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PLAN ON THE MOVE: MOBILE PARTICIPATION IN URBAN PLANNING

State-of-the-Art and Future Potential

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Executive summary

Citizen participation in urban planning has been a topic of academic and practical interest since the 1960s. The adoption of information and communication technologies for civic participation, electronic participation, impacts how citizens and urban planners interact. Within the field of electronic participation, mobile participation is a rather recent chapter. The proliferation of mobile technologies enables both novel forms of participation and the embeddedness of these technologies into existing practices of participation. This dissertation contains five studies exploring *how emerging practices of mobile participation are changing citizen participation in urban planning.*

Each of the five studies describes a facet of mobile participation, beginning with an overview of participatory planning apps in use; exploring next how citizens develop apps themselves; turning then to the theoretical basis of mobile participation grounded in previous theories of participation and the digital divide; covering further the actual usage of the Täsä urban planning app; and finally, discussing self-organized community planning using mobile technologies.

The results provide an overview of the specific features enhancing democratic urban planning, asses who develops mobile apps and with what intentions, and contrasts the circumstances conducive to inclusiveness in mobile participation. Mobile phones are ubiquitous and possess a combination of unique affordances such as situated engagement and participatory sensing, enabling rich, real-time data collection and experimentation. These features resonate with early adopters who, in order to affect change, need to be embedded in the institutional civic participation setting. For citizens, mobile technologies have diversified the roles of participation, so that citizens can choose between being informed, contributing ideas, or developing applications. Finally, the apps developed with open data are the result of negotiations between developers' agency and open data availability.

Overall, this dissertation suggests that mobile participation is socially constructed in as far as the features and practices implemented are subject to a host of stakeholder interests. To this end, mobile participation is conceptualized as *maximum allowed deviation*: it affords new practices that reshape citizen participation while being part of established forms of civic participation.

Tiivistelmä

Kansalaisten osallistuminen kaupunkisuunnitteluun on kiinnostanut sekä tiedeyhteisöä että suunnittelijoita jo 1960-luvulta lähtien. Informaatio- ja kommunikaatioteknologian omaksuminen sekä sähköinen osallistuminen ovat vaikuttaneet siihen, miten kaupunkilaiset ja suunnittelijat ovat vuorovaikutuksessa toisiinsa. Mobiiliosallistuminen on uusi sähköisen osallistumisen ilmiö. Mobiililaitteiden nopea leviäminen sekä mahdollistaa uusia osallistumismuotoja että sulautuu jo olemassa oleviin käytäntöihin niitä muuntaen. Tämä väitöskirja koostuu viidestä artikkelista, joissa tutkitaan miten mobiiliosallistuminen muuttaa kansalaisten osallistumista kaupunkisuunniteluun.

Osatutkimukset tarkastelevat mobiiliosallistumista eri näkökulmista. Ensimmäiseksi on kartoitettu millaisia kaupunkisuunnitteluun ja kaupunkien hallintaan osallistavia sovelluksia maailmassa oli käytössä vuoteen 2015 mennessä. Toiseksi on tutkittu, miten kansalaiset osallistuvat itse sovelluksien kehittämiseen avoimen datan kilpailuissa. Kolmanneksi on tutkittu edellytyksiä mobiiliosallistumiselle, perustaen tarkastelu sosiaalisiin ja poliittisiin osallistumisteorioihin sekä digitaalisen kuilun ylittämistä koskeviin tutkimuksiin. Neljännessä osatutkimuksessa esitellään Turussa 2015 toteutetun mobiiliosallistumisen kokeilun (Täsä) tuloksia ja viidennessä käsitellään mobiiliteknologian käyttöä kaupunkilaisten itse-organisoituvassa osallistumisessa.

Tulokset kertovat miten teknologiset ominaisuudet muuttavat osallistuvaa kaupunkisuunnittelua, mikä ja mitkä tahot vaikuttavat sovellusten kehittämiseen avoimella datalla, ja millä ehdoilla mobiililaitteiden avulla voidaan saavuttaa laaja osallistuminen. Mobiililaitteet ovat jo nyt ihmisten mukana kaikkialla. Niiden ominaisuudet mahdollistavat osallistumisen paikan päällä (situated engagement) ja osallistumisen sensoridatan keräämiseen (participatory sensing) ja siten uusiin ja aiempaa monipuolisempiin käyttäjä- ja paikkalähtöisiin analyyseihin. Tämä ominaisuudet ovat olleet houkuttelevia aikaisille omaksujille. Institutionaalista tukea kuitenkin tarvitaan, että uuden teknologian mahdollisuudet voidaan tehdä tutuksi laajalle yleisölle. Mobiiliosallistuminen on myös monipuolistanut osallistumisrooleja: sen avulla kansalaiset voivat aiempaan helpommin valita mitä informaatiota saavat, esittää omia ideoitaan ja kehittää omia sovelluksia. Avoimen datan kilpailuissa kehitetyt sovellukset ovat kompromissi kehittäjien tavoitteiden ja käytössä olevan datan välillä.

Kokonaisuudessaan väitöskirja esittää, että mobiiliosallistuminen on sosiaalisesti rakentunutta, siinä määrin kuin sen ominaisuudet ja käytännöt määrittyvät eri tahojen intressien yhteensovittamisessa. Tämän vuoksi mobiiliosallistuminen käsitteellistyy ”suurimmaksi sallituksi poikkeamaksi”: se mahdollistaa uusia käytäntöjä jotka muokkaavat kansalaisten osallistumista samalla kun ne ovat jo osa vakiintunutta kansalaisten osallistumista.

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For Ben, with Love from Äiti-Mama

List of Original Articles

STUDY 1
Ertiö, Titiana-Petra (2015). Participatory Apps for Urban Planning-Space for Improvement. *Planning Practice & Research, 30*(3), 303–321. doi: 10.1080/02697459.2015.1052942

STUDY 2
Ertiö, Titiana-Petra. Stakeholder Participation in Open Data Contests: Insights from Apps4Finland (Article manuscript, submitted to Social Studies of Science)

STUDY 3
Ertiö, Titiana-Petra & Ruoppila, Sampo (2014). Supporting 'participation' in mobile participation. In Janssen M. et al (Eds.) *Electronic Government and Electronic Participation. Innovation and the Public Sector*, *21*, 3–12. Amsterdam: IOS Press. doi: 10.3233/978-1-61499-429-9-3

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STUDY 5
Ertiö, Titiana-Petra & Akshay Bhagwatwar (2017). Citizens as planners: harnessing information and values from the bottom-up. *International Journal of Information Management, 37*(3), 111–113. doi: 10.1016/j.ijinfomgt.2017.01.001

1 Introduction

The starting point of this thesis was a *Fast Company* article in October 2011 (Schwartz, 2011). The article discussed mobile technologies employed by the government of California to make itself more accessible to citizens and to engage with them more. It listed three new ways in which citizens could become part of government business: CPR (cardiopulmonary resuscitation)-certified citizens could volunteer to be on call and receive notifications through a mobile app; citizens could participate in a government sponsored challenge to make their own mobile apps; and citizens could report code violations through a mobile app. At that point, I started to think about ways in which mobile phones could be used to augment citizen's participation in government.

The International Association of Public Participation defines *public participation* as *"involv[ing] those who are affected by a decision in the decision-making process. It promotes sustainable decisions by providing participants with the information they need to be involved in a meaningful way, and it communicates to participants how their input affects the decision"*. The definition details the practicalities of instrumenting participation. First, it is concerned with *who* is to be engaged, arguing that those affected by a decision should have a say in the process. Second, it stresses *communication*, such as, informing the public in the early stages about the technical requirements of the planning proposal so that those affected can make informed decisions. Once the plan has been developed, the public participation initiators inform participants about how their *input has been weighed against a suite of other stakeholders' interests*. Third, the definition recognizes that *citizens' input is of value* and that by listening and acting upon such input, plans are enriched, are more widely accepted, and more socially sustainable.

While attention afforded to engaging citizens with mobile technologies is new, the phenomenon of citizen participation is not. In her seminal work, Sherry Arnstein conceptualized citizen participation in terms of a ladder, ranging from non-participation through tokenism to citizen power. Arnstein (1969: 216) defined citizen participation as "the redistribution of power […] the strategy by which the have-nots join in determining how information is shared, goals and policies are set, tax resources are allocated, programs are operated, and benefits like contracts and patronage are parceled out." Participation is not only a political subject matter of power about who is and how they are engaged, but also a matter of how the preferences are aggregated and to what extent they influence policy. Participation also touches upon the social aspects of community building and collective action in planning, as well as the equality of opportunity to participate.

Throughout Western societies, citizen participation in planning is an entitlement secured by law. The main benefit of participation in urban planning is undisputed: participation ensures better plans (Burby, 2003) *when* citizens' local knowledge is used

(Hummel & Stivers, 1998). As many commentators have argued, citizens' knowledge rarely has a 'status' in policy-making (Yli-Pelkonen and Kohl, 2005; Sieber, 2006; Bäcklund and Mäntysalo, 2010), which in practice means it can be dispensable. In order to ensure that citizens' knowledge is most useful in planning, attention can be given to collecting, aggregating, and presenting the knowledge in an easily understandable manner. For this reason, the collection tools tend to take central stage in the debate on citizen participation, sometimes to the detriment of implementing the gathered knowledge. Reporting on the challenges of embedding new participatory methods into existing institutions, Innes (2005) found that citizens may be active and voice ideas and concerns using social media but public hearings are the only legal, dedicated instruments for decision-making. In contrast, municipalities are currently struggling to gather and use input via new tools as they rethink the existing institutional routines (Edelenbos 2005).

The mass adoption of the Internet and information technologies in government create new opportunities for citizens' electronic participation (e-participation). The juxtaposition of technology with the practices of citizen engagement has led to an avid debate on the benefits and challenges of e-participation. E-participation is believed to alleviate some limitations of traditional participatory methods (Sæbø *et al.*, 2008), in terms of access to information, trust, and transparency (Kim & Lee, 2012; Bekkers & Homburg, 2007; OECD, 2003) and most importantly include previously disengaged social groups (Seifert & Peterson, 2002). Critics on the other hand, have pointed out that each new technology may at first only reproduce social inequalities, as there are constraints in terms of access and skills to take advantage of new participatory methods, which are causes for concern (Norris, 2001; Peacock & Künemund, 2007; Norris & Reddick, 2013).

Against this backdrop, *mobile participation stands as the newest chapter in electronic participation*. Mobile participation (m-Participation) is "the use of mobile devices (mobile phones, smart phones and tablet computers) via wireless communication technology to broaden the participation of citizens and other stakeholders by enabling them to connect with each other, generate and share information, comment and vote" (Höffken and Streich, 2013: 206). Notably, mobile participation mostly occurs through applications ('apps'), small programs which can be downloaded from app stores. However, citizens can also be engaged through SMS texts or standard webpages which can be accessed on a mobile phone. At the macro-level, mobile technologies are argued to impact democratic governance (Castells et al., 2006). In more practical terms, mobile participation is conflicting- it may open opportunities to monitor the city in real-time (Townsend, 2000; Evans-Cowley, 2010a) while simultaneously creating a 'mobile underclass' with access to less functions, lower user skills and perhaps only interested in poor quality content (Napoli & Obar, 2014). Nevertheless, the affordances and the possible actions through mobile participation are compelling. Virtually everyone can own a mobile phone (ubiquity) equipped with multiple sensors (camera, microphone, GPS) allowing a sensing of the surrounding environment (Burke et al., 2006) as one is

physically present at the site of a proposed urban development (situated engagement; Korn, 2013). Together, these affordances may significantly change public participation as I detail in the chapter on Mobile participation.

This study is placed at the intersection of established and new forms of citizen participation. In doing so, it analyses *citizen participation as an institution from a socio-technical perspective.* Institutions in sociology can be broadly understood as set of rules, both formal and informal, and their enforcement. Institutions govern social interaction (North 1990; Brinton & Nee, 2001) by providing different stakeholders with a "choice within constrains", which determine possible future actions. The *Institution of Citizen Participation* combines the three elements mentioned above. The *formal requirements* prescribe how citizens are to be engaged: the organizing agency, the law-abidingness (here regarding land-use planning), the participatory methods employed, the communication strategy chosen, the level of transparency in the process, the outcomes, and which individuals and groups should participate, and so on. The *informal rules* deal with organizing participation, such as the chosen venue, interaction among participants, how ideas are shared and conflicts resolved, etc. *Enforcement* or *monitoring* is done by the citizens themselves (either by those participating in the engagement or the public at large – through input feedback mechanisms), activist groups, the media or as formal evaluations of the organization responsible for the engagement process. The "choice within constrains" can be seen as the parameters established *before* engaging citizens (the formal requirements of participation) but also *during* the process, when the citizens and organizers persuade each other. The entry of mobile participation into more institutionalized forms of citizen participation is essentially about change: new technologies are constantly being invented, people expect to be engaged in the workings of the city beyond voting, and municipalities are changing their attitudes towards collaborating with their citizens.

Sociology also provides a unique vantage point from which to examine the emergence and adoption of new technologies. Mobile participation can be explored through the *Social Construction of Technology* (SCOT), a theory in science and technology studies based on social constructivism. The ideas developed in SCOT show how technologies do not develop by themselves or independent of the social context, but are rather 'socially shaped' (Bijker, Hughes and Pinch 1987; Bijker & Law, 1992; MacKenzie & Wajcman, 2010). In practice, this means that every app and all its features are designed, either consciously or unconsciously, to enable certain types of activities and restrict others. The main contribution of SCOT is highlighting that citizens, municipalities, and other groups do not simply adopt mobile participation, but actively shape it, and in shaping it attach different meanings to it. Moreover, the resulting technology is adopted at different paces and creates types of digital divides, in terms of access, skills, and usage.

Methodologically, I have adopted the alternate template strategy proposed by Langley (1999). The alternate template strategy provides alternative explanations for the same phenomenon using different theoretical perspectives. Here, I describe how alternative

interpretations based on political-social and socio-technical theories describe and explain citizen participation. The strategy draws its theory from outside the phenomena, making it a deductive process (Langley, 1999). The democratic perspective provides the normative values, which underpin any participatory exercise, namely principles of democracy, inclusion, empowerment, and transparency. Institutional theory provides a framework for studying change. Finally, the social shaping of technology – mobile technologies – provides a lens for studying how mobile participation is negotiated among various social groups.

The purpose of this dissertation is to explore how the emerging adoption practices of mobile participation is changing citizen participation in urban planning. This study seeks to describe what types of mobile apps are used for citizen participation, how they are created and by whom, which users are likely to adopt an advanced mobile app, and how citizens use mobile technologies to self-organize. The study's aim is to chart the different avenues in which applications are or could be used to enhance citizen participation in urban planning. The main research question of this dissertation is *How is the adoption of mobile participation changing citizen participation in urban planning?* The three sub-questions provide a more nuanced view of how change unfolds. RQ1 asks: *Which features of mobile applications are used in participatory urban planning and how do these enhance democratic goals?* RQ2 investigates: *Who is developing mobile applications and with what intentions?* RQ3 examines: *Under what circumstances, if any, does mobile participation support an equal opportunity for everyone to participate?* Charting this emerging topic is important both epistemologically and practically. The Human Computer Interaction (HCI) field of research, particularly Mobile HCI has placed emphasis on developing and testing mobile prototypes and "systems" (Fechner et al., 2016). In contrast, instances of how mobile participation has been applied in practice, *in real-world contexts*, reveals that the systems tested miss features critical to their adoption and integration with existing government business (Sunio & Schmöcker, 2017; Nam & Pardo, 2014). This dissertation contextualizes the prototype-practice (RQ1 and RQ2) with a normative, democracy development perspective of civic engagement (RQ1 and RQ3). Considering the present 'rush to mobile', public managers need to balance the costs and benefits of adopting mobile technologies for public engagement, especially if they are to support inclusive participation. As mobile participation is still unfolding, this thesis also aims to explore its expected developments in the near future. I posit that *mobile participation is socially shaped*, both as an institution and as an instance of technology: mobile participation is a function of both the local government as well as the citizens; the adoption of mobile participation can be supported through digital skills enhancement for all citizens; and finally, a mobile application's features and affordances are humanly designed. These three themes run throughout the study and show how mobile participation shapes the culture of citizen participation in urban planning and governance on various levels, as detailed in the research questions in Chapter 4.

1.1 Motivation of the dissertation

In 2010, the United Nation University reported that more people have access to a mobile phone than good sanitation (UNU-IWEH, 2010). Nevertheless, within this abundance, differences exist. Amongst the OECD countries, twelve countries are above the 100 percent penetration threshold while the median lies at 95 percent per 100 inhabitants (OECD, 2017). The question then becomes, how to use this prevalent resource of mobile phones for desirable outcomes. In doing so, mechanisms of effectuation as described by Sarasvathy (2008) can be employed. Effectuation starts with the identification of available resources, a selection between the possible effects which can be created with the resources, and their refinement through experimental and iterative learning techniques aimed at discovering the future. The inherent assumption is that the same resource can be used in multiple ways.

The study of generic ICTs in political studies is well established, yet the effects of mobile phones on democracy is less visible. Nonetheless, some evidence seems to support claims that mobile technology influences network building, and consequently the provision of information and mobilization of activists in democratic processes (Hermanns, 2008). In this dissertation, I avoid the deterministic and instrumentalist approaches that assert that technology in and by itself will effect change in democracy or society. Rather, I aim to provide a more nuanced and critical account of how the technology is intertwined with the people who design it and their intentions, as much as it is with the people who use the technologies for a certain intended purpose (Feenberg, 1991). The advantages of incumbency provide an advantage to shape technologies sometimes on a par with democratic goals (Portes, 2010). On the other hand, the socio-cultural impact of mobile technologies is argued to be changing the entrenched structures of power in society (Castells, 2000; Katz, 2006; Castells et al. 2006).

In practical terms, mobile participation began as a series of experiments testing the technology in two areas: either networked individuals sharing ideas about urban space with one another or individuals learning about the surrounding environment by interaction with an information layer similar to augmented reality (e.g. Urban Tapestries prototype by Silverstone and Sujon (2005); Telelogs by Davis and Karahalios (2005); or Luley et al., (2005); Nurminen, 2006). A shift towards collaboration has been seen in examples such as TexTales, which has used mobile technologies to portray cities as sites for public opinion and social construction. More specifically, it used a projection screen to display photos of the city taken by residents, while a different group participated in tagging and annotating them using SMS (Ananny & Strohecker, 2009). A further example discusses mobile phones as networked, personal measurement instruments enabling ‘citizen science’, i.e. collective measurement of the neighborhood environment, and sharing and remixing the data (Paulos et al., 2009). Liu et al. (2012) integrated the two areas mentioned by citing the following example. On the one hand, tourists want to learn about the environments they visit, and on the other, residents

provide answers to tourists' quests by generating a map with augmented reality features. The 'revolutionary and magical' smartphone as Jobs called the iPhone in 2007, has indeed changed how people use and interact with their mobile phones using third-party services or apps. For mobile participation, the introduction of the smartphone meant that citizens could observe their environment and report immediately anything they deem worth mentioning. Until a decade ago, participation was always postponed: citizens either had to wait for a public meeting, survey, or referenda or simply delay the matter until they had access to a PC. Unlike these methods, mobile participation occurs in-situ, at the place of planning, because mobile phones are portable. For urban planning in particular, because it thrives on location-based knowledge and input from citizens, mobile participation holds great promise to 'participate here and now'.

Studying mobile participation is topical for several reasons. First, mobile technologies have triggered a change in behavior, transforming passive recipients of information into active users who co-create information and generate content (Hermanns, 2008; Schroeter & Houghton, 2011; Schroeter, 2012). Second, mobile phones are an integral part of citizens' everyday practices, which help them organize tasks, their leisure activities, as well as personal relationships (DeGusta, 2012; Carter et al., 2013; Carter & Grover, 2015; Kneidinger-Müller, 2017). The same skill set can be extended to other aspects of social life, such as improving society and democracy. Third, citizens expect to be engaged in actively shaping their living environment with the social media services they use (Evans-Cowley, 2010 b; Schweitzer, 2014). Having the means and skills to use them is certainly building momentum around the smart city discourse (Nam & Pardo, 2011; Kitchin, 2014b; Williamson, 2015; Capdevila & Zarlenga, 2015). Fourth, mobile participation supports publicity, making information available by aggregating the contributions of many (Burke et al., 2006; Kanhere, 2011; D'Hondt et al., 2013). Big data analytics is currently a hot topic that has become an imperative for analyzing the huge amount of user data (Kitchin, 2014a; French et al., 2016). Fifth, mobile participation allows citizens to customize the type of data they want to share among the affordances provided by mobile phones (Egelman et al., 2013; Martin, 2015). Permissions are needed to access the camera, GPS positioning, or push notifications. Mobile technologies allow the collection of different types of data than previous tools, for instance attach pictures, noise samples, or data captured with additional sensors, e.g. auxiliary sensors to measure aerosols. Sixth, citizens willing to contribute knowledge to the development of cities need better integration with the institutionalized participation processes (Boonstra & Boelens, 2011; Saad-Sulonen, 2014; Horelli et al., 2015). Finally, the single most salient benefit of mobile technologies is the situated engagement (Gordon & de Souza e Silva, 2011; Korn, 2013) allowing citizens to reflect on the site of planning while roaming through the city, and thereby providing rich descriptions of their ideas.

