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Co-shaping smart cities: participation inequalities in civic crowdsourcing

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CO-SHAPING SMART CITIES: PARTICIPATION INEQUALITIES IN CIVIC CROWDSOURCING

Bastiaan Baccarne & Lieven De Marez

ABSTRACT

This paper studies participation divides on civic crowdsourcing platforms in a smart city context, hybrid applications of distributed urban innovation management, and new modes of digital citizenship, often applied to co-shape future urban environments. However, the emergence of new participatory instruments also brings new digital inequalities, as their adoption is not distributed equally. Hence, from an explicitly interdisciplinary perspective, this article explores the role of civic engagement, digital inequalities, and opinion leadership in understanding differences in participatory behavior on such platforms. Using a regression model (N = 178), this study shows that participation differences on civic crowdsourcing platforms are explained by opinion leadership and political engagement, but not by community engagement, traditional digital inequalities. This reveals that such platforms are used most by those who were already participating and have high levels of expertise, which sheds a light on the potential empowerment of such platforms and its democratic implications.

INTRODUCTION

While participation in traditional political systems (e.g. voter turnouts and party memberships) is decreasing (Siaroff, 2009), new forms of civic engagement are emerging. Catalyzed and supported by *web 2.0* technology (O'Reilly, 2007), citizens are increasingly exercising power through ad hoc collectives (Castells, 2012; Freelon et al., 2018; Rheingold, 2002). In this paper we study the nature of such innovative participation models to co-shape the city, focusing specifically on civic crowdsourcing initiatives instigated and managed by local governments.

Such initiatives can be considered a managerial response to the mostly bottom-up, nature of these new movements, characterized by speed, scale and decentralized organization (Rheingold, 2002), as opposed to rigid, but time consuming democratic processes (Martin, Levey, & Cawley, 2012;

Smith, 2010). To cope with this tension, (local) governments are increasingly trying to proactively reach out to their citizens and promote participation and co-creation (Bherer et al., 2016; Krivý & Kaminer, 2013; van der Graaf & Veeckman, 2014). More specifically, this has led to a growth in *top-down web 2.0 participation processes*. This entails the efforts of institutions, such as local governments, to apply the participatory and connective action potential of web 2.0 environments on institutionalized and governed participation processes (Rowe & Frewer, 2005; Ertio, 2015; Hilgers & Ihl, 2010; Nam, 2012).

A common application of such top-down web 2.0 participation processes is *crowdsourcing* (Howe, 2006). This principle is built upon methodologies and insights that have emerged in a commercial innovation management environment, However, it is important to reflect upon the implications of implementing such technologies and methodologies in a democratic context, which has been labeled *civic crowdsourcing* (Heikka, 2015). In this context, scholars studying digital citizenship (Mossberger et al., 2008) highlight the importance of digital participation inequalities, since it is known that only a small proportion of internet users makes full use of the participatory affordances of web2.0 environments (Dimaggio et al., 2004; Hargittai & Walejko, 2008; Van Dijk & Hacker, 2003). Hence, civic crowdsourcing might confirm or reinforce existing power imbalances (Albrecht, 2006). Therefore, this study aims at understanding participation inequalities in civic crowdsourcing.

CIVIC CROWDSOURCING

Civic crowdsourcing can be positioned on the crossroads between two driving forces. The first is the changing nature of civil society, democracy and the political system. While there is quite some academic literature with a rather pessimistic undertone, concluding democracy is in a crisis (e.g. Putnam, 2000), other authors, focus on new forms of civic engagement, social movements and other exponents of lifestyle politics (Dahlgren, 2003). Research in this domain often focuses on the abilities of web 2.0 to empower citizens and on a new (bottom-up) form of political engagement (Castells, 2000). On the other hand, governments have also started adopting open government principles (Janssen, Charalabidis, & Zuiderwijk, 2012), positioning themselves as a platform, facilitating and supporting other societal actors in the delivery of civic tasks, services and infrastructure (Janssen & Estevez, 2013; O'Reilly, 2011).

