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Designing Digital Participatory Budgeting Platforms: Urban Biking Activism in Madrid

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Abstract. Civic technologies have the potential to support participation and influence decision-making in governmental processes. Digital participatory budgeting platforms are examples of civic technologies designed to support citizens in making proposals and allocating budgets. Investigating the empirical case of urban biking activists in Madrid, we explore how the design of the digital platform Decide Madrid impacted the collaborative practices involved in digital participatory budgeting. We found that the design of the platform made the interaction competitive, where individuals sought to gain votes for their single proposals, rather than consider the relations across proposals and the larger context of the city decisions, even if the institutional process rewarded collective support. In this way, the platforms’ design led to forms of individualistic, competitive, and static participation, therefore limiting the possibilities for empowering citizens in scoping and self-regulating participatory budgeting collaboratively. We argue that for digital participatory budgeting platforms to support cooperative engagements they must be revisable and reviewable while supporting accountability among participants and visibility of proposals and activities.

Keywords: Civic tech, Digital participatory budgeting, Participatory budgeting, Digital democratic innovations, Digital activism, Urban biking

1 Introduction

In March 2017, Victor Margolin and Ezio Manzini (2018) published an open letter to designers where they urged them to “stand up for democracy”. Their motivation was grounded in the increasing attacks on democracy, even in places where democratic values used to be taken for granted. The letter was also a call for action to conceive new possibilities for democracy as a kind of “proactive resistance” (Manzini and Margolin, 2018). This letter added to many other calls and manifestos produced for -and by- designers, researchers, and developers to actively reflect and act on the values they include in their technology designs (Becker et al., 2020; Saxena et al., 2020). These examples underline the well-known fact in CSCW that the ways in which digital technologies are designed
are not neutral. Design decisions have an active role in enabling or constraining democracies. This critical stance on the impact of digital technologies contributes to a growing corpus of work, where academia, activists, and grassroot collectives such as design justice networks converge (Menendez-Blanco et al., 2017).

Digital technologies have been used to influence elections (Groshek and Koc-Michalska, 2017), spread fake news (Bradshaw and Howard, 2017), and create polarization (Bail et al., 2018). However, digital technologies can also enable people to gather and act on concerns and issues (Crivellaro et al., 2014) and develop safe online environments for social movements (Hansson et al., 2019). To contribute with a critical perspective on technology supported participation, in this paper we focus on institutional digital platforms. These platforms are developed, or commissioned, by governments and political parties which seek to tap into the potential of digital technologies to enable participatory forms of democracy (Gerbaudo, 2019). In CSCW, research on how to design, develop, and evaluate these platforms often falls under the umbrella of civic technologies (Saldivar et al., 2019). Research on civic technologies critically investigates how digital platforms allow citizens to communicate with governments and partake in decision-making initiatives through participatory instruments such as budget allocation and opinion gathering (Saldivar et al., 2019). In this paper, we focus on how the design of institutional digital platforms impacts citizens’ engagement in allocating public budgets participatorily by investigating an empirical case of urban biking activism.

The contribution of participatory budgeting to democratic processes has been the object of an extensive corpus of research in the political and social sciences (e.g. Cabannes, 2004; Sintomer et al., 2008). Participatory budgeting has proved to be a democratic innovation that exemplifies and legitimates distributed decision-making in public institutions (Smith, 2009) and an emancipatory instrument that empowers people to influence the allocation of public budgets (Baiocchi and Gauzuza, 2014). However, whether digital participatory budgeting is an emancipatory instrument and how the design choices embodied in the platform impact participation are still open questions. These open questions are especially relevant for CSCW research since the collaborative aspects of digital platforms for participatory budget allocation are often overlooked (Saldivar et al., 2019). In this paper, we extend CSCW research by unpacking the design considerations for collaborative civic technologies by investigating: How do activists collaboratively engage in scoping and self-regulating participatory budgeting through digital platforms?

The empirical case that serves as the ground for our work is Decide Madrid in Spain.¹ We focus on the participatory budgeting module and how this is used to bring forward proposals related to urban biking. The empirical data are 845

¹ https://decide.madrid.es/.
approved participatory budgeting project proposals, which include 86 proposals related to biking that serve as our main data. We found that the platform’s design contributes to individualistic participation and competition between complementary proposals. Still, participants used other means to mobilize and create proposals cooperatively outside the platform. These results contribute to the corpus of research that investigates how design choices shape participation in digital democratic innovations from a CSCW perspective. This means that our empirical work focuses on investigating cooperative situations inside and outside the platform with the aim of designing collaborative systems.

The remaining of this paper is organized as follows: First, we provide an overview of the current literature on digital platforms for citizen participation with an emphasis on digital participatory budgeting. Then, we situate the empirical work by elaborating on the case study of Decide Madrid and describe the methodological approach followed by our empirical results. Finally, we discuss our findings and conclude by proposing design guidelines for participatory budgeting digital platforms.

2 Democratic participation through digital platforms

2.1 Digital democratic innovations

Democratic innovations are participatory instruments that “deepen democracies” by producing ways in which “ordinary people can effectively participate in and influence policies that directly affect their lives” (Fung and Wright, 2003, 4:7). The first attempts to use digital platforms for participatory democracies date to the 70s (Etzioni et al., 1975). As information and communication technologies became more mature, these experimental attempts materialized in examples of how digital technologies could facilitate participation in local governments through e-forums, websites, or mailing lists (e.g., Dahlberg, 2001; Wright and Street, 2007; Towne and Herbsleb, 2012). Nowadays digital institutional platforms have become part of the political scene as a complement, or an alternative, to representative forms of democracy (Gerbaudo, 2019; Dias, 2018; McDonald and Mazmanian, 2019). At the core of these initiatives is a hope for democratization (Aragón et al., 2017), inclusion (Spada et al., 2015), and empowerment (Parra et al., 2017) being enhanced by the affordances of digital technologies.

Particularly interesting for this submission is the work on how design choices shape participation in digital democratic innovations (e.g., Wright and Street, 2007; Dahlberg, 2011; De Cindio, 2012; Towne and Herbsleb, 2012; Palacin et al., 2020). Design choices, such as reaching an agreement through voting mechanisms or through a group discussion, shape the democratic affordances of digital platforms (Dahlberg, 2011). Most of the recent work on the design of institutional platforms for democratic participation in CSCW focuses on the
experience of participation and the impact of the participation in the institutional processes (e.g., Nelimarkka, 2019; Saldivar et al., 2019). However, less attention has been paid to how digital technologies’ design supports collaborations between people and public institutions for democratic purposes (e.g., Crivellaro et al., 2019; Saldivar et al., 2019; Teli et al., 2018).

One of the general principles of democratic innovations is that they should involve ordinary people affected by specific problems and officials close to them (Fung and Wright, 2003). But who are these “ordinary people”? Different terms are used in research, and within the institutions, to refer to the individuals and collectives that are involved in digital democratic innovations. These terms range from users, citizens, participants, and denizens to citizenry, communities, or residents. These terminologies are loaded with meaning and connotate crucial aspects such as what information is exchanged and how participation is enacted (Liste and Sørensen, 2015). In this paper we use “citizens” to refer to those who can participate in the participatory processes because that is the terminology used in the platform and because, as we will see in the results, the term is important to the design.

