A taxonomy of resident engagement barriers in public open innovation

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Abstract

As governments at different levels – federal, state, and local – face complex societal challenges such as climate change or the transformation towards smart cities, efforts to engage civil society in decision-making and planning processes are increasing. However, not all citizens/residents are equally involved and broad participation is sometimes absent. Two bodies of literature are especially relevant to understanding potential barriers to participation that can lead to inequitable involvement in digital public decision-making: citizen/resident participation and public open innovation. Both must consider the reasons why residents may be unaware, unwilling, or unable to participate and find new ways to approach them, especially those who are marginalized and historically underrepresented. To assist practitioners and scholars in categorizing existing knowledge on barriers, we used a design sciences research approach to create a taxonomy for classifying resident engagement barriers in public open innovation. The final taxonomy consists of two dimensions and 14 characteristics. Public sector professionals, consultants and academics can use this taxonomy as a shared language to identify potential barriers and improve their engagement with residents.

Keywords

citizen participation, resident participation barriers, public open innovation barriers

1. Introduction

Municipalities are confronted with various complex challenges today, including responding to accelerating climate change [e.g., 6, 20]. In tackling these challenges, municipalities seek to engage residents in developing or evaluating new strategies [49]. However, not all residents participate equally in these processes and not all residents are equally affected by proposed actions [56]. Often, it is those who are already marginalized who are negatively affected and whose voices are missing or the least heart [9, 14, 20, 51, 65]. To prevent potential injustice, some municipalities are looking for better and more inclusive ways to engage with residents, including using digital means of engagement [e.g., 57]. There are specific barriers to participation that need to be understood to increase inclusion of certain stakeholder groups [28]. With a better understanding of these barriers, better informed choices regarding the design of engagement processes can be made.

These considerations are also relevant in the context of public sector *open innovation* processes. *Open innovation* refers to the incorporation of external knowledge sources [7]. We found little scholarly work that systematically investigated and conceptualized barriers to resident engagement in public *open innovation* processes. The existing literature on barriers in this context is scattered and lacks a common conceptualization. Consequently, more research on barriers on *open innovation* in the public sector is warranted [68].

The objective of the current research is to organize the existing knowledge about barriers in public *open innovation* and investigate the different dimensions and characteristics of relevant barriers. The results are organized within a taxonomy. Our research question (RQ) is: *How can different engagement barriers in public open innovation be categorized?*

Such a taxonomy can assist in the classification and accumulation of existing knowledge, thereby enabling comparison between studies and providing guidance for other researchers conducting future research as well as for practitioners wanting to develop inclusive *open innovation* processes. To conduct this research and develop the taxonomy we have used the *extended taxonomy design process* (ETDP) [33]. The anticipated contributions of this taxonomy would be twofold: First, it can be used as a common language to better understand, describe and classify existing barriers and potential solutions to addressing the barriers. Second, it can be used to develop better (digital) tools for participation or to improve existing ones with respect to the identified barriers.

2. Theoretical background

2.1. Citizen/resident engagement

Citizen/resident engagement or participation and how it is exercised in a 'good way' has been described in various ways [41]. Most relevant for our current context is its understanding as a collaborative approach between different stakeholders to achieve a common goal with a commitment to a shared set of values. This does not necessarily mean that everyone in the community can or should participate, but that efforts are made to increase opportunities and inclusiveness so that everyone who wants to can participate [4]. Several reasons are cited in the literature for engaging in resident participation, such as exercising liberal democratic values [28, 35], offering the opportunity to include more voices and perspectives that may not be heard otherwise [3] and more aligning with the preferences of the residents [28]. Citizen participation can take various forms and levels with different outcomes, ranging from pure manipulation (where citizens have no power and are merely used to create the appearance of involvement) to effective citizen control (where citizens have a high degree of power) [3]. Between these two extremes, there are multiple sub-stages of how participation can take place, often referred to as pure information exchange and consulting (e.g., via public hearings or discussions with stakeholders [13]), involvement in decision-making (through polling, advisory committees, or citizen/resident panels [13, 52]), or engagement/co-creation integrating residents also in the solution design (e.g., in the form of community partnerships or comanaged projects [13]). Any of these approaches bare the risk of unintentionally underrepresenting or excluding certain stakeholder groups or individuals [e.g., 3, 28].