The second driving force is the emergence of web 2.0 technology which allows individuals to interact online with unprecedented levels of richness, affording them to easily consume, share, communicate, facilitate and create online (Beer, 2009; Song, 2010). It are these qualities that led to the development of crowdsourcing platforms (Schuurman et al., 2013). Built upon the ideas of the 'wisdom of crowds' (Surowiecki, 2004) and 'collective intelligence' (Lévy, 1997), crowdsourcing uses the reach and interactive possibilities of web 2.0 environments to outsource tasks (mostly idea generation and problem-solving) to a large and undefined group of people (Howe, 2006).

In an urban environment, the implementation of top-down web 2.0 participation is closely related to the notion of smart cities (Komninos, 2013; Schuurman et al., 2012; Townsend, 2014). When the crowdsourcing mechanism is implemented in such a context, this is often called *'civic crowdsourcing'* (Heikka, 2015) or *'citizen sourcing'* (Hilgers & Ihl, 2010; Lukensmeyer & Torres, 2008). Hence, this paper conceptualizes civic crowdsourcing as the top-down application of web 2.0 technologies that facilitate idea generation, discussion and deliberation by a large, undefined group of citizens by means of an open call. So far, civic crowdsourcing has mainly been focusing on the nature of the generated ideas (e.g. Bernardino & Freitas Santos, 2020), the mechanisms (e.g. Sasao & Konomi, 2016), its mediating role between citizens and institutions (e.g. Harding et al., 2015) and governance models (e.g. Ettlinger, 2016). However, participation inequalities in civic crowdsourcing initiatives have so far been underexplored.

PARTICIPATION INEQUALITIES

As was introduced earlier, access, skills and especially usage of web 2.0 technologies are not distributed evenly across society (Mossberger et al., 2008; Van Dijk & Hacker, 2003). This has mainly been studied from a cultural studies approach, referring to concepts such as the 'participation gap' (e.g. Jenkins et al., 2006; Nielsen, 2006). In a democratic context, a common starting point to understand participation inequalities, is Arnstein's ladder of participation (1969). Among the many critiques and additions is the argument that Arnstein's ladder is hard to use when making sense of participation inequalities at a practical level (Collins & Ison, 2006). To better understand emerging forms of participation that take place on web 2.0 platforms, several authors have updated this model. One of such more tailored models is the behavioral chain of online participation, introduced by Fogg and Eckles (2007). This model conceptualizes democratic

participation through web 2.0 technology as a three-staged process: (1) discovery, (2) superficial involvement and (3) true commitment.

Based on this model, this study conceptualizes *participation inequalities* as differences in interactions on civic crowdsourcing platforms, which can be described as levels of engagement. In line with Fogg and Eckles (2007), these can be further conceptualized in a hierarchical way by ranking the different interaction modes enabled by the platform, which results in the following order:

- 1. **Rejecting:** Awareness of the platform, but no interaction.
- 2. **Spectating:** Only consuming platform content.
- 3. **Joining:** Joining the online community (sign up).
- 4. **Commenting:** Annotating content (votes or comments).
- 5. Creating: Submitting new content (new ideas).

Understanding differences in platform interactions is quite challenging given the numerous perspectives to this matter. Therefore, this study compares three divergent perspectives and tries to understand which perspective is most likely to predict participation inequalities. The first perspective is a political sciences perspective from which this paper try to understand the role of civic engagement in predicting participation inequalities. In other words: Are these emerging platforms an instrument for citizens that are already civically engaged, or does it also empower those individuals who are less civically engaged? The second perspective starts from a digital divide perspective in which the role of the technological aspect of the communication is looked upon. How does the interaction on the civic crowdsourcing platform relate to technical skills and broader usage patterns in a web 2.0 environment? The third and final perspective takes the angle of innovation management literature. Although this point of view is rather unusual, It can be argued that such insights, particularly lead user-related insights (von Hippel, 1986) might enhance knowledge on citizen involvement in urban innovation processes and platforms.

CIVIC ENGAGEMENT

Many authors have discussed the potential of web 2.0 as an empowering instrument by trying to understand the relation between online and offline civic engagement, as well as the nature of online civic engagement (a.o. Dahlgren, 2003; Raynes-Goldie & Walker, 2008; Smith, 2013; Warren, Sulaiman, & Jaafar, 2014). Civic engagement is a long standing concept with a wide variety of definitions. This study conceptualizes civic engagement in the same way as Doolittle and Faul, being "the process of believing that one can and should make a difference in enhancing his or her community" (2013, p. 2).