1.2 Structure of the dissertation

The remainder of this study consists of the following. In the second chapter, I review participatory methods for citizen participation in urban planning, ranging from traditional face-to-face methods to electronic participation practices. I also discuss matters of in/equality of access using mobile technologies. Chapter 3 is dedicated to mobile participation. The forth chapter provides the theoretical lens through which citizen participation is investigated. I start by outlining the normative criteria underpinning public participation in planning, and also setting the democratic goals which participation should fulfill. I then turn to the perspective of the Social Shaping of Technology to provide a more nuanced understanding of the social factors which shape technologies used for citizen participation. After presenting the research questions and methods, I provide the empirical results of the five studies contained in this dissertation. Chapter 8 details the findings of this dissertation. Finally, I discuss the implications of the study and its limitation and conclude with arguments regarding the changing nature of citizen participation shaped by mobile technologies.

2 The Evolving Landscape of Participatory Methods in Urban Planning

This chapter focuses on the changing tools used for public participation. I begin with a brief listing of traditional participation methods, which form the baseline for public participation. I then proceed to investigate the changes in participation brought about by collaborative technologies, broadly comprised under the umbrella-term electronic participation. In doing so, I track e-participation from the incipient phase as expert usage in a Geographic Information System to the more democratical, citizen-oriented use through social media.

2.1 The baseline: traditional citizen participation methods

According to Rowe and Frewer (2000: 8-9), the "most formalized public participation methods" include referenda, public hearings, public opinion surveys, negotiated rule making, consensus conferences, citizens' juries/ panels, citizen advisory committees and focus groups. Except for referenda and public surveys, all the other methods involve some type of meeting requiring a personal presence. *Referenda* are advisory or binding surveys, in which those participants entitled to vote, chose among a small set of options in a ballot. *Public hearings* gather both citizens and representatives of the engaging agency, experts, and political decision-makers. Typically, only one issue can be placed on the agenda, but the same issue can be discussed several times. The more controversial the topic, the more likely it is to attract citizens' attention. Public servants and experts inform the public about their plans and simultaneously consult them by collecting their ideas and development suggestions. *Public surveys* are conducted through large-scale questionnaires structured around topics of interest. They typically survey both the significant questions under review as well as the identity of the respondents. Selected participants, including citizen delegates, public agency representatives and other stakeholders, are invited to *negotiate rule-making*. At the end of the process, the stakeholders are required to achieve a consensus on a specific topic.

Consensus conferences involve the deliberations of citizens, experts, and public agency representatives. Citizens first attend expert presentations in order to familiarize themselves with the topic, after which the deliberation proper takes place. The lay citizen panel then writes a report outlining their recommendations and conclusions, which is afterwards debated with the experts and sometimes in a press conference. In a similar fashion, *citizens' jury and panels* invite randomly selected citizen's representative from the local population to draft their recommendations over a topic of interest. Whereas consensus conferences entail technical details with a high level of complexity (e.g.

gene technology), citizens' juries tackle topics such as health, education, or traffic. Key individuals are chosen, who can tackle the problem under scrutiny from many different angles, giving the citizens a comprehensive amount of information on which to base their decision upon. A final document is drafted which along with the recommendations also allows citizens to reflect upon how they perceived the process and evaluate the public servants involved. *Citizen advisory committees or boards* are instituted by local governments to examine a pressing topic. The committee reports to the local government through a report and its work is supported by staff inside the local government. Lastly, *focus groups*, are small groups of citizen representatives, at times chosen according to selected criteria (e.g. pedestrians, teachers, parents). Participants are asked about their opinions or user experience of city services or infrastructure.

These traditional citizen participation methods have been subject to much critique, yet still continue to underpin contemporary citizen engagement (Baker et al., 2007). Other authors have argued that rather than being flawed, the citizen participation methods have not been used correctly by planners and other public organizations responsible for engagement (Innes and Booher, 2004: 420). When comparing these traditional methods, they score moderately at best (see Rowe and Frewer, 2000: 19-20). As regards inclusiveness or the degree to which the citizen sample represents the entire population – most methods score moderate to low. Only referenda and public opinion surveys attract participants, because the participation process and resulting outcomes are simple to interpret and are transparent: referenda are popular given the commitment to recognize the outcome[1] and public opinion surveys uncover citizens' values for a significant proportion of the general population (Rowe and Frewer, 2000: 19-20). The same holds true for the case of influencing the decision. When evaluating the transparency of the process, referenda and consensus conferences rank high, while the rest moderate to low. Turning to "process criteria" for evaluation, the scores are more variable. Resource accessibility is quite polarized – high (for negotiated rule making, consensus conference and citizens' panel) and low (for referenda, public opinion surveys or focus groups). Task definitions are generally high across-the-board. The costs of participation are rarely disclosed; the premise, however, is that the more deliberation and stakeholders invited, the costlier the process. Referenda and public hearings are considered the most cost-effective methods. For Rowe and Frewer (2000), combining different methods at different phases of the decision-making process is beneficial.

2.2 Participation and technology: Electronic Participation

The first attempts to make participation digital included introducing an expert-led Geographic Information System (GIS) to citizens. Later, as computers, social media applications, and mobile phones have been connected to the Internet and adopted on

1 Rowe and Frewer do not discuss the case of not legally binding referenda

a global scale, citizen participation has entered a new era of electronic participation (e-participation). In broad terms, e-participation is defined as a collection of practices that use different technological tools (computers, phones, tablets, sensors, applications, etc.) to gather, manage, and analyze citizen input. A democratic innovation refers to various methods which aim to increase and deepen citizen participation in urban governance (Geissel & Newton, 2012).

Public hearings and accessing written material are 'inconvenient' for citizen participation (Innes & Booher, 2004; Kahila-Tani et al. 2016). Inconvenience, coupled with scarce evidence of being able to influence policy and decision-making (Beierle & Cayford, 2002; Bäcklund & Mäntysalo, 2010), has led many citizens to weigh the cost of their participation. *Geographic Information Systems (GIS)* are tools which enable the generation, analysis, management, and visualization of geographic data. GIS has become an integral part of local governance, particularly in urban planning, because of its inherent spatial commonalities. Initially GIS was used only by planning experts and geographers (Nuojua, 2010). Public participation GIS (PPGIS) became a response to the long-standing plummeting of citizen participation rates. PPGIS is often proposed as a solution to include previously excluded individuals and groups (Radil & Jiao, 2016). PPGIS applications are confined to maps, which steer the data collected to some degree. Citizens can 'map' or 'pinpoint' data in the form of text at a particular location on a map. The spatial distribution of a topic may be the focus interest of an organization asking citizens a question (top-down PPGIS) or chosen by the citizens themselves (Volunteered Geographical Information, VGI detailed below).

Place and location have a special status in PPGIS. Brown (2015) suggests that a location may be a source of potential conflict between place values and land use preferences, whether current or future. A psychological component is tied to place, which gives it importance or not. On the same note, familiarity with a place can be achieved beyond physical presence. Brown (2015: 204) suggests that when those familiar with a place participate, the mapping information gathered about locations is more accurate. Local residents are believed to be the primary users of PPGIS, with the aim of bringing their *local* knowledge into the realm of urban spatial planning.

The introduction of PPGIS is largely due to a more increased uptake of technology in political, economic, and social life. As a result, the orientation of PPGIS is to collect answers to set questions on a map (Kahila-Tani et al. 2016), in short, a map-based survey. PPGIS is usually carried out in conjunction with local government land-use development projects and involves a pragmatic approach connected to top-down planning. In contrast, Volunteered Geographical Information (VGI; Tuloch, 2008) refers to citizens providing data on whatever issues they find important in a bottom-up approach (Kahila-Tani et al. 2016). Aside from the purpose of the data collection, the data itself may contribute to informing participants, raising their awareness, and consequently increasing their participation in informed decision-making (Haklay & Tobon, 2003; Sieber, 2006). PPGIS has been popular with experts but institutional adoption has been limited for reasons such as sporadic use (Kahila-Tani et al. 2016),

expensive and difficult to use functionalities (Nuojua, 2010), and seclusion in "an expert system and thus bounded within the institution of urban planning and within the confines of employed expertize" (Hemmersam et al, 2015: 48).

A notable development of the PPGIS tools and methods is SoftGIS. In contrast to generic PPGIS, SoftGIS is particularly interested in citizens' subjective 'soft' experiences of places and therefore collects resident's knowledge about their environment (Kahila-Tanni et al, 2016; Babelon et al., 2016; Kyttä et al., 2013; Kahila & Kyttä, 2009). The interfaces are designed in an appealing way which allows the combination of 'soft' knowledge with expert knowledge and GIS data. Nonetheless, like many of the PPGIS applications, SoftGIS is in fact a map survey tool. No PPGIS tool as such supports dialog or peer-to-peer communication (Nuojua, 2010). The legacy of PPGIS as regards spatial data and harnessing citizens' knowledge of a place has continued on into mobile participation, either in the form of map-based mobile applications for reporting similar to Volunteered Geographic Information (e.g. 'reporting apps') or municipality initiated mobile surveys without a map (e.g. Porukka app). I return to this issue and expand on the PPGIS legacy in the chapter on Mobile participation.

Web 2.0 tools, including social media, wikis, blogs, virtual worlds, and virtual games, are built around peer-to-peer communication and collaboration. These tools enable both one-to-many as well as many-to-many communication channels, coupled with opportunities to work together collaboratively. In urban planning, three broad categories of engagement through Web 2.0 tools have gained much success. First, *the public agency or municipality which plans to engage in public participation uses social media tools such as Facebook or Twitter*. Currently, public organizations have official accounts as part of their marketing and digital presence strategies (Fredericks & Foth, 2013). Either the agencies themselves ask citizens for feedback, or the citizens themselves initiate a discussion feed where public officials (might) respond. Second, in contrast to this top-down approach, *citizens self-organize using Web 2.0 tools*. Numerous urban planning interest groups and neighborhood community planning groups have started to debate on Facebook and have organized themselves to perform collective action. Third, the massive amount of *citizen generated data produced for other purposes can be mined and interpreted for urban planning purposes*. I will detail each of these strands in the following section. Finally, citizens not only use these tools, but also participate in their creation, tinkering, and tailoring with them to serve their goals – a point I shall return to when discussing citizen participation in application competition.

Firstly, planning agencies have strived for a long time to include more interactive methods to communicate with citizens, but empirical research shows that these ambitions have often remained unfulfilled with municipalities offering predominantly one-way, static information (Williamnson & Parolin, 2012; Evans-Cowley and Conroy, 2006). Planners have sometimes felt that their agency has been constrained by 'regulation and process' (Houghton et al., 2014: 29). Even when planners were interested in experimenting with different technologies, they could not go beyond their mandate. The laws governing planning were perceived as rigid compared to the ever-

changing technological landscape and this opposition prevented planners from being innovative. Evans-Cowley's study (2010b) showed that Facebook planning groups were reluctant to meet in-person with planners, but were eager to cooperate online. Citizens are also eager to engage in discussing public services such as public transportation on Twitter (Schweitzer, 2014). However, it has been argued that Twitter does not foster communication but rather monologues (Williamson & Parolin, 2013). Municipalities can choose between different social media strategies: they can tweet factual content and avoid conversations online; tweet in order to market their services and provide information to other agencies and the media; or engage in dialogue with citizens (Schweitzer, 2014: 229-230). Being responsive to citizens not only yields positive interactions and tweets but also results in positive media coverage and interaction with businesses. The fact that citizens choose to use social media tools for civic engagement signals a shift from 'social' to 'activist' media tactics.

Secondly, citizens use technology tools to self-organize. On Facebook, citizens form reactive groups in opposition to formal plans, but planners have sometimes been banned from accessing these social media tools for work purposes (Evans-Cowley, 2010b). Even within this constraint, citizens do expect to be engaged online: "in some communities, there is a growing expectation on the part of citizens that there will be online participation opportunities" (Evans-Cowley & Hollander, 2010: 399). Citizens are also appropriating "mundane technologies" to self-organize in urban planning (Saad-Sulonen, 2014; Boonstra & Boelens, 2011; Varnelis, 2008). At the intersection of municipalities using Web 2.0 tools to engage citizens and citizens using them to self-organize, "expanded urban planning" (Horelli et al., 2015: 288-289) the seamless integration of planning processes into everyday life becomes possible: the virtual and physical realms become united, planning becomes a learning process both for planners and citizens, participation is simultaneously local and global, and finally long, short, and real-time planning are combined. When self-organizing communities intersect with the formal urban planning practice, this takes place in a semi-formal, mixed sphere in which the citizen activists deliberate with planners one-on-one (Horelli et al., 2015). Similar practices are found in the Australian context, where planners also maintain informal relationships as a mechanism for crafting a common ground for future deliberations with the community (Cameron & Grant-Smith, 2017). The role of the mundane information technologies (websites, Facebook, blogs) is to support the community and link it to the formal urban planning process (Saad-Sulonen, 2014). For instance, Helka, the Helsinki Neighborhood Association NGO, is mainly a mediator between self-organizing local residents and the Helsinki local government through ICTs (Kanervo, 2010).

Thirdly, information contained in social media data can be used for planning purposes to various degrees. Every single social media post reaches individuals well beyond an immediate, spatial proximity (Williamson & Parolin, 2013). Social media tools are mostly present in cities (Goodspeed, 2016), where they capture users' experience of a place and monitor the city's conditions in real-time, by aggregating data that users produce (Townsend, 2000; Foth et al., 2009; Evans-Cowley, 2010a). Compared to the

heavy GIS tools, social media is (relatively) easy to use and accessible through APIs (Application Program Interfaces) increasing the need for professionals who can parse and extract value from the vast amounts of data (French et al., 2016). Potentially, the social media data gathered from users can overhaul the practice of urban planning (Foth et al., 2009) but also urban governance more generally, in cases of emergency response, tourism, transportation, etc. Social media data shares an important attribute of GIS, namely geo-location. Most of the content on Instagram, Twitter, Facebook, and the like have attached geo-tags, making them particularly luring for analyzing urban dynamism. Indeed, urban planners have been purchasing citizen-generated transportation data from commercial apps, such as Strava, in order to make informed, evidence-based decisions (Albergotti, 2014). Cerrone (2015) combined Instagram, Swarm, and Twitter secondary data to explore the activity patterns of citizens in Turku, Finland. In Estonia, operator based geographic user data has also been used to study mobility patterns (Silm &Ahas, 2014; Järv et al., 2014; Zhang et al., 2013). Livehoods combines social media data from Twitter and Foursquare and machine learning to understand the interplay between the built environment and the social fabric of cities.

Beyond these innovative experimentations, using social media data in government – particularly analyzing the input gathered from citizens – is currently a challenge, which requires considerable resources that have not been available to municipalities and planners. It thus becomes important that planners make strategic decisions about whether social media data brings sufficient value, given that traditional engagement methods are still the norm (Baker et al., 2007: 82). A sea of change in citizen participation and engagement beyond institutional boundaries is occurring, particularly often, which means that new sources of data can no longer be neglected in formal organizational procedures (Williamson & Parolin, 2013). As an alternative, what is needed is for planners to engage with citizens on their own terms, if they want to capture value from their expertise, essentially reinventing participation practices (Evans-Cowley, 2010 b). Fostering mobile tools for civic engagement is one strategy to achieve this goal, it is far from receiving wide-spread adoption, as I will present in the next section.

2.3 The digital divide in citizen participation

There is an implicit assumption that technological innovations have ‘relative advantages’ (Rogers, 2003), which help us accomplish tasks more effectively than before; choosing not to use such innovation would be irrational. This view is particularly pervasive for proponents of technological determinism, given that technologies accumulate over time. Along the same line, an innovation diffuses among the entire population; even “laggards” end up adopting it over time, otherwise it qualifies as a “failed diffusion” (Rogers, 2003). There is a body of scholarship investigating non-adoption and non-use of technologies, ranging from psychological factors to learning the skills required to use a technology. Compared to immense research on improving the technology’s

usability (from a Human-Computer Interaction perspective), non-usage research is rather marginal. However, its advocates share a belief that the preferences of non-users must also be accounted for in technological design (Selwyn, 2003; Satchell & Dourish, 2009). Selwyn (2003: 104) discusses the concept of 'technofobia', "cloud[ing] an individual's perception of the technology in question, making it appear somehow 'not for them'". Noteworthy is the fact that such caution is by no means linked to electronic civic engagement as such, but part of a wider spectrum comprising ICTs at the workplace or home, discussed as 'appropriation' (idem). The gist of Selwyn's argument is that technology use is contingent on choice and non-use is as justified as use of a specific technology. Non-users might actively resist or invoke nostalgia about the past whenever asked to adopt a technology (Satchell & Dourish, 2009), despite the availability of resources and skills (see below van Dijk's (2005) motivational level). Resistance, however, does not always equal protest but rather avoiding a digital trace of (unwanted) behaviors (Satchell & Dourish, 2009). Studies of mobile technology use in cities have consistently addressed young professionals, whose use and experiences of the city differ from other demographics, for instance in terms of sharing content vs. preference for anonymity (idem). In order to make participatory technologies democratic, such critical voices must be acknowledged.

Every time a new technological innovation is introduced, the opportunities of access and usage are unequally distributed in society (van Dijk, 2005), this is commonly denominated as the 'digital divide'. There are multiple cumulative factors that contribute to unequal adoption of a technology, such as a lack of motivation, a lack of material access, a lack of skills or different purposes for use. To use a new technology, van Dijk claimed, one needs to develop an inquisitive nature, to be *motivated* to 'give it a try', which constitutes the foundation of usage and moderates all other factors. Digital divide studies take as their starting point a *lack of the proposed technology* – personal computers, broadband, smartphones, mobile Internet, costs associated with acquiring and obtaining access to the Internet and so on. Socio-demographic factors (gender, age, nationality) and economic factors (education and income) structure the opportunities for individuals to adopt a technology (van Dijk, 2005; Hargittai & Hinnant, 2008). Providing 'access' to technology was synonymous with bridging the digital divide, but left the consequences unquestioned, such as the actual benefits of access (Gurstein, 2003) or the occasional creation of inflated expectations on and about social media (Lehdonvirta, 2014). After the access gap to the technology started to close, the focus of the digital divide moved towards the *skills* needed to operate the technology. Around this time, Hargittai (2002) coined the term 'second-level digital divide'. The same social, economic, and demographic background factors fuel skills disproportionately (van Deursen et al., 2011; van Dijk & van Deursen, 2014). A third wave of digital divide research focuses on how individuals actually use technologies and for which purposes, claiming that the new digital divide shifts to differences in *usage* (van Deursen & van Dijk, 2013; van Deursen et al., 2014; Zillien & Hargittai, 2009). The subject matter of the digital divide is constantly evolving, as new technologies are introduced. Initially,

personal computers and access to the Internet were explored, but presently the focus has shifted to mobile phones: the skills required to use them and the purposes for which they are used.

In this context, the case of access and use of mobile phones are closely related. Critics even identify the emergence of a mobile underclass (Napoli & Obar, 2014). The mobile digital divide still exists, despite leap-frogging effects (Poushter, 2016). The global median of smartphone ownership is situated at 43 percent due to the stark contrasts between those countries with no ownership and high ownership (e.g. 88% of South Koreans own a smartphone). Finns are also avid smartphone users: in 2015, 69 percent owned a smartphone and used it primarily to read news and emails, with 61 percent of use purpose each (Statistics Finland, 2015). Moreover, Finland has adopted electronic participation to a high degree (ranked 5th in UN E-Government Survey 2016) and Finns are keen mobile phone users (77%; Statistics Finland, 2016). Age is negatively correlated with phone ownership and usage. By using smartphones, users improve their information acquisition skills (search and handling capacity) but as an effect of age, user skills are often insufficient to use them for capital-enhancing purposes such as increasing political awareness or participation (Srinuan et al., 2012; Stork et al. 2013; Pearce & Rice, 2013; Ramirez-Correa et al., 2015; Gerpott, 2015; Mascheroni & Olafsson, 2015; Puspitasari & Ishii, 2016; Rangaswamy & Arora, 2015).

In contrast, recent studies have also lent support to the idea of mobile phones actually bridging the participation gap. For instance, Martin (2015) found that traditionally underprivileged social groups are much more likely to use mobile phones for political engagement than previously believed. Additionally, outside of academic research, private and non-profit organizations have also taken up the task of providing a mobile Internet on existing mobile phones, which are available in great numbers in emerging markets. Global platforms like biNu enable easy access to the Internet on any phone, thereby unlocking their potential globally.

At the macro level, the early days of digital participation literature stressed a growing need for ICT advancement, empowerment, and the inclusion of marginalized groups rather than economic and regional development (Odendaal, 2006). This also echoed Gurstein's (2003) finding, according to which the achievement of meaningful ICT-enabled participation (e-governance) has been demoted to the design and implementation of efficient electronical service delivery (e-government). Together, these authors advocate for an effective use of technologies for participation that will bring about social, economic, and political change.

3 Mobile participation

However much within reach global social media and mobile technologies might be, much of the buzz taking place gravitates around local, place-based issues, such as transport or neighborhood planning (Foth, 2006; Foth et al., 2009, Evans-Cowley, 2010 a; Foth et al., 2011). Intrinsically, therefore mobile technologies are being used to augment place-based relations, particularly when physically present at the specific location of the proposed development. Local awareness is increased by opportunities to check-in, rate a service, or receive targeted marketing when nearby a location, all of which occurs because of the prevalence of smartphones. In short, while the tools are global, the activity and discussion are local.

Smartphones are the fastest adopted technology of all time (DeGusta, 2012; McGrath, 2013). Höffken and Streich (2013, 203-206) list their advantages as follows: they are *easy to handle* with touchscreens (usability); they are *multi-functional*, combining phones, cameras, email, etc.; they enable *multi-channel communication* through instant messaging or social networks; they are *small and portable* (mobility); their *functionalities can be extended* with apps; and, lastly, users can program new apps to spur wider innovative services (user-driven innovation). In short, phones are no longer devices used for placing calls but hand-held computers which are always ready to be used in several ways. The 'rush towards mobile' has been best observed in the number of services, initially built for desktop computers, that are now being provided in a mobile version and as native apps to customers.

Mobile applications ('apps', add-on programs which are downloaded from application stores) come in different types, among them apps that local governments can use to engage with their citizens. "The use of mobile devices (mobile phones, smart phones and tablet computers) via wireless communication technology to broaden the participation of citizens and other stakeholders by enabling them to connect with each other, generate and share information, comment and vote" is commonly addressed as mobile participation (m-Participation; Höffken and Streich, 2013: 206).

The emergence of apps for urban planning has been studied inductively. The apps were mapped according to their characteristics (Desouza & Bhagwatwar, 2012; Evans-Cowley, 2012); they showed a prevalence for transportation apps – allowing citizens to track busses in real-time, find parking spaces and pay for them, and cycling apps which map bikers' routes – and 'reporting apps', which enable citizens to report code violations to the local authorities. These early studies of mobile participation were as much concerned with the functionalities of the apps as they were with their origin. The majority of participatory apps were commissioned by local governments, some were developed by community groups and private companies, and yet others by individual citizens. To that end, it was noted that applications made by tech-savvy citizens in open

data competitions were an integral part of the participatory apps landscape (Desouza & Bhagwatwar, 2012; Evans-Cowley, 2012). I will now return to the point made in the previous section about citizens creating their own participatory tools.

For much of the civic engagement history, citizens had little efficacy over the particular method used by local government to engage them. In the context of mobile participation, the role of citizens changes as they participate in the creation of mobile applications around topics and issues they find relevant, referred to as 'civic apps' (Desouza & Bhagwatwar, 2012; Lee et al., 2015). In general, citizen-initiated applications are developed in app challenges organized by cities or other public agencies in conjunction with open data initiatives (see challenge.gov by Desouza, 2012). Examples of app challenges are those hosted in New York, Boston, Alberta, and Amsterdam.

At their core, app challenges are contests. Citizens compete with one another in developing apps, based on a set of pre-defined criteria, such as the usage of a particular data set, solving a specific problem, or designing apps for a specific demographic (youth, the elderly). Winning apps mostly receive a prize (monetary) or other types of recognition (coaching or networking to develop the prototype further or start-up mentoring). Contests are mechanisms for driving innovation (Boudreau et al, 2011: 843), and so are app challenges. Public agencies leverage their assets by making open data available for public use in the hope of creating added value and solutions to urban problems. The apps produced also improve the work of governments, as they are able to procure services for citizens through a citizen-sourcing approach (Linders, 2012; Nam, 2012).

SeeClickFix was the first app in the undertaking to connect citizens to their local governments. Citizens used the app to report non-emergency problems (potholes, graffiti, broken bins) they observe in the city while going about their daily business. The interface of the app made reporting simple and quick by automatically mapping the location coordinates (with the GPS sensor in the phone) and enabling the attachment of photos (camera sensor) with which users of social media were familiar. Once ready, the issue was reported to the local government's back-end office where it was managed. Citizens received a reply every time a request had been taken care of. Employing these types of mobile reporting strategies makes urban management much more effective for local governments, who are tasked with keeping the urban environment in order. Citizens, on the other hand, contribute bottom-up to making the city more livable and enjoyable collectively. Urban management in the form of 'crowdsourcing' (Howe, 2008; Brabham, 2013; Lehdonvirta & Bright, 2015) or 'citizen-sourcing' (Nam, 2012) allows the citizens to become the government's 'eyes and ears on the streets' and monitor the city in real time (hence the name 'reporting apps') as predicted by Townsend (2000). Because integration with the city's back-end office requires some technological tweaking, different apps fulfilling the same task have been built, from scratch, in different countries (e.g. SeeClickFix functions in the US while FixMyStreet is UK-based and spread in Europe). Another crowdsourcing tool is Ushahidi, an application and back-end analytics system used for crisis management or election

monitoring. Reporting apps were the first type of m-Participation tools that emerged and have remained mainstream ever since.

Further types of apps include participatory sensing apps. Participatory sensing (Burke et al., 2006:1) tasks "mobile devices to form interactive, participatory sensor networks that enable public and professional users to gather, analyze and share local knowledge". Sensors of many types are built-in to phones, including the GPS and camera mentioned above but also the microphone and accelerometer. WideNoise is an app that uses the microphone in mobile phones to collect sound samples and monitor sound pollution. Citizens participate in data collection through the sensors in their phones (participatory sensing; Burke et al., 2006). The accelerometer-sensor can be used in apps sensitive to differences in height, such as Street Bump, which collects road conditions while driving with little input required from the user and sends the information automatically as the services request. Auxiliary sensors further increase the capabilities of phones, such as those analyzing the composition of aerosols in the air in the case of iSPEX. Participatory sensing allows citizens to gather factual, objective data about their environments, when previously they could only gather subjective experiences of a place.

Prior to mobile participation, citizens could always phone city maintenance or fill in a web-based service request and complain about noise pollution or potholes. Instead of giving detailed information about the location and severity of the issue, they can now just gather the information with their mobile phones quickly on-the-go. The data gathered – even though not as accurate as designated measurement tools – gives a first indication of where further investigation is needed, helping local governments to allocate resources more efficiently. On the other hand, the accuracy of the sensors in mobile phones is improving constantly and mobile participatory noise-mapping comes close to official simulation-based maps (D'Hondt et al., 2013). Mobile phones become thus 'dense sensing' tools, which support the collection of rich environmental data (Evans-Cowley, 2010a).

Mobile phones also facilitate the sourcing of citizens' ideas as informed by "situated engagement" (Korn, 2013). Capitalizing on the portability, pervasiveness and ubiquity of mobile phones, citizens can contribute not only in the immediate location, but more importantly partake in developing those places that are most meaningful for them, thereby situating the engagement. Instead of inviting citizens to come to a meeting at a specific time and place, situated engagement empowers them to engage at those locations which are at stake for urban planning development –and which they care about – whenever they transit them. Situated engagement is the property of and is mediated by mobile phones. One type of situated engagement expects citizens to browse or look for development plans when interested in giving feedback about a particular location, similar to the participation in Volunteered Geographical Information but instrumented by a mobile phone. In the near future, the implementation of geo-fencing techniques will attract the interest of the wider public whenever they are in the proximity of a location. Through geo-fencing, it is possible to build a radius around a point of interest using the phones' GPS and send push notifications to users entering the zone, provided they grant

access to receiving them. Geo-fencing has not yet been implemented in urban planning, except for small-scale field trials including FlashPoll and Action Path. Together, situated engagement and geo-fencing will offer more lucrative prospects for nudging citizens into participation than traditional methods. To achieve the same results, a planner would have to invest considerable time on-site and use resources beyond comparison.

Mobile participation is often hybrid (Gordon & de Souza e Silva, 2011; Schroeter & Houghton, 2011; Schroeter, 2012; Tomitsch et al., 2015), augmenting both physical and digital spaces. Gordon and de Souza e Silva (2011: 56) note that "location-aware mobile technologies can change the way we experience both physical and digital spaces by configuring a new hybrid space, which is composed by a mix of digital transformation and physical localities". The authors introduce 'net localities', hybrid spaces created through the interactions of individuals with the technology as well as people present in the urban environment who do not use technologies, but who are still part of the urban landscape (idem, p. 86). Mobile participation has also been complemented with public screens mounted in the urban environment (see Schroeter & Houghton, 2011; Schroeter, 2012; Hosio et al., 2014; Hosio et al., 2015). Planners use the display to request input on development ideas, in the hope that the citizens will text or tweet ideas in response to the public display. Passers-by can read the feedback on the display or engage with the content presented. The presence of the display and the fact that it streams real-time information were believed to augment the physical features of the environment, albeit a square-sized temporally defined space. Tomitsch et al. (2015) also envision public displays as mediating interactions between people, their phones, and the surrounding physical environment.

To summarize, on the one hand, mobile participation maintains the emphasis on place found in PPGIS and the knowledge of citizens tied to that place; however, it is developed further through a strong emphasis on a 'hybrid' place, enabled by situated engagement. On the other hand, mobile participation opens new avenues such as real-time participatory sensing and develops new forms of participation through the creation of apps by citizens.

4 Theoretical Lenses to Participatory Methods in Urban Planning

This chapter outlines the theoretical lenses through which participatory methods of citizen engagement can be seen. The political science and democratic perspective offer the ideal benchmark against which participatory methods can be assessed. Institutionalism puts emphasis on stakeholders and their interactions for achieving shared goals. The perspective presented by science and technology studies and the social shaping of technology takes wider assessment in order to evaluate who shapes the tools used in electronic participation methods, and how. The underlying assumption is that technology enhances the democratic aspects of participation; nonetheless, these technologies also require scrutiny. Together, these two perspectives aim to offer a deeper understanding of the intricacies of electronic participation as proposed by Langley (1999) in the alternate template strategy.

4.1 The democratic lens

Arnstein (1969: 216) defined citizen participation as "the redistribution of power […] the strategy by which the have-nots join in determining how information is shared, goals and policies are set, tax resources are allocated, programs are operated, and benefits like contracts and patronage are parceled out." Arnstein's definition is still as popular today as it was half a century ago. There is a strong underlying assumption that the redistribution of power is something which is desirable and can be achieved. First, *redistribution* – as seen through an institutional lens – involves a center, an organization or entity, who first pools resources together and then divides them across contributing individuals (Polanyi, 1957). The rules of division are subject to mutual agreement and change over time. Secondly, *power* can be viewed in at least two ways. A classical, Weberian definition of power is the ability to impose one's own ideas onto others despite resistance or protest – a definition of power being primarily coercive in nature. Roy (1997: 13) defines a second dimension of power, 'structural power' as "the ability to determine the *context* within which decisions are made by affecting the consequences of one alternative over another" (italics added). Indeed, the context itself becomes the object of competition, not only the 'rules' of the redistribution mechanism.

Public participation has often been linked to democratic principles, because different theories of democracy involve respect for public preferences (Goodin, 1993). There are four *democratic goods of citizen participation* which are fundamental to any theory of democracy, namely inclusiveness, popular control, considered judgement, and transparency (Smith, 2009). Inclusiveness exemplifies how equality is realized

in both presence and voice. Popular control, in turn, focuses on the degree to which participants can influence different stages of the policy-making process. Considered judgement requires participants to understand both substantial matters of the participation topic as well as fellow citizens' ideas. Transparency is concerned with the openness of the engagement and decision-making process. These democratic qualities are operationalized through the goals of participatory initiatives. Beierle and Cayford (2002) identify different kinds of citizen participation goals: first, including public values into decisions; second, improving the substantive quality of decisions; third, resolving conflict among competing interests; fourth, building trust in institutions; and fifth, educating and informing the public.

Planning theories, on the other hand, emanate from the democratic ideals of participation outlined above. The link between democracy theories, goals of participation and planning theories is illustrated in Figure 1. The top row represents democratic qualities (Smith, 2009), followed by Beierle & Cayford's (2002) goals for citizen participation discussed so far. Next, I elaborate on the interdependencies of democratic and planning theories. There are three democratic theories particularly relevant for public participation: representative, pluralist, and deliberative democracy theory (Norris, 2004; Scott, 2006: 343-346). In representative theory, decisions and policy making are done by elected representatives and public servants. The citizenry ensures legitimacy and accountability, and their interests are represented through elections. Pluralist theory argues that democracy is served through 'elite-level competition' and bargaining, in order to secure the representation of diverse interests (be they marginalized groups or elite, agencies or grass-root initiatives). Finally, deliberative democracy posits that citizens need opportunities to be directly involved in debate and decision-making.

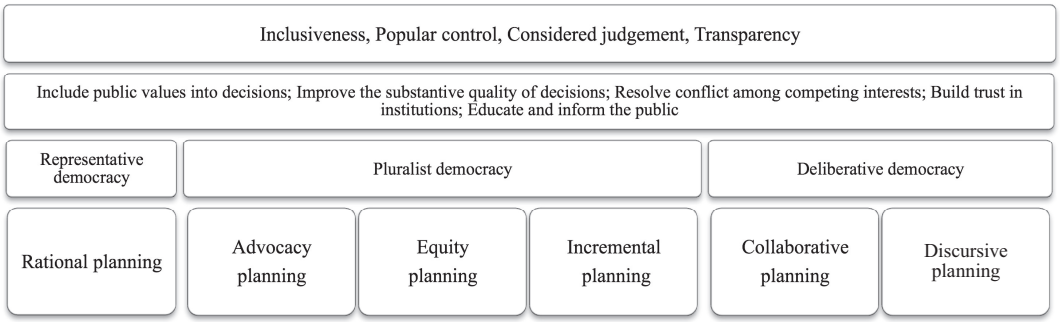

Figure 1 Interdependencies between democracy theories and planning theories

In what follows, I present planning theories through highlighting the democratic ideals they embody. Both democratic and planning theories are identified according to their historic development and compiled to reflect their interconnections. For representative democracy theory, an analogous planning theory is *rational planning*. According to

this theory, public participation is not only unnecessary but also hinders achieving the common good envisioned by the professional planner. As for pluralist democracy theory, it is possible to identify three different planning theories that share its ideals. In *advocacy planning* (Davidoff, 1965), equal representation is sought despite any inequalities. The planner becomes the advocate and voice of marginalized groups; he/she prepares alternative plans to those proposed by local governments. Similarly, through *equity planning or transactive planning* (Krumholz, 1982; Friedman, 1973) social justice and redistribution of resources is sought, particularly engineered by planners. Transactive planning also underscored mutual learning: the citizens would become more knowledgeable about the planners profession, while the planner would receive information from the community. Advocacy and transactive theories shifted the scope of planning from land use and zoning to solving urban social problems. Lindblom (1965) elaborated on the *incremental decision-making theory* through the concept of 'partisan mutual adjustment', a form of bargaining decision-making in which decisions are reached incrementally among actors having conflicting interests.

With regard to *deliberative democracy theory* (Dryzek, 2000), the analogous planning theories are collaborative and discursive planning. *Collaborative* and *communicative planning* (Healey, 1997; Innes, 1995; Innes & Booher, 2010) is based on Habermas' concept of 'communicative rationality', which means reaching a mutual consensus based on the persuasive power of the best argument. It is believed that consensus is always achievable (see Hillier, 2002: 159). Pløger (2001) based his *discursive planning* on ideas of social constructivism; thus, each individual attributes subjective significance to a place, giving it its own identity, whether physical or symbolic. Essentially, the challenge is to combine the planners' discourse with the social realities participants live in. During the process, participants also reconcile their differences and find workable solutions by discussing alternatives and building on each other's ideas. High optimism has been vested in two-way communication and deliberation. The underlying assumption of deliberative democracy is that deliberative methods make use of citizens' collective knowledge and aim to reengage citizens into the political process (Coleman & Gøtze, 2003).

4.2 Institutionalized citizen participation

Smith (2009) also argues that democratic participation needs to become 'institutionalized', if it is to become widely adopted. Against the democratic goods and planning theories outlined above, the practical concerns of citizen participation must also be addressed. At the implementation level, civic participation is mainly concerned with embedding citizens –their knowledge, views, and ideas – into the fabric of institutional decision-making. For Smith (2009), this is achieved by evaluating the extent to which participation is efficient (in terms of costs incurred both by citizens and public authorities) and transferable (to different political contexts, scales, political systems, etc.). These two institutional goods ensure that the four democratic goods are

also feasible in practice. Smith's account of 'institutions' is grounded in democratic theories of participation, with a focus on the feasibility of participation to the political process of decision-making. However, an 'institutional' account of participation based on political science is incomplete. In contrast to Smith, *Selznick*'s (1949: 16-17) definition of institutionalization is "to infuse with value beyond the technical requirements of the task at hand". Values and commitments to those values are shaped in human interaction, not only by external forces as political scientist assume. A sociological understanding of civic participation as an 'institution' captures the intricacies between the different stakeholders involved in political decision-making, of which citizens are integral – but not a singular part. According to one influential definition, institutions can be understood as "any form of constraint that human beings devise to shape human interaction" (North, 1990: 3). According to North (1990), institutions define the incentive structure of society. In the following an outline is presented of the elements that make citizen participation an institution designed and shaped through social interaction.

Citizen participation as an institution is humanly devised. The rules of who will participate and how the involved stakeholders will interact has to be negotiated repeatedly, reflecting the struggle between values and moral principles and power. As mentioned in the previous section, under the rational-comprehensive framework, citizens' participation was not expected; it was seen as interfering with the work of planners, a classical Weberian view. Gradually, citizens became part of the negotiating process under pluralistic and deliberative democracy orientations, for instance in equity, incremental, collaborative, and discursive planning theories (see FIGURE 1). The participatory process became infused with democratic values resembling *Selznick*'s definition of institutionalization.

Citizen participation as an institution changes over time. New knowledge, including new ideas, technological advancements, new skills, and competing organizations propel change (North, 1990). In order to survive, organizations must adapt to the new impetuses of technology and adopt them (Nelson and Winter, 1982). Nonetheless, organizations are particularly resistant to changes which affect their core features (Hannan & Freeman, 1984), since these cannot be changed at the rate required by the external impetus. Campbell (2004) identifies two types of institutional change: path dependence (Nelson & Winter, 1982) describes continuity between initial conditions and future developments and diffusion (Rogers, 2003) where established patterns translate into new contexts. Because change is slow, new rather than existing organizations drive institutional change (Hannan and Freeman, (1977). Along the same line, Sen (1999) proposes deliberative development, built on public discussion and an exchange of ideas (outside of the organization). However, unless individuals inside the organizations are persuaded to join the deliberative development values and recognize that joining in is in their interest, the dynamics of power are unlikely to change (Portes, 2010). Thus, Sen's argument is that change emerges from different actors cooperating with each other.

Citizen participation as an institution is socially oriented. An individual's personal ties and networks structure their exchanges, be they economic or non-economic

(Granovetter, 1985). Recurrent interactions between two or more individuals gives rise to networks, in which sympathies or aversions continuously modify the goals of interaction. Even in formal arrangements or organizations, individuals act according to the predispositions they have towards others; these predispositions are mostly informal in nature (share the same values, respect, intimidated, etc.). The resulting networks are dynamic and alter during the course of the interaction. Furthermore, not only are the interactions in the network socially constructed but they also create identities for the individuals that participate in them as well as meaningful social contexts (Granovetter, 1973). Essentially, social relations are embedded into any type of action.

Applying these ideas to citizen participation begins with the observation that the act of soliciting input from citizens structures their behavior. There are a series of actors, whose interactions structure participation; in addition to citizens and public servants, there are also policy-makers, representatives of the media, for profit and non-profit organizations, interest groups, to name just a few. New engagement practices (or democratic innovations; e.g. participatory budgeting, Stortone & De Cindio, 2015), new technologies (information technologies), public servants with new skills (e.g. mining large amounts of citizen data) can all re-shuffle the practices of citizen participation. However, change needs time to unfold.

Institutional change often manifests through incremental changes, which are only partly explained by the interactions between the involved stakeholders. For instance, Innes (2005) reports on the challenges of embedding new participatory methods into existing institutions. She sights the fact that citizens can now be active and voice ideas and concerns using social media applications, in a context where only public hearings are the legal instruments of decision-making. Thus it is possible that what might begin as an informal practice requires time to be assimilated or transformed into a formal, established course of action. Edelenbos (2005) reports how in Dutch municipalities, institutional deviation of citizen involvement were kept to a minimum to assure embeddedness with existing institutions.

Recently however, the public sector, which is largely responsible for citizen participation, has been eager to adopt civic open innovation, that is, experiment with formal practices outside of the organization. In practice, civic open innovation provides new opportunities to create public value, such as the case of open data competitions. Almirall and colleagues (2014), identify ‘embedded change agents’, i.e. members (called ‘fellows’) of organizations like Code for America and Code for Europe who develop open data applications with cities. It is noteworthy that these new, stand-alone non-profit organizations aim to “inject code developer culture to close the gap between cities and citizens” and “break down bureaucratic processes and bring innovation to city government” (Almirall et al., 2014: 394). Such developments are in line with the claim that change comes from outside rather than inside existing organizations.

Another way to counter institutional inertia, promote institutional change and participation in decision-making comes in the form of ‘civic accelerators’. Civic accelerators match cities with a variety of stakeholders (start-ups, non-profits, established

firms) to "provide better services, bring modern technology to cities, or change the way citizens interact with city hall" (Almirall et al., 2014: 394). Civic accelerators are either provided by outside organizations (e.g. Code for America) or through the establishment of new departments inside cities (e.g. the Mayor's Office of New Urban Mechanics in Boston and Philadelphia).

In asserting that citizen participation is an institution, there are, however, two elements of institutional theory that have been overlooked. First, a central tenet of North's (1990) understanding of institutions is that they define the incentive structures of the actors involved. There is a long-standing assumption that citizens are motivated and want to be engaged in participatory processes because they want to influence city development, hence their motivation is a given and incentivizing participation has long been taboo. Only recently, have citizens begun to be motivated to participate in open data contests through a number of incentives, such as monetary prizes and non-monetary compensations (Desouza, 2012), signaling the convergence between goals of participation and incentive structures. Second, as I have previously discussed institutions are humanly devised and negotiated over the course of time. For most of the history of citizen participation, citizens had little control over *the process* through which they were to be engaged or *the tool* with which their input was collected. In principle, citizens today have the means and resources to create their own (open data) applications, and thus bypass the entire formal participation process by self-organizing and taking community action (Foth et al, 2015; Boyd & Mitchell, 2013). These two aspects illustrate the fact that institutions evolve through social interaction. I now turn to assessing how different groups negotiate the creation of new technologies, and in particular new apps.

4.3 The social shaping of technology lens

The democratic perspective outlines the ideals and normative qualities against which a participatory method can be evaluated. In doing so, the starting point of the evaluation becomes the *implementation* of the method but not the *method itself*. The underlying assumption is the neutrality and autonomy of participatory methods and technologies (a form of technological determinism). In contrast, the social constructivist approach adopted here posits that participatory methods, specifically electronic participation tools, are shaped, similar to any other technology, by social groups with diverse interests and interpretations (Social Construction Of Technology; Bijker et al., 1987; MacKenzie & Wajcman, 2010).

Relevant social groups will attach meaning to a technology (Bijker, 1995). Importantly, these groups are involved in the development of the technology and share a general understanding of the technological artefact. As Bijker & Law (1992) put it, technology represents "different things to different actors". Each group embodies a particular interpretation: "all members of a certain social group share the same set of

meanings, attached to a specific artifact" (Bijker et al., 1987: 30). The relevant social groups are those involved in the early stages of conception and design, but notably groups can join at any stage of the technology design suggesting a constant change of the actors involved.

While the social groups may share the meaning of an artefact, intra-group meanings differ considerably, because they are underpinned by different, and sometimes conflicting, interests and motivations. In fact, the precise interests of the relevant social groups provide the impetus for technological development in SCOT. Moreover, the relevant social groups will also mobilize the resources necessary for development and jointly determine which problems are relevant to address with the technological artefact. SCOT does not account for the motivations for participation of the relevant social groups. Longstanding research in social psychology suggests that relevant groups will be invested, they will have a stake and be motivated to participate for extrinsic rewards (e.g. money and reputation) or intrinsic ones, such as satisfaction in participating in communal affairs. Additional factors motivating participation include a sense of community and membership or identity formation (see Hafer & Ran, 2016).

Design and Interpretative flexibility is a concept indicating that technological artefacts are shaped and interpreted, thus flexibility is manifested in how different people interpret technology as well as how it is designed (Bijker et al., 1987: 40). Technology design produces different outcomes depending on how the social groups perceive the meaning of the technology. Technological artefacts are thus seen as the result of a negotiation process between the competing meanings of the relevant social groups as regards, strategies, knowledge, and resources. Satchell & Dourish (2009: 11) posit that active resistance to a technology also shapes its interpretation as much as eager adopters, because both groups are part of a collective effort to make sense of the technology, albeit in different ways.

If one considers how the design and features of a technological artefact enables the possibilities of action, affordance theory offers the tools to explore the relationships between individuals, groups, and technology (Volkoff & Strong, 2013; Strong et al., 2014). Affordances, that is possibilities for action, can be built into a technology, however, they only actualize when users perceive and act upon them (Strong et al., 2014). Users perceive affordances differently, thus flexibility is both a property of the technology inasmuch as of the capabilities of the users. SCOT is primarily concerned with the 'construction' of technology, thus mainly interested in how the features of technology are designed (existence) and perceived. The crucial contribution of affordance theory to SCOT is to extend the process to include how these features are used (actualization) and to what effect (outcome). Over time, a technology will be stabilized as the plurality of meanings will coalesce and the technology will be accepted, at which point a state of *closure* is reached (Bijker et al., 1987: 46). Pinch & Bijker (1984) suggest that closure is reached when the interpretation of the most dominant social group is imposed; thus, either the stakeholders finally compromise on a design, or the technology has more than one design but these co-exist. Bijker (1995: 270) posits that the design of an artefact

reaches closure not because of objective evaluations, but, because the relevant social groups accept that it works for them.

Whereas in institutional terms path dependence had a negative nuance (accumulation inhibits change), in SCOT the opposite is true. Existing technologies provide inspiration to tweak and modify, either through small changes that might accumulate or through innovative uses in another setting. It is essential, however, that the new technology can be integrated into the existing system. This integration in turn, constrains how the technology is designed.

SCOT also has its limitations. SCOT analyses only one direction of influence, namely how social groups shape the technology. In contrast, the effects of technologies in shaping human behavior, social relations, and society more generally, although overlooked in SCOT, are investigated in a line of inquiry presented under *sociomaterialism* and *actor-network theory* (Orlikowski & Scott, 2008; Scott & Orlikowski, 2014; Leonardi & Barley, 2010; Latour, 2005). MacKenzie & Wajcman (2010: 23) claim that "technology and society are mutually constitutive", with technology as the part that makes society possible. Even within this broad stream, bifurcations exist: some signal human action and intention as primordial (e.g. Leonardi & Barley, 2010), others advocate for "symmetric" relationships (as per actor-network theory), and yet others emphasize "entanglement" as humans and technology merge whenever they meet (Orlikowski & Scott, 2008; Scott & Orlikowski, 2014).

At the societal level, individuals increasingly rely on technology, the Internet, and physical devices, for work, entertainment, and social relationships (McMillan & Morrison, 2016). Beyond 'connectedness' to the Internet, individuals may attach themselves emotionally to a device or software until these become a constitutive part of their identities (Schwarz & Chin, 2007). Relationships with mobile phones are particularly tantalizing: checking one's phone briefly and repetitively increases the overall usage of smartphones as regards other functionalities and content (Oulasvirta et al., 2012). Oulasvirta and his colleagues found that these habits emerge and are sustained by the rapidly available informational rewards, such as social networking, communication, and accessing news. Additionally, checking habits tend to develop as a response to boredom and perceived lack of stimuli in different situations and are rarely considered problematic by the respondents (Oulasvirta et al., 2012). On the contrary, Roberts et al. (2015) argue that boredom influences mobile phone addiction. More recent studies show some support for the online availability facilitated by smartphones increasing communication and information overload (Kneidinger-Müller, 2017) as well as the decline in in-person conversations (Misra et al., 2014). Indeed, individuals use their phones several times a day for leisure (Lepp et al., 2017) such as media consumption, particularly for the age cohorts of the 1980s and 1990s (Westlund & Färdigh, 2014); excessive use is associated with gaming and social networking sites (Škařupová et al., 2016). Users' autonomy, empowerment and authenticity have been linked to their relationships with mobile phones (Carter et al., 2013). Although these technologies were first adopted for work, the new generation of BYOD (Bring Your Own

Device – smartphones and watches, tablets) suggests for Drakos and Paquet "the need for participation, the desire to contribute and the sense of being part of a community" (cited in Carter & Grover, 2015). In addition, apps have often been investigated as a means of changing users' behavior, for instance decrease alcohol use (Cohn et al., 2011), purchase intent and decisions (Bellman et al., 2011) or physical activity and workouts (Conroy et al., 2014).

Applying the central social shaping of technology concepts to electronic participation starts with the use of ICTs in traditional forms of participation. The adoption of personal computers by municipalities and public agencies and by citizens enabled the deployment of online surveys, the provision of electronic materials instead of print, or the option to vote online. The introduction of PPGIS enabled the collection of location-based data from citizens, which continues to underpin the current electronic participation tools, albeit couched in more user-friendly interfaces and including perhaps more interaction among participants.

Citizens' motivation to participate in technology development is incentivized through cash prizes. However, participants feel that the amount offered is insufficient to compensate for their investment of time and effort (Desouza, 2012). This suggests that citizens have a number of different motives for participation. In addition to citizens, open data competitions include city managers, non-developer citizens, companies, consultants, policy makers, venture capitalists, and intermediaries (Almirall et al., 2014); these are all groups identified in this context as the relevant social groups and each having a different connotation as regards the technology to be developed. Therefore, interpretative flexibility and parallel designs are manifest in the wide range of participatory apps I later detail in Study 1. On the socio-materiality of mobile technologies, that is how they influence behavior, their portability and situated engagement encourage immediate action, rather than delayed action, as was the case with other electronic participation tools.

5 Aim and Research Questions

Against this backdrop, the aim of this study is to investigate the potential of mobile technology for civic engagement in urban planning. The main research question guiding this inquiry is: *How is the adoption of mobile participation changing citizen participation in urban planning?* Following the review of citizen participation in planning based on the democratic and socio-technical perspectives, the next enigmas arose and structured the secondary research questions below.

1. People interact with their phones during their daily activities. Mobile phones, as hand-held computers, have different affordances, functions, and features, such as communication, entertainment, or task-management. However, it is unclear which features or affordances are used in mobile participation in urban planning. Because civic participation is deeply entrenched in democracy development, mobile participation furthers the question of how it might promote democratic goals.

RQ1: Which features of mobile applications are used in participatory urban planning and how do these enhance democratic goals?

2. The participatory tools and methods used to engage the public have been presented as given, even though citizens can choose in which instances or how they wish to be engaged. Nonetheless, participating in the shaping and design of the participatory tools (developing an app) opens new avenues for investigating the interests of citizens and how they interact with other stakeholders in shaping technology-enabled participation.

RQ2: Who is developing mobile applications and with what intentions?

3. Mobile phones are popular among teenagers and young adults, cohorts consistently absent from traditional participation. Thus, there is an opportunity to broaden participation and make it more inclusive using mobile participation. Nevertheless, the fact that entertainment rather than political participation is the most common purpose for using a mobile channel makes this demographic particularly hard to reach.

RQ3: Under what circumstances, if any, does mobile participation support an equal opportunity for everyone to participate?

Table 1 below details the link between the research questions and the five studies presented in this dissertation. Their linkages are presented as themes, and further elaboration is presented in Chapter 7.

Table 1 Research questions answered in the five studies

	RQ1 *Which features of mobile applications are used in participatory urban planning and how do these enhance democratic goals?*	RQ2 *Who develops mobile applications and with what intentions?*	RQ3 *Under what circumstances, if any, does mobile participation support an equal opportunity for everyone to participate?*
STUDY 1	identified features of mobile technologies for civic participation and how these features relate to the democratic values of transparency, deliberation, and empowerment	identified apps and their developers	studied the extent to which mobile participatory apps were supplemented with other mobile technologies (SMS, mobile-optimized websites)
STUDY 2		studied how the motivation of citizens as application developers and those other stakeholders involved in the Apps4Finland open-data contest shapes the types of apps created	examined the strategies of participating stakeholders in the Apps4Finland open data competition to mobilize individuals and groups to join-in
STUDY 3	presented a normative account of how the CLEAR-model promotes citizens' skills, motivation, and influence in mobile participation	provided normative requirements for the public management of mobile participation	
STUDY 4	investigated the degree of inclusive participation in the Täsä app trial		framed the Täsä sample of participants against perspectives drawn from political activism and digital divide
STUDY 5	presented the tools and methods of mobile technologies used by self-organizing groups for urban/ neighborhood planning		elucidated the ways in which self-organizing groups combine online and offline mobilization to organize for action in urban planning

6 Methods and Data

I chose an exploratory research approach (Yin, 2012) designed to gather knowledge in-the-making on a phenomenon rather than test strictly defined hypotheses. This dissertation explores and describes the changes brought about by the adoption of mobile technologies for civic engagement in urban planning. Informed by the work of Tashakkori and Teddlie (2003), for the explorative focus of this dissertation, I have used pluralistic approaches to dissect, analyze, and derive knowledge about mobile participation.

In 2012, when I wrote the research plan for this PhD study, an assumption was made that mobile participation will develop quickly in the next 3-5 years. Mobile participation was in all terms a new phenomenon. It needed to be understood holistically, as both technology and participation were unfolding simultaneously. On the technology side, mobile technologies have catalyzed change so rapidly that theory has struggled to keep pace. On the participation side, new and sometimes unpredictable ways of participation have emerged. To make sense of these changes, the publications in this dissertation employ methods drawn from each study's research questions and are, for the most part, qualitative in nature. This qualitative nature lends itself well to exploring and understanding how mobile participation is currently transforming citizen participation.

In my *initial typology study* (Study 1), I explored mobile participation at the generic level, and pursued in the consequent studies topics found in the first study. Studies 2 and 3 seek to understand the *circumstances under which application development takes place*. In more detail, the *application development study* (Study 2) elaborates on the social shaping of technology in application contests; the stakeholders involved in the contest have different reasons for participating and these are mirrored in the type of apps created. During my PhD training, I was employed in the Building Pervasive Participation (b-Part) research project. The project's goal was to investigate the potential of mobile technologies for urban planning through developing and testing the Täsä app (See section 6.4). The *mobile participation support study* (Study 3) provides the socially based requirements that were used to develop the Täsä app and its trial. During the Täsä field trial, the project consortium, of which I was part, had the opportunity to test several expectations of mobile participation, such as: the challenges of implementing Living Labs (Åström et al., 2015; Adenskog et al., 2017); the promises and pitfalls of gamified mobile participation (Thiel, 2015; Thiel & Fröhlich, 2016; Thiel & Ertiö, 2018); and the role of democratic innovations in perceptions of trust (Åström & Karlsson, 2016). The consortium collected in-app survey and usage data from participating citizens as well as conducting interviews among inactive users on factors that enabled and hindered their participation. Certain sections of this participation data have been used in Study 4 on the *motivating factors behind using the Täsä app*. Finally, *the study on citizens*

as planners (Study 5) discusses self-organized participation and collective action in planning outside public institutional boundaries.

The studies included in this dissertation strive to present a great breadth in how mobile phone adoption is changing civic engagement. After the exploratory Study 1 had been completed, the subsequent studies investigated different aspects identified there. This breadth comes with inference tradeoffs, insofar as the studies are descriptive. The heterogeneity of the studies falls short regarding the representativeness – it is hardly possible to assess the total 'population' of participatory apps in the current development phase, or consider the studied cases more than illustrative examples. Notwithstanding, these research design choices have served the *exploration and description* of changes brought about by mobile participation very well.

The five publications contain a mixed spread of qualitative and quantitative methods. Some are conventional social science methods, such as interviews, surveys, and case studies. In contrast, the Living Lab context in which the Täsä application was developed and tested provided a unique insight into the opportunities and bottlenecks that arise when experimenting with mobile participation in urban planning (see also Table 2). Below, I provide a more detailed account of the methods and data used.

6.1 Literature review

The *mobile participation support study* aimed at advancing knowledge on how to support 'participation' in mobile participation, thereby connecting mobile participation to the larger, on-going debate about citizens' electronic participation. Most of the mobile participation literature comes from the Human-Computer Interaction domain, where the different features of the application prototypes were tested with small samples of users. The results of such tests have rarely been linked to civic participation methods but rather highlighted the technological features. The study consisted of a literature review of 40 articles thematically linked to inclusive electronic participation, motivation, social norms, and institutional support aiding citizens' participation, trials of mobile participation, and political studies. The *mobile participation support study's raison d'être* was to advise the development of the Täsä application and the trial (detailed below in section 6.4). The literature review was heavily concept-centric: while synthesizing existing literature, it also provided a comprehensive list of recommendations on how to close the knowledge gap (see Webster & Watson, 2002). Furthermore, this list of (theoretical) recommendations provided in the study was used in developing the Täsä app. In other words, drawing on concepts from the digital divide and inclusive electronic participation, the study suggests how these can be integrated into mobile participation. The literature review was part of the preliminary stages of the research, where the theory of civic participation was reviewed. The themes reviewed addressed the first two research questions: inclusiveness and the digital divide (RQ1), motivation and social norms (RQ2), and political studies (RQ1).

6.2 Typologies and cross-case study with secondary data

The *typology study* (Study 1) used a theoretical framework to map the landscape of participatory urban planning apps. I used snowballing techniques to collect a sample of applications. Initially, I searched for urban planning apps; however, as these turned out to be rather scarce at the time of writing the article, I expanded the search to include applications related to urban governance more generally. The applications were sampled during 2013-2014 and used secondary data found online. Approximately 100 urban governance applications were identified, out of which –after removing redundant and repetitive apps – 35 were included in the final sample. In addition to the relevance for urban planning, sampling criteria included geographical distribution, multiple roles of citizens, stakeholders, and scalability. I mapped the 35 identified applications into a typology constructed of three dimensions, each containing two sub-categories, thus resulting in 8 types of participatory applications. According to Doty & Glick (1994: 232-233), "typologies identify multiple ideal types, each of which represents a unique combination of [the organizational] attributes that are believed to determine the relevant outcome(s)." When discussing the implications of typologies for theory building, the authors mention that ideal types represent forms: firstly, that might exist rather than do exist; secondly, are described in multiple dimensions; and thirdly, each type represents a unique combination of dimensions. Within the typology, each first-order construct is considered to be equally important. In this specific case, first-order constructs were the three dimensions and their sub-categories: the type of data collected (subcategorized into environment- and citizen-centric); information flow (subcategorized into one-way and interactive); and empowerment of citizens (subcategorized into operational and strategic). However, the second-order factors – geographical distribution, multiple roles of citizens, stakeholders, and scalability – were not equal in ponderance. None of the 35 applications featured all of the second-order factors but a combination of selected ones. Together, the first-order constructs and second-order factors provide the typology with internal consistency. The data collected for this study is biased by sampling. The apps analyzed represent a sample of the diversity of apps purposefully used in urban planning and related urban governance. The typology study was chronologically the first undertaken and gauged the different uses of mobile technology for civic participation. It therefore impacted RQ1 (identified features of apps), RQ2 (identified who develops apps) and RQ3 (identified mobile technologies other than apps which were used in connection with mobile technologies to promote inclusiveness).

The *citizens as planners study* (Study 5) focuses on understanding the role of self-organizing citizens participating in planning enabled by mobile-based applications and internet-based participatory apps. Self-organizing citizen engagement in planning was discussed through three cases – Widenoise, Block by Block, and Neighborland. We sampled the cases purposefully according to geographic dispersion, online/offline activities, and diversity of problems tackled. For the analysis, we used

secondary data gathered from the online websites and social media accounts of the three cases. The data was analyzed in a cross-case comparison (Yin, 2012). The data was coded inductively into different categories, based on how technology was used for planning (open coding). We identified both similarities and differences in usage: we related categories drawn from one case to another and cross-analyzed them. We kept what was unique about the usage in one case and unified shared practices of technology use for urban planning across cases. The data was analyzed in two steps. First, we identified and assessed the categories or technologies self-organizing groups used in each case, similar to value-oriented coding. We then compared these technologies between the cases we studied. We derived connections between different categories of usage, which eventually became the list of recommendations for planners. We provided these recommendations with the aim of increasing urban managers' understanding and expertise in the use of community technology. For each recommendation, different characteristics of the categories have been presented. The sample was rather small but has been compensated by the technology's global reach, the manifold online and offline engagement opportunities and multiple use-purposes. The study addressed RQ1 by exemplifying applications that support self-organization with mobile technologies as well as RQ3 by underlining how community groups use mobile technologies to mobilize and create awareness beyond those engaged with a mobile technology tool.

6.3 Interviews and online surveys

The *application development study* (Study 2) explores how citizens develop mobile applications themselves as well as their relationships with other stakeholders involved in open data contests. This study uses a combination of semi-structured interviews and an online survey with participants of the 2014 Apps4Finland open data competition. The Apps4Finland website served as an entry point to sample the interview participants, both from the main competition and the regional contests. I conducted 19 interviews, in-person and over the telephone. One participant sent their responses by email. The online survey gathered responses from five open data application developers. The total sample of data used came from twenty-five informants. All but two participating stakeholders have been interviewed for the study, and are therefore representative of the stakeholders involved in the contest. The applications themselves have not been the focus of this study but rather the participating stakeholders' motivation to join the contests. The most suitable way to approach the topic was through a case-study of the 2014 Apps4Finland competition, because case-studies are inherently explanatory (cf. Yin, 2012). For the interviews, I selected contacts listed on the Apps4Finland webpage from each participating organization. Interviewees' insights were solicited following an interview protocol, shared with them in advance. The interview guide consisted of themes such as their participation history in the contest, their intentions to participate,

their collaboration with the other stakeholders involved, their views on open data and developers, and the (future) format of the contest. The interviews took place during the actual apps development contest, spanning several months, at a 'designated time and place' agreed upon with the interviewees (Creswell, 2003).

The data from the interviews was transcribed and coded for analysis. Selective coding was used to gather statements into the "motivation to participate"-category. Excerpts from the interviews were presented in the text to highlight instances of 'motivation'. Content analysis was used to map how the participating stakeholders explain their participation in the contest, to reveal what drove them to participate, and what kind of expectations they had as a result of participating. Later, in the discussion part of the study, the subsequent codes were positioned into more theory-based debates akin to axial coding, including crowdsourcing (Howe, 2008), institutional theory (North, 1990) and effectuation (Sarasvathy, 2008). By using two types of codes, we examined both the descriptive and theoretical aspects of participation.

As already mentioned, the *application development study* also gathered data through an online survey. Application developers participating in the contest were randomly selected among those who provided their contacts in the description of the submitted apps. The survey link was sent to participants' emails and they were given 3 weeks to respond. Automatic reminders were sent 1 week and 1 day before the survey was closed. Online surveys are quick and inexpensive to implement, while simultaneously automating the collection and data entry (Fan & Yan, 2010), although they may generate low response rates. The survey asked app developers about how they became interested in the contest, whether they worked alone or as part of a team, asked them what they had learned and about their intention to participate again. The *application development study* is confined to one open-data contest in Finland, but similar formats are globally in use. The online survey sample among citizens who developed apps and participated in the online survey was rather small, and only gave an initial account of the interests and motives of participation in the competition. Inferences from the study should be seen in the light of these limitations. This study targeted RQ2 and RQ3 by elucidating how stakeholders' motivation shaped their participation in the Apps4Finland contest and the strategies these stakeholders employed to mobilize and advocate for groups who were not participating at the time when the research was conducted, respectively.

A modified format of online surveys was used in the *Motivations to Use a Mobile Participation Application* article (Study 4). Specifically, we used an in-app pre-survey to collect data from Täsä users. The users received the survey directly in the app, rather than through their email; emails were used in the post-survey after the trial. The online surveys (pre- and post-) were cross-sectional, meaning that respondent samples have been used for each survey; however, some users answered both surveys. The data collected for the study is presented in section 6.4 Living Lab and Täsä trial. The surveys were designed according to the web survey process (Callegaro et al., 2015) and consisted of a pre-field, field, and post-field stages. After preparing the online questionnaire, we monitored its completion with the users, and finally analyzed the results. Since we

administered the survey to the registered respondents of the app, concerns of Internet access were not pertinent; the concerns were rather about having a large enough sample on which to draw inferences.

6.4 Living Lab and Täsä trial

In addition to the more established methodologies used in social sciences described previously, this dissertation benefits from a uniquely designed Living Lab (real-world experiment) deployed in Turku, Finland (Åstrom et al., 2015; Adenskog et al., 2017). Living Labs "engage people with their different roles (as users, enablers, designers, entrepreneurs, activists, etc.) in every phase of an RDI process [research, development, and innovation]; from the identification and definition of a challenge, the concept or prototype design and the experimentation, towards the pre-and postlaunch of a novel product, service, social innovation or other solution" (Dezuanni et al., 2018: xiv). In the Täsä Living Lab, the b-Part research consortium planned, deployed, and evaluated the Täsä app. Täsä was a prototype initiated in the project, with the aim of testing advanced features of mobile participation in practice. In addition to co-financing the project, the City of Turku (municipality) was involved in the early stages of concept validation, providing the themes and questions that engaged the citizens and responded to citizens' feedback. In the planning stage, requirements coming from social, political, and Human-Computer Interaction disciplines were gathered and served as input for the app development. The *Supporting 'Participation' in Mobile Participation* (Study 3) article reviewed the social requirements of the app (see section 6.1). Once the requirements were in place, we validated the prototype with representatives of the municipality, as well as local citizen associations (in a so-called walkshop, in which they had the opportunity to test and comment the features of the prototype). In addition, the Austrian consortium partner tested the prototype in five iterative user studies.

The deployment of the Täsä app took place between June and November 2015 in Turku, during which time it was granted an official feedback channel status by the municipality. The Täsä app consisted of features uniquely tailored to the Turku context. Entries in the app took the form of 'contributions', which were user-generated geo-referenced sections of content. They could be augmented by attaching a photo, location, and feeling; other users could also comment on or support/like contributions. The app was a direct communication channel between Turku residents and the public servants on matters of urban planning. Moreover, citizens could also communicate among themselves by commenting and liking each other's contributions. Both public servants and citizens could create 'missions' within the app. A 'mission' consisted of a question or a poll to which the community could answer. However, in practice citizens did not create any missions, but rather participated in the missions given by the municipality. In turn, citizens created contributions to which public officials were encouraged to respond. The Täsä trial was marketed in the newspaper, radio, and social media by

the municipality, researchers, and individual citizens themselves. Some missions also had posters on-site to alert passers-by to the opportunity to participate. Täsä had 780 registered users, of which 32 percent produced several kinds of content in the app.

After downloading and installing the Täsä application, a survey window appeared on the participant's screen soliciting responses regarding their socio-demographic background as well as interests and attitudes towards politics. In this *pre-survey* (of which selected items were used in Study 4 *Motivations to Use a Mobile Participation Application*), gender, age, and educational background were requested, as well as experience of using mobile phones, and attitudes towards urban planning and local politics. The pre-survey was answered by 185 respondents out of 780 registered users of Täsä. For instance, motivation to download the app was measured on a 5-point Likert scale (1= Not relevant … 5= Highly relevant). During the trial, the research team noticed that many users who created accounts were not producing any content in the Täsä app. We randomly sampled these 'passive users', approached them by email and requested their consent to be interviewed (also used in Study 4 *Motivations to Use a Mobile Participation Application*). The main objective of the interviews was to understand why they abandoned usage and what features would make the app more appealing. We conducted 12 telephone interviews, until we noticed that data saturation was achieved. Finally, a *post-survey* was emailed to respondents at the end of the trial, asking them to rate their experiences in using the application, motivational factors, potential of mobile participation, and improvement ideas (selected variables have been used in the *Motivations to Use a Mobile Participation Application* article). The questions in the post-survey were all optional, which resulted in different response rates for different questions. Thus, we collected both qualitative data (inactive user interviews and open-ended questions in the post-survey) as well as quantitative data (from the pre- and post-survey). Both surveys were undertaken in the app. Additionally, data on the usage of the app could be derived from the backend, e.g. for each mission the number and contents of contributions and comments. Within the Living Lab, walkshops, surveys, and interviews were conducted, thereby leading to a nested research approach.

Study 4 on *Motivations to Use a Mobile Participation Application* was part of the evaluation of Täsä. It uncovered who the early adopters of Täsä were, what was their motivation to participate in the trial (pre-survey), and which factors enabled (pre-survey) or hindered their participation in the trial (interviews with 'passive users' and post-survey). Together with my co-authors, I used quantitative data from the pre- and post-surveys and qualitative data from the interviews for the article. Triangulating data sources on motivation for both users (quantitative data, those who answered the questionnaire) and 'passive users' (qualitative data, from interviews) sought convergence across the entire sample of app participants. The primary purpose for mixing the two methods was to provide insight into two different groups of users, active and inactive, within the app. The socio-demographic variables in the pre-survey (N=185) were contrasted with the population characteristics of the municipality. Either dichotomous or 5-point Likert-scales were used to measure the variables. The variables

were presented using simple frequency distributions. Stacked bar charts were chosen to present the data visually. Regarding the interviews with passive users, we employed a semi-structured approach. Interviewees were randomly selected, contacted by email and, in case they agreed to be interviewed, received an interview guide outlining the main questions (i.e. understand why they abandoned usage and what features would make the app more appealing). Additional questions were asked based on the responses according to the semi-structured protocol. Interviews were taped and transcribed. The interviews and preliminary analysis occured more or less simultaneously: decisions whether to continue interviews were made towards the end, when it was noticed that the same themes were being repeated (saturation). During data analysis, the themes and categories were ordered and repeatedly re-organized. The purpose of the interviews was to learn from the experiences of passive users and the challenges they encountered while using the Täsä app. At the time when the article was written, the post-survey was still open and the items measured amounted to 97 responses. Descriptive statistics were also used to present the results from the post-survey. While the results obtained from Täsä cannot be generalized outside of the Living Lab, they provide evidence about who used what was presumably the most advanced mobile participation tool to have been implemented at that time. These insights provide academic and practical knowledge for the field of mobile participation and are in accordance with the exploratory research approach applied in this thesis.

The potential and risk of running the Täsä Living Labs have been detailed in Åstrom et al. (2015) and Adenskog et al. (2017). Methodologically, Living Labs are potentially high-risk high-return experiments, which have gained popularity over recent years. Living Labs is an innovation methodology engaging users in the early planning stages of interventions and experimentation in real-world setting (Almirall & Wareham, 2008, 2011). In the Täsä trial, we experimented with state-of-the-art technologies in a real planning context and monitored participants within the app as well as through surveys. Compared to research in controlled environments, the real Living Lab situation allowed us to gain a considerable amount of information about the users and their usage of the app as well as about collaboration with a municipality in co-developing a democratic innovation. Margetts (2011: 202) discusses several barriers to the widespread adoption of experiments such as Living Labs in public management, among them being problems of coordination between different actors who "need to be persuaded to buy into the process and implement the intervention as required". Indeed, in the Täsä Living Lab experiment, we came across hurdles: some were related to the functioning of the app; others to the communication between officials and citizens; and yet others were concerned with public servants' and local politicians' fear that the new participatory channel might be used by citizens for Not In My Backyard reactions – a fear that turned out to be unfounded (see Adenskog et al., 2017 for details). Study 4, *Motivations to Use a Mobile Participation Application* touches upon issues of deliberation in light of the communication features implemented in Täsä (RQ1) and inclusiveness and representation when compared with Turku's population (RQ3).

7 Overview of the Studies

This dissertation comprises five studies detailing how different facets of mobile participation were explored. In this chapter, I first present each of the five studies and then explain their connections to the dissertation as a whole (see also Table 2).

7.1 STUDY 1: Participatory Apps for Urban Planning – Space for Improvement

The first study charts the spread of mobile applications to engage citizens in participatory urban planning. The study starts inductively with the observation of different mobile applications aiming to engage citizens in urban planning. The study introduces a typology of participatory urban planning applications that depicts the landscape at that time and identifies missing applications and explicitly suggests which features these could have. The theoretical framework of the typology builds on three dimensions of participation, each consisting of two levels: firstly, the type of data collected by the apps (Kanhere, 2011): *people-centric apps*, which document user activity and aim at understanding behavior; *environment-centric apps*, collect environmental parameters. Secondly, information flow (Rowe & Frewer, 2005): *one-way*, either from the citizens to the organization or organization to citizens; *interactive*, information exchange and dialog; and thirdly, empowerment as a consequence of participation (Winstanley et al., 1995): *criteria power*, the ability to determine a service or policy; *operational power*, ability to determine how a service or policy is carried put in practice.

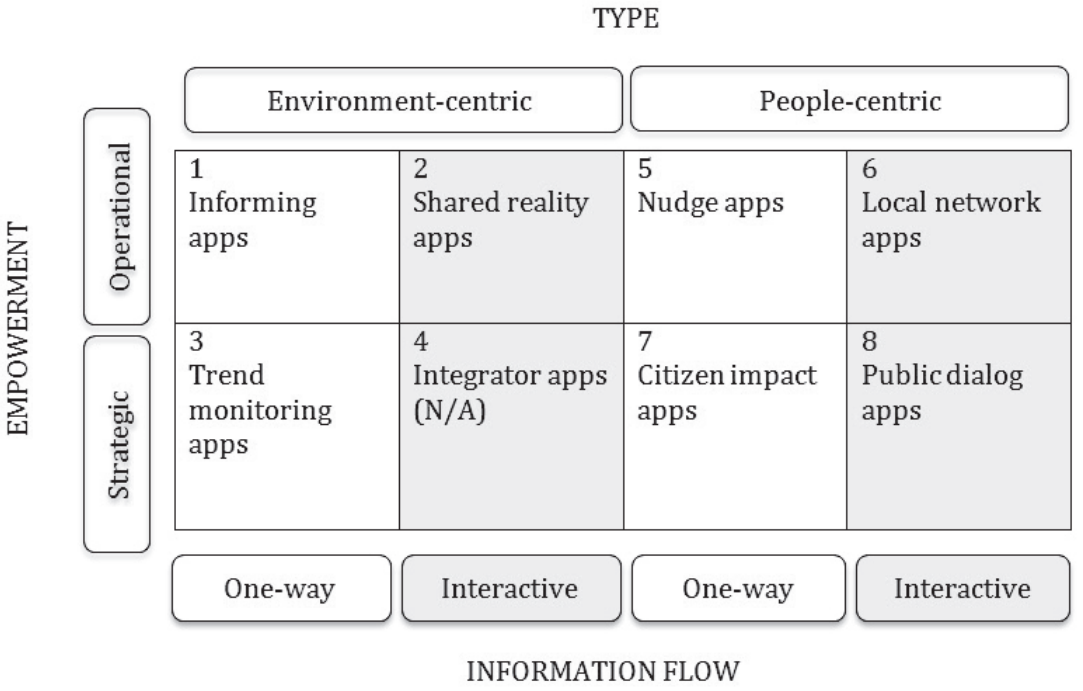

Figure 2 Typology of Participatory Apps

The typology resulted in eight types of participatory apps, each representing a combination of the levels in the dimensions (see Figure 2).

1. *Informing apps* are a one-way channel for conveying environment data. Two subtypes exist, prepopulated apps (the information is previously added to the app by the managing organization) and reporting apps (citizens generate data about their environments for the organizations to use and act upon). This type of applications allows citizens to affect the operations of organizations that engaged them through the apps.

2. *Shared reality apps* illustrate an interactive "reality", in which citizen-generated content interacts with smart objects (e.g. sensors in buildings) creating additional information. These applications enable experiences to which many users contributed (shared) through aggregation and visualization.

3. *Trend monitoring apps* collect data from citizens that helps authorities recognize trends and shifts in local, environmental conditions thereby allocating resources to specific areas.

4. *Integrator apps* are similar to *trend monitoring apps* except for the communication which is interactive in nature. This is one category for which no empirical evidence was found, yet the category arose from the theory-based typology.

5. *Nudge apps* documents user behavior that serves as a useful backdrop for further action on an operational level. Nudges in this context is understood as incentives which alter behavior.

6. *Local network apps* are –for the most part– developed in open data competitions, merging open data, open software, and citizen-generated data. They enable information exchange among local community members and provide information about their practical decision-making.

7. *Citizen impact apps* integrate citizen's data into strategic decision-making despite the one-way information flow.

8. *Public dialog apps* enable interactive communication inside the app about citizens' ideas and suggestions, and the managing organization behind the app is committed to using them in strategic planning.

The study found a predominance of apps with an environmental focus (both mundane such as news and maps but also more sophisticated, augmented reality experiences of urban environments) rather citizen-centric apps. Problem articulation – the reasons behind collecting citizen input and the purposes for its usage – in apps was weak. The findings also revealed that mobile applications support communication between citizens that is rooted in social media and Web 2.0 practices. This type of communication adds to the literature on participation, particularly Rowe and Frewer's (2005) categories. Citizen-to-citizen communication is present, for instance, in *local network apps*. However, there is still little dialogue between citizens and local governments through apps. On the empowerment side, citizen-centric apps provide the most valuable policy making input, as they tap into citizens' local tacit knowledge (Polanyi, 2009).

In general, most types of participatory planning apps help local governments monitor the city, in real-time. They provide pragmatic information which can be used in service delivery. The popularity of reporting apps has led to a 'lock-in', because they represent win-win participation instances: citizens report service needs and observe when they are resolved. For local governments, listening and acting upon citizens' requests showcases responsiveness and a functional city. There have been few incentives to go beyond this well-working model. The study also found that the impact of participatory planning apps was modest (at the time) but that it changed the role of citizens from information receivers (app users) to sensors (content providers)

and partners (app developers). Future development recommendations include strengthening the dialog between citizens and governments and among citizens, implementing feedback mechanisms that track the input at different points in time, follow-up after the participation process, gauging opportunities for citizen inclusion in data analysis and mining, and refining citizen's local knowledge into relevant content for policy-making.

7.2 STUDY 2: Stakeholder Participation in Open Data Contests: Insights from Apps4Finland

The second study investigates how mobile participatory applications are made from the perspective of open data competitions. In the context of open data promoted by public agencies, this study looks at the production side of applications: which stakeholders make apps, what are their interests and motivations, and how do these different stakeholders interact with each other in the app making process. The empirical evidence for this study comes from participant interviewed during the Apps4Finland contest in 2014. The main focus of the study was to explore how stakeholders' motivations and preferences shape their participation. Therefore, the specific questions were *Who are the stakeholders involved in the Apps4Finland open data contest and how do they participate in it?* and *What factors influence the type of applications created?*

The results reveal that stakeholders had a well-rounded *role* in the competition, such as main organizers, organizing partners, challenge partners, sponsors, and application developers. However, roles also overlap, as in the case of the organizing partners who were simultaneously also challenge partners. Participating stakeholders in the Apps4Finland involved: ministries, agencies, and programs under the ministries' authority, public-private organizations, registered associations and non-profit organizations, local government departments, companies, and citizen-developers.

As expected, the challenge partners – most of whom were responsible for making the open data available – were interested in increasing public awareness of their data and making it attractive to developers by e.g. organizing coaching sessions aimed at diversifying the data use. The format of each challenge was open ended, the main criterion being the use of the challenge partner's open data. In fact, most challenge partners deliberately refrained from setting any "challenge" as they were afraid it might alienate citizen-developers or stifle developers' creativity to generate innovative uses. They were eager to learn from and with the developers, access ideas outside their organization and willing to change and adapt to new digital practices, as posited in open innovation literature.