2.2 Digital participatory budgeting

The basic idea behind Participatory Budgeting is that citizens have direct say in how public budgets are allocated, and this is orchestrated by implementing decision-making venues where citizens are invited to participate (Sintomer et al., 2008). The first participatory budgeting initiatives took place in Brazil in the late 1980s and were implemented in the Workers’ Party administrations throughout the 1990s (Sintomer et al., 2008). Following the Brazilian success, participatory budgeting gained international popularity in Latin America, the United States, and Europe (Sintomer et al., 2013). Only in Europe, the number of participatory budgeting initiatives increased from 55 to more than 1300 between 2005 and 2012, reportedly involving more than 8 million EU citizens2.

Over the years, participatory budgeting has transformed and evolved, and a main reason behind the success is the apparent adaptability to different political views. Even if the first initiatives were started by leftist parties and social movements in Brazil (Montambeault, 2019); current participatory budgeting initiatives are part of political projects from the left, right, and centre (Baiocchi and Gauza, 2014). Unlike other participatory instruments, such as citizen proposals or local neighbourhood forums, participatory budgeting provides measurable outcomes through allocated budgets and finished projects (Cabannes, 2004). Moreover, participatory budgeting tends to be temporally and financially defined.

2 https://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI(2016)573894 (last accessed 9th November 2021).
by yearly public budgets, which provide a clear framework for action (Sintomer et al., 2008).

Political adaptability, measurability of outcomes, and citizens’ engagement are desirable aspects of citizens’ participation; however, research in the social and political sciences points to the emancipatory power of participatory budgeting as a unique aspect of this participatory instrument (Chavez, 2008; Baiocchi and Ganuza, 2014; Brown et al., 2015). More specifically, participatory budgeting is considered emancipatory to the extent that the process gives people social and political rights that they could not achieve otherwise.

The digital component of participatory budgeting is at the centre in our research, and we are particularly interested in the transformational aspects of participatory budgeting when it becomes digitalized. By implementing digital technologies to support otherwise analogue processes, these processes are fundamentally transformed and shaped by the platform’s design. Most of the existing research on digital participatory budgeting from a technology design perspective tends to focus on the technical characteristics of the digital platforms and on how their design impacts individual experiences (e.g. Alfaro et al., 2010; Omar et al., 2017), while the ability to enable empowerment is often given for granted.

The popularity of digital participatory budgeting as an institutional approach to engaging citizens is mainly based upon the positive experiences of participatory budgeting as a successful participatory instrument (Spada et al., 2015). These positive experiences are enhanced by assumptions on the digital technologies abilities to increase inclusiveness while making a positive impact on citizens’ engagement with politics (Miori and Russo, 2011; Allegretti, 2012).

There are many challenges when moving from face-to-face participation processes into the digital environment. Reportedly, one of the main challenges is that digital participation reduces social relations among citizens, fostering individualistic behaviour (Allegretti, 2012; De Cindio, 2012). More concretely, the platforms enable little possibilities for collaboration among citizens and with other relevant actors (e.g., city officials). Other reported challenges relate to how decision-making processes are designed and their impact on power distribution (Parra et al., 2017). The different digital functionalities are usually designed as vertical silos structured through sequential phases (e.g., from problem-solving to voting). The sequential design into phases makes it difficult for citizens to follow proposals and decisions, limiting citizens’ possibilities for control and action. Further, the lack of process overview has been reported as problematic and serves as a risk to create power imbalances, for example between citizens and city officials (Stortone and De Cindio, 2015). Even though individual participation is at the core of liberal forms of democratic participation, collaborative forms of democracy are grounded on processes of deliberation, articulation, or cooperation (Dalhberg, 2011). A CSCW perspective can help analyse and design platforms that enable these collaborative democratic processes.
There are few studies aimed at evaluating digital participatory budgeting; however, many of them focus on the technical capabilities of the platform. When they consider non-technical aspects, they tend to focus on the individual experiences of using the platform such as acceptance and satisfaction while disregarding sociotechnical aspects such as how the platform’s design and the underlying institutional processes are intertwined, or how design choices impact the extent to which people can engage in cooperative participation. Therefore, while this corpus of research provides important insights into digital participatory budgeting, they miss a CSCW design perspective of such platforms. In this paper we investigate the cooperative aspects of participatory budgeting with the aim of designing collaborative systems by asking the research question: How do activists collaboratively engage in scoping and self-regulating participatory budgeting through digital platforms?

3 Method

We focus on the digital participatory budgeting module on the digital platform Decide Madrid. Exploring the design and use of digital participatory budgeting we are inspired by the multi-sited ethnographic approach (Bjørn and Boulos-Rødje, 2015) since this approach allows us to investigate digital participatory budgeting as constituted by mobilization of various actors and collectives. When investigating digital participatory budgeting the research phenomenon is multi-sited (Blomberg and Karasti, 2013), as we must both capture what is taking place in and outside the digital platform.

3.1 Empirical case: decide Madrid

Consul software On May 15th, 2011, the “Indignados” social movement took the main central square in Madrid to protest the austerity measures. These pacific protests lasted for several months, received worldwide attention, and transformed the Spanish political scene. Some of the consequences was the creation of the grassroots organisation “¡Democracia Real YA!” (“Real Democracy Now!”), which advocated for direct forms of democracy based on participatory instruments such as people’s assemblies. Some of their members became part of “Ahora Madrid”, which was an instrumental party without organic internal life that stood and won the municipal elections of 2015 in the city of Madrid. Upon winning the elections, the director of Open Government, Participation, and Transparency in Madrid (who was also a software developer well-known in the Free and Open-Source Software community) led the implementation of the open-source project Consul as their main instrument for enabling digital participation. Consul is a software to create digital participation platforms that allow citizens
to make proposals, develop participatory budgeting projects, participate in discussions, and engage in processes of collaborative legislation. Since 2015, Consul has become a popular software to use in processes of civic engagement in Spain, and several municipalities have implemented a local instance. Furthermore, in the last years, Consul has grown in popularity internationally. More concretely, in 2020, a total of 130 public institutions in more than 30 countries have implemented Consul to enact different kinds of citizen participation processes. The local implementation in the city of Madrid is called Decide Madrid. Decide Madrid has been previously studied as a digital platform for citizen participation inspired by deliberative forms of direct democracy that allows citizens to make proposals, create participatory budgeting projects, participate in discussions, and engage in collaborative legislation (Royo et al., 2020; Davies and Procter, 2020).

**Participatory budget module** The participatory budgeting module in Decide Madrid is inspired by face-to-face participatory budgeting processes. Citizens can propose projects including budget, and all proposals are then opened to voting. Most voted projects are approved to be implemented. Decide Madrid has a relatively high budget allocated by the city for participatory budgeting. Concretely, in 2016 the city of Madrid allocated a total of 60 M euros, and this was increased to 100 M euros between 2017 and 2019. Several collectives, associations, and groups in Madrid joined participatory budgeting as an instrument for activism. In this respect, one of the most active collectives are the groups dedicated to turning Madrid into a biking friendly city.

**Urban biking in Madrid** Traditionally, only few people use bicycles as public transport in Madrid (unlike other European cities such as Amsterdam or Copenhagen). Nevertheless, in the last years an increasingly part of the population actively revendicates the right to cycle in the city, many of them as part of activist collectives. A recent analysis of the urban biking activist landscape in Madrid identified four main collectives, each of them focusing on different actions: from advocating for new biking infrastructures to road safety education. Some of these revindications take place physically, such as periodic demonstrations where bikers occupy some of the main streets in Madrid. These demonstrations have contributed to rendering urban biking as a concern of public interest in Madrid, which is joined by many citizens and echoed in the news media. The first author had participated in some of these demonstrations in the past even if she had no connection with the activist groups. A preliminary analysis of the participatory budgeting projects showed that urban biking was not only present in the city and on the media but also on Decide Madrid. Thus, based on their assiduous activity online and offline, and the personal interest of one of the authors, we decided to

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3 https://www.enbicipormadrid.es/2020/06/el-ecosistema-activista-de-madrid.html (last accessed 9th November 2021).
focus our research on how urban biking groups are pushing their agendas on the digital platform utilizing digital participatory budgeting. This methodological choice has several implications. More concretely, the fact that urban biking groups engaged in so many activities meant that they had a strong commitment towards making the city a better place for bikers, but it also meant that they had the possibility to engage in all those activities. More specifically, some other concerns might not be so salient on the platform because those directly affected do not have the time or skills to actively engage both online and offline. Indeed, it is relevant to mention that many of the activists with whom we engaged during the research were highly educated, skilled, young men bikers. Therefore, the methodological choice of selecting urban biking groups has implications on the extent to which our results reflect aspects such as inclusivity and issue framing in digital participatory budgeting, since how to make a city “a better place for bikers” very much depends on the “biker”.

3.2 Data sources

Between January-August 2018, the first author worked closely with the city council’s citizen laboratory in Madrid, Spain. During this period, they worked five days a week in the Collective Intelligence for Participatory Democracy Lab, where multiple collectives for political activism came together and participated in different workshops, events, and presentations. Throughout this engagement, the first author became familiar with the Decide Madrid platform and with the participatory budgeting module, as instrumental in materializing activist engagements. To deepen our understanding of how the digital module was being used, the authors manually collected empirical data from 845 participatory budgeting projects, which were approved on the Decide Madrid platform between 2016 and 2018.

Even though the digital participatory budgeting was generally welcomed with enthusiasm, many of the shortcomings related to the only digital nature of the process started to emerge. Therefore, different unofficial initiatives have been put in place to create so-called hybrid processes, combining digital with physical interventions. One of these initiatives is organised at the citizen laboratory for participation where citizens and city officials work together face-to-face on concerns for public interest (Güemes and Resina, 2020). To that purpose, a series of six workshops addressing different themes proposed by citizens were organised. The workshops had different working groups proposed by citizens as a response to an open call for participation, and one of them was about producing “A handbook for effective biking activism”. As part of the data collection, the first author actively participated in this group over two months (ca. five hours per workshop accounting for a total of ca. 30 hours). A total of six people living in Madrid and interested in urban biking participated in these workshops. Participants included activists, citizens, and the city officials who were responsible planning
and developing biking paths in Madrid. Fieldnotes and collaborative notes were collected throughout the workshops. All the data was collected in Spanish and translated into English for analysis.

3.3 Data analysis

The first author imported the 845 participatory budgeting projects into Atlas.ti and manually filtered all the projects related to urban biking based upon whether the word ‘biking’ was part of the project title and/or project description. Following this procedure, a total of 86 projects were categorized as related to urban biking.

Reading through all the projects’ titles and descriptions also helped us to produce a general understanding of what themes were addressed and, through discussions, we realized that the platform provided additional information for each project that was important to our analysis. To collect this additional information, the first author gathered all the projects in a single file and populated each project with data directly available on the platform. These data included the proposer profile and comments (see Table 1. for a complete overview). In our discussions we decided to create additional variables that contained relevant information for our research based on what was available on the platform. For example, even though the projects were formally owned by one proposer, reading the descriptions we found that several proposals were created by a group of people. Therefore, we decided to add a variable to indicate whether the description mentioned that the proposal was created collaboratively. Similarly, we created another variable to indicate the percentage of a district dedicated to urban biking based on our quantitative analysis of the proposals.

Then, the data were imported into Atlas.ti again and the first author conducted a thematic analysis of only the urban biking projects. The outcome of the thematic analysis was discussed among both authors and disagreements were settled. This second analysis allowed us to unpack what were the specific issues about urban biking and how citizens proposed to address them. Then, we triangulated these data with the fieldnotes, official documents, and online blog posts, focusing on specific examples that allowed us to unpack the ways in which the design helped, or restrained, the participants in scoping and regulating their proposals collaboratively.

4 Results

We have divided our results into four sub-sections: First we introduce the urban biking activism in the context of the participatory budgeting module on the digital platform Decide Madrid. Then we zoom in on how the urban biking
community engaged with the digital participatory budgeting module, and this is followed by two sub-sections each unpacking constraints of the digital platform in terms of negotiation and competition.

4.1 **Citizens’ participation in the budget allocation process**

The participatory budgeting module follows a year-around budget process and is divided into six sequential and consecutive phases. In each phase, citizens can engage in different ways at different times (Figure 1).

- In the first phase, citizens can submit project proposals to one of the 21 districts or the entire city. For example, citizens can create a proposal concerning constructing a new biking path in the “Centro” district of Madrid and submit it to the platform.
- After the initial proposal phase, citizens can show their support for specific proposals. This phase lasts one week and there is no limit for how many different proposals citizens can support on the platform. The proposals are then sorted based upon the digital scores and shown in prioritized order on the platform.
- After closing the support phase, the city officials collect all the proposals, and an internal evaluation process is initiated. The revision process lasts four months, during which the city officials assess the proposals’ viability.

| Amount | Data Description | Description |
|--------|------------------|-------------|
| 206 (2016) | Accepted participatory budgeting projects | Project title; project description; allocated budget per project; number of votes per project |
| 311 (2017) | Accepted participatory budgeting projects about biking | Project title, project description, profile of the proposer (individual person, association, collective), comments, follow-up comments by city officials, date of the last update by city officials, project status (completed or not completed), allocated budget, attached documents, additional comments |
| 328 (2018) | Accepted participatory budgeting projects about biking | Project title, project description, profile of the proposer (individual person, association, collective), comments, follow-up comments by city officials, date of the last update by city officials, project status (completed or not completed), allocated budget, attached documents, additional comments |
| 17 (2016) | Participation in workshops | Fieldnotes, images, shared documents |
| 39 (2017) | Participation in workshops | Fieldnotes, images, shared documents |
| 31 (2018) | Participation in workshops | Fieldnotes, images, shared documents |
| 30 hours | Official Documents | Surveys on quality of life in 2016, 2017, 2019; Use statistics of the Participatory Budgeting Module |
| 6 documents | Online and social media | Online blogs (posts and comments) and discussions on social media |
| Undefined | Online and social media | Online blogs (posts and comments) and discussions on social media |

Table 1. Data sources.
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and budget. If there are too many proposals on the platform for the city officials to assess within the four months period, remaining proposals are left out of the next phase. Therefore, the prioritized listing of proposals created through the voting system determines which proposals go through revisions and thus are handed over into the next phase.

- When the four months are done, all the estimated budgets for each of the proposals which the city officials assessed and declared viable are then published on the platform.

- Based upon this list, citizens then have access to the complete budget available, e.g., 30 million euros for the entire city in 2019, as well as to the individual proposals and their estimated costs. Then, a new voting process begins. This voting process is different from the initial process of supporting projects. In this case, there is a limit to how many projects can be supported, which is structured and designed following online shopping cart approach. Concretely, citizens can ‘buy’ proposals by putting these into their shopping cart; however, the overall cost of the whole cart must be below the maximum budget. Each district of Madrid has an assigned maximum budget, proposals are ordered by the number of votes (how many times they are in the carts) and accepted in that order until the maximum budget is reached.

**User profile design choices** Of especial interest are how the user profile design choices impacted citizen’s ability to participate in this process. In the first place, the platform required citizens to validate their residence to complete their profile registration. In this way, only those who had a legal residence in the city of Madrid could vote on projects. This design decision triggered some controversies, which were discussed during the workshop. More concretely, a source of controversy among the workshop participants was that many people living in the suburbs, who worked
and spent time in the city, had no power of decision over the projects. Moreover, one participant highlighted that this situation was exacerbated by the increasing gentrification of the city. More concretely, more and more people were moving away from the centre because rental prices had become disproportionately high in comparison to average salaries. Therefore, people were not only forced to move away from the centre but, by so doing, they also lost their power to influence how the public budget was allocated through the platform. Even if controversial, this design choice was the only way for the city to make sure that participation was legitimate from a legal perspective. On the one hand, the user profile design brings to the fore that institutional procedures and policies, and design practices are intertwined, and the digital interface’s design cannot disregard the institutional and organisational aspects of participation. On the other hand, the exclusionary requirements exemplify that designing digital platforms for participation might entail finding, and negotiating, compromises between broadening and legitimising participation.

Another interesting design choice was that, at the time of this research, user profiles could only be linked to individual people. The platform allowed registered citizens to add a label to their profile that indicated if they were formally related to the city council, such as local forums or city officials; however, profiles could not belong to more than one person. Based on the discussions during the workshop, this design decision seemed to disregard some of the actual practices by which groups engage with to create meaningful proposals. By analysing the description of the proposals, we observed that collectives and associations still found their way around to indicate the collective nature of their proposals. For example, some of the proposals included “on behalf of [name of collective or association]” in their descriptions. More specifically, by analysing the descriptions of the accepted proposals about urban biking, we found that one every three proposals, a total of 26 out of 86, were proposed by a collective.

**Design of social interactions** The platform impacted people’s ability to interact digitally throughout the process. More concretely, the platform allowed citizens to send individual messages to other citizens; however, group interactions were bounded to comments to individual proposals (Figure 2, left). An important consequence was that the ability to collectively participate in this process was limited to single proposals. However, by analysing the comments to these individual proposals, we found that also in this case citizens made their way to discuss across different projects by referring to the proposal codes in the comments. Oftentimes, citizens discussed similarities and contradictions across proposals in the comments although these discussions hardly ever led to any concrete action. In some cases, citizens suggested proposals to be merged, as this was possible in the initial phase. However, our analysis indicates that merging hardly ever happened in this phase. One
possible reason was that, as projects could only be proposed by an individual person, to merge two different projects one of the proposers had to “give in” their proposal.

Visibility of the institutional process The digital platform impacted citizens’ ability to interact with city officials throughout the process. In the platform, city officials could send individual messages to individual persons; however, these one-to-one interactions took place outside of the public discussions and therefore limited the opportunities for public scrutiny of their decisions. In addition, city officials used the platform to provide updates on the status of the project in the form of milestones (e.g., under assessment, in progress, completed). When projects were completed, city officials usually updated pictures showing the result of the intervention; however, this communication was completely unidirectional as the platform did not allow citizens to comment on the project status updates (Figure 2).

Analysing the comments, we found that several citizens reacted to these updates by, for example, pointing out that what had been done was different from what was originally proposed; or asked for further information on the status of accepted projects, as illustrated by the following comment:

‘What’s going on with this project? I have not seen any update on what was supposedly approved one year ago. Also, it does not look like anything is
going to get started in the following months’ [Citizen, 2017, comment on participatory budgeting digital platform].

Analysing the reactions and requests written by citizens upon the approval of projects, we found no reply by the city officials. These data are particularly interesting when investigating how opening digital communication channels with local governments can empower citizens. Indeed, the follow-up comments on the platform and the discussions during the workshop suggest that ineffective communication left the citizens powerless and limited the extent to which citizens thought they could influence the course of their proposals throughout the process of digital participatory budgeting. In addition, the lack of interactive communication with the administration seemed to shape citizens’ opinions on the city official’s stance towards the digital platform. The first author’s observations across different activities pointed to a spread belief among citizens that city officials posed resistance to their participation through the digital platform. However, the workshops added some nuances to these observations. Here we learned that the city officials expressed concerns about the digital platform not being considered in their existing work practices. Further, citizens were not made aware of how the platform clashed with city officials’ everyday activities. It turned out that the ordinary procedures and the procedures produced by the platform created additional work for city officials increasing their work burden. It seemed as if the designers behind the digital platform, in their eagerness to give power to the citizens, had disregarded the city officials. Paradoxically, the platform’s design meant to support bottom-up participation, but city officials described it as imposed with a top-down approach.
4.2 **Scoping urban biking as a public concern**

Considering the data collected during the workshops, the activity on social media, and the presence of several dedicated blogs, urban biking was a very pertinent topic, which triggered a high level of citizen engagement also outside the participatory budgeting platform. For example, there were a total of 4850 posts and a very active community of visitors on one of the online blogs dedicated to urban biking in Madrid (active since 2006). However, the extent to which urban biking was deemed relevant to the allocation of the public funding (as in relevant for many people) was not evident on the digital platform for budgeting.

To investigate whether the scope of urban biking as a public concern was an important concern on the platform, we looked at the biking projects relative presence in the entire set of the accepted proposals. To that purpose, we calculated the percentage of all accepted proposals about urban biking in the entire city and per district. The results are illustrated in Figure 3 and show that almost every district in the city proposed at least one project about urban biking throughout the three years.

Zooming into what specific concerns were addressed by the proposals in each district, we found that even though the geographic distribution of the projects was very diverse, the projects were thematically similar. More concretely, the content of the projects could be classified in three main themes: creating parking spaces, building new infrastructures (biking lanes, dedicated paths), and adapting existing infrastructures (making turns possible, pacifying roads, connecting existing biking lanes).

These results show that urban biking was indeed an important topic in the participatory allocation of public budget on the digital platform. However, the extent to which these concerns were present on the platform was only visible after a laborious data collection and detailed analysis, and therefore there were not easily available to people directly on the platform. These results suggest that the design reduced the citizens’ ability to scope urban biking openly and visibly as a public concern through digital participatory budgeting. The problem here is not only that the concern is not visible but also that the different views on the concern are not easily recognisable. For example, through our research we came to know that some of the most active citizens advocating for urban biking on the platform were skilled bikers that claimed their right to share the urban space with cars; however, there were other views on the same concern who were less present on the platform and advocated for separated spaces for bikes and motor vehicles as it would be safer for casual bikers, families, and older people.

From a design perspective, an important choice that impacted the ability to scope urban biking as a public concern was designing the platform as proposal-centric platform instead of issue-centric platform. This design decision implied that discussions were structured around a concrete proposal such as building a biking path in a concrete street, or parking lots in an area, rather than on a
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In general, the proposal-centric structure was beneficial for individual proposers with a concrete interest in e.g., planting a tree, setting up a garbage container, or similar projects with clear boundaries. Differently, project proposals on infrastructural issues requiring expertise, competences, and a larger overview of the city —such as urban biking— had very difficult conditions on the platform. The participation in the workshops, and interaction with city officials, revealed that in Madrid there is a “general masterplan for biking” approved in 2018 by the city council of Madrid. This masterplan provides guidance on biking paths development and is required when considering infrastructural proposals. Proposals compatible with the masterplan could have more chances to be implemented successfully; however, the masterplan was not available on the platform.