Research has shown that web 2.0 environments promote higher rates of civic engagement (Gil, 2011), often through quicker and wider dissemination of information, and community building, often called *issue networks* (Bennett & Segerberg, 2012). Hence, individuals that are more engaged in social media practices show higher rates of civic engagement (Shah, McLeod, & Yoon, 2001; Skoric, Zhu, Goh, & Pang, 2015; Wellman et al., 2003). Furthermore, both Purdy (2017), and Zait and Andrei (2019) have shown strong relationships between offline and online civic engagement. While most of these studies take a generic perspective on the civic usage of web 2.0 technology, it is reasonable to assume that civic crowdsourcing is a specific example of such online modes of civic engagement. Therefore this study hypothesizes the following:

Hypothesis One: Civic engagement predicts participation on civic crowdsourcing platforms.

While these authors often take a community-based interpretation on civic engagement, other authors (eg. Ekman & Amnå, 2012; Talò & Mannarini, 2015), have made an explicit distinction between the community aspect and the political aspect of civic engagement. The latter entails formalized aspects of civic engagement or political engagement (e.g. voting, party membership). Since this study looks at a formalized form of citizen-government interaction (top-down), we make the same distinction. Hence, we conceptualize political engagement as "an interest in political life[, and] include[s] all actions, either individual or collective, aimed at influencing government decisions and political outcomes, including aim-oriented, rational, observable and measurable actions" (Talò & Mannarini, 2015, p. 801).

Similar to civic engagement, high levels of political engagement relate to high levels of political expression on web 2.0 platforms (Ferrucci, Hopp & Vargo, 2020). In this regard, web 2.0 environments are lowering thresholds to be politically involved (Ekström & Shehata, 2018). However, whether this fosters new publics or rather reinforces existing participatory publics is still subject of debate (Gibson & Cantijoch, 2013). Nevertheless, taking the institutional nature of civic crowdsourcing platforms into account, the following is hypothesized:

Hypothesis Two: Political engagement predicts participation on civic crowdsourcing platforms.

DIGITAL INEQUALITIES

Civic crowdsourcing platforms are integrated in web 2.0 technology and therefore embedded in a broader online repertoire This implies that participation inequalities can also be understood by looking at its relationship with digital skills and the way individuals generally engage with the participatory possibilities of a web 2.0 environment (Van Dijk & Hacker, 2003). As mentioned earlier, participation inequalities reflect differences between citizens that use and don't use web 2.0 platforms to engage in the digital realm and participate in public life (Norris, 2001).

In a highly connected society, this is decreasingly a matter of access, but increasingly a matter of attitudinal and usage patterns (Van Dijk & Hacker, 2003). Inequalities in the goal-oriented and efficient usage of web 2.0 environments are often explained by differences in internet competences, skills, education and socio-economic factors (Dimaggio et al., 2004; Hargittai & Hinnant, 2008; Hsieh et al., 2018). In this context, Helsper and Enyon (2013) integrated digital inclusion and digital literacy frameworks into a theoretical model that explains the relationship between internet skills and internet engagement. This distinguishes digital engagement and digital skills (Van Deursen, Helsper & Eynon, 2014), and relates both to inequalities in different online practices. Since civic crowdsourcing platforms can be interpreted as a specific form of digital engagement, the following can be hypothesized:

Hypothesis Three: Digital skills predict participation on civic crowdsourcing platforms.

Hypothesis Four: Digital engagement predicts participation on civic crowdsourcing platforms.

OPINION LEADERS AND LEAD USERS

Since civic crowdsourcing platforms are also part of broader urban innovation processes, it makes sense to take learnings from innovation management into account. Especially since the technology that is used in civic crowdsourcing is often adopted from a commercial innovation context. Innovation management theory argues that users (or citizens) can be a highly valuable source of innovation (Piller & Ihl, 2009; Trott et al., 2013). In this context, Erik Von Hippel's concept of the *lead user* is of specific interest (von Hippel, 1986). It is argued that lead users are actors that have specific rich 'sticky' knowledge and face needs in a very early stage. Therefore, they have an increased value perception of future solutions and are highly valuable for innovation processes (von Hippel, 1986; Von Hippel, 1994). Because of this, the self-selection bias that occurs when an open call is launched to contribute on crowdsourcing platforms, is often seen as a good mechanism to attract and identify lead users (Schuurman et al., 2010).

However, from a societal perspective, lead users can also be considered social actors acting and resonating within a social system. Typical lead user attributes such as high levels of interest and high levels of expertise show interesting synergies with the concept *opinion leadership* (Lazarsfeld et al., 1944), and have, in fact, inspired this concept (Flynn et al., 1996). Theory in this domain states that opinion leaders are a medium between politics and the general public. Such opinion leaders show much similarities with lead users (and have, in fact, also inspired this concept). Research has shown, for example, that opinion leaders have higher levels of interest and knowledge about societal issues (Weinmann, 1994), and change opinions earlier than others (Black, 1982). In a social media context, there has been found a significant relationship between opinion leadership and the probability of online political activity (Karlsen, 2015; Weeks et al., 2015).

This implies two things. First, when the ambition of the (civic) crowdsourcing platform is to harness the most valuable ideas, lead users provide better input than a general public (Mahr & Lievens, 2012). Second, an individual's lead user characteristics can predict participation

inequalities. The characteristics that define lead users, however, has been a topic of academic debate, ever since the emergence of the concept (Lüthje & Herstatt, 2004). Nevertheless, Erik von Hippel's original characteristics are still commonly used. These characteristics include (1) domain specific expertise, (2) opinion leadership and (3) expected benefit (Nambisan, 2002; Urban & von Hippel, 1988). This leads to the following hypothesis:

Hypothesis Five: Lead userness predicts participation on civic crowdsourcing platforms.

METHODOLOGY

Research Context

This study focuses on a civic crowdsourcing platform, built by the city of Ghent, Belgium. In 2015, the local government launched a civic crowdsourcing platform, "*Ruimte voor Gent*" [Space for Ghent]¹ to stimulate bottom-up urban innovation and to obtain input for the urban planning strategy. The pitch on the website was the following:

In which way do we want to live, work, relax and transport ourselves in 2030? Space is scarce and sustainable, creative solutions will be needed. That is why the City of Ghent is creating an urban planning strategy for 2030. [...] It is the first human oriented urban planning strategy in Flanders: it is co-created with the citizens. [...] Submit your ideas here.²

Besides the digital platform, ideas were also collected through offline events (mainly to target digitally excluded target populations). Online, citizens could read ideas from others and, after creating an account submit their own ideas, comments on ideas or vote on ideas. From January 2015 to July 2015, ideas were collected. From these ideas, ten were selected to be elaborated upon: the five ideas with the most votes on the website, and five ideas selected by a think tank. The project reached 18,365 citizens (unique visitors) and collected 234 ideas.

¹ <u>https://ruimtevoor.stad.gent/</u>

² Translation from <u>https://ruimtevoor.stad.gent</u>, accessed December 1st 2017.

Data Collection

This study focused on the inhabitants (both permanent and temporary) of the city of Ghent. As a sampling technique this study applied a quota sample, based on age categories (16-19, 20-29, 30-39, 40-49, 50-60) and gender (male, female). Participants older than 60 were not included in this survey, which limits our insights to younger populations. Recruiting took place online (newsletters, social media, targeted mailing) and offline (face-to-face in the public environment: streets, public places such as the local library and community locations). The survey instrument was pretested qualitatively with seven participants (some spelling errors were corrected), and quantitatively with 25 respondents (no changes were made). After data cleaning, this resulted in 178 valid responses, of which 48.9% male and 51.1% female. The following age categories are represented in this sample: 16-19 (9.6%), 20-29 (37.6%), 30-39 (23.6%), 40-49 (14.0%) and 50-60 (15.2%).

Measures

Inequalities on the civic crowdsourcing platform were measured using five dichotomous questions: (1) have you ever heard of the initiative 'Ruimte voor Gent', (2) did you ever visit the website 'Ruimte voor Gent', (3), did you create an account on 'Ruimte voor Gent', (4) did you ever vote or comment on one of the ideas in 'Ruimte voor Gent', and (5) did you publish one or more ideas on 'Ruimte voor Gent'? These questions were recoded to a single variable '*maximum level of participation*', with 6 levels (1) 'non-informed (71.3%), (2) rejecting (7.9%), (3), spectating (5.1%), (4) joining (1.7%), (5) commenting (6.7%) and (6) creating (7.3%).

Civic engagement took both an attitudinal aspect and a behavioral aspect intro account. Both constructs were measured using an 14-item, 7-point Likert scale developed by Doolittle and Faul (2013), containing question such as 'I am committed to serve in my community' and 'I help members of my community' ($\alpha = .87$).

Political engagement measurements were derived from the PBS scale, developed by Talò and Mannarini (2015). Respondents had to answer seven 7-point Likert statements, such as 'I consume media that address political issues' and 'I discuss politics with friends and/or on the Internet' ($\alpha = .86$).

Digital skills, the abilities to make use of the potential of a web 2.0 environment were measured on four levels: operational skills, information navigation skills, social skills and creative skills. These dimensions were measured using 32 7-point Likert scales derived from van Deursen et al. (2014), containing question such as 'I know how to upload files' and 'I feel confident publishing a self-made video online' ($\alpha = .94$).

Digital engagement is constructed out of three sub dimensions: critical engagement, social engagement and creative engagement. All three were measured in line with van Deursen et al. (2014). This operationalization captures behaviors, which implies that the construct is built upon 7-point scale with 1 = never, 7 = daily, following the statement 'how often do you use the internet for the following activities?', including items such as 'consume news sources' and 'visit social networks' ($\alpha = .88$).

Lead user characteristics were measured following the approach of Spann et al. (2006), who operationalize three main lead user characteristics: expertise, opinion leadership and expected benefit. These were measured on a nine item 7-point Likert scale containing the statements such as 'I frequently talk about how the city should look like' and 'I would contribute more frequently to participatory projects to shape the way the city looks like if these would occur' ($\alpha = .84$).

These measures are summarized in table 1. Considering the overarching goal of comparing predictors from different knowledge domains, this study combined the subdimensions of each construct into a single predictor construct. Each of these constructs has a reliable Cronbach's alpha value (> .70).

Construct	# items	Mean (S.D.)	Cronbach's alpha
civic engagement	14	4.86 (1.23)	0.87
political engagement	7	3.63 (1.74)	0.86
digital skills	32	5.60 (1.49)	0.94
digital engagement	22	4.08 (1.71)	0.88
lead userness	9	4.26 (1.43)	0.84

Table 1. Descriptive statistics and reliability of predictive constructs

RESULTS

Correlations with Level of Participation

Before including all predictors in a single regression model, individual Pearson correlations between predictors and the dependent variable 'level of participation' are explored (table 2). These results show high correlations between level of participation and lead userness (r = .445, p < .001), political engagement (r = .328, p < .001) and civic engagement (r = .262, p < .001), but no significant correlation between level of participation and digital skills (r = .042, p = .577) nor digital engagement (r = -.036, p = .629). This exploratory analysis supports the first, second and fifth hypothesis, but not the third and fourth hypothesis. It suggests that, although engagement in civic crowdsourcing is embedded in a more general repertoire of digital skills and activity, these variables do not relate to crowdsourcing participation. This is surprisingly, but clearly, not one of the defining aspects of participation inequalities on such platforms and seems to be in line with literature that suggests research on online activity should focus on specific content consumption and production, rather than to apply a general approach to online behavior (e.g. Hsieh et al., 2018).

However, there might be some overlap in the predictive power of the five predictive constructs. Therefore, multiple regression model was applied which included these parameters as predictors for the level of participation.

	level of participation		
Predictive construct	r	р	
civic engagement	.262	< .001	
political engagement	.382	< .001	
digital skills	.042	.577	
digital engagement	036	.629	
lead userness	.445	< .001	

Table 2. Pearson correlations between predictive constructs and level of participation

Predicting Level of Participation

This multiple regression was performed in two stages. First, the initial model was tested, following the hypothesized relationships, including five predictors: civic engagement, political engagement, digital skills, digital engagement and lead userness. After assessing the outcomes of this model, a second model was tested, which only includes the significant predictors.

Initial model

The initial regression model explains 26.8% of the variation in level of participation through civic engagement, political engagement, digital skills, digital engagement and lead userness ($R^2 = .268$, adjusted $R^2 = .247$, F = 12.59, df = 5, p < .001). This model explains a significant amount of the variation. The Durbin-Watson statistic for this model is 1.92. Since this is close to two, it suggests that the model has a low level of auto-correlations.

However, when taking a closer look at the individual predictors in this model (table 3), unequal contributions to the model can be noticed. As was expected when looking at the correlations between the individual predictors and the dependent variable, both digital skills ($\beta = .020$, t = .214 , p = .831) and digital engagement ($\beta = .132$, t = -1.449, p = .149) are not significantly adding any predictive power to the model.

What is unexpected however, is that the earlier reported correlation between civic engagement and level of participation (r = .262, p < .001) evaporates in this full model ($\beta = .008$, t = .099, p = .921). This suggests that civic engagement is rather predicting political engagement, than predicting civic crowdsourcing inequalities. Political engagement, on the other hand is a rather good predictor of such participation inequalities ($\beta = .247$, t = 3.229, p = .001). This makes sense, given that political engagement is more 'outward-driven' (pushing community issues to a higher governance/political structure), while community engagement is rather 'inward-driven' (improving the community oneself). While both go hand in hand, participation in civic crowdsourcing mainly supports 'outward-driven' participation repertoires.

While political participation is an good predictor, it is also the most traditional one, going back to participation formats and studies before digital participation modes emerged (e.g. Ekman & Amnå, 2012; Talò & Mannarini, 2015). It is, however, the independent variable 'lead userness' that has

the highest predictive power (β = .373, t = 4.898, p < .001). Although this variable correlated highly with the other predictors, its variance inflation factor (VIF) is only 1.399, which indicates that the variable has enough distinct variation to support the model (since it has a low degree of multicollinearity). Overall, every VIF metric is within acceptable range. The residuals of this model are normally distributed.

Dependent: level of participation						
Independent	β	t	р	VIF	Hypothesis	
civic engagement	.008	.099	.921	1.390	H1 rejected	
political engagement	.247	3.229	.001	1.370	H2 supported	
digital skills	.020	.214	.831	2.071	H3 rejected	
digital engagement	132	-1.449	.149	1.939	H4 rejected	
lead userness	.373	4.898	< .001	1.399	H5 supported	

Table 3. Full model	<i>– coefficients</i>	table
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Reduced Model

The reduced regression model, including only lead userness and political engagement, still explains 25.4% of the variation in level of participation (compared to 26.8% in the initial model) ($R^2 = .254$, adjusted $R^2 = .246$, F = 29.832, df = 2, p < .001). The Durbin-Watson statistic for this model is 1.867 (again, close to two), and the reduced model also has a low level of auto-correlations. As was suspected, this reduced model is almost equally good at predicting participation inequalities, but using two, instead of five predictors. Lead userness remains the most important predictor ($\beta = .353$, t = 5.045, p < .001), followed by political engagement ($\beta = .254$, t = 3.631, p < .001). The residuals of this model are also normally distributed.

CONCLUSION

This paper explored participation inequalities on civic crowdsourcing platforms, top-down applications of web 2.0 technologies to facilitate idea generation and deliberation. Such emerging instruments are often believed to have an empowering potential because they can leverage

traditional (offline) participation instruments by lowering the barriers to participate and reach a larger audience. However, a common concern in both political participation research and research on participatory culture, are the participation inequalities that are inherent to such environments. Due to the interesting overlap of different traditionally separated knowledge domains, this study approached this question from three perspectives: a political science (engagement) perspective, a media studies (digital divide) perspective, and an innovation studies (lead user) perspective.

In line with Ekman and Amnå (2012), and Talò and Mannarini (2015) this study makes a distinction between civic engagement and political engagement. Civic engagement being less formalized and focused on supporting the community (inward-driven), political engagement being aimed at influencing political outcomes (outward-driven). Although literature suggests a strong relationship between civic engagement and activist usage of social media, civic crowdsourcing seems to have a different nature, since civic engagement does not predict participation inequalities on the platform studied here. This can be explained by the top-down nature of civic crowdsourcing platforms. Since the government initiates such platforms and embeds it within its formal policy making processes, it seems to be more similar to formal political participation, than to the grassroots bottom-up issue networks as discussed by Bennett and Segerberg (2012), and Castells (2012).

Political engagement is the second strongest predictor of participation inequalities. This supports the assumption that the nature of political engagement is different from civic engagement, and that is better at explaining differences in behavior on civic crowdsourcing platforms. It also implies that those who are already participating in traditional participation formats are the same citizens that show the highest levels of engagement on the crowdsourcing platform. In other words: civic crowdsourcing platforms mainly capture the ideas of those who are also participating without such online platforms (who can be labeled the 'participation-elite'). Given the importance of political engagement as a predictor, it might be interesting to further explore its relationship with constructs such as political efficacy and empowerment, as suggested in a broader context by Leung (2009). Nevertheless, we have to acknowledge the complex and layered nature of both political and civic engagement (citizens switching between roles and engagements), which our study was not able to take into account.

We could not find evidence for a relationship between crowdsourcing participation and digital skills nor digital engagement This means that general insights on the digital divide (cfr. Dimaggio et al., 2004; Hargittai & Walejko, 2008; van Deursen et al., 2014; Van Dijk & Hacker, 2003) do not suffice to explain participation inequalities in civic crowdsourcing. Consequently, this seems to support the notion that participation inequalities are better explained by non-technical attributes, such as specific motivations. Based on these insights, it seems more important to focus e-inclusion policies on attitudinal aspects (e.g. promoting citizenship). We must add that the high level of digital skills in our sample suggests that we might have an underrepresentation of some vulnerable groups. Hence, these conclusions should be handled with care. In any case, innovative participation models should always be implanted in an complementary mix of different online and offline participation modes.

Finally, lead userness proves to be the most important predictor in our model. It was hypothesized that civic crowdsourcing platforms attract and leverage lead users through a self-selection bias that is inherent to such platforms. The evidence in this study supports that assumption. Open innovation literature suggests that knowledge is distributed among society (Bogers & West, 2012), and that lead users have the highest potential to generate valuable ideas (Piller & Ihl, 2009; Trott et al., 2013). As such, when an organization successfully taps into this lead user potential, there is no need for large numbers of participants, at least not when it comes to idea generation.

However, it is important to point out the multi-leveled nature of participation. As it was put forward by Fogg and Eckles (2007), every level of participation adds certain value to the platform. In this case, citizens who participate by commenting, or voting on ideas, and thereby enriching submitted ideas, also provide value to the platform. This is in line with Pierre Lévy's (1997) understanding of the mechanics of collective intelligence in which each actor brings knowledge to the platform to improve the general outcomes. Given the lower investment that is required to participate, a larger number of citizens can be involved. The substantial amount of such 'lower involved' citizens makes online participation different from offline participation. While idea-submitting citizens are largely the same online and offline, the ones annotating them, or the ones spectating the process, would otherwise not (as easily) be reached. Although it can be argued that a certain degree of investment is beneficial for qualitative participatory processes, a broader rather than a deeper involvement nevertheless benefits both the transparency and the political involvement of a group of citizens that would otherwise not be reached (Schmidthuber et al., 2019). Finally, the voting mechanism of online crowdsourcing also entails risks. Since only 10 out of 234 ideas were selected, this implies that a lot of participants (both idea submitters and supporters) are left unaccounted for. This might be detrimental for engagement levels on the long run if this is not managed well (for example through clear two-way communication, follow-up processes, etc.). However, it are these dynamics between policy makers, highly engaged citizens and a lurking majority, that make a civic crowdsourcing platform an instrument to facilitate next-generation public deliberation, by making participation and decision-making transparent, open and sharable.

This is related to the goal-orientated nature of the initiative. Why would a government implement such platforms? The potential to *highly* engage new populations which are otherwise hard to reach (due to a low interest, or other barriers) is rather limited. This supports a *participation paradox*: the more participation instruments are implemented, the more existing participation inequalities are confirmed because it empowers the same citizens. However, through both passive observation, discussion and annotation of ideas, civic crowdsourcing initiatives can increase transparency, political involvement and policy support for a larger population. These aspects should be carefully considered before implementing civic crowdsourcing platforms.

With these insights, this research contributes to previous studies on civic crowdsourcing (especially Ertio, 2015; Hilgers & Ihl, 2010; Nam, 2012) by taking a comparative interdisciplinary perspective. Given the strong interdisciplinary nature of these new platforms and the processes in which these are embedded, such approach is strongly needed to fully understand each aspect of the mechanisms that drive behavioral differences. A particularly interesting aspect to explore further in such models would be the relationship between participation differences, political engagement, psychological empowerment and political efficacy.

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