2.2. Public open innovation

Open innovation generally describes the use of external knowledge for an organization's problem-solving [7]. The public sector is one area where *open innovation* processes have been promoted and applied [e.g., 16, 17, 30, 40]. Some scholars report mutual benefits for the both the public sector organization and the residents, such as increased resident knowledge about the process of implementing new policies, and cost savings for the government compared with external consultants [38]. The *open innovation* paradigm related directly to citizen/resident participation [e.g., 42, 54, 62]. One difference between the two is the tendency of *open innovation* literature to focus more on problem-solving [e.g., 68] and the innovation outcome, especially with the involvement of several actors from different stakeholder groups (residents/citizens, universities, private sector) [e.g., 16, 30]. In this way, the *open innovation* paradigm has brought new concepts and formats to the citizen/resident participation domain, such as civic hackathons [e.g., 68], innovation contests [e.g., 48], and citizen-sourcing [e.g., 22, 54]. *Open innovation* in the public sector can be differentiated into three forms: 1) public-to-public, 2) public-to-private, and 3) public-to-citizen [42].

The literature suggests that some innovation approaches fail or are insufficient because of barriers that somehow inhibit the innovation process itself [23] and/or hinder the participation of residents. Such barriers to public *open innovation* approaches can be understood from two perspectives: those within the orchestrating institutions [e.g., 15, 29, 37, 39] and those external to them [29]. While previous studies have reported several barriers, little is known about how different types of users are affected [59]. From an *open innovation* perspective, such barriers are problematic because they can negatively affect the outcomes of solution design [e.g., 48, 68].

2.3. Resident participation barriers

While ICT offers a potential solution to overcoming some barriers that impede citizen/resident participation, especially for marginalized and underrepresented groups [10, 11, 58], it can also create barriers of its own [e.g. for people with computer anxiety [47], accessibility issues [31], or lack of access to ICT [12]. Other reasons for non-participation include cultural and language barriers, socio-economic status, or disability, leading to non-participation of residents [1]. At a higher level of abstraction, these reasons for non-participation can be divided into three general categories: 1) Unable [e.g., 1], 2) unwilling [e.g., 1, 24], and 3) unaware [e.g., 1].

Within these three categories, previous work has identified several barriers. For example, individuals may be unable to participate because of language barriers, which can exist for both non-native speakers [e.g., 10] and native speakers due to the rigid language often used [e.g., 67]. Another example relates to traditional participation forms, such as public meetings, that can be inefficient and ineffective in attracting residents' interests or may be untimely, or time-consuming, leading to low participation [10]. Unfortunately, the current literature on this topic is scattered and lacks a common framework, which makes it more difficult to discern how the various barriers relate to one another, a shortcoming we hope our taxonomy will alleviate.

3. Research method

We have chosen the *extended taxonomy design process (ETDP)* [33] to develop a taxonomy of resident engagement barriers in public *open innovation.* Taxonomies are fundamental artifacts

or outputs of information systems research [21, 36, 43]. *ETDP* consists of six activities: I) Identify problem and motivate, II) Define objectives of a solution, III) Design and development, IV) Demonstration, V) Evaluation, VI) Communication [33]. Each activity comprises a number of steps. For a comprehensive overview, please refer to the original publication [33].

Within the *EDTP* activity I) we have specified as follows: The phenomenon under study are participation barriers for resident engagement in *open innovation* (*EDTP* step 1). The purpose is to serve as a common language, facilitating a more comprehensive understanding, description, and classification of existing knowledge (*EDTP* step 2). The target user group are scholars and public sector professionals in the field of public *open innovation* (*EDTP* step 3).

Within the *EDTP* activity II) we have defined: In this case, the taxonomy is intended to classify barriers to participation and engagement on the individual level in public *open innovation* (*EDTP* step 4). We have applied the minimum objective and subjective ending conditions proposed by Nickerson et al. [44:344] (*EDTP* step 5). However, we have specified the objective ending condition, namely that at least one object is classified under every characteristic of every dimension [44:344], to the extent that we have defined an 'object' as empirical evidence. In other words, we have sought at least one study that describes the apparent phenomena of a barrier in at least one dimension and one corresponding characteristic.

Within the *EDTP* activity III) we have used a *conceptual-to-empirical* approach based on a literature review to create the taxonomy [33]. In this approach the two dimensions, namely 'barrier type' and 'barrier effect' were added. Furthermore, three main characteristics of the dimension 'barrier type' have been added, namely 'unable', 'unwilling', and 'unaware'. Within the *empirical-to-conceptual iteration*, we used scholarly literature and an open coding [33] using the software *MAXQDA* [32]. In total we have reviewed 32 scholarly studies (journal articles and conference proceedings from the information systems and public management field). We started with a sample of 11 scholarly articles from our initial literature review. We then identified five additional relevant articles that we found using the database Scopus using the keywords 'public' AND 'open innovation' AND 'barrier'. Using a backward search by following the references in this initial sample, we identified 16 more articles. We stopped the backward search when we found saturation in the results. We started the initial inductive coding process, utilizing the three primary categories ('unable', 'unwilling', 'unaware'). We coded text fragments that were formulated in a negative description where barriers were explicitly mentioned (e.g., 'lack of trust', 'unwilling') as well as positive descriptions such as identified actions to overcome barriers (e.g., 'they need trust', 'willingness to participate'). This approach is consistent with the view that barriers (seen as the absence of a resource) and success factors (seen as the presence of a resource) are just *'two sides of the same coin'* [23].

Within the *EDTP* activity IV), we stopped when no new dimensions or characteristics were added, merged or split within the last iteration and we successfully checked the other objective ending conditions of Nickerson et al. [see 44].

As this study is ongoing research, we have not yet formally evaluated the taxonomy according to *EDTP* activity V).

4. Preliminary results

The first dimension describes the exact 'barrier type' – or why participation is hindered. The second dimension describes the 'barriers effect' on participation.

Within the dimension 'barrier effect', we have identified three main characteristics (being 'unaware', 'unwilling', or 'unable') and eleven sub-characteristics of this dimension, which are explained in Table 1.

Unaware. Lack of awareness may stem from factors external to the participation system or format, leading to the failure of well-designed systems during implementation or unmet expectations. While some cases of unawareness can be resolved through marketing or word-of-mouth, other issues may be deeply rooted in social systems and influenced by powerful actors shaping individuals' self-perception within society [18].

Unwilling. This barrier type refers to why individuals who could participate choose not to engage. For example, often due to a lack of trust in policymaking, change, or self-confidence, or general disinterest. Strategies to overcome these barrier types may involve persuading individuals to change their perspective or offering incentives if intrinsic motivation is absent.

Unable. Barriers related to being 'unable' to participate primarily stem from lack of resources or access, which can include intangible resources like time, knowledge, and information. Significant obstacles also include poorly designed or non-inclusive participation systems (digital or cyber-physical), which can be challenging for individuals with disabilities or those who cannot understand the provided language.

Table 1
Overview of barrier types

Barrier type/ sub-type	Description and empirical examples
Unaware	
Lack of general awareness	Individuals are unaware of the general possibility for participation [e.g., 29] and of specific participation activities regarding the time, place, and form in which they can participate. *Empirical example:* ▪ A study conducted on 19 civic hackathons in the United States: When Open Government Data sources are published, people of civic society may not always be aware of the availability of the different data sources or how to use them. Civic hackathons are often used to increase awareness of data availability and promote data utilization within a specific problem definition [68].
Lack of ownership awareness	Individuals may be aware of the opportunity to participate in general, or even in a specific activity, but may not recognize their own need to participate [62], or may believe that they are not part of the target group because they lack a sense of ownership [8]. Such a *lack of ownership awareness* could be related to a social status, where immigrants do not feel addressed by the term 'citizen' [e.g., 34]. *Empirical example:* ▪ A study using a quantitative survey conducted in the City of Seoul (South Korea): A sense of ownership of the city or district was one of the most important factors expressed by the survey participants [see 8].
Lack of efficiency/	Individuals are aware of the general opportunity to participate and see themselves as a target audience; however, they are not aware of the capabilities that a new participation format or tools can bring. This is primarily related to the use of new technology for participation formats. For

capability awareness	example, new and emerging technologies may provide benefits to improve the participation process, but these benefits may only be visible to a minority of technologically savvy individuals [27]. *Empirical example:* ▪ A study on a new blockchain-based platform for urban planning, implemented for the City of Berlin (Germany): It reported that the benefits and added value of complex technologies such as blockchain are mostly clear only to a minority of tech-savvy users, and that communication to non-expert users is a critical factor [see 27].

Unwilling

Lack of trust in policymaking/ change	Individuals often mistrust the policymaking process due to beliefs that the government does not act in their own interest [e.g. 1:33, 66] or that decisions are predetermined [60]. This skepticism often stems from past policymaking failures where governments ignored public contribution [29]. Reasons for this may include lack of commitment to change, past unreliability [37, 42], or inability to manage numerous responses from residents at a large scale. *Empirical example:* ▪ A study conducted in the City of Seoul (South Korea) using a quantitative survey instrument reported that trust in the government is one of the main drivers for participation. Examples included that the municipal government would maximize the benefits for its residents or try to bridge the gap between social classes [see 8].
Lack of interest in policymaking/ problem domain	Individuals are generally not interested in politics/policy [e.g., 1:33] or a specific problem domain [e.g., 60] and are therefore not interested in participating in policymaking. *Empirical example:* ▪ A study regarding an online ideation platform in the State of Bavaria (Germany): Political interest was the main driver for people to contribute ideas [see 26]. ▪ A study on the public participation of the residents of the surrounding municipalities regarding the 'Drentsche Aa National Park' (Netherlands): Some residents did not share the same concerns as the initiators or did not see the need for action [see 60].
Lack of incentives/ rewards	Individuals are only willing to participate if participation is incentivized [e.g. 1:33]. Such a barrier may arise when intrinsic motivation is insufficient, but user interaction is desired to stimulate the innovation process [53]. Also, marginalized communities, who have historically been exploited, may expect compensation for their time as a sign of appreciation for their effort and input. *Empirical example:* ▪ A study conducted in the City of Linz (Austria) found that incentives were effective in motivating residents to evaluate the ideas of others on an open ideation platform [see 53]. ▪ An innovation contest in the City of Tampere (Finland) used monetary rewards as a motivation tool. The study also reported that international students preferred the challenges of large corporations as they saw it as an opportunity to showcase their skills for the job market [see 48].
Lack of self-confidence	Individuals may have ideas or opinions about the decisions to be made, but they may not feel comfortable or confident sharing their ideas or opinions with others [25]. This may also be related to power differentials due to different levels of experience or status among different types of participant groups (e.g., city officials and people experiencing homelessness). *Empirical example:* ▪ A study on the design of a MOOC to encourage and train residents in co-creation approaches, developed for the City of Milton Keynes (England), reported that learners stated that not everyone would feel confident to post their own ideas on online platforms [see 25]. 3/21/21 1:36:00 AM

Unable

Accessibility barriers	This type covers barriers that prevent individuals from accessing participation formats. While offline participation was previously challenging due to location (e.g., for people living in rural communities) [45] and physical limitations [1:33], ICT has aimed to increase accessibility by

removing time and place constraints [38, 63]. However, ICT can also present new accessibility barriers through design issues [46] or unequal technology access, often referred to as the 'digital divide' [e.g., 37, 42, 54].

Empirical example:

- A study to test a newly developed web-based interactive map tool for informing planning in Pilsen (United States): Many local residents did not have access to the internet and were invited to the university lab [see 2].

Language barriers	The language used is foreign to the participants, so they cannot understand it or understand it only poorly – mainly addresses non-native speakers [e.g. 10] or the language is too rigid and therefore not feasible [e.g., 5, 39, 67] – mainly addresses native speakers. *Empirical example:* ■ A study about the open ideation platform *challenge.gov* of the central administration (United States): Public managers stated that it was very important to make requests for proposals understandable for amateur problem solvers in plain language, as the platform was intended to include the general public, not just experts [see 39].
Knowledge-based barriers	This type includes all barriers that relate to a difference in the knowledge, information [e.g., 29, 42], or skills [e.g., 5, 29, 37, 42] required to participate or that affect the effectiveness of participation. *Empirical example:* ■ A study conducted on 19 civic hackathons in the United States: Civic hackathons have tended to attract individuals with specific skills and knowledge about digital data and different technologies, resulting in a lack of diversity and inclusiveness in the solution design [see 68].
Temporal barriers	This type encompasses barriers related to the timing and duration of participation activities. As participation is typically a leisure activity for residents [54], some may not participate due to competing social or economic responsibilities, such as working multiple jobs [e.g., 1], or spending time with family, friends, or hobbies [54]. While ICT was previously seen as a time-saving solution for physical participation formats [e.g., 38, 54], in digital settings it can also pose a barrier depending on how time-consuming a task is [e.g., 23]. *Empirical example:* ■ An innovation contest to develop novel digital services to make public transportation in Stockholm (Sweden) more attractive: A lack of time and money to develop the submitted and selected ideas to a prototype stage was one of the main reasons why participants dropped out [see 23].

Within the dimension 'barrier effect', we have identified three main characteristics (exclusion/restriction, disruption, impediment), which are listed in Table 2.

Table 2
Overview of barrier effects

Barrier effect	Description and empirical example
Exclusion/ Restriction	Participation is often exclusive or restrictive [60, 61]. Exclusion refers to people who cannot participate because of barriers. Restriction is just another framing in which participation is only possible because of the possession of certain resources, knowledge/skills, or status [60]. *Empirical example:* ■ A study conducted on 19 civic hackathons in the United States: Civic hackathons have tended to attract individuals with specific skills and knowledge about digital data and different technologies, resulting in a lack of diversity and inclusiveness in the solution design [see 68].
Disruption	When barriers occur at a later stage, they can disrupt the participation process so that full participation is not possible as in other groups.

Empirical example:
- An innovation contest to develop novel digital services to make public transportation in Stockholm (Sweden) more attractive: A lack of time and money to develop the submitted and selected ideas to a prototype stage was one of the main reasons why participants dropped out [see 23].

Limitation   A barrier may also limit how residents can participate or interact in a process compared with other groups. Participation is therefore possible in principle, but to some extent what residents can contribute is limited and may not fully represent their whole perspective.
Empirical example:
- A study of the public participation process for the municipal strategic planning 'Shanghai 2035 Master Plan' (China): The study reported that a wide variety of participation approaches were used at different stages. However, while residents belonging to 'social elite' groups had more say in the whole process, the participation of the broader public was limited to a questionnaire [see 50].

5. Discussion and conclusion

Ensuring equal and equitable participation opportunities for all stakeholders, especially those who are underrepresented, is critical to achieving a just and sustainable society. Barriers to *open innovation* have been studied before [e.g., 15, 37, 39], but a better understanding of the variety of barriers is lacking. To support practitioners and researchers in identifying, analyzing, and classifying existing barriers and possible solutions, we have developed a taxonomy to structure the existing knowledge base. For government actors, our taxonomy offers a new perspective on how to analyze current processes and identify existing barriers. It can also be used as a systematic approach to guide evaluations of participation processes. In this regard, the types of barriers can help as a checklist to determine if current systems have taken these factors into account. The main limitation of this study is that the taxonomy was developed solely based on scholarly literature. While this approach is acceptable, the taxonomy could benefit from other qualitative data such as interviews [33]. Future research could use this structure in a systematic literature review [64] to identify gaps in the literature. Furthermore, the dimensions and characteristics may be extended by the nature of taxonomies as new characteristics appear that were not previously considered [44]. For example, different characteristics could appear in other nations or cultural contexts, such as other not yet identified stakeholder groups or socio-economic factors that influence the possibility to participate.

We hope that the taxonomy is beneficial to both practitioners and scholars alike. For example, our taxonomy could serve as descriptive knowledge, helping to guide *design science* approaches in the definition of the problem space or to characterize its contribution [19] by structuring the phenomenon of interest [33].

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References

[1] Alberto Alemanno. 2015. Stakeholder engagement in regulatory policy. In Regulatory Policy in Perspective. OECD Publishing, 115–158. doi:10.1787/9789264241800-6-en

[2] Kheir Al-Kodmany. 2001. Online tools for public participation. Government Information Quarterly 18, 4 (2001), 329–341. doi:10.1016/S0740-624X(01)00087-9

[3] Sherry R. Arnstein. 1969. A Ladder Of Citizen Participation. Journal of the American Institute of Planners 35, 4 (1969), 216–224. doi:10.1080/01944366908977225

[4] H. J. Aslin and Valerie A. Brown. 2004. Towards whole of community engagement: a practical toolkit. Murray-Darling Basin Commission, Canberra, ACT.

[5] Mark Baker, Jon Coaffee, and Graeme Sherriff. 2007. Achieving successful participation in the new UK spatial planning system. Planning Practice and Research 22, 1 (2007), 79–93. doi:10.1080/02697450601173371

[6] Ellen Bassett and Vivek Shandas. 2010. Innovation and climate action planning: Perspectives from municipal plans. Journal of the American Planning Association 76, 4 (2010), 435–450. doi:10.1080/01944363.2010.509703

[7] Henry Chesbrough and Marcel Bogers. 2014. Explicating Open Innovation: Clarifying an Emerging Paradigm for Understanding Innovation. In New Frontiers in Open Innovation. Oxford University Press, Oxford.

[8] Ju-Choel Choi and Changsoo Song. 2020. Factors explaining why some citizens engage in E-participation, while others do not. Government Information Quarterly 37, 4 (2020), 101524. doi:10.1016/j.giq.2020.101524

[9] Eric K Chu and Clare EB Cannon. 2021. Equity, inclusion, and justice as criteria for decision-making on climate adaptation in cities. Current Opinion in Environmental Sustainability 51, (2021), 85–94. doi:10.1016/j.cosust.2021.02.009

[10] Maria Manta Conroy and Jennifer Evans-Cowley. 2006. E-Participation in Planning: An Analysis of Cities Adopting On-Line Citizen Participation Tools. Environ Plann C Gov Policy 24, 3 (2006), 371–384. doi:10.1068/c1k

[11] Eric Corbett and Christopher A. Le Dantec. 2018. Going the Distance: Trust Work for Citizen Participation. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems, April 21, 2018. ACM, Montreal QC Canada, 1–13. doi:10.1145/3173574.3173886

[12] Sanjeev Dewan and Frederick J. Riggins. 2005. The Digital Divide: Current and Future Research Directions. JAIS 6, 12 (2005), 298–337. doi:10.17705/1jais.00074

[13] Thomas Dietz and Paul C. Stern. 2008. Public Participation in Environmental Assessment and Decision Making. National Academies Press, Washington, D.C. doi:10.17226/12434

[14] Jennifer Dobai and Manuel Riemer. 2024. Closing the Equity-Deficit: Sustainability Justice in Municipal Climate Action Planning in the Waterloo Region. American Journal of Community Psychology 73, (2024), 118–132. doi:0.1002/ajcp.12675

[15] Alberto Ferraris, Gabriele Santoro, and Anna Claudia Pellicelli. 2020. "Openness" of public governments in smart cities: removing the barriers for innovation and entrepreneurship. Int Entrep Manag J 16, 4 (2020), 1259–1280. doi:10.1007/s11365-020-00651-4

[16] Therese Figenschou, Jason Li-Ying, Anne Tanner, and Marcel Bogers. 2024. Open innovation in the public sector: A literature review on actors and boundaries. Technovation 131, (2024), 102940. doi:10.1016/j.technovation.2023.102940

[17] Lars Fuglsang. 2008. Capturing the benefits of open innovation in public innovation: a case study. IJSTM 9, 3/4 (2008), 234. doi:10.1504/IJSTM.2008.019705

[18] John Gaventa. 2006. Finding the Spaces for Change: A Power Analysis. IDS Bulletin 37, 6 (2006), 23–33. doi:10.1111/j.1759-5436.2006.tb00320.x

[19] Shirley Gregor and Alan R Hevner. 2013. Positioning and presenting design science research for maximum impact. MISQ 37, 2 (2013), 337–355.

[20] Dave Guyadeen, Jason Thistlethwaite, and Daniel Henstra. 2019. Evaluating the quality of municipal climate change plans in Canada. Climatic Change 152, 1 (2019), 121–143. doi:10.1007/s10584-018-2312-1

[21] Alan R. Hevner, Salvatore T. March, Jinsoo Park, and Sudha Ram. 2004. Design Science in Information Systems Research. MISQ 28, 1 (2004), 75–105. doi:10.2307/25148625

[22] Dennis Hilgers and Christoph Ihl. 2010. Citizensourcing: Applying the Concept of Open Innovation to the Public Sector. International Journal of Public Participation 4, 1 (2010).

[23] Anders Hjalmarsson, Paul Johannesson, Gustaf Juell-Skielse, and Daniel Rudmark. 2014. Beyond innovation contests: A framework of barriers to open innovation of digital services. In ECIS 14 22nd European Conference on Information Systems, 2014. Tel Aviv.

[24] Jesper Holgersson and Fredrik Karlsson. 2014. Public e-service development: Understanding citizens' conditions for participation. Government Information Quarterly 31, 3 (2014), 396–410. doi:10.1016/j.giq.2014.02.006

[25] Lorraine Hudson, Gerd Kortuem, Annika Wolff, and Patrina Law. 2016. Smart Cities MOOC: Teaching citizens how to co-create smart cities. In Proceedings of ICT for Sustainability 2016, 2016. Atlantis Press, Amsterdam, the Netherlands. doi:10.2991/ict4s-16.2016.18

[26] Katja Hutter, Johann Füller, and Giordano Koch. 2011. Why Citizens Engage in Open Government Platforms? Lecture Notes in Informatics P192, (2011).

[27] Beatrice Ietto, Jochen Rabe, Robert Muth, and Federica Pascucci. 2023. Blockchain for citizens' participation in urban planning: The case of the city of Berlin. A value sensitive design approach. Cities 140, (2023), 104382. doi:10.1016/j.cities.2023.104382

[28] Renee A. Irvin and John Stansbury. 2004. Citizen Participation in Decision Making: Is It Worth the Effort? Public Administration Review 64, 1 (2004), 55–65. doi:10.1111/j.1540-6210.2004.00346.x

[29] Marijn Janssen, Yannis Charalabidis, and Anneke Zuiderwijk. 2012. Benefits, Adoption Barriers and Myths of Open Data and Open Government. Information Systems Management 29, 4 (2012), 258–268. doi:10.1080/10580530.2012.716740

[30] Atreyi Kankanhalli, Anneke Zuiderwijk, and Giri Kumar Tayi. 2017. Open innovation in the public sector: A research agenda. Government Information Quarterly 34, 1 (2017), 84–89. doi:10.1016/j.giq.2016.12.002

[31] Elena Karahanna and Detmar W Straub. 1999. The psychological origins of perceived usefulness and ease-of-use. Information & Management 35, 4 (1999), 237–250. doi:10.1016/S0378-7206(98)00096-2

[32] Udo Kuckartz and Stefan Rädiker. 2019. Analyzing qualitative data with MAXQDA. Springer.

[33] Dennis Kundisch, Jan Muntermann, Anna Maria Oberländer, Daniel Rau, Maximilian Röglinger, Thorsten Schoormann, and Daniel Szopinski. 2021. An Update for Taxonomy Designers: Methodological Guidance from Information Systems Research. Bus Inf Syst Eng (2021). doi:10.1007/s12599-021-00723-x

[34] Joanna Lucio. 2009. Customers, Citizens, and Residents: The Semantics of Public Service Recipients. Administration & Society 41, 7 (2009), 878–899. doi:10.1177/0095399709344056

[35] Charru Malhotra, Abhinav Sharma, Nishtha Agarwal, and Ishita Malhotra. 2019. Review of Digital Citizen Engagement (DCE) Platform: A Case Study of MyGov of Government of India. In Proceedings of the 12th International Conference on Theory and Practice of Electronic Governance, April 03, 2019. ACM, Melbourne VIC Australia, 148–155. doi:10.1145/3326365.3326385

[36] Salvatore T March and Gerald F. Smith. 1995. Design and natural science research on information technology. Decision Support Systems 15, 4 (1995), 251–266. doi:10.1016/0167-9236(94)00041-2

[37] Albert Meijer. 2015. E-governance innovation: Barriers and strategies. Government Information Quarterly 32, 2 (2015), 198–206. doi:10.1016/j.giq.2015.01.001

[38] Ines Mergel. 2015. Opening Government: Designing Open Innovation Processes to Collaborate With External Problem Solvers. Social Science Computer Review 33, 5 (2015), 599–612. doi:10.1177/0894439314560851

[39] Ines Mergel. 2018. Open innovation in the public sector: drivers and barriers for the adoption of Challenge.gov. Public Management Review 20, 5 (2018), 726–745. doi:10.1080/14719037.2017.1320044

[40] Ines Mergel and Kevin C. Desouza. 2013. Implementing Open Innovation in the Public Sector: The Case of Challenge.gov. Public Admin Rev 73, 6 (2013), 882–890. doi:10.1111/puar.12141

[41] Evelina Moulder and Robert J. O'Neill. 2009. Citizen engagement and local government management. National Civic Review 98, 2 (2009), 21–30. doi:10.1002/ncr.248

[42] Rui Mu and Huanming Wang. 2022. A systematic literature review of open innovation in the public sector: comparing barriers and governance strategies of digital and non-digital open innovation. Public Management Review 24, 4 (2022), 489–511. doi:10.1080/14719037.2020.1838787

[43] Robert C Nickerson, Jan Muntermann, and Upkar Varshney. 2010. Taxonomy Development in Information Systems: A Literature Survey and Problem Statement. In Proceedings of the Sixteenth Americas Conference on Information Systems, 2010. Lima, Peru, 12.

[44] Robert C Nickerson, Upkar Varshney, and Jan Muntermann. 2013. A method for taxonomy development and its application in information systems. European Journal of Information Systems 22, 3 (2013), 336–359. doi:10.1057/ejis.2012.26

[45] OECD. Publishing. 2009. Focus on citizens: Public engagement for better policy and services. Organisation for Economic Co-operation and Development.

[46] Hans Persson, Henrik Åhman, Alexander Arvei Yngling, and Jan Gulliksen. 2015. Universal design, inclusive design, accessible design, design for all: different concepts—one goal? On the concept of accessibility—historical, methodological and philosophical aspects. Univ Access Inf Soc 14, 4 (2015), 505–526. doi:10.1007/s10209-014-0358-z

[47] C.W. Phang, J. Sutanto, A. Kankanhalli, Y. Li, B.C.Y. Tan, and H.-H. Teo. 2006. Senior Citizens' Acceptance of Information Systems: A Study in the Context of e-Government Services. IEEE Trans. Eng. Manage. 53, 4 (2006), 555–569. doi:10.1109/TEM.2006.883710

[48] Matti Pihlajamaa and Maria Merisalo. 2021. Organizing innovation contests for public procurement of innovation – a case study of smart city hackathons in Tampere, Finland. European Planning Studies 29, 10 (2021), 1906–1924. doi:10.1080/09654313.2021.1894097

[49] Tim Posselt, Manuel Riemer, Randy Sa'd, and Brenna Walsh. 2022. Breaking the Walls of Complex Systems Change in Cities: A Service Ecosystems and Psychological Perspective. JCCPE 1, 1 (2022), 32–60. doi:10.3138/jccpe-2022.1.1.0009

[50] Shuangshuang Qiu, Xiang Gao, Wenze Yue, and Qun Zhang. 2023. Government-led and Internet-empowered citizen participation in China's policymaking: A case study of the Shanghai 2035 Master Plan. Government Information Quarterly 40, 3 (2023), 101806. doi:10.1016/j.giq.2023.101806

[51] F. Ravensbergen and M. VanderPlaat. 2010. Barriers to citizen participation: the missing voices of people living with low income. Community Development Journal 45, 4 (2010), 389–403. doi:10.1093/cdj/bsp014

[52] Andrea Sarzynski. 2015. Public participation, civic capacity, and climate change adaptation in cities. Urban Climate 14, (2015), 52–67. doi:10.1016/j.uclim.2015.08.002

[53] Lisa Schmidthuber, Frank Piller, