM), water security, water user associations, and river basin organisations (e.g. Mollinga et al., 2008; Huitema et al., 2009).

With the rapid spread of information and communication technologies (ICTs), the intensity and nature of public participation in water governance may have shifted (Pedregal et al., 2015). Firstly, crowd-sourcing and ‘citizen science’ have become options for the generation of, for instance, weather data (Bonney et al., 2009; Dickinson et al., 2010; Buytaert et al., 2014; Wehn et al., 2015). Secondly, the Internet and various open-source geo-web tools are used to support social movements and global advocacy for water justice (Kishimoto, 2014; Hernandez-Mora et al., 2015). Finally, mobile device applications and online forums have been developed to monitor public service delivery and hold governments accountable to citizens (Hellstrom, 2010;

Jimenez and Perez-Foguet, 2011; Wesselink et al., 2015).

The most common definition of public 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: 216). Feldman et al. (2006) used the term “inclusive management” to emphasise joint deliberation as a necessary condition of public participation, from which a common judgment emerges (Thacher, 2001: 5). Terms such as “citizen observatories” (Wehn et al., 2015), “citizen co-production”, and “citizen-government interactions” (Linders, 2012) have been used to refer to public participation involving digital tools. So far, there is no systematic review of the literature on the impact of ICT tools on public participation in urban water governance. Laspidou (2014) touched upon stakeholder engagement only passingly, nor did Pedregal et al. (2015) pay specific attention to public participation and deliberation in their editorial of the special issue on ICT in water governance. The aim of this article is to fill in this gap by providing a systematic review of the literature on ICT and public participation in urban water governance, and by formulating avenues for future inquiry. More specifically, we wonder to what extent ICT initiatives in urban water governance reflect the ideals of inclusiveness to engage all willing citizens in governing a particular resource or an issue; afford authority and power in decision-

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making to relevant stakeholders; and allow for deliberative and consensus-based governance modes (Fung, 2006).

The paper proceeds as follows – section two introduces the framework we developed for a systematic review of our case studies. In section three, we explain the methodology, whereas section four characterises citizen-government and citizen-citizen interactions from our dataset. In section five we discuss the results of our review in the context of debates on digital participation, and section six concludes the paper with three avenues for future research.

2. Conceptualising citizen participation via ICT-enabled interactions

Two existing frameworks were modified to fit the purposes of our review. The first framework is developed by Linders (2012) and examines various types of ICT-facilitated interactions between citizens and a government, including interactions between citizens. The second framework has been initially developed by Fung (2006) to analyse the extent to which initiatives are participatory, and subsequently modified by Wehn et al. (2015) to apply it to digital initiatives. While the framework of Linders helps discern patterns in citizen-government interactions, the framework of Fung (2006) and Wehn et al. (2015) helps to assess these interactions against the criteria of public participation. We explain these two frameworks in the text below.

Linders (2012) offers a useful typology of information flows between citizens and a government in the context of ICT-facilitated public service provision. He distinguished between information flows from a citizen to a government (C2G), from a government to a citizen (G2C), and from a citizen to a citizen (C2C). We modify this framework by adding a fourth type of interaction – “collaborative planning and groupware” or “government with citizens” (GwC). Here, government officials regularly meet with citizens to discuss and design policy options with the use of ICT technologies (Forester, 2012; Hoyt et al., 2005). We added this type of interaction to account for the whole spectrum of joint planning approaches. Table 1 illustrates the framework with examples.

The first type of interaction is citizen sourcing when “the public helps government to be more responsive and effective” (Linders, 2012: 447). It is a part of a broader trend of crowdsourcing, which can be defined as “collective generation of media, ideas, and data undertaken voluntarily by many people” (Dodge and Kitchin, 2013: 19). While citizens contribute their knowledge, it is a responsibility of the government to manage systems and services (Fung et al., 2013). One well-publicized example of citizen sourcing is PeertoPatent, in which patents are examined not only by experts, but by all with relevant knowledge, to determine if an innovation warrants a new patent (Noveck, 2009).

The second type of citizen-government interaction is called “government as a platform”, in which information and knowledge passes from a government to citizens (e.g. O’Reilly, 2010). In this interaction, the government helps citizens to improve their productivity or achieve their goals, such as better healthcare or more sustainable water and electricity consumption. While at first this may not appear to be a form of public participation, it may play an important role in establishing government as open and transparent, and increasing trust in government.

In the third type of interaction, through social media, open source software, such as OpenStreetMaps (OSM), blogs, and virtual learning platforms, citizens may play games, exchange experiences and self-organise for learning and action (Medema et al., 2014). Citizens can share useful information with each other in real time format, and this potentially presents a substitute for traditional government responsibilities to protect and help citizens, including in the times of crises such as floods and earthquakes (Palen and Liu, 2007). Examples of such collective action include self-monitoring, whereby citizens help each other by reviewing hotels, restaurants or government services (Linders, 2012). Examples of fully independent citizen initiatives include

Table 1
A typology of ICT-enabled citizen-government and citizen-citizen interactions with relevance to public service provision.
Source: Adapted from Linders (2012).

	Citizen sourcing (C2G)	Government as platform (G2C)	“Do It Yourself”-government (C2C)	Collaborative planning & groupware (GwC)
Description of interaction	Citizens share their opinion among themselves and with government for planning purposes; Citizens provide intelligence to government to identify and fix emerging problems	Government supplies data for informed decisions by citizens; Government discloses data to win trust and legitimacy of the public; Government uses decision heuristics to encourage sustainable behaviour of citizens	Citizens self-organize to produce and consume services with no or little involvement of the government; Online citizen testimonials, sharing of sustainable practices, online advocacy for justice	Joint discussion of problems and solutions in workshops with visualising tools and scenario building, training of citizen scientists; Cultivating engaged citizens with on-going face-to-face contact with government representatives
Traditional examples	Town hall meetings, letters, election boards, park volunteer, charter schools, emergency services	Academic alliance, embedded community health workers, bill boards, government newspapers	Word of mouth, private schools, carpooling, activist meetings	Community volunteers and neighbourhood watch, participatory modelling
ICT examples	eRulemaking, IdeaScale, eDemocracy party, CrisisCommons, Challenge.gov, PeertoPatent, SeeClickFix	Geographical Positioning Systems (GPS), GovOpen Sourcing Data.gov, Recovery.gov	Open Source, SETI@HomeYelp, NHS Choice, Email, Community websites, social media	“CommunityViz” software tool for planning, weather networks funded or facilitated by government, virtual learning platforms, touch-tables and visual scenario-building

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