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Integrating Online and Onsite Participation in Urban Planning:
Assessment of a Digital Participation System

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ABSTRACT

The present contribution offers an assessment of the development and implementation of the digital participation system in Hamburg, Germany. The system utilises open and public planning data within a web-based interface and a physical decision-support tool. These technologies are integrated in urban planning processes, namely through citizen participation and citizen engagement. The research presented in this paper assesses the impact of the digital participation system by evaluating three key aspects shared with traditional citizen-participation methods: (1) the selection of participants, (2) the modes of communication used, and (3) the authority and power. The assessment is based on the analysis of data collected from interviews and a usability and user-experience study. For the analysis and comparison of DIPAS to other participation formats, this paper introduces a visual assessment tool, the participation cube. The digital participation system is found to have diversified the selection of participants and improved collaboration with the general public. However, it did not facilitate higher decisional power, due to the lack of legal adjustments. The author argues that new forms of participation should not only rely on digital tools, but should also engage with the institutional and procedural context in which participation occurs. Several strategies are suggested to support an inter-disciplinary approach at the intersection of technical tools and traditional planning practices. These hybrid strategies would allow the seamless integration of citizen contributions into the creation of urban development plans.

KEYWORDS

Citizen Engagement, Collaboration, Digitalization, E-Participation

1. INTRODUCTION

The integration of citizens within urban planning processes has been a hot topic in the planning theory discourse, starting with the birth of Jacobs' *democratic urban planning* (Jacobs 1961). Ever since then, several tools and methodologies to achieve proper citizen engagement have been tested, all of which serve the fundamental principle that cities are made for citizens and thus citizens should have a say in how they are planned. That discussion between top-down large-scale strategic planning developments and empowered citizen action, started by Jacobs at the end of the 1950s, is still ongoing. Citizen

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participation is currently an approach successfully integrated within the planning processes of many cities, and an extensive body of literature emphasises its benefits (López Baeza, J., Noennig, J. R., Weber, V., et al 2020; Hälker, N., Hovy, K., & Ziemer, G. 2018; Lazzarini 2016). More specifically, recent studies focus mainly on two strains: either communicative methods as a way to increase the quality of participation, or digital participation procedures facilitated by technological development. This paper sets out to expand on the link between both, and to analyse the key aspects of participation using an applied example: an integrated e-participation system deployed in the city of Hamburg, Germany. The Digital Participation System (DIPAS, www.hamburg.de/dipas/) is the resulting product of a long series of participation projects carried out in the Free and Hanseatic city of Hamburg. DIPAS was implemented as a cooperation project lead by the Hamburg Authority of Urban Development and Housing (BSW) in cooperation with the Agency for Geospatial Data and Surveying (LGV) and the CityScienceLab of HafenCity University (HCU). The research and development project had the objective of developing, testing and implementing a digital workshop tool that would be used in physical participation workshops while intersecting with an existing online participation platform. [1] In this cooperation, HCU takes the role of performing scientific accompanying research, among other tasks – from which the present paper results.

The research presented first localises the topic within the participation and collaborative planning discourse, and introduces the *case study* of the Digital Participation System in Hamburg. Following this contextualisation, data collected in interviews and usability studies is evaluated and analysed through procedures following Fung's (2006) approach, the *Democracy Cube*. This section elevates the evaluation of participation from a two-dimensional assessment as it has been laid out by the fundamental *ladder of participation* concept (Arnstein 1969), towards a three-dimensional evaluation focusing on the selection of participants, the modes of communication and decision making and the extent of authority and power. By introducing the *Participation Cube*, a tool for visual analysis is used to help evaluate participation procedures. After that, the implications for the embedding of a DIPAS within procedural planning systems are discussed.

2. LITERATURE REVIEW

2.1 Communicative and Digital Urban Participation Approaches

Citizen Participation as part of political decision making in urban planning is seen as an instrument to redistribute power by including citizens in the process of determining the future of their cities and reducing political apathy and post-democratic feelings. Healey (2003) summarized the driving forces for this transformation: a world under globalization sees rising interdependencies between the global and local and creates fragmented social realities, and the recognition of social injustices being produced by spatial development lead to re-assessments of strategic planning. Specific emphasis is put on discursive elements within policy planning, shifting away from strictly empirical, analytic approaches towards those including argumentation and deliberation, local expertise, and tacit knowledge (Fischer and Gottweis 2012). Nowadays, participatory planning practices are being tested in a variety of political and social frameworks, not only in a European and US-American context (Degbelo et al. 2016; Conroy and Evans-Cowley 2006) but also in emerging economies such as Kenya (Onyimbi et al. 2017), South Africa (Lues 2014), Vietnam (Nguyen et al. 2015), Malaysia (Abdullah et al. 2016), and China (Li and Jong 2017), to name just a few. These ways of communicative planning recognise and give more emphasis to a diversity of meanings, knowledge and interests within local communities (Silva 2010).

In the last 15 years, digital technologies and new methodologies have been implemented in participatory processes. The web as an evolving platform of communication and exchange has lead to a paradigm shift: users move from being consumers to producers of content (Geiger 2012). Adding to this, digital services are increasingly utilized on mobile devices (Abdullah O. Al-Zaghameem, Omar

M. Al-Qawabah and Wajedah H. Al-Gmool 2016). In planning, this is represented by an increase in the use of digital tools including, geographic information systems, virtual reality technologies, computer supported working environments, and interactive social media tools (e.g. Silva 2010; Höffken and Kloss 2011; Gil et al. 2019; Bertelsmann-Stiftung 2010).

Several researchers focus specially on participation that is grounded in geoinformation systems (GIS). To refer to this particular type of public participation, Pánek (2019) establishes the term *GeoParticipaton* or *public participation GIS* (Brown 2017). Kyttä and Kahila (2011), arguing for new participation methodologies, set out to categorize localized experiential knowledge that is collected via user-friendly digital applications under the umbrella term *softGIS* referring to resident's knowledge repositories. Additionally, knowledge and capacity building need to be taken into consideration because levels of knowledge on the usage of mobile platforms might create new thresholds and thus pose a potential bias of social segregation linked to access and usage of technology (Abdullah O. Al-Zaghameem, Omar M. Al-Qawabah and Wajedah H. Al-Gmool 2016). Forms of participation that engage with digital technology and mobile services – henceforth referred to as e-participation – provide valuable opportunities for higher transparency (Coleman 2009), democratic co-governance (Ostrom 1990), and have the potential of reducing the gap between politics and citizenship (Bertelsmann-Stiftung 2010). They have the capacity to expand outreach and enable the digital evaluation and analysis of contributions (Zentraler Immobilien Ausschuss 2013), to provide better planning and urban management services, be more efficient, work at lower costs, and to be more collaborative and participative, transparent and accountable (Silva 2010)[2].

The shift from conventional planning tools towards the deployment of digital services represents a new paradigm not only for participatory procedures, but also in the urban planning field as a whole. Silva (2010) describes this new planning paradigm as a combination of two aspects: the extensive use of information and communication technologies, and the interaction between multiple urban stakeholders (ibid.). He argues that the evolution from conventional to digital tools should not only be seen as a technological shift, but it should also be accompanied by fundamental changes in planning procedures (Silva 2010). Research on participation under the new planning paradigm would require broadening the subject beyond the use of technical tools. Rather than limiting participation research to the evaluation of the utilisation of technology, e-participation research needs to consider new methodologies for participation (Kyttä and Kahila 2011) and should entail an analysis of the respective context (Kubicek 2010) by introducing the legal planning framework and focusing on the participants of e-participation events. E-participation research should examine the ways citizens engage and communicate with policy makers, and the extent of influence the engagement unfolds in regards to prospective planning processes.

2.2 The Legal Basis of Formal Participation in Germany

An important marker in planning contexts is whether a participatory procedure is formal or informal: formal procedures refer to participation that is legally obligatory, while informal procedures summarize a wider range of participation that is not mandatory and where results are not automatically provided as input into planning procedures. While political frameworks are very different in each country, common regulatory trends for formal citizen participation have emerged and been consolidated over the past years in Western and Central European countries such as the Netherlands, Germany and Austria. Moreover, regulations still may differ highly within one country in regards to informal citizen participation because federal states and municipalities issue their own guidelines.

Political participation in Germany was legally formalized for planning procedures in 1971 when it was included in the newly created Urban Renewal Act (Behörde für Stadtentwicklung und Umwelt 2013). Since then, formal participation procedures have become well established and have been included in state laws. For the implementation and adjustment of master plans, the law obliges a two-step participation of the populous. In the first step, a public discussion of plans takes places early in the process. These events are usually advertised to the general public in the form of posters and

an official written announcement. At this stage, the plans are not yet fixed but the objectives of the development project are displayed in concepts and preliminary drafts. Citizens can inform themselves, express their needs and interests as well as provide critique (Behörde für Stadtentwicklung und Umwelt 2011). In the second step, a public exposition of the aligned blueprint is made available to the public for a 30-day period (§ 3 paragraph 2 BauGB). During this month, citizens can see the draft, inform themselves and input their remarks. All remarks are to be examined by the public authorities and balanced against private interests (Behörde für Stadtentwicklung und Umwelt 2013).

In parallel, more direct and conversational modes of participation have emerged, summarized under the term informal participation, as they go beyond the legal, formalized participation. These procedures and methods are numerous and diverse, and include real labs, charettes, deliberative polling, open space, citizen budgets and many more[3]. However, since informal procedures are not legally binding, they require additional effort and hence vary in their embeddedness in formal planning procedures and thus in their impact. Additionally, the outcomes of these informal participatory procedures are limited and come across as recommendations rather than as binding agreements for actual urban planning practice.

2.3 Evaluating the Features of Citizen Participation

Criticism has pointed to the limits of participation processes: their oftentimes restricted political impact has been addressed as a mode for producing approval through placebo participation procedures, instrumentalising citizens without sharing decisional power, and de-politicising the public by muting marginalized voices through consensus-building (Arnstein 1969; Miessen 2012; Mouffe and Wagner 2013; Rancière 2008). Elaborating on concrete values might be fruitful in this regard, such as: *Who is included in the participation procedure? What are the modes of communication during the process? What shall be the outcome of the participation procedure?* (Fung 2006, p. 66) Reflecting on these questions helps not only in the analysis and evaluation of participation procedures, but also in the design of better, custom-made participation solutions. After all, participation is not to be seen as a mechanism to substitute political representation or expertise, but instead complement them (ibid.).

3. METHODOLOGY

3.1 Research Question

This paper evaluates the impact of DIPAS based on the question: *What is the added value of the integration of online and onsite participation in regard to the embeddedness of participation within urban planning procedures and institutions?* By answering this question, the research presented includes an investigation of the usage of the DIPAS tool during the first two development phases of the project and an analysis of the feedback provided by (1) participants ("citizens") of a Usability and User Experience study and of participation workshops during the piloting phase of the system, as well as (2) staff of municipal planning authorities ("planners").

3.2 Introducing the Case Study: Communicative Planning in Hamburg

In 2012, the senate of the city of Hamburg established the "Urban Workshop" (Stadtwerkstatt), an administrative institution that coordinates all informal citizen participation procedures for topics of planning and environment in the city of Hamburg (Behörde für Stadtentwicklung und Umwelt 2013). This department is part of the Authority for Urban Development and Housing (Behörde für Stadtentwicklung und Wohnen, BSW). The Urban Workshop is one of three partners in the research and development project DIPAS. The other two are the Agency for Geospatial Data (LGV) and the CityScienceLab of HafenCity University (HCU). While the Urban Workshop coordinates and manages the project, the LGV is in charge of providing necessary GIS systems and data management, while

– with support of the HCU – the LGV carries out software development and implementation. The HCU, in turn, is in charge of scientific monitoring and evaluation of the system.

The DIPAS system has been developed during a three-year research project between BSW, HCU and LGV, from 2017 to 2020. Technical development takes place in three development phases, and each phase is accompanied by a usability and user-experience study to evaluate the user interaction with the system in order to re-inform further development and assess the system's effectiveness. This research concluded at the end of the second development phase following the completion of the subsequent second scientific evaluation.

The basic requirement for a digital participation system is a comprehensible and reliable presentation of information such as public data, documents, and plans; the system must also provide a visualisation of spatial data, plans, panning alternatives, designs and simulations (Lieven 2017). Additionally, it must provide a digital feedback channel leading to the institutions responsible for the planning and allow citizens to voice their thoughts, criticism, ideas and comments in connection with planning projects (cf. Lieven 2017). In order to reach this objective, the project brings together a workshop tool established within the FindingPlaces Project at HCU (Noyman et al. 2017) and an online participation tool established by the Urban Workshop. Both tools are integrated over a digital interface that can be operated through physical tools: citizens can participate either online, from a remote desktop or smartphone, or onsite, in participatory events. The digital workshop tool is designed to present citizen comments and other maps and georeferenced 2D data on a large touch screen application. This browser-based application is an extension of the existing online participation tool. The graphical user interface (GUI) consists of the following elements: an interactive 2D map, an address search bar, a comment menu to show / hide citizen contributions of different categories, a layer menu to show / hide geodata layer, and a system menu with setup functionality, such as full-screen or lock-screen. The 2D map displays the geolocated comments and the geoinformation layer and is freely navigable. The position of the map usually shows an overview of the district / area that is being discussed in the current participation process. With the help of this digital workshop tool, citizens can access geospatial information and other services, discuss with other citizens and planners onsite and input their comments into the digital system. DIPAS can thus be classified as a softGIS tool as it visualizes localised knowledge through user-friendly digital tools (Kyttä and Kahila 2011).