Another result was the shared understanding of the value of open data initiatives, in which the stakeholders wanted to be involved. Their desire to support the open data movement even surpassed their perceived benefit, i.e. the results in terms of new types of applications. Others participated in the contest for instrumental reasons,

as they saw the contest as a means to achieving the goals of transparency and good governance.

Other organizations became part of the contest because of the spare time interests of their employees, which they wanted to support. This type of active citizenship extended to the application developers as well; they participated in order to map opportunities for business ideas or because they could collaborate with tech-savvy individuals and as a consequence were not required themselves to have coding skills. They were also interested in refining their ideas, peer recognition, and developing their problem-solving capacities.

Stakeholders also promoted the inclusion of a wide array of social groups into the contest. They actively engaged with specific populations, such as teenagers, seniors or universities and wanted to become an example for others to follow. Reaching out was also manifested in the organization of regional contests, in which stakeholders were mainly interested in promoting their fine-grained local data and creating tailored, local solutions. At the regional level, finding the right talent proved to be challenging: while application developers quickly heard about the opportunities, other citizens hesitated to participate because they believed they did not have the right skills to contribute. Contest managers eagerly promoted the contest as a business prospect, where the managers and developers would collaborate closely to refine the apps. In addition to the motivations of the stakeholders outlined above, the Apps4Finland contest was also shaped by the nature of the data provided. In more detail, the character of the data is believed to motivate its use by developers and hence the resulting applications. For example, some data playing on the emotional ties of Finns to nature (such as water, lakes or forests) was considered appealing, while other data was perceived as unattractive. Real-time data was considered interesting, while some data sets requested by the users could not be provided because of privacy regulations. Agreement was reached over the potential of parsing, linking, and refining data. Lastly, the members of the jury considered it important to have access to the application prototypes, so that they could use and test them.

Going beyond the seeker-solver dyad, this study showed how a number of different stakeholders' interests and motivations negotiated the application development process in the Apps4Finland open data contest. The importance of creating awareness of the data and attracting new groups and individuals to use it was particularly recognized. In addition, the study also provides a first-hand account of how technical aspects, type of data and prototype availability, influence applications. The Apps4Finland provided both an enabling and constraining structure for making apps, resembling the ways in which institutions structure participation. The data owners expected developers to be creative in making the apps and therefore set flexible challenges-to-be-solved. However, in contrast, the resulting apps are constrained by the types of data available.

7.3 STUDY 3: Supporting 'Participation' in Mobile Participation

This publication aims to link the empirical evidence to established literature in the field of electronic participation. A main concern of the article was to link past experiences of e-participation to mobile participation and thereby contribute to developing this new kind of participation.

According to the digital divide literature, people use a technology (for participation) by overcoming a series of successive thresholds: motivational (wanting), material (access to the device), skills (competence in handling the technology) and usage (for entertainment or "serious" use). Given that motivation is the first and most crucial determinant of participation, both extrinsic (material, status, and reputation) or intrinsic (when it satisfies innate needs as posited by self-determination theory) need to be considered simultaneously. At times, monetary incentives displace either internal motivation or social conventions. People are highly sensitive to other's perceptions about themselves, and with regard to behavior, most public behavior is under scrutiny and likely to comply with social norms. In addition, feedback and monitoring greatly contribute to a community's formation and sustainability over time.

Without an institutional structure supporting and encouraging participation, most participatory initiatives fail, irrespective of the technology employed. The literature identifies five requirements that government should undertake to support citizens' skills, motivation, and influence in the policy process, and these are summarized in the CLEAR model (Lowndes et al., 2006). First, citizens must have or be given the resources and knowledge to participate (can participate); secondly, citizens must have a sense of attachment that reinforces participation (like to participate); thirdly, citizens must be provided with the opportunity to participate (enabled to participate); fourthly, citizens should be mobilized through public agencies and civic channels (asked to participate); lastly, citizens must see evidence that their views have been considered (responded to).

We applied these five requirements to mobile participation. In the app development stage, the design needs to be user-friendly and intuitive, tasks need to be small and easy to solve, people need to have access to the technology, encouraged to participate and be given feedback. For the development of user skills, institutional support means continuous learning to make full use of the technology, co-operation between users and transfer of skills, as well encourage purposeful usage of mobile phones, e.g. in planning. On the communication side, people need to be aware of the participation opportunity, and they need to be given feedback once they have contributed. They need to be invited and re-invited to participate not only through mobile participation, but also with other tools provided. Finally, to involve citizens into policy making, they need to be informed about the task and have its intricacies explained, gain trust that their input will be considered and that the agency responsible for engagement is committed to promoting participation, communicating the goals of participation as well as the impact their participation will have on policy.

In the study, we identify three ways in which mobile applications transform participation: collection of data sensors, situated engagement, and gamification. Previous participation methods for urban planning, both on- and offline, removed citizens from the physical environment and neglected their motivation to participate. In mobile participation, the *sensors in the phone enable data collection objectively*, such as positioning through the GPS system, the registering of decibels of sounds in the environment via the microphone, or velocity, inclination, and vibration as measured by the accelerometer sensor. Secondly, mobile participation enables feedback *at those locations* at which interventions are planned, thereby "situating" citizen engagement. When citizens pass by a planning site, they can provide immediate feedback resulting in richer, detailed observations. Situated engagement also allows breaking with resident involvement (citizens living nearby) and integrating the perspectives of citizens that use a location or locations that are meaningful and relevant to citizens. Third and lastly, experimenting with gamification to increase citizens' motivation to participate is a practice borrowed from social media applications. Concrete examples of game elements are points, leaderboards, badges and the like that inspire citizens to collaborate, compete, and have fun with each other.

The study concludes with a list of recommendations for implementing mobile participation. Recommendations 1-3 are mobile tool specific, 4-5 are typical of electronic participation more generally, and 6-7 are inherent in any participatory exercise.

1. Expand usage – encourage users to learn how to use mobile phones for "serious" participation, rather than entertainment.

2. Situate engagement – make use of the ubiquity and portability of phones to reflect "on-site"

3. Utilize sensor data – collect and analyze geo-referenced data captured by the phone's sensors

4. Make participation fun and easy – motivate citizens to collaborate and compete with each other and design micro-tasks

5. Build a community – enable users to communicate among themselves, not only citizen to public servant communication channels but also commenting and building on peer ideas

6. Listen and respond – provide feedback channels and encourage many-to-many-communication

7. Connect to the policy process – safeguard the status of citizens' contributions in the decision-making process

7.4 STUDY 4: Motivations to Use a Mobile Participation Application

The forth study investigates who were the early adopters of the ambitious mobile participatory application Täsä and what were their interests when using it. The data was collected during the Täsä trial in Turku in 2015.

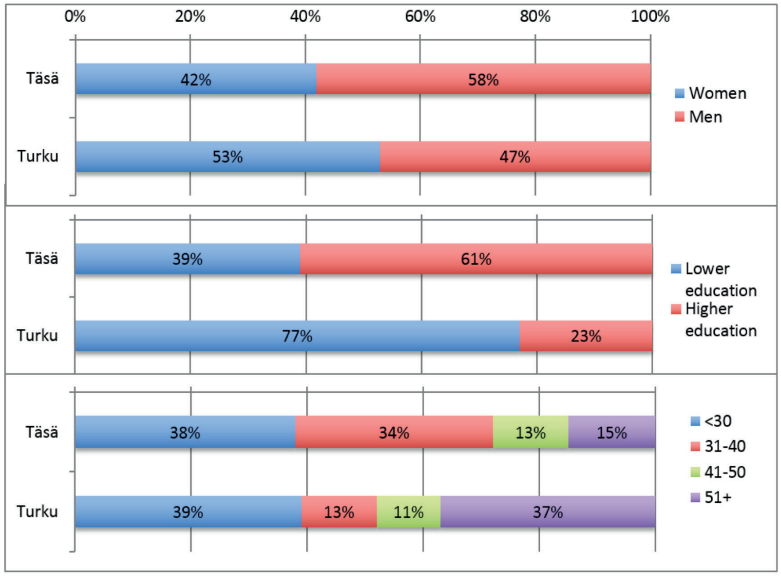

Figure 3 Profile of Täsä users as compared with Turku residents

Findings in Figure 3 show that the majority of users were young adults and professionals between 20-40 years of age with a high level of education. Men slightly outnumbered women (58% / 42%). Compared to the population of Turku, participants under 40 years were considerably over-represented (72% in Täsä, 52% in Turku overall) and conversely, senior citizens were under-represented (e.g. age 51+ were 15% in Täsä and 37% in Turku overall). The socio-demographics of Täsä users (61% hold an academic degree) was also mirrored in their mobile phone using skills (89% perceived they had excellent skills).

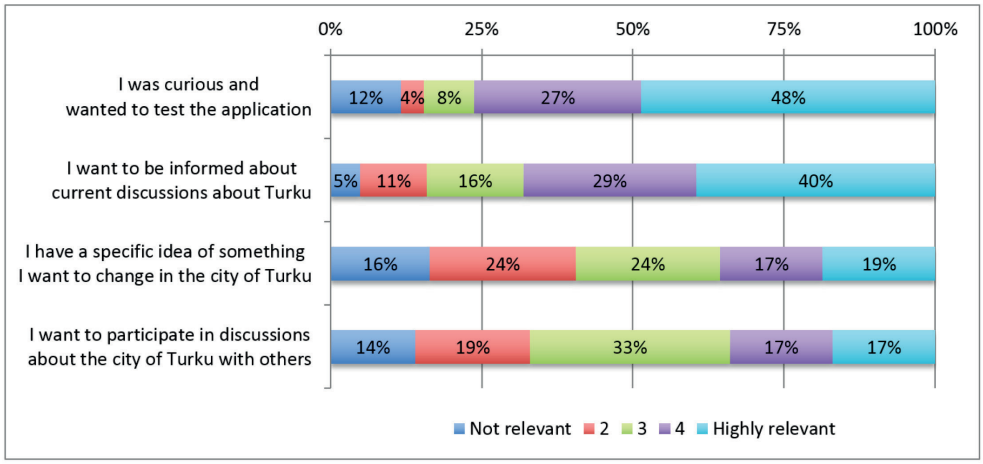

Figure 4 Motivations for downloading the Täsä app (pre-survey data)

Results of the pre-survey (Figure 4) show that Täsä users were curious and wanted to test the application (48%), and at the same time that they were very (64%) or fairly (30%) interested in urban planning issues. The highest motivating factor (Figure 5) was perceived to be the opportunity to bring one's own idea to the attention of city authorities (45%). The specific affordances of mobile participation such as the ability to write at a specific place and user-friendliness of mobile participation ranked second (38%) and forth (21%). Access to information on urban planning issues and urban residents' opinions ranked third (23%). At the opposite end, the app's game elements, the social influence of acquaintances who used the app, and interacting with other users contributed least to using the app (1-3%). Even though the Täsä users initially had excellent skills in handling mobile phones, 46% of them reported that they had learned quite a lot or very much about using an app for urban planning. On the other hand, 86% perceived no change in their general mobile device using skills after participating in the trial.

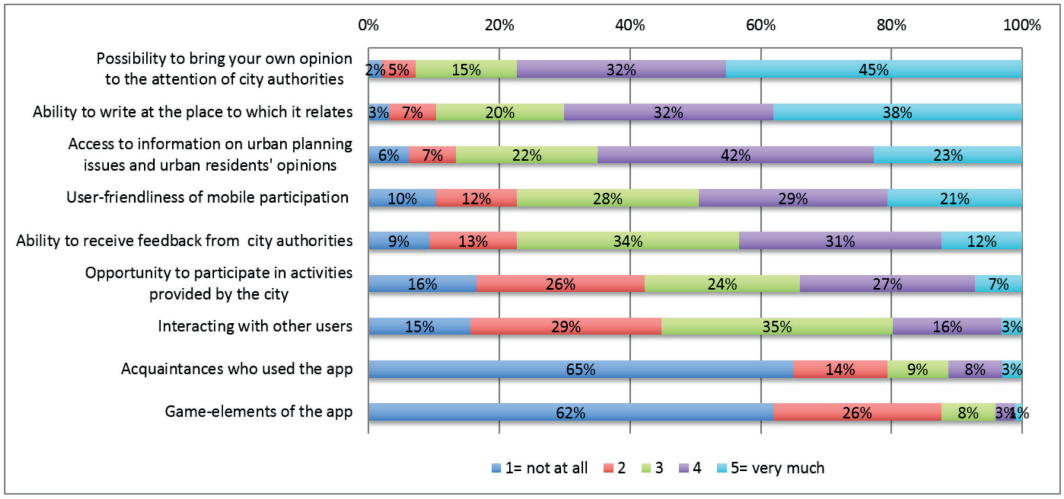

Figure 5 Motivation for using Täsä (post-survey data)

This study also provided insights into why some users downloaded the app but did not generate any content (passive users). We discovered that this was either because they opted to follow the content in the app without feeling the need to actively contribute themselves or because they abandoned the use of the app altogether due to technical challenges. Some experienced trouble downloading and signing up, others complained about the bugs, while still others would have wanted to participate though a webpage using a personal computer.

The self-selected users of Täsä were young, well-educated and interested in urban planning. As in a number of other electronic participation experiments, Täsä users did not represent the characteristics of the entire population of Turku. Nevertheless, Täsä was successful in attracting one particular group who has notoriously been missing from traditional face-to-face participation, young to middle age adults. Because of its characteristics, mobile participation is particularly suited to young professionals at the busiest times in their lives when they are juggling between jobs and family responsibilities. The ease of use and ubiquity of mobile participation appeal to this particular group. It seems that the "novelty effect" (Kormi-Nouri et al., 2005) of the app was quickly displaced by the technical challenges, yet it constituted an important initial motivator. Results also indicate that early adopters – albeit proficient users already – expand their knowledge base (46% of them reported that they have learned quite a lot or very much about using an app for urban planning), which in turn will help them to better navigate future participation opportunities.

We also found that participants used Täsä in a more individualistic manner than we had anticipated; they were interested in making their voices heard to the city authorities but not keen on receiving feedback from the municipality, participating in the tasks the municipality presented, or discussing their ideas with fellow citizens. This finding was

surprising, because previous studies of citizen participation have assumed that citizens would be interested in using social media tools to engage with planners. The feedback received from the users, in the form of constructive critique indicated a broad support for mobile participation, a finding consistent with the Technology Acceptance Model and suggesting a positive usage intention in the future.

7.5 STUDY 5: Citizens as Planners: Harnessing Information and Values from the Bottom-up

The aim of this study was to understand the changing role of citizens in participatory planning using mobile applications and Internet-based platforms. The study builds on three cases of outstanding citizen-initiated platforms to investigate how citizens plan their communities in novel ways through technology.

The cases were analyzed from a dual dimension, from a process (of engaging the citizens) and outcome perspective. We postulated that planners today need to take an active role in setting up both online and offline canvases for citizen engagement and collaboration. Based on the analysis of how these citizen-initiated platforms operate, we formulated five recommendations for urban planners.

1. Plan in an anticipatively manner – start with citizens' wishes and wants rather than presenting all-ready, full-fledged plans

2. Expand the pool of solvers – invite everyone and keep them engaged through a consistent social media presence across major platforms

3. Analyze by default – analytical tools for sorting the data generated in bottom-up initiatives should be embedded into the participation architecture. Tags, categories, data filters, voting and ranking are all commonly employed activities which parse the data easily for further analysis

4. Diversify citizen roles – builds on the potential of each contributor

5. Leverage technology – the strategies employed by citizen-initiated platforms thrive on a seamless integration of devices and software services.

7.6 Synergy between the studies in this dissertation

This dissertation consists of five interconnected studies addressing the research questions discussed in Chapter 5 (see also Table 1). The *Participatory Apps for Urban Planning* study laid the groundwork of the dissertation. It explored mobile participation both from a technology use perspective (what type/ technical features are used) as well as more substantial, normative aspects of participation as a democratic practice (the way the new technology contributes to citizens' empowerment and deliberation). The communication aspect was particularly salient in light of recent deliberative democracy theories as well as the inherent property of mobile technologies to support communication of one-to-many and many-to-many. The results of this first study opened research streams for the subsequent ones, as follows. When mapping participatory apps for Study 1, I identified apps delivered by citizens in 'open-data contests'. In contrast to more conventional civic engagement methods, this new form of participation invited citizens to make apps themselves (identified within the changing role of citizens in Study 1; see Table 2 below).

Study 2, *Stakeholder Participation in Open Data Contests*, then elaborated this finding by asking "What motivates people to make these apps and who participates?" and "What is the role of open-data" in shaping the types of apps resulted in open-data contests. Going back to Study 1, participation through apps eluded –for the most part – framing a problem or issue on which citizens would express their opinion. Participation was 'open ended', giving the citizens tools to report on a wide range of urban problems for which solutions needed to be found. The same theme continued in the apps contest, where 'challenge partners' (stakeholders providing the open data) restrained from framing the problem and thereby allowed app developers sufficient leverage to make apps in a creative manner. Nevertheless, the open data influenced the developer's interest and motivation to participate due to the type of data available.

Table 2 Overview of the five studies

	Literature	Data	Methods	Findings of the study
STUDY 1 Participatory apps for urban planning – Space for Improvement	• Democratic underpinning of participation • Electronic participation • Affordances of mobile phones	• Secondary data on 35 mobile applications	• Typology of apps	• Predominance of apps with an environmental focus rather than citizen-idea centered; weak problem articulation • Supports communication between citizens; little dialogue between citizens and local governments through apps • Most valuable policy input comes from citizens' tacit knowledge • Changed role of citizens: app users, content providers and app developers
STUDY 2 Stakeholder Participation in Open Data Contests: Insights from Apps4Finland	• Social Construction of Technology • Innovation contests	• 20 interviews • 5 app developer responses from survey	• Case study of Apps4Finland contest • Axial coding	• Identified stakeholders and their roles in the contest • Participation in the competition was motivated by advancing public awareness of the data; make data attractive for developers; be part of the open-data movement; accessing ideas from outside their organizations and willingness to adapt to new digital practices; persuade other social groups to participate • Motivated by inclusiveness rather than setting a "challenge" • Citizens were motivated by opportunities to map their business ideas; easiness- it does not require many coding skills; peer recognition and developing their problem-solving capacities • Type of data shapes the interest in using it and hence the applications
STUDY 3 Supporting 'Participation' in Mobile Participation	• Digital divide • Social norms and formal requirements supporting participation	• Literature review consisting of some 40 articles	• Applying concepts from citizen participation literature to mobile participation	• Identified ways in which mobile applications transform participation: collection of data sensors, situated engagement, and gamification • List of recommendations for implementing mobile participation, mobile specific, typical for all electronic participation, and inherent in any participatory exercise
STUDY 4 Motivation to Use a Mobile Participation Application	• Motivation to participate • Digital divide in electronic participation	• User surveys • 12 interviews	• Quantitative analysis/ descriptive statistics • Interviews • Living Lab	• Socio-economic characteristics of Täsä users; self-selection, young, highly motivated and educated, absent from traditional participation • Factors that motivated the downloading of Täsä included curiosity and wish to be informed about topical discussions • Factors that motivated the use of Täsä included making one's ideas known, situated engagement, access to urban planning information and other's opinions. Rather individualistic usage • Factors for discontinuing use were mainly technical challenges
STUDY 5 Citizens as Planners: Harnessing Information and Values from Bottom-up	• Use of mobile technologies to self-organize in participatory planning	• Secondary data of 3 outstanding cases	• Qualitative analysis, coding	• List of recommendations for urban planners to support self-organizing citizens to plan anticipatively; expand the pool of solvers; analyze by default; diversify citizen roles; leverage technology

In contrast to Studies 1 and 2, Study 3 *Supporting 'Participation' in Mobile Participation* explored the formal requirements of citizen participation from the point of view of a public-sector agency or local government. It positions mobile participation in the digital divide literature and underlines the importance of access to new technology, skills, motivation, incentives, and social norms for participation. Simultaneously, the study emphasizes which institutional actions support a seamless integration of mobile participation initiatives in the ongoing civic engagement efforts. The study presents seven recommendations, three mobile specific, two typical for electronic participation more generally, and another two inherent in any participatory exercise. This study was conducted in conjunction with the Täsä mobile app trial and the Living Lab preparation. Study 2 and 3 already present and stress the importance of motivation for participation. Study 4 *Motivations to Use a Mobile Application* continues this line of inquiry with evidence from the Täsä trial, the most ambitious mobile planning app of its time. It looks at the question of digital divide and inclusive participation identified in Study 3 and discovered that young adults, otherwise absent from traditional forms of participation formed Täsä's largest user base. It then assesses citizens' motivation to participate at the time of downloading the app, the reasons why some users discontinued use, and asked citizens to reflect on what motivated them.

Study 5 *Citizens as Planners* elaborated on one type of mobile apps identified in Study 1, namely Local Network Apps. It aimed to gauge how active citizens use technologies to self-organize in neighborhood and urban planning. In more detail, it looked at how awareness was created concerning their cause and mobilized through social media, as well as an understanding of how these groups aggregate and analyze the data collected from different technological platforms. In order to promote action, volunteers can take on the role most suitable for their skills and interests.

The studies central to this dissertation examined the landscape of mobile participation practices (*Participatory Apps for Urban Planning*), the circumstances ensuring its adoption (*Supporting 'Participation' in Mobile Participation*) and the experiences of individuals who participated in a mobile app trial (*Motivations to Use a Mobile Application)*. Additionally, *Stakeholder Participation in Open Data Contests* examined the motivation of stakeholders when participating in app making and *Citizens as Planners* illustrates the uses of technology for community planning.

8 Findings

8.1 RQ1: Which features of mobile applications are used in participatory urban planning and how do these enhance democratic goals?

Overall, the most prevalent features of mobile participation are linked to *reporting* apps. Apps which facilitate the transfer of code violations in a systematic way to the knowledge of city departments are very common and popular. Citizens who roam the city can take a photo of the issue they want to report, which is already marked with the GPS location of the respective place. At times, feedback mechanisms such as push notifications, email or SMS will alert the reporter when the problem has been resolved. Every time a reported issue has been corrected, civic participation has been fulfilled. Attending to each citizen reported issue truly serves the quintessential feature of participation, namely that each participant brings their own valuable contribution to improving the city. However, it is an important first step before achieving more strategic empowerment in urban policy or planning. In a very short time, reporting and monitoring apps have become "the norm" in mobile participation, because of the benefits described. There are few incentives to go beyond a well-working model of citizen participation. Apps developed in ways that better utilize the technical affordances of mobile phones are considered superfluous, especially by municipalities. In practice, reporting apps have led to sub-optimal opportunities for mobile participation.

Surprisingly, despite the fact that mobile technologies are tools for peer-to-peer communication, most planning apps are *unidirectional*. The description section reserved in reporting apps is hardly the right place to interact with the planner or discuss more broad ideas. Commenting features, familiar to social media users, are lacking or are underused. Together with the automated feedback responses citizens receive when their reported issues have been resolved, mobile apps seem to be poorly equipped to foster dialogue or deliberation. Strikingly, our study of Täsä showed that users who believed they had good mobile handling skills and broadly used various apps still preferred to use the Täsä app to bring their own ideas to the attention of the municipality rather than engage in conversation with other users or comment on other's posts. Signals of lock-in effects are in place when, given the opportunities for deliberation, they are overlooked.

A host of apps respond to the needs of *transportation and commuting* in cities. Apps for parking, biking, retrieving time schedules are also common. More often than not, transportation apps are built on government open data and utilize location-based services to localize the starting point of a journey or suggest free parking services nearby, track public transportation and estimate time of arrival. Apps that solely convey information are not participative. However, they do serve transparency and awareness raising purposes. One might argue that transportation is among the greatest of citizen interests,

as it touches the daily routines of every citizen. Therefore, the multitude of apps devoted to transportation seems to be designed with inclusive aims in mind, with every resident having a stake in the matter and hence an impetus to contribute. Features related to the *situated engagement* concept are prevalent, which indicates changes brought about by the portability of mobile technologies. In particular, participatory sensing afforded by mobile phones provides a detailed understanding of the environment in which citizens' live e.g. measurement of air quality with add-on sensors, noise pollution with the microphone or issue reporting with the GPS sensor. Such measures are situated between the subjective experience of citizens (i.e. calling city maintenance to complain about the "loud noise" nearby, or the "bad smell" or fixing a pothole near landmark X) and dedicated instruments of measurement used to assess the environment. The sensors in mobile phones quantify and provide an approximate measurement of the environment but are not as reliable as "official" measurements. When input is given as text, the descriptions on-site can be rich in detail. Among the sensors in phones, camera, GPS, accelerometer, the microphone or even add-on sensors (e.g. to measure aerosols) register different qualities of the environment. It is important, however, to note that mainstream urban planning apps rarely incorporate multiple sensors or combine sensor and text-based data, resulting in scattered information in different apps built in siloes. As an exception, GPS information is always present in mobile-sourced data. Some apps also *experiment* with different ways of creating or displaying information, such as those that use voice samples instead of text or display information visually, on-site with augmented reality features. In Täsä for instance, we implemented sorting features, by which relevant content (commented or voted upon by users) was highlighted. Situated engagement has a rather indirect impact on democratic goals, by increasing the substantive quality of participatory planning information generated by citizens, and eventually, the quality of decisions. By collecting rich on-site data, situated engagement contributes to the production of knowledge about different qualities and interpretations about a place, as a policy input.

Data *mining and aggregation* of citizen feedback beyond single entries is, as yet, rare. The principal benefit of mining is identifying latent patterns in the data. In contrast, the apps used by communities to self-organize provide in-built analytical tools to categorize and sort the data produced by community members using tags or voting instruments. While such apps do not provide pure deliberation either, they do spur some form of interaction among users – a noteworthy fact. The lack of mining tools is also seen in features allowing the attachment of photos rather than text collected from citizens; text requires more effort to analyze and on the other hand, might deter those citizens looking for a quick fix on the go. Aggregation of preferences is a central tenet of democracy. When this idea is applied to the data generated by individual citizens, the aggregated data set reveals patterns. For instance, the Strava case has shown planners interest in aggregated data for urban planning.

The capacity to enhance democratic goals can be linked to specific mobile app features. Automated feedback mechanisms incorporated in reporting apps serve the

democratic goals of popular control and transparency. In contrast, the reporting format (one-way information flow from the citizens to city managers) constrains deliberation among citizens and their understanding of peer? ideas (i.e. considered judgement in Smith, 2009). To avoid this, in Täsä we implemented features supportive of deliberation by allowing citizens to comment on each other's posts and interact with urban planners. Because the Täsä users were able to create their own contributions and missions, the feature corresponds to agenda setting- bringing those issues to the fore which were important to citizens. In reporting apps, the feedback mechanisms coupled with action on every reported issue further citizens' popular control and influence, albeit in very practical terms without access to more strategic decision-making. Inclusion can be promoted through specific apps that enjoy wide interest among different demographics, such as transportation and mobility apps. Situated engagement and participatory sensing features provide richer description of the problem to be addressed and, when used, improve the quality of decisions. Finally, features related to data mining and aggregation gain relevance to influence urban policies.

8.2 RQ2: Who is developing mobile applications and with what intentions?

My dissertation identified four main contexts providing fertile ground for app developing: startups and companies, municipalities, application competitions and Living Lab. In particular, the early mobile participation apps were developed by *startup companies*, with local governments procuring the services. They appealed to residents' curiosity and civic spirit to develop their communities, hence localism was a central element. Key features included responsiveness, tracking, and feedback for individual entries. Another main element was integration with the municipality's APIs to ensure seamless management of citizen data. Other *municipalities developed their applications in-house*, which secured integration with existing operations and greater flexibility to respond to the local needs of the users. These benefits came at the expense of scalability to other agencies, cities, or regions. Local governments have also hosted *application competitions, where individual citizens and small teams were requested to build apps addressing topics of local concern*. Many of these applications use some set of government open data. The stakeholders involved in open data competitions reach far beyond the local-government/ citizen dyad and include brokers supporting the competition such as data owners, enthusiasts, and social innovators. Two issues became salient in open data competitions: the participants' motivation and the problems they address with data. Participating citizens were interested in mapping business ideas during the competition, refine half-backed ideas, gain peer recognition, and improve their problem-solving capacities. The apps may not address the most pressing problems identified by the developers, but rather problems solvable with open data. Interviews revealed that the nature of the data shapes the resulting apps: some data sets are overused, others are in high-demand but unavailable, and yet others are 'boring' and underused.

Another context in which mobile applications emerge is at the interstices between research and municipal collaboration, where new *mobile services can be tested and evaluated in real-world environments such as Living Labs*. The central component of Living Labs is the co-creation processes between the actors involved. In the Täsä Living Lab, the b-Part research consortium together with the public servants and citizens of Turku commented the beta-prototypes before the final version was trialed. The concept and features were designed based on the state-of-the-art in mobile participation, but public servants and citizens had suggestions of their own, which the research team added, e.g. integration with another citizen feedback channel and display of the app content on a separate webpage.

Interestingly enough, *unintended modes of 'mobile participation'* exist too. Commercial applications like Strava, which curates a network of athletes, make data available to urban planners and in doing so, challenge the long-held understanding of 'civic participation'. This signals a sea change that can be expected as a result of massive mobile technology adoption outside the institutional-initiated setting of public engagement.

8.3 RQ3: Under what circumstances, if any, does mobile participation support an equal opportunity for everyone to participate?

The circumstances providing equality of opportunity to participate comprise technology, design, and institutional factors. Among *technology* related factors, the lowest common denominators are mobile participation methods based on SMS or "apps" which are in fact webpages and mobile optimized web-pages. They provide a broad reach independent of the operating system, with heightened awareness and participation pre-requisites. Firstly, the difficulties of operationalizing emerging mobile participation phenomena are visible since the distinctions are not clear cut but rather overlap with previously existing technologies. Secondly, with a focus on mobile technologies, the most inclusive apps seamlessly integrate apps and webpages into the same 'hybrid' offering, making sure that content is automatically updated on all outlets. Inasmuch as technology can be designed with inclusive features in mind, the study on user motivations showed that users have a range of preferences: Täsä was simultaneously preferred by young adults and discontinued by others who preferred webpages or computers as means to engage. Conceptually, mobile 'apps' and 'mobile' participation are extremely hard to isolate.

Generally speaking, the *design features* supportive of inclusion gravitate around different aspects of community building and usability. The mobile technologies investigated in this dissertation use communicative features to create awareness outside the app by posting content on social media sites, for instance. In this way, the invitation is extended to everyone but more specific engagement actions are lacking, such as skills support, tutorials or signposting in the app on how to use it. Another feature enables users to communicate among themselves to exchange information and/

or physical goods. A further feature provides users with different roles; they can self-select a role (event organizer, fundraiser, petitioner) they feel most comfortable in before trying on new roles or extending their knowledge base. Contrary to community building, apps also promote a very simple, individualistic mode of participation that has gained much popularity with the citizenry. Compared to lengthy conversation threads, making personal ideas known to the municipality entails minimal investment of time and effort, while the satisfaction of having contributed to the common good of the city is recognized.

The debate surrounding mobile participation has placed great emphasis on the technology itself. However, it cannot detach itself from the wider institutional structure in which it is embedded. Consequently, the institutional factors safeguarding inclusion, which are rather generic, could serve any participatory practice. Anticipative planning, starting with citizens' wishes and wants, provides an even playfield for envisioning the ideal city and its services. With few notable exceptions including Täsä, most participatory methods examined in this dissertation were reactive, i.e. they answered some detected problem or issues. One of the paradoxes of mobile participation was visible in the results of the Täsä app. Although the majority of participants were young adults, highly educated and skilled users of mobile phones, they were also the demographic missing from other forms of participation. Albeit having a skewed user profile in Täsä, it appears that even this early and ambitious trial of mobile participation fits well into the broader participation toolbox. Additionally, stakeholders involved in the Apps4Finland competition were genuinely interested in broadening the stakeholder groups and include the elderly, pupils, and students. Overall, in mobile participation citizens' roles have diversified; these roles are now comprised of application users, content and idea providers, and app developers. The outlook for planners is therefore to shape those technologies that harness participation aligned to citizens' motivations.

9 Discussion

The purpose of this dissertation was to explore how emerging practices of mobile participation adoption change citizen participation in urban planning. New electronic tools for citizen participation have not only demonstrated a successful adoption of technologies but have also become socially constructed and adopted drivers of institutional change. This dissertation connects established fields of theoretical enquiry into citizen participation with democratic, institutional, and technological shaping theories. The discussion derived from this research centers around (1) experimental methods for citizen participation, (2) early adopters of mobile participation, (3) different citizen roles, and (4) balancing structure and agency in open data competitions.

9.1 Mobile technologies hold potential for experimental methods for citizen participation

Mobile technologies for civic participation presents itself as a form of experimentation, but bolder moves towards the ambition to support democracy would be well placed. Against the legacy of citizen participation, it is likely that real-world experimentation with different technologies and new approaches will need several iterations (Margetts, 2011; Almirall & Wareham, 2008, 2011). A culture of experimentation and rapid – but thoughtful – delivery will support this endeavor. Firstly, the implemented communication channels in mobile participation could be used to support deliberation and a two-way information flow. If the goal of civic participation is to remain a strengthening of democracy and more civic inclusion in urban plans (Goodin, 1993; Burby 2003; OECD, 2003), there needs to be commitment at both an administrative level as well a citizen level in order to deliberate and build on each other's ideas. Enabling this to occur – by implementing commenting options and encouraging their use– is essential, but an insufficient first step. This is because a culture of deliberation and desire to build on fellow citizens' ideas need to be fostered, where argumentation of one's own ideas becomes the central component of participation (Dryzek, 2000; Innes, 1995; Innes & Booher, 2010). Such a starting point also ensures that the input is most relevant to policy making and that a broader variety of opinions and arguments will be covered. Secondly, experimental methods should take a stronger stance to the most enduring challenge of civic participation: how to facilitate the integration of experimental knowledge into policy-making. There is no easy answer. The progresses made in service delivery provide a good start – through reporting apps, citizens can contribute in a direct manner to improving the services delivered by the city. Citizens can

experience the change first hand through observation or receive an automatic feedback informing them how their input has been handled. However, in the matter of strategic planning and implementation, citizens' input still lacks status (Bäcklund & Mäntysalo, 2010). Thirdly, the different affordances of mobile technologies need to be united into single apps, rather than numerous stand-alone apps with one function. Participatory sensing needs to integrate communication channels and reporting applications better, as this would facilitate the management of holistic information about the environment. Mobile participation provides novel aspects to the citizen participation instrument on mobile phones but it currently lacks benchmarking. Future research could examine inclusion and influence in policy making, e.g. who participates and to what effect, the effects of certain design features by deploying test and control versions of an app (e.g. gaming elements), or document the process through which participatory technologies are tested, iterated, and institutionalized. Cross-national comparisons investigating citizens' socio-demographic factors and, more importantly, the area of expertise they are willing to lend to the participatory process would yield fertile ground for further development of the initial findings in this dissertation. Additionally, comparisons could also focus on changes that occur in mobile participation over time, both in terms of users and technical affordances. Furthermore, the acceptance and preference of participatory apps instead of a webpage or traditional face-to-face should receive further attention.

The finding of a slow change in mobile participation examined from a theoretical perspective points to slow institutional change (Hannan & Freeman, 1984; Campbell, 2004) and partial closure (Pinch & Bijker, 1984; Bijker et al., 1987; Bijker, 1995). Closure can be noticed in the implementation of the minimal viable method of mobile participation in versions with much more sophisticated features – hence the prevalence of reporting and participatory sensing apps. After an initial rapid diffusion of mobile participation across the globe, only incremental improvements have been introduced in the apps widely used by public institutions. Most likely, transformative change will come from outside the institutionalized environment (Hannan and Freeman, 1977), perhaps through the self-organized forms of participation, more experimental ways of gathering and structuring information (including academic studies), or unintended (and unknown yet) uses such as the Strava case (Albergotti, 2014). The detection of such parallel developments indicates only temporary closure achieved by reporting and sensing apps (see closure in SCOT; Pinch & Bijker, 1984; Bijker et al., 1987; Bijker, 1995). In practical terms, experimentation might be desirable and attractive because of its service innovation prospect. First, experimentation would have to overcome many institutional hurdles, such as dedicating time and resources to acquiring new knowledge or dealing with the outcomes of uncertainty, to name only a few. This would be followed by experimentation clashes with the predictable outcomes and stability favored by institutionalism (Brinton & Nee, 2001). Therefore, experimental methods need to be coupled with change agents outside the organization.

9.2 Early adopters of new participatory methods need institutional embeddedness to effect change

In the Finnish context, early adopters in self-organizing groups chose mundane technologies to promote their causes and, in doing so, they had collaborated previously with the municipality in a semi-formal, mixed sphere in which these citizen-activists deliberated with planners on an individual basis (Horelli et al., 2015; Saad-Sulonen, 2014). Since Finnish municipalities have leverage when choosing among different engagement methods, long-standing (such as PPGIS use) and experimental ones (co-development with citizens to promote their causes) co-exist. The co-existence of participation practices rather than the substitution of one practice with another may cause institutional ambiguity (Bäcklund & Mäntysalo, 2010). This co-existence is typical for the Finnish context, with planners referring to the so-called 'toolbox' of engagement practices.

In more practical terms, the two-way information flow (among citizens and between citizens and planners) was unique to Täsä and implemented to support deliberation and embeddedness. Furthermore, by enabling citizens to create their own contributions and missions, Täsä sought to integrate citizen initiatives, ideas, and knowledge into the participation topics formulated by the planners. In the Apps4Finland, embeddedness came as a result of diffusing the contest into regional and thematic sub-contests and the need to adhere to a workable format of running the contest. Apps4Finland was a typical app competition, although the definition of the problem was less structured when compared to other competitions. The global affinity for experimental cultures has also become currently visible in the Finish context, with public servants becoming more open to dealing with uncertainty.

Early adopters recognize the distinctive features new technology can bring to public engagement. Affordances of mobile phones, such as giving feedback on-site as well as ubiquity and pervasiveness were highly appreciated by the early adopters of Täsä, including some public officials we cooperated with in Turku. The users were mostly young, highly educated, and knowledgeable as regards using applications even before they joined the trial. They were both interested in testing the new app as they were in matters of urban planning, and keeping abreast of the newest urban plans of Turku municipality. Despite the fact that Täsä's early adopters were versed in using multiple apps, the motivation study in this dissertation (Study 4) showed that every second Täsä participant learned about how apps can be used for civic participation in planning.

Early participants in the Apps4Finland contest, in turn, were at times uncertain about the benefits their participation would yield, but more importantly, they were eager to be part of the open data community. Tech-savvy citizens can help preempt the technical pitfalls before deployment of a new participatory technology and act as 'tech evangelists' in the engagement process. On the participation continuum, targeted activities aimed at building the capability of citizens who lack – but are interested in – new forms of

participation could become part of the digitalized community services. Early adopters can play an important role in transferring skills and ideas among interested people.

It is critical, however, that early adopters are also integrated into municipalities and public agencies, and move back and forth between the community and the institutional setting. Inside the municipality, early adopters can be involved in at least three broad thematic areas. First, leverage communication between the municipality and the public, and fostering dialogue and debate among citizens. Second, helping planners shape the technological component of participation, because there are limits on how much novelty citizens are willing to accept in mobile participation. For instance, the idea of an app as the sole participation channel might be a restrictive factor for participation, as the experiences with Täsä showed. Finally, they can nudge the shift from a reactive, problem-based culture to a pro-active, preventive view.

The idea of early adopters as facilitators is closely tied to that of embeddedness (Granovetter, 1973, 1985), both social in the community and institutional within the local government or municipality. For the community, early adopters represent a direct communication channel with the municipality; for the municipality, they could function as intermediaries that manage user involvement and act as change agents (Almirall et al., 2014). The inclusion of citizens as representative of relevant social groups (user groups) in the incipient phases of participatory technology development (as prescribed by SCOT and the Living Lab methodology) mitigates the costs of adoption for the wider public, while at the same time it can facilitate community building.

9.3 In mobile participation, citizens take on different roles

Mobile participation created opportunities for more resourceful participation, especially when seen from the broadening-deepening participation vantage point of digital inclusion (van Dijk, 2005; Hargittai & Hinnant, 2008; Zillien & Hargittai, 2009; van Deursen & van Dijk, 2013; van Deursen et al., 2014). Each citizen can self-select a role – or many roles – with which they are most comfortable, while at the same time having the option to learn new skills should they chose to do so. Roles identified in this dissertation include (1) application users, who download apps and follow its content, (2) content providers, who provide content in the app, be it text (providing ideas) or sensor-based content or a combination of these, (3) and app developers, who develop apps for other citizens to use. Providing content gathered by the sensors in the phones and developing apps are new for mobile participation, while the other roles are inherited from previous engagement methods. In the light of the digital skills divide, manifold participation capitalizes on citizens' strongest skill-set. Further refinement of citizen roles can take place in practice and provide enough leverage to accommodate emerging roles. As governments join the (open) data surge, some citizens may be interested in helping with data-mining activities too. City administrations could also implement and manage a talent network of voluntary citizens. For instance, simple forms that include

citizens' skills they excel at but also skills they wish to develop could be collected and managed. Such registers would facilitate a call-on citizen crowd willing to help government in solving urban governance issues. Much like in the case of app contests, citizens' role can be open-ended and not confined to any denomination. In such a setting, attracting outside talent becomes a conversation on the role and tasks citizens want to assume rather than filling pre-defined roles.

In practice, different roles can solve problems of coordination for large groups of actors with various interests (Brinton & Nee, 2001). Because institutions structure social interaction to achieve efficiency (North, 1990), the complexities of implementing different roles – pre-defined and open-ended – are rather straightforward. The introduction of different citizen roles in urban planning is enabled by two factors. First, the institutional framework enables the design of the app or, to put it more concretely, the roles are socially shaped. The emergence of more symmetrical relations to structure citizen participation takes place simultaneously with the search of replacing hierarchical structures inside organizations and attracting talent from the outside. Tying in with the SCOT and democracy development literature, flexible roles potentially bring in new individuals or groups to the already existing 'relevant social groups', thereby promoting inclusiveness. Secondly, the technology and its design features support the different roles adopted by citizens. These roles give testimony to the ways in which new technologies impact the interactions between individuals, organizations, and society at large as postulated in the socio-materialist view. Apps in particular have been argued to impact behavior (Cohn et al., 2011; Bellman et al., 2011; Conroy et al., 2014), in such a way that these various citizen roles can lead to different behaviors across different groups of users.

9.4 Managers of open data competitions need to balance between structure and agency

Open data apps might not solve the most pressing urban challenges but they might create solutions for unknown problems. Data availability *structures* the outcomes of app development. This means that while available data can be combined in a number of innovative ways to effect desired outcomes (effectuation; Sarasvathy, 2008), it is unclear what kind or whose problems the consequent apps address. Conversely, to address identified problems, open data might need to be complemented with other data sources (Desouza, 2012). Stakeholders shape the incentive structures of hackathons and open data competitions, such as the entrance criteria (e.g. use of certain data sets) and compensation prizes. The Apps4Finland 'challenges' had a rather weak problem formulation, compared to US app challenges. To the contrary, the entry requirements give application developers (and their teams) considerable *agency* to choose among different problems, design, and target user-groups of their apps. App developers enter competitions to refine their business ideas and gain peer recognition. Early adopters

participate because they are curious to learn new things and voice their ideas. The incentive structure seems to be fertile ground for pursuing personal growth rather than solving longstanding urban challenges.

The debate surrounding open data gains legitimacy because the argumentation follows democratic principles of enhancing transparency, empowerment, and equality of opportunity (Smith, 2009). Open data competitions are also indicative of experimenting with new forms of participation: first, through citizen-created technologies and second, through design and delivery of (monetary) incentives (Almirall et al., 2014). The effects of incentives on participants' motivations are unknown because app developers consider the cash prices insufficient to compensate for their investment of time and effort (Desouza, 2012). The differences between established and experimental, incentivized methods of citizen participation have begun to emerge in app contests. Traditional participation aims at developing the 'common good' through reconciling opposing views (Arnstein, 1969; pluralist and discursive democracy), while the new participatory methods create network nodes for community engagement (e.g. the self-organizing communities in which the initiator aims to build a community around his or her cause; see Varnelis, 2008; Saad-Sulonen, 2014). Furthermore, empowerment is sometimes stressed by the shaping of the technology by citizens according to their personal beliefs – which are seldom bias free. Thus, interpretative flexibility (Pinch & Bijker, 1984; Bijker et al., 1987) is exercised not only in the design of the technology but also in mediating diverging meanings, knowledge, and resources. The emphasis on technology shaping in this dissertation is useful for investigating not only mobile technologies but also future participatory technologies. Citizen participation has mainly dealt with the different methods with which citizens have been engaged and their effects (structure) and eschewed citizens' motivations, intentions, and incentives to shape the participatory process (agency). Citizens' motivations, intentions, and incentives can become a construct connecting theories of institutionalism and technology shaping, and perhaps predicting deeper participatory outcomes. Therefore, this dissertation supports the conclusion of prior research (Boudreau et al, 2011; Desouza, 2012; Almirall et al., 2014) that compensation does not need to be material to incentivize participation but rather support individual goals of agency and recognition within the community.

9.5 Limitations and challenges for future research

In this dissertation, I have given a sociological account of the change after the introduction of mobile technologies for civic engagement. It explores the adoption process, however, more cross-validation with evidence is needed to evaluate the influence of the mobile participation still emerging. The present dissertation contains two limitations, which have influenced the conclusions that can be drawn. First, the studies are exploratory and descriptive rather than causal. Second, a structural constraint exists, which hampers the development of the mobile participation field.

Primarily, the choice of exploratory research that was done in the early stages of this dissertation impacted the design of the studies. The empirical evidences gathered for Studies 1 and 5 used secondary sources, which are suited for exploring what changed and how. Mobile planning applications were, at the time of data collection for Study 1, rather scarce; this led to the addition of urban governance apps as they were then broadly understood. Study 5 illustrates only a few outstanding cases but nonetheless indicates the characteristics of the new types of mobile technology that have enabled civic engagement. Studies 2 is limited to the study of one, yet fairly representative, application contest. Study 4 is limited to user data of one particularly ambitious participation app, designed by the Täsä research consortium. The application contest study does align with previous studies as similar formats are globally in use (e.g. Almirall et al., 2014). However, the role of open data as a factor motivating participation needs more refinement and attention in different contexts. The representativeness of the Täsä trial in the emerging mobile participation context remains an open question. Compared to HCI trials with small samples, the Täsä Living Lab was aware of the typical socio-demographic characteristics of users and tried to also to reach other groups. The users were nonetheless mostly young, well-educated, and highly knowledgeable in using applications, and motivated by curiosity to test the app and interested in the topic of urban planning. However, the mobile usage skills and interest in planning were self-reported with subjective measures. We benchmarked the Täsä demographic against e-petition services and Turku's population but not against other mobile participation applications as none that were comparable existed to the best of our knowledge. The Täsä demographic was comparable to an e-petitioning system implemented in Malmö and was considered typical for democratic innovations (Åström & Karlsson, 2016). The studies shed light on mobile participation in a number of ways, although they do not cover the empirical spectrum of the whole emerging mobile participation phenomenon.

Another limitation was that the research choices made were due, to a considerable extent, to structural constraints. There were several issues to consider. Essentially, there was the question of data availability. No prior study tackled the issue of user demographics in participatory apps nor their democratic 'success'. Beyond the number of downloads (which does not reflect usage), few details were disclosed. In particular, organizations that develop participatory apps were unwilling to share their data due to its monetization value or demographic bias. The predominant discourse enables them to advocate the 'potential' of technology, without disclosing evidence. Sociologists are thus left with the choice of working with available data, running a trial themselves, as we did with Täsä, or abandon studying mobile participation altogether. By considering these constraints and solving them, the present research is a highly relevant study of an emerging phenomenon.

Only empirical data will enable a more systematic approach on the effects of mobile participation. This dissertation provided an initial, necessary step but theory development and sustained interest in the mobile participation practices are needed for a better understanding of the phenomenon. This study has also opened new questions

and avenues for further research. For instance, documenting the changes that occur over time to mobile participation, both in terms of users and technical affordances would yield fertile ground for developing the findings of this study. Revisiting and refining the participatory apps typology, running large-scale experiments and user studies of emerging apps would impel the field forward. In cities with multi-channel participation tools, the acceptance of a participatory app instead of a webpage or traditional face-to-face meeting should receive further attention. Finally, the interplay between geo-fencing and user privacy can be a fruitful pursuit in investigating how mobile technologies change participation.

10 Implications

10.1 Practical Implications

This dissertation has practical implications for civic engagement through mobile technologies for public managers, citizens, HCI designers, and open data managers.

For planners and engagement specialists, this study suggests a change in how they approach civic participation. Instead of reacting to citizens' complaints, they should implement anticipative planning; this provides an approach that starts with citizens' ideas, their wishes and wants and then seeks ways these can be implemented given the constrains of city resources and jurisdiction. It is important that citizens who organize around community causes, such as promoting inclusion, equality of opportunity or social good, receive support to implement the ideas gathered through mobile technologies. This dissertation argues for and provides evidence of the changing role of citizens. Public managers could respond to this change by implementing and developing a talent network of volunteers willing to lend their time and expertise to solve urban problems. There could be a strong boon in matching volunteers to the right challenges and would serve as a double solution: the role of the citizens would become truly 'citizen-centric', as the negotiated role takes a starting point in their skills and motivations, and the insight provided by citizen engagement would be most relevant for urban planners.

For citizens, the present study is a further encouragement to apply the skills they have acquired from using social media to real-world participatory planning situations. Transferring skills such as posting personal content, commenting on other's posts and sharing posts on multiple outlets simultaneously, fosters deliberation among citizens as well as between citizens and planners. Some citizens will find it worthwhile to become 'early adopters' of participatory technologies, in which case they can also serve as 'evangelists' in their communities. Others will find shaping the technological designs of interest, thinking about the design features and outcomes they want to achieve. Citizens should also be able to choose among different offerings of participation, depending on their present disposition. Sometimes, they could opt for a more individualistic participation mode, comprising of sharing sensor data or ideas, while at other times, they could engage in deeper conversation with the community.

For HCI designers, the present study suggests better integration of dispersed technological features. As exposed in this dissertation, an 'app' yields a more nuanced understanding of mobile participation. An 'app' should enable participation through SMS, a website, and an app –all seamlessly integrated into a single participatory channel. Additionally, content from the app should be 'sharable' on social media networks through open APIs so that citizens can create awareness and mobilize resources outside of the app themselves. The app should also coalesce sensor data with

features supporting a two-way information flow. Equally important, the app should provide background analytics, including data mining, aggregation and visualization, as well as integration with the municipal APIs.

For open data managers, this dissertation exposes the array of motivations stakeholders have for participating. Open data managers have to weigh whether open data can be used to solve urban challenges and economic development, or whether it needs complementary data sources to solve the challenges proposed and devise an incentive structure aligned with the proposed outcomes. As a general guideline, intrinsic civic engagement should not be displaced by extrinsic incentives but boosted by promoting developers' agency and community recognition.

Until now, practical examples of mobile participation have sought to experiment with the potential of the technologies. However, the different actors involved in civic engagement need to make long-term commitments in order to respond to the needs of local governments and citizens. It is expected that any prototype will need several iterations before widespread adoption; this can be achieved only through commitment to development. In addition to accepting the time-frame, citizens need to be involved early on in shaping the participatory tool, testing it, and refining it.

10.2 Theoretical implications

This dissertation has a set of implications for conceptualizing the ongoing 'participatory turn' in urban governance. A social phenomena is rarely new, but rather 'new' when applied to new situations; citizen engagement is not new (Arnstein, 1969), nor are notions of crowdsourcing (Howe, 2008). However, when social media and mobile technologies were added to the mix, new forms of participation started to emerge (Nam, 2012). This work builds on previous theories of civic engagement and suggests that 'citizen' in mobile participation can be a substitute for 'the user', the 'co-creator' or 'content generator'. The empirical parts of this dissertation provide evidence that citizens can act as passive users, active providers of ideas or as sensor data and app developers. Providing sensor data and developing apps are intrinsic to mobile participation, and thus enlarge the instances of civic engagement. This dissertation also suggests that by allowing citizens to self-select different roles in which they feel empowered (are motivated and/or have the right skillset) solves the problem of coordination, which ensures that the participation outcomes can become more relevant for different aspects of planning and policy. Nevertheless, this self-selection comes with representation trade-offs.

This work provides further evidence of how goal finding, as a central aspect of planning (Rittel and Weber, 1973) has been substituted by principles of effectuation (Sarasvathy, 2008). This dissertation exposes how the problems citizens are supposed to participate in solving are currently weakly articulated (Study 1) or deliberately eschewed so as to not constrain developers' creativity (Study 2). Granted, effectuation

allows citizens more leeway and creativity than pre-set agendas for public participation; however, without a purpose for the participation, the outcomes are challenging to apply and integrate within the existing planning practices. The dominance of reporting apps across different countries suggests that the lack of focus is quite robust: reporting whatever one comes across might not be of relevance to city development. In the same vein, open data applications can fail to respond to problems or urban needs.

Political scientists have taken a particular interest in evaluating the outcomes of participatory exercises and their effects on policy (e.g. Smith, 2009). Study 3 provides concrete advice on how to require that an app and its content is aligned with the institutional setting. A range of strategies are needed to target how the content produced in the app is in line with practices outside the app, such as marketing efforts and involvement in policy making. To that end, Study 5 discovered that for self-organizing communities, backend support and data analytics are integral parts of participatory technology and ensure relevance for policy advocacy. Together, these findings underline the need to embed apps into the formal, institutional setting rather than regarding them as stand-alone experiments.

E-participation literature has previously detailed how PPGIS and social media (notably Facebook and Twitter) have engaged citizens in planning (Brown, 2015; Kahila & Kyttä, 2009; Kahila-Tani et al., 2016; Schweitzer, 2014; Evans-Cowley, 2010b). The present dissertation has been successful in expanding citizen participation to include the shaping of the participatory tool itself. Study 2 investigated social shaping of technologies, i.e. how citizens negotiate together with other stakeholders which apps are being built. Similarly, drawing on the Social Shaping of Technology theory, this dissertation suggests that citizens do not *only* use technology to participate but also to develop and refine it. Further, Study 2 also provides initial evidence of the fact that citizens are motivated by the nature of the open data as postulated in sociomaterialism. However, the intricate ways in which technologies affect human behavior are beyond the scope of this dissertation.

A number of studies have documented the existence of the digital divide (van Dijk, 2005; Hargittai & Hinnant, 2008; Zillien & Hargittai, 2009; van Deursen et al., 2011; van Deursen & van Dijk, 2013; van Dijk & van Deursen, 2014; van Deursen et al., 2014) and even the emergence of a mobile underclass (Napoli & Obar, 2014). Against this backdrop, Study 4 showed that the majority of the Täsä app participants were young professionals who have good mobile device handling skills. Thus, when considering their absence from traditional, face-to-face meetings, this dissertation suggests that mobile participation actually broadens participation – albeit in itself a skewed one. For the time being, mobile participation is therefore rather part of a comprehensive list of tools to ensure inclusiveness, rather than a one size-fits-all.

This dissertation sheds light on citizens' interest in participating. Study 2 and Study 4 do not take motivation as a given, but rather try to assess which factors shape motivation. While deliberative scientists have stressed shared learning, argumentation, and consensus building (Healey, 1997; Dryzek, 2000; Hillier, 2002), the findings of this

dissertation suggest that at least the early variations of mobile participation provide an individualistic participation. In the Täsä trial, despite interactive features, most citizens were primarily motivated by posting their own ideas. They were less eager to engage in debate with each other or the planners. The propensity of citizens to promote their own ideas might indicate that mobile technologies are not used to support deliberation, which is surprising when considering the fact that mobile technologies are tools for communication. In contrast, even in their current form, they support pluralism as outlined in the incremental decision-making theory (see Figure 1; Lindblom, 1965) and suggest an individualistic way of using mobile phones for participation. In the case of open data competitions, citizens were attracted by the prospect of developing skills related to problem solving, mapping of business opportunities and peer recognition. This indicates more of a capacity building approach to participation as seen in the light of life-long learning.

Finally, discussions on mobile and electronic participation, is a continuously evolving practice that involves theory from political science, social science, and technology studies. This has produced fragmentation rather than an overlap, and poor boundary limitations. Technology catalyzes change so fast that theory lags behind.

11 Conclusions

Within the field of electronic participation, mobile participation is a rather recent chapter. Taking this into consideration, it has, however, extended opportunities to engage citizens in urban planning, while simultaneously raising new challenges. In this dissertation, I have discussed mobile participation as a continuum of citizen participation from a democratic-institutional perspective inasmuch as I have highlighted the role of the participatory technology with Social Shaping of Technology insights, thereby aiming to understand new participatory methods beyond the current smart city (and its smart citizens) hype.

In conclusion, this dissertation has made three contributions to understanding mobile participation. First, it has provided an overview of the specific features used in participatory apps (or lack thereof) which enhance democratic urban governance. Second, it has assessed the participatory technology: who develops apps and with what intentions. Finally, it has contrasted the different approaches conducive to inclusiveness in mobile participation across theories of democracy, institutionalism, and social construction of technology. These contributions open the door to investigating more broadly new participatory technologies in the field of civic engagement.

The landscape of participatory apps for urban planning proved to be rather more scarce than anticipated. Generally, there is considerable isomorphism when reporting and sensing apps and consequently a shortage of apps experimenting with the technical affordances of mobile phones more resourcefully. This can be seen, for instance, when combining open and citizen-sourced data, data from auxiliary equipment that can be attached to the phone, or virtual reality features. Currently, the most used features are location-based features that facilitate app usage and situated engagement, and then unidirectional communication channels inside the apps. Despite the widely available features of reporting and visualizing data in new ways, communication between users is seldom implemented. Additionally, the "apps" terminology has expanded to include mobile optimized websites, SMS-services, and hybrid forms, echoing that apps should be broadly accessible and aligned to citizens' usage skills of the different types of mobile technologies they possess. The divergent and overlapping conceptual definitions of apps are a case in point for the emerging nature of mobile participation.

The early adopters of mobile participation have been tech-savvy, highly educated young adults, who have been traditionally absent from face-to-face participation. The affordances of mobile participation – ubiquity and situated engagement – proved to be compelling for this demographic. Mobile participation does not yet resonate with older cohorts, suggesting that it needs to be complemented with other forms of participation to achieve the broadest inclusion possible. Proponents of electronic participation have repeated ad nauseam the necessity to broaden the user-base, which not even at this

point has been fulfilled despite ubiquity and ease of access. Equality of opportunity to participate can be advanced by technical, feature, and institutional means. Chiefly, however, early adopters can become community anchors of diverse participatory methods, an endeavor that can be achieved through fostering their community ties and integration in public sector activities.

Compared to previous electronic participation tools in which citizens provided geo-tagged content, mobile participation now also enables them to 'sense' their environment (enabling automated data input) as well as write their ideas down on the site of planning, thereby situating engagement and providing rich details. In addition to providing sensed data or receiving planning information, mobile participation also creates opportunities for citizens to create their own participation tools rather than being engaged on the terms of planners or other public officials. Moreover, mobile participation advances citizens' self-organizing capacities by capitalizing on their actual motives and concerns. When considering that the role of citizens has already expanded, it is reasonable to assume that the huge amounts of citizen-generated data will give impetus to further engage citizens in data parsing and mining too, provided that such data will be open and accessible. Altogether, the roles will become more diverse and citizens can self-select the role in which they feel most comfortable – even to the extent of creating their own roles. These roles are socially shaped into the mobile technologies, and conversely, the roles shape the behavior of different user groups.

Mobile participation needs to be balanced between data-determinism and agency. Gathering and analyzing data are important subsequent steps, yet determining what problems to address, with which technological tools, and who will shape the participatory tools are essential. When citizens participate in apps development, the incentive structure needs to be aligned with finding solutions to urban challenges. This research supports the importance of involving citizens in different types of app development, particularly in the early stages of development – a stance popular especially in Living Lab experiments. Therefore, citizens could beta-test and suggest feature development for apps created in-house by municipalities, companies, or fellow citizens – in the real-world.

By and large, designing mobile participation situates itself at the intersection of established practices of civic participation and decision-making, and new ones, such as electronic participation and citizen-initiated innovation. Mobile participation can be thus conceptualized as *maximum allowed deviation*: it affords new practices that reshape citizen participation while being part of established forms of participation. It is similar to its predecessors in that it promises to democratize participation, make it more inclusive because mobile phones are widespread, build trust in public institutions and empower citizens. It also bears strong legacies of participatory GIS features, spatial data, and citizens' knowledge of place. What is new is the type of data that can be collected by the phone's sensor, the diverse roles of citizen, the creation of the participatory tool itself, compensating for participation as well as self-organization as supported, among other things, by mobile technologies. The social and technical forces shaping

participation allow for discrete change, albeit at times with more radical, unpredictable outcomes.

This dissertation highlights changes brought about mobile technologies. It is naïve to assume that any technology will remedy all the pitfalls of citizen participation. Nevertheless, technology is an asset that can be shaped and leveraged to bring about transformation in society, including citizen participation.

12 References

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