The choice of designing a proposal-centric platform allowed citizens to examine how the entire budgets were allocated after the fact; thereby serving a communication purpose to the local government by openly sharing the budget allocation. However, this design choice was in detriment to giving citizens the ability to visibly scope the content of the digital platform to their concerns and to explore those concerns. Citizens could explore the rejected and accepted proposals per district (Figure 4). However, there were no possibilities to thematically explore the accepted proposals across different districts or inspect the percentage of the budget that was allocated to different themes. Furthermore, the platform’s design offered very limited opportunities for thematic exploration.

Figure 4. Visualization of the accepted proposals for one of the districts
of what projects were proposed, which ones were accepted, and how much budget was allocated.

4.3 **Limited possibilities for negotiations**

One of the premises of participatory budgeting is to give power to citizens to allocate public budget while engaging in deliberative processes and decision-making. Looking at the urban biking proposals and related comments, the platform did not seem to successfully enhance citizens’ ability to generate or engage in debates. Instead, the results of our analysis suggest that the platform became a space where people mostly posted their proposals. Carefully reading through the urban biking project proposals and the related comments, we found that each proposal generated some interaction, as almost every proposal received at least one comment. However, zooming into the content of the comments, many of them were individual expressions of support, clarifications, or rejections of the proposals. Oftentimes, these comments were independent of each other, meaning that they only referred to the original project proposal and did not engage with other citizens’ comments.

Furthermore, the comments section available in each proposal was often appropriated to make other proposals visible and request votes rather than to create debates. Some associations and collectives used the comments to foster discussions outside the platform. For example, a neighbour association tried to use the platform to engage people in their face-to-face forums by inviting them to join their self-organised meetings. Based on their comments, these meetings seemed to focus on discussing and deciding offline what to support as a collective online:

‘Hi [name]. On Saturday 3rd June we will have a face-to-face meeting in [district] so every neighbour in the district can decide which projects are more suitable to our district. We will create a list [of proposals] that will be supported and shared collaboratively. We invite you to join to debate the proposals and decide where you want that the budget is allocated.’ [local association, 2017, comment on participatory budgeting digital platform].

This invitation was about discussing projects in the support phase; however, we saw similar invitations addressing different phases of the participatory budgeting processes. For example, other association commented on several accepted projects inviting the proposers to join a self-organised face-to-face meeting aimed at collectively examining the status of the accepted projects on which no further information had been provided. All in all, there were several of these comments in different proposals, which demonstrate the shortcomings of the platform for debating and discussing. To accommodate this problem, some collectives created digital opportunities outside the platform to give citizens the ability to discuss and organize themselves around the proposals. For example, one of the activist
collectives invested time and effort in coordinating, making visible, and updating on the status of the participatory budgeting proposals on an external website. There was a lot of effort and work put into developing knowledge that would help improve individual participatory budgeting proposals for urban biking. They created a geo-visualization with all the participatory budgeting proposals about biking, which provided a general overview of the proposals, where they were located, and their colour-coded status on the platform (e.g., in assessment, in progress, completed) (Figure 5, up). The time and effort that the collective invested in creating this visualization suggests an awareness of the fact that individual proposals did not have value without a connected network that created a biking infrastructure. It is interesting to compare the visualization created by this activist collective with the visualization available on the participatory budgeting platform, which contained all the proposals located geographically; however, there was no possibility to explore them by theme, status, or district (Figure 5, bottom).

These data suggest that citizens lacked a way to work together digitally creating concrete projects aimed at a negotiated common purpose. The platform’s design offered citizens limited possibilities for collaboration. Moreover, in some situations, the design was detrimental in supporting people coming together online, since
creating successful proposals required socially organisation outside of the platform. Therefore, activists, collectives, and associations had to develop additional ways (digital or collocated) to organise themselves to create proposals and coordinate their contributions.

The limited possibilities for negotiation were also exemplified by the limited possibilities to express different views on an issue, have a discussion, and then decide how to act together online. Through our research, it became clear that the urban biking activism in Madrid was divided into two main groups: those who want bicycles to be part of the regular traffic (i.e., “calzadistas”, as they were commonly referred to online and during the workshops) and those who want separated paths for bicycles (i.e., “carrilbicilistas”). The tension between these two groups sometimes was intense, as the participants explained during the workshop and as we could observe in interactions on blog posts or social media. This division within the urban biking community was practically invisible in the participatory budgeting module, even though we found some references to the division in the comments. Therefore, it was impossible for citizens to see which proposals were within which group, and in general how the two groups reconciled their differences and found common ground for biking in Madrid.

4.4 Producing competition by design

An intrinsic aspect of participatory budgeting is that the process entails the allocation of limited resources, as in the fixed budget allocated per year. The shopping cart design approach forces citizens to prioritize proposals when allocating the maximum budget. Therefore, the cost of a proposal becomes meaningful when compared with the costs of other projects and with the total available budget for the district. During the budget allocation process on the platform, there is an explicit competition among project proposals created by the design choices in the digital participatory budgeting module.

The competition approach on the digital platform created tensions among citizens who potentially agreed on the overall city change but had different local proposals. Thus, rather than supporting citizens in thriving for larger interventions across the city concerning specific ideas (like urban biking in Madrid), our analysis suggests that the platform’s design created a competitive environment, especially at the district level. Furthermore, by not providing visualizations of the proposal and budget allocation thematically, the platform made it impossible to have an overview of how much funding was allocated across project proposals for certain areas (e.g., urban biking, safety, or street cleanness). However, a detailed analysis of the proposals and their allocated budget by districts revealed that biking projects did take a substantial amount of the total budget. More specifically, most of the districts had biking among the accepted proposals and, in some cases, these proposals took up to 80% of the total budget (Figure 6).
In consequence, the urban biking community was often held accountable for taking up a large percentage of the district budget, leaving only little for other kinds of projects. The competitive dynamics which were created among citizens due to the platform’s design constrained the larger citizen engagement across the city into making Madrid a better place. More concretely, the design forced citizens in being strategic, when making proposals and having them implemented. Indeed, some of the comments in the platform highlighted different strategies that citizens adopted; and even some local associations appropriated the comments section on the digital platform to invite citizens to be strategic in the way they supported the projects:

‘Keep in mind that the phase to support projects is like a sieve that leads to some projects being eligible for voting and some others not. If many projects are about the same concern or geographical area, supporting all of them is not a good strategy. Instead, it is better to choose some of them and focus the support.’ [local association, 2018, comment on Participatory Budgeting digital platform].

The way in which the process of participatory budgeting is implemented in the digital platform encouraged competition among citizens with different concerns. The platform’s design made people strive for their concerns by defeating others with little room for collaborative endeavours. This was especially true for urban biking proposals, where citizens did not only strive for a limited budget but also for a limited public space. Reading through the proposals and discussions, it became clear that the public space was a contested territory for motor vehicles,
pedestrians, and bicycles. One project proposed to turn a part of the road into bike parking, rather taking space from the pedestrian path as it was usually done:

‘[…] improving urban mobility cannot be done to the expense of pedestrian mobility. Bicycles cannot be yet another vehicle competing for space with the pedestrians. We believe that we should move forward and start to create a real network of bicycles parking located in the driveways’ [collective, 2016, an extract of project description on the Participatory Budgeting digital platform].

This proposal fostered a great deal of discussion and became one of the most active discussions with the highest number of detailed comments, engaging the highest number of citizens. The discussion addressed many different topics, from parking taxes for motor vehicles to the need for parking space for people with different abilities. The discussion of the proposal clearly demonstrated that increasing urban biking facilities in the city required a redistribution of the public space, as described in one of the comments:

‘We could all agree on ‘equal rights mean equal duties’; indeed, bikes must comply with the same traffic regulations as cars… however, there are exceptions that apply to some and not to others […] The fact is that there should be positive discrimination toward urban biking with respect to cars because bicycles do not entail as many public costs as cars do.’ [citizen, 2016, comment on Participatory Budgeting digital platform].

It is interesting to notice that using the term “positive discrimination” contributes to positioning the distribution of public space and urban biking matters of social justice. In this regard, the comment argued that there was a need for practices and policies favouring bikers to compensate for previous unjust treatments. However, this framing was rejected by one citizen as it was considered undemocratic:

‘I am not in favour of positive discrimination, at the end of the day that’s also discrimination and therefore goes against equity principles that need to be applied in a democratic society, doesn’t it?’ [citizen, 2016, comment on Participatory Budgeting digital platform].

This discussion highlights that the proposed projects were as much about urban biking as about the allocation of public resources and democracy. It also highlights important aspects of power distribution enabled by the platform’s design. More concretely, the discussion allowed people to give their opinions and feedback on the proposal; however, it was up to the proposer to include any of the suggestions or comments in the project proposal. In this way, the power remained in the individual citizen or collective that wrote the proposal.
5 Discussion

Participatory budgeting is about providing citizens the social and political rights to actively participate and impact the allocation of public budgets. Participation is thus fundamentally built upon an emancipatory goal; namely, to empower citizens in scoping and self-regulating budgets (Baiocchi and Ganiuza, 2014). Through our investigation of the digital participatory budgeting module, and aligned with previous work, it was evident that the platform’s design shaped the ways in which participants were able to engage in budget allocation (Wright and Street, 2007; Dahlberg, 2011; Towne and Herbsleb, 2012; Palacin et al., 2020). Interestingly, we found that despite the intended aim of broadening participation, the design limited the extent to which citizens were able to engage in scoping and self-regulating the city budget for Madrid. More concretely, the platform’s design enabled forms of individualistic, competitive, and static participation. Below we discuss each in turn.

Individualistic participation The platform’s design structured participation around individual profiles, bounding citizens’ opportunities for participation by their citizenship and status as residents in the city of Madrid. Even if exclusionary, this design choice was the only way for the city to make sure that participation was legitimate from a legal perspective and brings to the fore some of the complexities of broadening and legitimising participation. Also, each individual profile was directly linked to a certain person, and it was these individual people who uploaded and suggested proposals. At the time of the research, the platform did not formally support grassroots collectives or NGOs to be co-authors of proposals. Therefore, most of the uploaded proposals were presented on the platform as individual contributions. These design decisions emphasized individual participation while disregarding collaboration. Even though individual actions are key to democratic forms of digital participation such as digital activism (Gerbaudo, 2019), we found that individual participation and action in civic tech must be approached and designed differently.

More specifically, when local governments provide digital platforms allowing citizens to impact the development of the city, there are underlying administrative processes that determine which kind of individual actions can take place (King et al., 1998; Stortone and De Cindio, 2015). These processes interlink with the use of the platforms and thus must be considered and aligned when designing digital participation (De Cindio, 2012). In our case, the platform’s design enabled individual participation, but the governmental administrative process rewarded collective support; therefore, the extent to which the proposers could make an impact became mediated by their connections outside the platform. Recent research found that civic technology must address the design of digital democratic processes holistically rather
than addressing bounded aspects of these processes, e.g., citizen deliberation or opinion gathering (Manuel and Crivellaro, 2020). Our results add to this research by demonstrating that misalignments between participatory processes and the design of digital participatory budgeting platform shape citizens’ power to decide on public budget allocation. Compartmentalizing parts of the democratic processes for the purpose of design thus risks creating misalignment and goes against the very intention behind the digital platform.

Digital platforms for citizen engagement have been found to have limited opportunities for collaboration (Parra et al., 2017; Saldivar et al., 2019). Our case shows that by designing the digital participatory budgeting platform around individual profiles made the platform appear as an individualistic platform, where individual desires are in focus rather than collective interests (Allegretti, 2012). However, by extending our research focus beyond the activities on the digital platform to include workshops, social media, and blogs, we found that individual proposals were still created collectively, which adds to existing examples of misalignment between design choices in digital participatory instruments and how people want to participate in democratic processes (Teli et al., 2018). Activists organized their activities by conducting workshops, meetings, and using other digital platforms when producing the proposals prior to uploading the results. These activities were very similar to any other kind of social organization engagements observed on social media (Kou et al., 2017; Grover et al., 2019); however, in this case, the potential of impacting the budget through the digital participatory budgeting platform was crucial in legitimizing their requests.

Increased inclusion and diversity are usually reported as some of the benefits of digital participatory budgeting in comparison to participatory budgeting (Miori and Russo, 2011; Spada et al., 2015). A commonly reported advantage is that participants do not need to share the same space and time to be able to make an impact to the process (Allegretti, 2012). Clearly, the digital platform did allow multiple people to express their wishes and desires for the city’s budget; however, the power to impact was still dependent on external factors taking place outside the platform. Indeed, collectively created proposals often had groups of people ready to vote on these, and thus had a higher chance of getting their proposal prioritized. The lack of transparency in the production of the proposals and the political advantage of mobilizing outside the platform risked minimizing the inclusion and diversity potentials of digital platforms. Not being able to join mobilization efforts digitally, risked leaving individuals who are outside of the side-bar mobilization efforts behind. Thus, the digital civic platforms risked potentially replicating dynamics of exclusion (Baiocchi and Ganuza, 2014). Even though the platform supported easy participation, proposers could still be divided between those who were organized outside the platform and those who were not. Therefore, when questioning whether digital participatory budgeting can be an instrument of inclusive and diverse participation, we need to consider
how the design choices produce different power distributions among participants. In this case, the lack of social translucence (Erickson and Kellogg, 2003) for mobilization behind some of the proposals on the platform risked jeopardizing equity in participation.

Mobilization is an important factor in analogue participatory budgeting (Sintomer et al., 2008), and by implementing digital participatory budgeting without digitally supported mobilization makes the mobilization efforts invisible. Similarly, mobilization efforts are crucial for participatory budgeting activities, and invisible mobilization efforts prioritize well-organized groups over individual citizens. Furthermore, individual citizens do not know they are missing out since the very activities they lack access to are not even displayed digitally. Finding ways to design digital platforms where citizens can engage in collaborative endeavors is important (De Cindio, 2012; Parra et al., 2017; Saldivar et al., 2019), as design choices can shape power distributions unintentionally. Individualistic design of civic digital platforms risks decreasing diverse participation through double-blinding design. First, the platform does not support mobilizations digitally and, second, the platform hides that mobilization takes place on other digital platforms as well as in physical events disconnected from the platform. The double-blinding design decreases the emancipatory and democratic goal (Baiocchi and Ganuza, 2014) of digital participatory budgeting and reduces the potential of reaching and engaging an increased number of additional citizens in the budgeting processes (Allegretti, 2012).

Competitive participation The design of the digital participatory budgeting platform followed a proposal-centric structure. This meant that citizens contributed, navigated, and searched in the platform mainly based on individual proposals. This design choice caused proposals to be displayed as separated items without clear connections, relations, or structure across proposals. Consequentially, the platform guided citizens to consider proposals individually, instead of considering groups of proposals within the same or similar category as in relation to each other.

A consequence of the proposal-centric structure was that the design enabled the segregation of proposals instead of cooperative aggregation (De Cindio, 2012; Parra et al., 2017) leading citizens to engage in competitive behaviors despite having similar interests. The competitive dynamics between city districts did not support cooperative efforts in creating proposals for larger infrastructural projects, such as bike paths across the city, which would support long-term sustainable efforts for the city. Instead, sub-groups who gathered under the same political concern (such as better biking infrastructures across Madrid) ended up competing rather than cooperating. These competitive dynamics became
problematic because these groups and individuals risked engaging in winning or losing competitions despite their shared interest. When making the argument that competition is detrimental to citizen participation, it is important to notice that cooperation does not entail working together in total agreement. Indeed, dealing with conflicts is an important aspect of cooperative engagements (Mouffe, 1999; Sennett, 2012). Thus, considering how design choices support the emergence and discussion of conflicts instead of competition becomes essential to citizen agency (Palacin et al., 2020) and “achieved citizenship” (Dahlgren, 2007).

Aligned with current research, we found that the concerns of the citizens -rather than the individual ‘proposals’- required more emphasis on the digital platform (Manuel and Crivellaro, 2020). If the conceptual design of the platform had followed an issue-centric structure, rather than proposal-centric, the platforms could support cooperative dynamics, even among people who had different views on the issues. In addition, an issue-centric structure would allow for categorizing and re-structuring proposals considering the different interests. Finally, an issue-centric navigation would allow participants to identify larger disagreements across collectives and find ways to set up negotiations to address these concerns. All in all, enabling mobilizing on the platform through an issue-centric navigation structure would support people in joining a shared matter of concern (Crivellaro et al., 2014; Manuel and Crivellaro, 2020). Instead, the current proposal-centric conceptual structure polarizes people’s voices and sub-divide their efforts. It is important to mention that in our empirical data, city officials tried to group proposals during their assessments. However, this was enacted as a top-down action where citizens did not have the power of decision. Potentially, a digital platform can allow people to engage despite their geographical dispersion across the city. However, the proposal-centric structure emphasizes the geographical divisions of the city unintendedly, making the sub-group dynamics across geography becomes a factor shaping the voting practices. People are more likely to be successful in persuading others when using cooperative technologies which minimize the perceived distances across partners (Bradner and Mark, 2002). The proposal-centric navigation structure increases the perceived distance across groups rather than enabling them to identify common ground (Clark and Brennan, 1991). Rather than putting together their strengths, the competitive design makes citizens ‘vote’ on proposal rather than ‘prioritize’ the importance of an ‘issue’ – risking that the prioritizing exercise becomes accidental rather than well-argued and purposefully organized. This also led to a concern for the democratic process and how participatory budgeting risk politicians neglecting their responsibility for prioritizing governmental finances. Prioritizing in government requires knowledge and expertise in balancing and considering the multiple interlinked concerns across diverse citizens for the public good. Responsible prioritization is not about winning
a competition, thus framing digital participatory budgeting in terms of ‘win’ or ‘lose’ in the design introduce problematic connotations. Participatory budgeting as a form of direct democracy produces an illusion of easiness to participate. The immediacy of digital technologies makes participation especially easy in digital participatory budgeting, as when citizens created proposals that described their wishes for the city. However, it loses the grounding in experience, knowledge, and strategic planning – as well as takes away the responsibility of the elected bodies in the government.

**Static participation** Posting proposals on the digital platform was designed as an individual writing process, without any form of cooperative writing, revising, or commenting. The proposals on the platform are static and cannot be dynamically revised by groups of people. It is possible for individuals to upload a new version of their proposal, but the actual process of negotiating and writing the proposal is often facilitated by other means outside the platform. This means that the interaction on the platform is reduced to voting proposals up or down and expressing support or rejection in the comments, rather than engaging in making meaningful proposals. This discussion and voting mechanisms are designed following liberal and deliberative forms of participation (Dahlberg, 2011). The focus on consensus in decision-making assumes that there are supporters and opposers to any argument – or in our case proposals - and collective dialog results is a synthesis on the topic on which everyone agrees (Sennett, 2012). Following this line of thinking, consensus making is at the core of design for all digital deliberative platforms for citizen participation (Mouffe, 1999; Dahlberg, 2011). However, our case demonstrates that creating meaningful proposals is not only a process of engaging in dialogues to reach a consensus. Instead, creating meaningful proposals is about developing a common ground (Olson and Olson, 2000) that sets the basis for collaborations and mutually beneficial action. Not only among proposal-makers but also including the city officials who revise them. Prior research on participation in public administration argued that enabling authentic participation required “re-educating” city officials from expert managers to “cooperative participants” (King et al., 1998). In our study, we worked together with city officials whose actions showed a commitment to cooperate with citizens and activist groups (e.g., they invested their personal time in participating in the workshops, valued and sought the opinions of expert bikers, and were themselves active urban bikers). Still, these city officers struggled to engage in participatory processes through the platform because the design did not allow them to dynamically interact with the proponents and suggest them ways to make their proposals aligned with legal requirements and urban planning policies (such as the general masterplan for biking), as it happened during the workshops (Ammitzbøll Flügge et al., 2021).
Thus, our work suggests that designing digital platforms for civic engagement based upon traditional face-to-face experiences of democratic forms of interaction might not be the correct design approach. The practices of civic engagement in face-to-face situations are not easily transformed online (Holten Møller et al., 2021). Furthermore, by reducing the interaction on the platform to voting on static content, implemented by a double voting scheme, further reduce the equality in the digital participatory budgeting platform. People who are not organizing outside the platform are double disadvantaged since they miss the mobilization advantage in terms of voters not only once – but twice. Even if their proposals reach the second phase, good proposals can be eliminated due to the number of voters.

So, what is lost when participatory budgeting becomes digital? Firstly, a crucial element of participatory budgeting when it takes place face-to-face is professional mediation. When municipalities engage in participatory budgeting, they provide professional mediation structures supporting the deliberation of the proposals. The mediation is about balancing the dynamics of the process when conducting workshops or executing events (Miori and Russo, 2011; Allegretti, 2012; Stortone and De Cindio, 2015). Part of this work includes collecting data and expert knowledge, which can facilitate partners in dynamic proposal making and the development of common ground (Olson and Olson, 2000). The collective process thus becomes a cooperative open-ended process where nothing is fixed, but dynamically evolve. Being invited to join such processes is limited, and politics decide who receives invitations and who are left out. However, the professional mediation process is key to balance opinions and consider equity in decision-making. In the digital participatory budgeting professional mediation is replaced by technology, and deliberation is replaced by a comments to a proposal and a binary voting mechanism. Further, the consensus process is reduced to a competition – and the process of developing common ground disappears.

5.1 Designing cooperative digital participatory budgeting platforms

Initially, we asked how do activists collaboratively engage in scoping and self-regulating participatory budgeting through digital platforms? Firstly, it is important to highlight that the extent to which activists can engage in decision-making through these platforms is bounded to the design of the underlying institutional processes. Therefore, there is little that digital platforms can do if the underlying processes are not designed to give power to their citizens by, e.g., allowing a substantial percentage of the public budgeting and committing to implement the proposals. However, the digital interfaces and navigation structures the democratic processes in certain ways. Participation does not “happen” simply when a digital participatory platform is made available – in the same way, that collaboration does not instantly occur when collaborative technologies are implemented (Orlikowski, 1992). Instead, we need to find ways
to design such platforms, allowing participants to develop their use of the digital platform cooperatively over time.

We argue that the design of a digital participatory budgeting platform where the institutional processes are designed for collaborative engagement must support citizens in developing cooperative practices, supporting participants in creating common ground around proposals and the budget while co-creating dynamically cooperative proposals. Designing such a platform must take the sequential process into account, which includes the open-ended engagement of mobilizing people, collecting data, and expert knowledge relevant for the proposal as part of scoping and self-regulating the budget. Furthermore, the sociotechnical design of such a platform must consider the role of the officials. Instead of reducing the official’s role to administer selected proposals for secondary voting, officials could take on the digitally mediating role, assisting citizens in finding relevant data and having access to expert knowledge. Finally, we argue that digital participatory budgeting platforms should support the cooperative grounding process (Clark and Brennan, 1991) by which participants develop common ground (Olson and Olson, 2000) across proposals considering long-term sustainable initiatives.

Developing common ground in geographically distributed situations is a core challenge for CSCW research (Bjørn et al., 2014). By combining our empirical observations with existing research, we propose that digital participatory budgeting platforms supporting cooperative engagements developing common ground must be revisable and reviewable while supporting accountability among participants and visibility of proposals and activities.

**Revisable** We found that the static content of the proposals was problematic, since it reduced the open-ended negotiations into pro/con statements, rather than supported the participants in engaging in discussions aligning common ground across proposals. Without open-ended negotiation developing common ground is difficult – and in some cases even impossible. Grounding is the process by which cooperative actors engage in meaning-making activities, with the aim of creating mutual knowledge, mutual beliefs, and mutual assumptions (Clark and Brennan, 1991). Grounding depends upon participants’ ability to establish a shared and mutual understanding of what is said and what is understood (Clark and Brennan, 1991). Surely, grounding processes are never perfect but entails the process by which the participants mutually believe that the other part has understood the meaning of the exchange sufficiently for the current purpose. Having access to how others relate to your content requires feedback loops where participants can demonstrate their understanding of the current concerns related to the purpose. Digital platforms supporting scoping processes for participatory budgeting proposals would thus benefit from allowing participants the ability to engage with proposals as well as engage in negotiations and discussions with
the purpose of creating common ground. This would entail the platform to allow participants to engage with the material matter of the proposals as a co-authoring process supporting grounding. The digital platform should be revisable, allowing participants not only to see static proposals but enable them to engage in dynamic content creating shaping the proposals collaboratively.

**Reviewable** Developing common ground while scoping the proposals for participatory budgeting does not necessarily need everybody as co-authors to the proposals. That would potentially be too many co-authors. Instead, there will be participants on civic platforms who are reading and commenting proposals – without becoming co-authors. These participants are an important part of the mobilization as the reviewers of the proposals, and their feedback is critical for the grounding process. Thus, digital platforms supporting the scoping and mobilization of proposals need to enable reviewers to review and make comments during the proposal making process. Understanding reviewing as a cooperative activity is not simply about allowing reviewers to review and comments on proposals. Instead, it includes approaches by which participants can have access to see others’ reviews and interact not just with the proposal text, but also with other people’s reviews. In that way, the reviewability of the digital platform is fundamentally about allowing participants to review proposals and make visible how they review the proposals in such a way that others can monitor the process and how the content is evolving. In this way, the reviewability of the platform is similar to designing awareness features into a cooperative platform. Awareness is the process by which participants make available their individual activities for others to monitor and act accordingly (Dourish and Bellotti, 1992). The reviewability of the platform is thus about making actions of review visible available so others can monitor (read the reviews) and act accordantly (revising the proposals).

**Accountability** Digital platforms for participatory budgeting are about making accountable actions where real-life budgets are allocated appropriately. Accountability is when participants through their actions take responsibility for the correct actions. Within CSCW research, accountability by design is framed in terms of social translucence (Erickson and Kellogg, 2003). Social translucence on digital platforms requires participants to display their actions in such ways that others can monitor, and then display their reaction publicly. By making reactions and actions available, participants can be held accountable for their actions. For example, if participants both know that one participant read a comment or material but did not make any remarks – all can assume that there is an agreement. However, if participants do not have access to people activities (e.g., reading comments) on the platform, they cannot know if the lack of comments is because nobody read it, disliked it, or is not paying attention – there is a lack of social translucence and thus support for accountability (Bjørn and Ngwenyama, 2009). Basically, without designing for accountability in the digital platform, makes it
difficult to evaluate who is spending the time to really engage with proposals and who are simply ‘voting’ without engaging with the proposal.

**Visibility** Finally, the conceptual navigation structures in digital platforms for participatory budgeting should be issue-centric rather than proposal-centric. Designing for issue-centric structures is basically about making it possible to evaluate each smaller proposal in the larger context of urban planning. It is about creating visibility of the contextual information, which are especially relevant for larger infrastructural changes cutting across districts or other relevant structures. The platform’s design needs to produce different views of the ongoing proposal data being created. Further, it is about allowing participants to evaluate the evolvement of the budget throughout the process. The visibility on the platform of the data should not limit the scoping of proposals which should still be open-ended, thus categories and classifications shaping the visibility must consider dynamic data, e.g., through tagging.

### 6 Conclusions

Introducing digital platforms into participatory budgeting practices with the aim of supporting democratic processes where diverse citizens can take action and shape the governmental decisions, must carefully consider the platform’s design. Digital platforms shape citizens’ participation and digital activism intentionally as well as unintentionally. We found that if **digital platforms are to empower citizens in collaboratively scoping and self-regulating participatory budgeting**, individualistic profiles, proposal-centric structure, and voting mechanisms risk producing an individualistic, competitive platform. Deliberative democracy is about balancing consensus decision-making and majority rule, however deliberative design for civic platforms risk producing competitive platforms without professional mediation and expert knowledge. As a competitive platform, the double voting system and lack of social translucence are double-blinding people who are not joining the outside-the-platform mobilization efforts. Citizens who are only on the platform do not even know that mobilizations outside the platform exist, thus making joining such efforts impossible. Rather than extending participation through digital participatory budgeting, the platform’s design risk double to disadvantage certain citizens.

In this paper, we argue that the **design of digital participatory budgeting platforms supporting cooperative engagements**, such as activist engagements, must be **revisable** and **reviewable** while supporting **accountability** among participants and **visibility** of proposals and activities. Revisable digital platforms allow proposals to be open-ended and revisable supporting co-created proposals by multiple authors. Reviewable digital platforms enable digital mobilization across related and interlinked proposals through visibility of proposals connections. Each proposal can be seen in the larger context of other proposals with similar concerns on related
Designing Digital Participatory Budgeting Platforms: Urban... issues, supporting social translucence and accountability. Further, digital civic platforms should follow an issue-centric structure rather than a proposal-centric structure, supporting mobilization on the platform rather than outside the platform. All in all, these design guidelines are meant to support designers shape and materialize democratic processes by considering the material way systems impact civic participation and digital activism.

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Declarations

Conflict of Interest The authors have no conflicts of interest to declare.

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