The methodological design of DIPAS follows Arnstein's aforementioned ladder of participation and aims at facilitating processes of information, consultation, involvement and collaboration (Lieven 2017). Citizen contributions are usually characterised by a broad and heterogeneous range of topics. A thorough treatment of these written comments is key in order for the participatory process to unfold its effects. The analysis of these contributions has so far been done by contracted service providers, oftentimes on-the-spot. The increasing amount of participation data is a challenge. In the DIPAS system, this issue is addressed with the integration of a natural language processing tool (NLP) to analyse the citizen comments and perform an extraction of key topics, opinions, and valuations. DIPAS is set out to support complex participation processes online and onsite on the basis of available data and knowledge. The seamless integration into public data infrastructures and administration processes is a key element (Lieven 2017).

3.3 The Dimensions of Participation

3.3.1 The Participation Cube

This paper is methodologically rooted in Fung's (2006) concept of the three dimensions of participation: the selection of participants, the modes of communication, and decision making and the extent of authority and power. Fung set the framework to analyse participation procedures in a visual figure, the *Democracy Cube*. He aligns the three features along three axes with scales. Mapping a participatory event within these axes creates a three-dimensional space visualising the characteristics of each approach. These characteristics are: (1), selection of participants, (2) modes of communication, and (3) the extent of authority and power.

3.3.1.1 Selection of Participants

Put shortly, the first aspect addresses the threshold for participation. Research has pointed out that high thresholds exclude already marginalized groups such as migrants and people with lower sociocultural resources (Kast 17/2008; DIFU 2003), pushing them even further to the edge of having a political voice (Behörde für Stadtentwicklung und Umwelt 2013). Brown (2017) points to the increased significance of local populations that are affected by planning decisions. This emerges as a key question for e-participation over the past years: can e-participation help broaden outreach not only in absolute number, but also in terms of inclusiveness of otherwise difficult-to-reach communities?

As Fung (2006) outlines, participation of citizens can remedy a lack of knowledge, competence, public purpose to command compliance and cooperation. But the success of participation processes heavily depends on who participates; whether the subset is representative of the relevant population, whether important interests are included, whether participants possess information to make good judgements, and whether they are accountable to those who do not participate. The important questions thus are, according to Fung (2006): Who is eligible to participate, and how do individuals become participants?

This study includes additional questions regarding the possession of information: What knowledge do participants bring to the workshop, and what information do they obtain during the procedure?

To scrutinize the inclusiveness in the selection of participants, Fung's *Democracy Cube* shows a diversified definition of the public. Running the scale from *more exclusive* to *more inclusive*, the cube lists Expert Administrators – Elected Representatives – Professional Stakeholders – Lay Stakeholders – Random Selection – Open, Targeted Recruiting – Open, Self-Selection – Diffuse Public Sphere.

3.3.1.2 Modes of Communication

The second aspect responds to the mode of communication. Depending on the design of the participation procedure, the range of modes of communication and decision making can vary from purely conversational modes where citizens can express and exchange concerns and preferences, towards more deliberative modes, where individual choices are exchanged and mutual agreements are established (Granberg and Åström 2010, Behörde für Stadtentwicklung und Umwelt 2013; Healey 2003).

Main questions regarding the mode of communication are: Are preferences of citizens explored, developed and possibly transformed during a collective deliberation procedure? Are citizens' opinions translated and aggregated so they voice one collective choice instead of listing individual preferences, mediating the influence and power they bring towards officials? (Fung 2006, S. 68-69). These questions focus on characteristics such as the communication during events, the connection of relevant stakeholders and the aggregation of voices. As the modes of communication unfold the possibility to act creatively, so does the intensity of their influence. Therefore, the *Democracy Cube* arranges the modes of Communication range from *least intensive* to *most intense*: Listen as Spectator – Express Preferences – Develop Preferences – Aggregate and Bargain – Deliberate and Negotiate – Deploy Technique and Expertise.

3.3.1.3 The Extent of Authority and Power

The third aspect regards the scope of the procedure and the authority in decision making. Research has shown that although participatory processes are increasingly employed, they usually lack anchoring within democratic structures (Allianz Vielfältige Demokratie 2017). Especially when the procedure appears closed rather than open and unbiased, the unfolding power might be perceived as limited, which can lead to frustration and can harm trust in democratic and participatory procedures (Bertelsmann-Stiftung 2010). Aspects of this feature include communicative influence, altering or mobilising public opinion, and decision making, the level of influence on authorities as well as the transmission of citizen comments to planners and the integration of the participation into formal planning procedures.

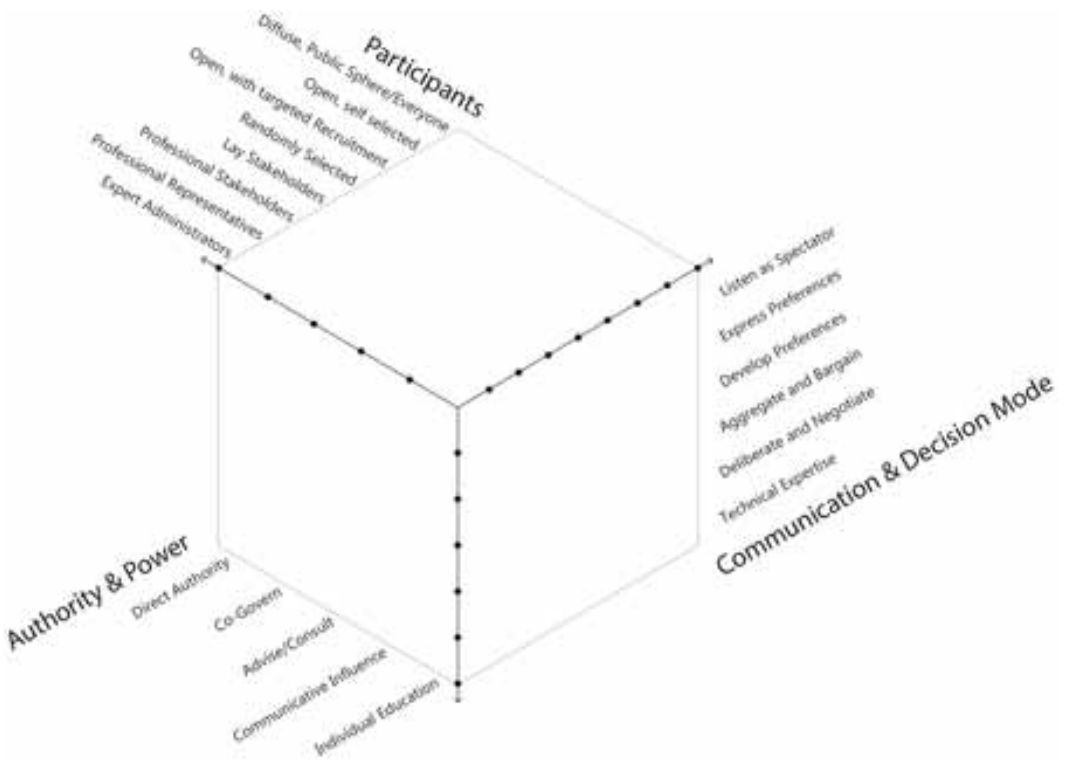
In order to assess the level of authority and power, the *Democracy Cube* aligns the extent of this aspect from *least authority* to *most authority*: Personal Benefits – Communicative Influence – Advise and Consult – Co-Governance – Direct Authority.

The present contribution suggests an update of Fung's *Democracy Cube*. From the root of the matrix to the outlines, and summarizing the sections developed above, Fung aligns the features in this way: participants from *most exclusive* to *most inclusive*, communication from *most intense* to *least intense*, scope from *most authoritarian* to *least authoritarian*. He then inserts different formats of participation into the matrix according to their characteristics within the three key features. The higher a procedure is characterized in terms of communication and scope, the closer it is situated at the root of the matrix. For the participant selection, this order switches: the more inclusive the participant selection, the further away this procedure will appear from the root of the matrix. While this tool allows for a spatial array of formats and therefore offers analytical clarity, it stays below its possibilities as a tool for visual analysis, as it lacks expressiveness in terms of the expansion in scale. This research introduces a variation of the *Democracy Cube*, for better distinction called the *Participation Cube (Figure 1)*, which aligns the three dimensions differently, namely: from lowest intensity of a feature to most. This allows for the same clarity in analysis but has the benefit of creating a visual representation of the level of openness, influence and complexity. As the three-dimensional space that is created grows, the more characteristics are fulfilled.

3.3.2 Data Collection and Analysis

In order to measure the impact of DIPAS, this paper aims at comparing the three formats of online, onsite and integrated participation by analysis with the *Participation Cube.* Due to the abundance of methodological setups for participation procedures (Nanz and Fritsche 2012), the comparison of

Figure 1. The Participation Cube (Source: author, adapted from Fung 2006)



the three modes of participation is a challenging task. In the following, the empirical data analysis is constrained to the evaluation of the integrated DIPAS system, while the evaluation of onsite and online procedures is taken from theoretical publications. This limits the explanatory power of the analysis as it only allows for experimental data for the integrated system. However, this research can thus operate as a starting discussion for future work on this topic.

The data for the evaluation of the integrated system stems from the empirical study that is carried out to support the technical development of DIPAS during the project runtime between September 2017 and August 2020. DIPAS is set out to be developed in three phases: a first Minimum Viable Product was rolled out in early 2018, and a second, upgraded product with more functions in early 2019. The development is accompanied by extensive research during each phase. This paper concentrates on the outcomes of the first two development phases.

The planners' perspective was assessed during a longer, standardised yet open interview that was held in November 2018 at the planning authority after the first phase of the development plan had been completed, and at the end of the first development phase of DIPAS. The two planners had been responsible for developing a new concept for development of the district of Bergedorf and had run a comprehensive participation procedure in onsite workshops. During these workshops, the baseline DIPAS system was piloted and approximately 120 visiting citizens were able to test the DIPAS workshop tool. Additionally, the authorities ran an online survey where citizens were able to contribute. 471 comments were collected via DIPAS. The remarks, ideas and questions were analysed by a contracted office who organised the parallel running analogue workshop and sent the results back to the public planners.

The user perspective of citizens was assessed with (A) a Usability and User Experience study in a laboratory setting, (B) piloting workshops during real participation procedures accompanied by short semi-structured interviews. During these events, questionnaires were handed out to participants assessing sociodemographic data such as age, professional background and residential area to allow for the evaluation of the diversity of included stakeholders.

(A) As the controlled setting of the study allows for more insights into the potential of the system, the analysis focuses on those data. However, it will be contrasted against findings from the piloting event, as this allows for insights into events that are more subject to spontaneity and improvisation. The Usability and User Experience study was held in three consecutive workshops in April 2019 with each 6-9 participants of all age groups, 24 participants in total. They were invited through newsletters of the Agency for Planning and Housing (BSW), the Hafencity University, and personal networks. The study took place in the building of the BSW during the early afternoon and evening, to allow people with family or work responsibilities to participate. Each workshop lasted 1.l5-2 hours each and was designed according to standards in sociological research on e-participation (for details on these standards see Baur and Blasius 2014; Bargas-Avila and Hornbæk 2011; Große 2018; Seaman 1999; Schrepp 2019). In three phases, the citizen's interaction with the tool was studied by participatory observation and a group discussion.

(B) The piloting at the kick-off event for a development plan (Kleiner Grasbrook) happened in December 2018 at an informational event and a subsequent workshop where the system was piloted in a local community café. Approximately 100 people were present, the majority of whom had a professional interest and approximately one fourth were residents of neighbouring areas (this was asked during the welcoming phase). Interaction was observed and short standardised interviews were held with randomly selected participants.

All observations were protocolled by staff of HafenCity University and the group discussion and short interviews recorded and transcribed using an online tool. The documents were imported to MaxQDA, coded and analysed. The coding and analysis of data followed the principles of a structured content analysis (Mayring and Fenzl 2014). The method was established in the 1980s to facilitate qualitative analysis of big data sets. Because this methodology generates categories, it demarcates from other text analysis tools. The category system structures the data and thus allows for more than

a free interpretation, but a thorough and rule-governed analysis that allows for intersubjective review (Mayring and Fenzl 2014). With the aid of this methodology, latent content can also be discovered from the data, and the qualitative insights can be analysed statistically. The first evaluation phase of the DIPAS system brought about 178 codes with 1105 coded parts in the data. The second phase brought 184 codes with 527 coded parts. These have been used in the analysis of Usability and User Experience and fed back to the developers of the project in comprehensive reports.

Next to an analytical discussion of these values, this chapter will visualise the arguments by drawing three-dimensional spaces within the matrix of the Participation Cube, each for the online and onsite processes, thus visually representing the extent of one participatory process compared to another. This research aims at understanding the impact of an integrated participation procedure as it combines the benefits from online and onsite procedures. This will be measured by laying the three-dimensional spaces on top of each other and analysing the resulted added or reduced spaces as a visual representation for added value.

4. RESULTS

4.1 Participant Selection

4.1.1 Acquisition of Participants

Onsite procedures rely heavily on the time resources of citizens and their verbal strength to persist in group discussions. Thus they oftentimes result in a homogenous group which is of above-average age and disproportionately male; often excluded are immigrants, people with young children or people with work obligations (Lieven 2017). Online procedures are likely to have a higher inclusivity as they are less bound to time and space and can be accessed anytime from anywhere. However, relying only on online participation could also have segregative effects, as Lieven points out: "*A digital divide persists along the lines of age, income and education. (…) When developing tools and methods for digitised participation, such segregation effects need to be taken into account, and counter-strategies need to be developed*" (Lieven 2017, p. 2478). The least restrictive method to select participants is open participation, where participants are self-selected. In the case of the DIPAS piloting event, participation was open to all. But when the audience at an event was asked about their background, only a small subset of people identified as neighbours of the development lot, while the majority was associated with the planning authorities or development companies, or represented other stakeholder groups such as members of initiatives or local commerce. This proves that those who choose to participate are frequently not representative of the larger public, and emphasis is on those who are wealthier and better educated. This could not be changed by the integrated system: People showed a lot of interest in DIPAS, but they were not well-informed about it. One participant emphasises that the system provides a great opportunity for citizens to participate, however it lacks advertising:

I think it's great that there's an online platform because there are always people who do not have time to attend the evening events for a variety of reasons. Because they cannot leave their workplace, or they have to be with their family at that time and so on. So now they have the opportunity to participate. However, what I've already thought about it on the way here, that it has not been widely promoted, so that all the people here in the district could know about it. So you have to lower the threshold in some way, one should sit down in the men's cafés and women meeting places. (Executive, 49 years old)

The question of adequate promotion of participation events is a topic that was not addressed within the research project but remains important. Participation processes, in practically any case, depend on skilful publicity and promotion strategies (Zentraler Immobilien Ausschuss 2013).

Having jumped the first threshold of *knowing about the event*, not all participants who were present interacted with the system. It has been established earlier that workshop settings privilege

those who are verbally strong and do not mind speaking up in a group of people, thereby excluding others. This dynamic has also been observed with the digital system. However, the issue of verbal strength seems to be less pronounced because the digital touch surface allows for participants to interact directly with the tool and add comments without having to speak up. On the other hand, the digital tool creates a divide along another line – between those participants who feel comfortable interacting with technology and those who do not. As one female participant puts it: "*I don't dislike it [the table tool]. It is just strange. One does not know what it is and might be a bit hesitant before approaching or interacting with it*" (Employee, 44 years old).

Here, the comparison between the piloting workshop and the study setting is significant: Compared to the piloting workshop, where oftentimes participants were observed walking past the tool, watching but not interacting, people showed immense interest to interact during the study. Because the study was characterised by the invitation to use the tool and a facilitator was present to support and encourage interaction, participants apparently felt more comfortable using and playing around with the technology. A conclusion for future uses of this tool emphasises the importance of an encouraging setting and the strong effect of the table facilitator.

4.1.2 Level of Information

When interacting with the different layers of spatial data in the workshop tool, participants reacted in a positive manner: "I found the interaction to be fun and rather innovative" said one participant. The visualisation of geospatial data facilitated high-quality discussions, and people appreciated the availability of data. The integration of quantitative data provided by the authorities with the local, qualitative knowledge of citizens' input – the softGIS – acted as support in extensive discussions.

Comparing onsite, online participation and the integrated DIPAS tool, characteristics on the scale of participant selection differ. Due to resource restrictions of onsite procedures, these would point to the characteristic open, self-selected participants, while online procedures allow for a diffuse public sphere and allow (almost) everyone to participate. DIPAS integrates an online tool in the public participation procedure and thus includes the diffuse public sphere. Thereby, DIPAS achieves the most inclusive participant selection mode (see visual analysis at the bottom in Figures 3-6).

4.2 Modes of Communication and Decision Making

The classical perception of onsite participation procedures is marked by lines of citizens waiting at a microphone in order to express their preferences towards officials. Communicative participation procedures have altered this by designing settings in which citizens can inform themselves on planning procedures, discuss in groups the advantages and disadvantages and voice their opinions. Depending on the mode of the procedure, it can result in a higher degree of aggregation of voices as the events oftentimes allow and even ask for group discussions on topics. Online commentaries are, due to the singularity of an online user, deemed to arise out of a single mind. However, as oftentimes tools showcase the contributions in online maps or lists, contributions experience a higher visibility and thus transparency. Online procedures additionally have the advantage of being connected to public data, allowing citizens to request information in real time, showing spatial data according to the questions that arise during the procedure, before writing a remark or commentary in order to make a more informed choice. In comparison, the knowledge base at offline onsite events is more limited and dependent on preparatory work by those implementing the procedure.

In the Usability and User Experience study as well as the piloting event of DIPAS, a high level of collaboration has been observed and voiced, while users additionally retrieved the available data to underpin and qualify discussions. In one discussion on the future use of an old building in the planning area, two users launched into a discussion on how to include a local rowing association into the development of the area. By retrieving information on historical and preserved buildings, the two users developed the idea of using the historical building that is situated directly at the waterfront as a storage facility for the rowing boats and input this idea into the system. Another user pointed out:

I really liked this about the table, that we sat there together and talked about the topic, and I notice: Oh, I am really interested in what the others have to say. I like that, and I wouldn't have thought that a table can do that. (Student, 32 years old)

This exemplifies the quality of interaction of onsite procedures that is supported by geospatial data that can be solicited individually when needed – a feature that is usually only available in online interfaces. DIPAS thus enables collaboration facilitated by technology – opinions are exchanged, preferences explored and possibly transformed through the solicitation of data, and new group preferences are communicated to officials via the contribution form. Decisions on what to write in a comment are made individually or in small groups. Contributions can also be voted and commented on, allowing not only for verbal onsite communication, but also for discussions online.

Comparing the online vs onsite DIPAS procedures in this domain, results highly vary. Whereas online procedures oftentimes are reduced to allowing citizens to express their preferences via online forms but not to engage over content, onsite procedures allow engagement about content but transmit preferences in their singularity as they are collected as notes, analysed on-spot by facilitators and presented in an aggregated way during the event and possibly in further reports. Online procedures can then be sorted into the characteristic *expressing preferences*, while offline procedures would dwell at *developing preferences*. DIPAS can be sorted into the characteristic of *developing preferences* as well, but the system does allow modes of deliberation and negotiation as well. DIPAS enables social choices to be communicated to officials, and has the significant benefit of allowing comments and remarks to be made any time of day from any location thus increasing scope and lowering thresholds for participation. But since DIPAS does not increase power in decision making, the system is still situated within the lower, communicative ranks of the scale.

4.3 Extent of Authority and Power

4.3.1 Transmission of Citizen Contributions to Planners

In onsite procedures, questions of transparency emerge regarding the impromptu analysis of comments by hired facilitators that cannot be held accountable by public vote. Online tools yield the power to increase transparency as they can showcase all contributions and make the data available to the public. However, as onsite procedures are well established, there are procedures for including citizen remarks from participation events into the formal planning procedures. It remains to be seen how this holds true for online procedures: the increased amount of data calls for a higher analysis effort and pulls more resources as the scope of participation increases. Here, online participation holds a key question: How should the upcoming big data in participation procedures be analysed? And how can transparency be achieved in the analytic procedures that eventually lead to decisions and preferences? Lieven sees the complexity of contributions as a key challenge and the meaningful restructuring of them as a main feature (Lieven 2017).

Another characteristic is the evaluation of contributions. What happens with the comments, who is evaluating and analysing them? How are they implemented in the planning process? In the first development phase of DIPAS, entries were output in an excel file and handed to the planning authorities. These were then been forwarded to the external service providers, "and they came up with a way to interpret the results" (planner). Due to restrictions in the resources of public authorities, the most sensitive task, the qualitative analysis, had been handed to external parties. In addition to the above-mentioned issues of lack of transparency and accountability, planners voiced their expectation that DIPAS would analyse and evaluate citizen comments. A reporting function has been elaborated on additionally:

If you could export data from the table to other programs, or automatically create a PowerPoint that you can present at the end of the day, or make screenshots and document intermediate results. An

interface to other digital possibilities, so you can save time for extra documentation. If I could wish for something, it would be that. (Planner)

4.3.2 Integrating the Results of Participation Procedures Into Formal Planning

Most communicative procedures address informal participation. As there is no legal obligation, citizen contributions remain only recommendations and do not develop authoritative power. This topic will be expanded on in the closing analysis.

Onsite procedures, as outlined above, can develop *advisory/consulting* characteristics, however the extent of this depends highly on the quality of the workshop and openness of the planning process. Online procedures hardly move beyond the mode of *communicative influence.* As DIPAS provides valuable mechanisms of collaboration and aggregation of voices, it can be sorted into the medium characteristics of this scale, *advice and consultation*:

In this mode, officials preserve their authority and power but commit themselves to receiving input from participants. The stated purpose of most public hearings and many other public meetings is to provide such advice. (Fung 2006, p. 69)

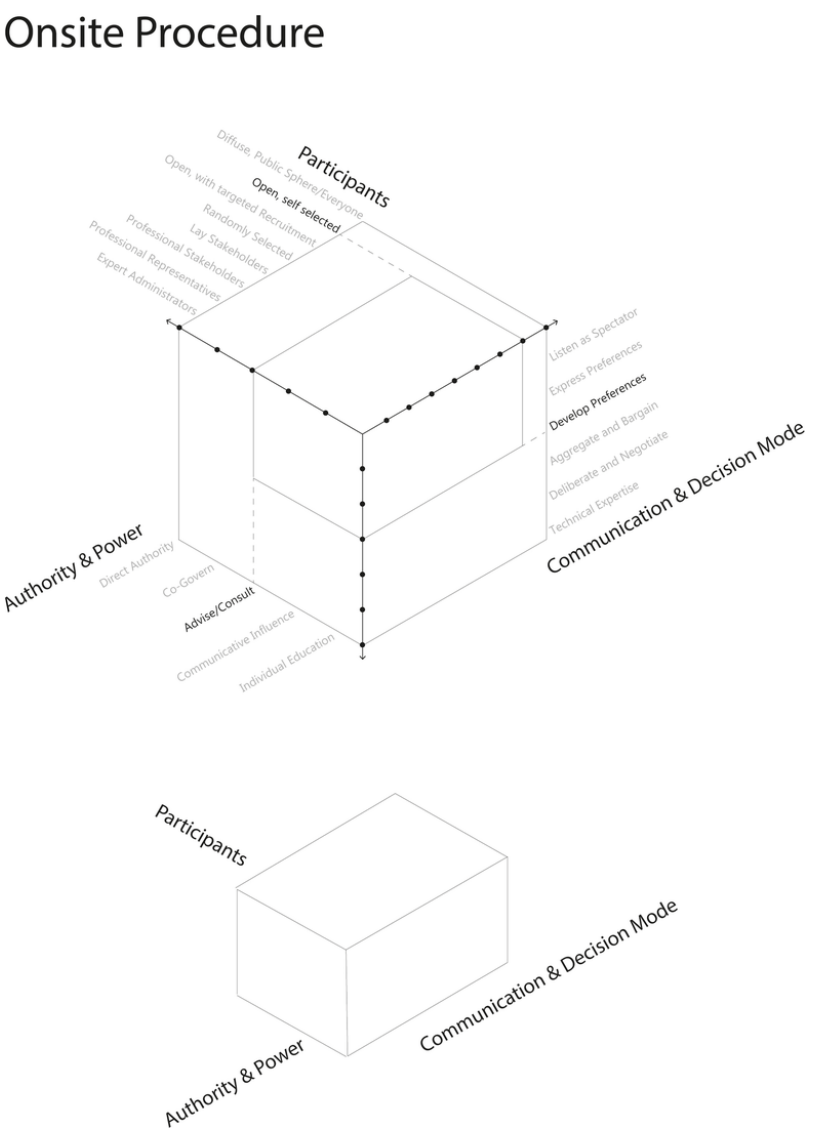
4.4 Comparing the Three Procedures

The visualisation shows that onsite procedures have a higher capacity in developing authority and power while employing more complex modes of communication and decision making compared to online procedures. The latter, however, invite a larger audience of participants compared to onsite procedures (Figures 2 and 3).

The comparison has shown that DIPAS as an integrated procedure combines the benefit of both approaches. It allows wider audiences to participate in the procedure by offering remote tools for participation typical of online procedures, but it also invites participants to engage in discussions both onsite and online, thus enabling citizens to exert advisory and consulting authority in the procedures (Figure 4).

DIPAS combines the better of both approaches, adding to each discipline a benefit from the other. This argument can be visualised with the Participation Cube by laying the three-dimensional spaces on top of each other and analysing the resulted increased added spaces (Figure 5). What this shows is that DIPAS has indeed an added value. This value stems from two main aspects: the aggregation of higher numbers of citizens and the communicative effort undertaken during onsite events. By inviting more citizens to voice their preferences via the online contribution tool, and at the same time enabling qualitative discussions and collaborative tinkering with the use of the digital workshop tool, DIPAS allows for a more diverse, higher-quality set of comments, ideas and remarks. This alone is not an added value, but the outcome of combining the advantages of both tools is. What arises out of this combination though, has implications for the political legitimacy of the participation procedure. All comments are publicly available on the DIPAS website, whichh offers a basic evaluation of comments according to topic, number of comments, and number of positive reactions from the community. This provides greater transparency since the public can access the results of the participation process. Unlike onsite procedures, no translation and mediation is carried out by external service providers, while at the same time the complete datasets of entries are publicly available for each citizen to access. This hands over control of the decision-making process. Because the extent and content of public opinion can be viewed by all, citizens are able to track which ideas have been incorporated in the planning decisions, and can hold their authorities accountable for their decision making.

Figure 2. Analysis of onsite procedures (Source: author, adapted from Fung 2006)



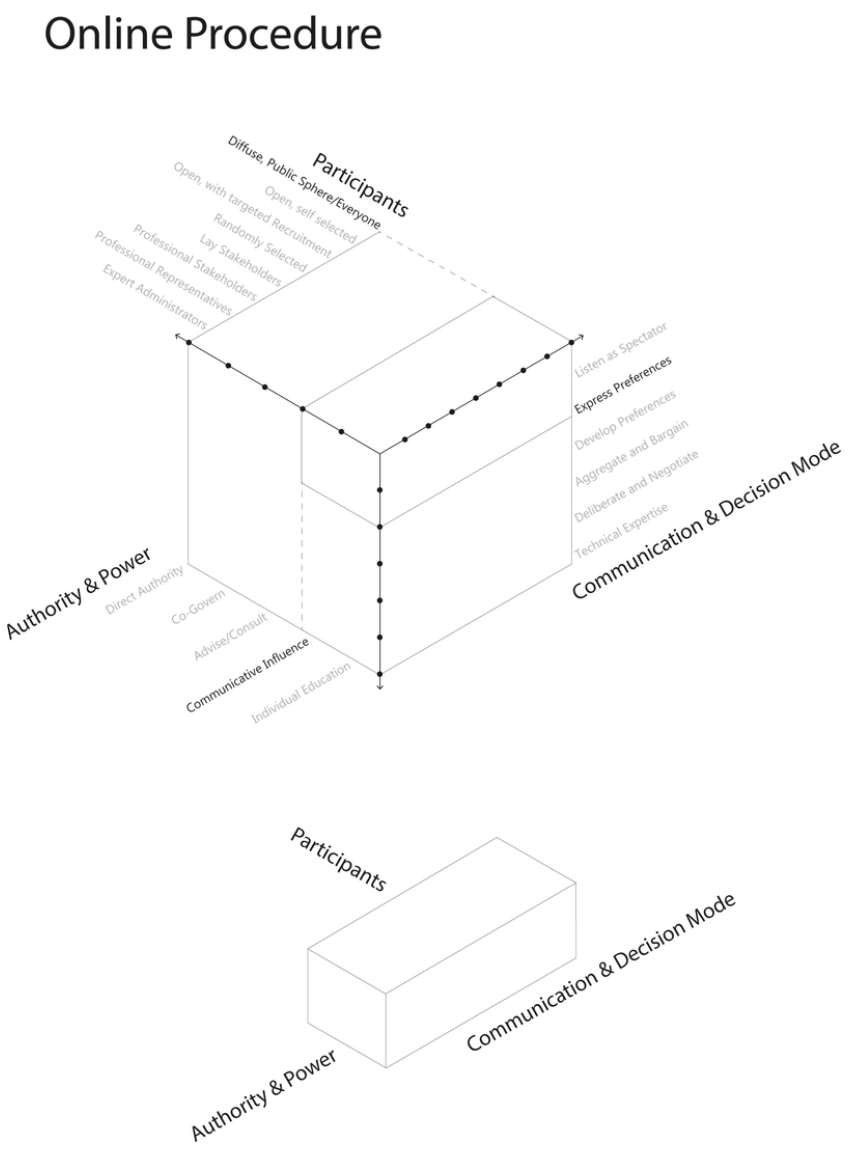
5. DISCUSSION

Questions remain regarding (1) the transparency of communication, (2) the diversity of participants, and (3) the integration of communicative participation in administrative processes and institutions.

5.1 Transparency in Communication

Up to now, no process has been established for how planners in the respective authorities are to integrate the findings from DIPAS tools into formal planning routines. Technical and administrative path dependencies certainly distort the potential uptake and utilisation of results. In the DIPAS project/study, all entries were collected, analysed and interpreted by a service provider specialising in public participation procedures. Their analysis was collected in a pdf document and sent to the planning authority, where remarks were clustered according to topics, with short summaries for each thematic

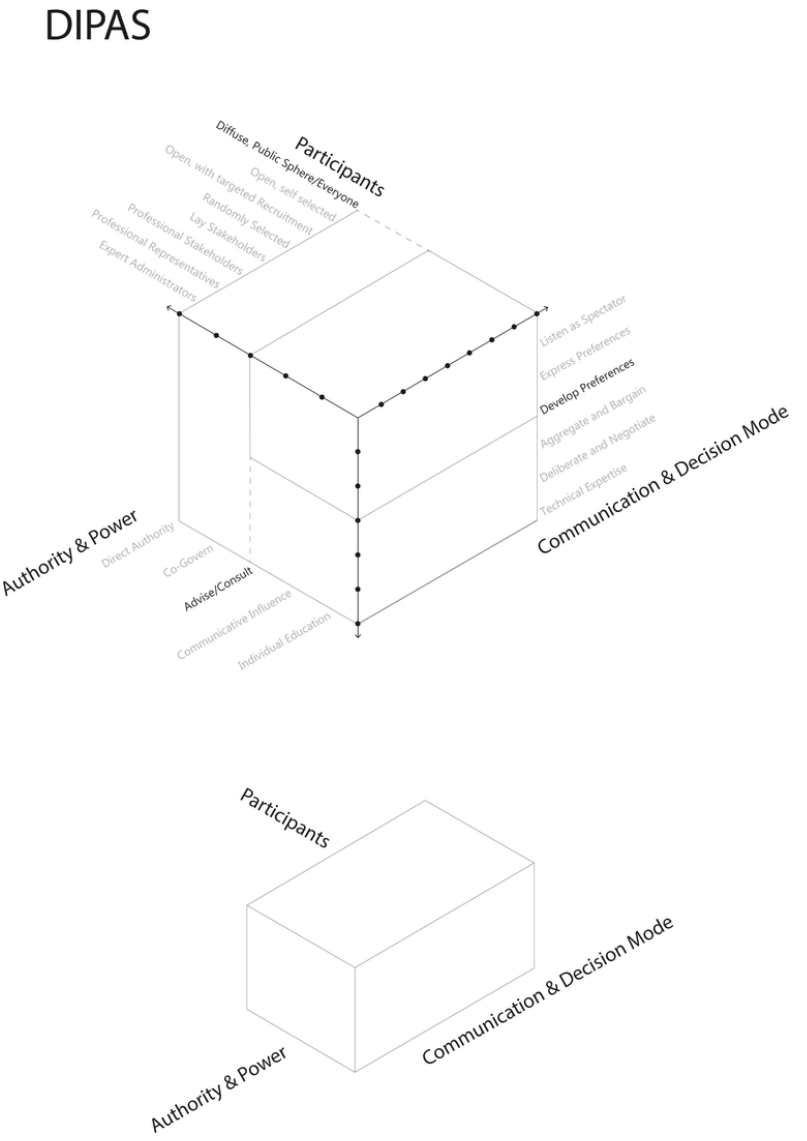
Figure 3. Analysis of online procedures (Source: author, adapted from Fung 2006)



cluster and main remarks indicated. The authority then developed a publication on the basis of this analysis. This process invites criticism: not only is the methodology of this process not transparent, it is also conducted by a private company, and thus lacks the level of accountability required of elected representatives. The possible influences of subjectivity in the aggregation of citizen comments is a topic for discussion. Additionally, by aggregating voices, the individual comments disappear from the discourse. This exacerbates later reviews of planning procedures because the historical data of past participation procedures is not accessible by the public anymore.

Greater transparency could be provided by variations on the moderation of these events, or by providing a direct channel for citizens to communicate their preferences. However, the review of these communications might overwhelm available resources at the public authorities. Within the DIPAS project, this challenge has been taken as a motivation to work on an evaluation tool that pre-clusters

Figure 4. Analysis of DIPAS procedures (Source: author, adapted from Fung 2006)

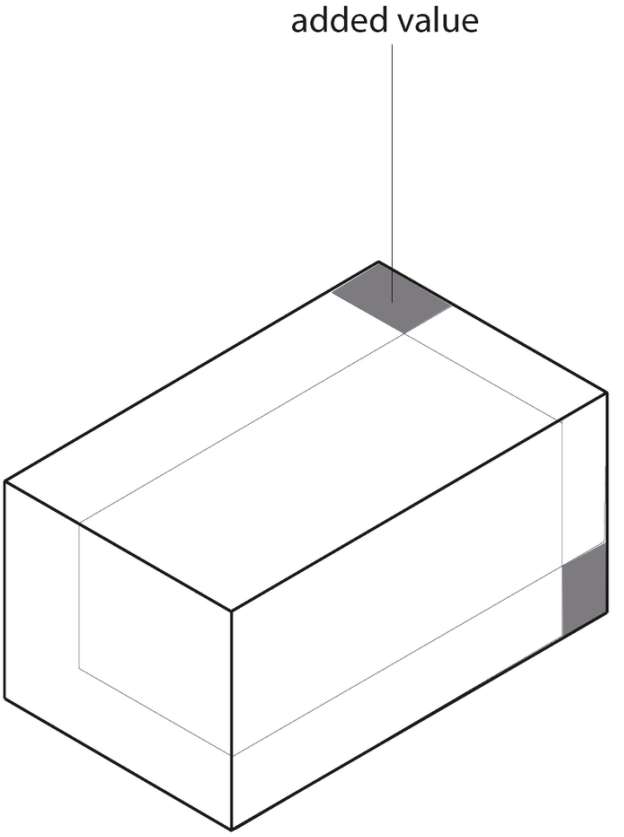


entries and extracts key topics based on mathematical functions. The advantage of automatically evaluating contributions is increased transparency and the aggregation of voices: if the knowledge about the amount citizens' real-time and historical interest in a specific topic is publicly available, it might create added pressure on officials to regard those voices in further planning. This would be content for further research. However, the development of an algorithm-based semantic analysis of citizen commentaries raises questions regarding the modes of decision making characteristics of these algorithms and has to be observed critically.

5.2 Diversity of Participants

Another aspect that could not be addressed within this study is the extent of diversity that the online participation tool, the one that DIPAS is integrating with the workshop tool, enables individually.

Figure 5. Added value (Source: author, adapted from Fung 2006)



This is due to the decision to let users comment without having to sign up, create an account and input personal data. A quantitative comparison of sociodemographic participant data in onsite and online participation procedures is required in order to determine whether the use of online tools increases diversity of participants, or if a digital divide appears/is evident, thus hindering certain groups from engaging. This would allow for insights into the performance of integrated systems such as DIPAS in this matter, and whether the combination of online and onsite procedures results in greater diversity in participation audiences.

5.3 Integration of Informal Participation Into Formal Planning

The new participation paradigm calls for a change not only in the tools used, but also in the culture of participation (Silva 2010). As has been elaborated, informal participation lacks political obligation and thus is limited in the extent of authority it enables. Within DIPAS, technical integration of the new software into existing and already operating technology is an objective – thus allowing for a lower threshold in the translation of knowledge from informal procedures into formal planning. This is being reached by two cascades in development. As a basis, the new software is developed within technological frameworks that are already in operation within the municipality to allow for easier maintenance and integration into existing systems. In a second step, the project aims at integrating the system into the digitised process chain that spans from the creation of first concepts until the approval of zoning plans, thus allowing planners to seamlessly access information from informal

procedures while working on their system and re-incorporate the results into the ongoing planning process. These questions could be addressed in further research on the DIPAS system.

6. CONCLUSION

This paper's objective was to assess the impact of an integrated participation system by utilising the *Participation Cube* for the evaluation and visualisation of empirical data. The research presented thus enriched the scientific discourse on participation by arguing for a complex view that integrates aspects beyond the *level of participation*. By giving an empirical example, an argument was made for a less normative view on the evaluation of participation since the highest form of citizen power might not always be the ideal decision mode. The design of participation procedures should be handled with care towards the abovementioned aspects and to the context and institutional framework in which the process is taking place. This paper introduced said Participation Cube, but further research should specify and detail its indicators.

By answering the research question, the added value of an integration of online tools with onsite participation procedures was highlighted. It was found that participants, being invited to discuss with others face to face, were engaging in discourse and collaboratively developing planning ideas, which they would then suggest. Compared to simple and singular online commentary, the heightened quality and depth of these contributions points to the importance of working with digital tools in moderated onsite settings. Future research should look into the content of these statements and analyse whether the quality of argumentation and level of innovation increases with the use of integrated systems.

A second finding highlights the importance of facilitation during these events: as this research has shown, participants were more likely to engage with the digital tools when a facilitator was present to encourage interaction with the tools – especially in the presence of people who self-claimed to have less experience with technology. This finding supports a counter-argument to a deployment of technological tools for public participation without further physical human interaction as the technological threshold might exclude members of the public from interacting.

A third argument supports the critique voiced by others (Arnstein 1969; Miessen 2012; Mouffe and Wagner 2013; Rancière 2008) that the power of participation relies heavily on the extent of authority it develops. In the case of DIPAS, the presented research has shown that however thorough the results of communicative participation procedures might be, a lack of legal obligation lowers the impact. It is yet to be seen whether the technological integration of results from informal participation procedures into administrative technical systems could ease access to that information. This matter could be observed in further research after the implementation of such a technical intersection.

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ENDNOTES

1 A remark on wording: In this paper, participatory planning events that employ communicative methods are summarized under the term *onsite procedures*. Oftentimes, but not exclusively, these events do not utilize digital tools and will thus serve as counterexamples to the case study events that integrate communicative methods and digital tools.

2 For a detailed analysis of e-participation frameworks see Wirtz et al. (2018).

3 For an extensive overview see Nanz and Fritsche (2012).

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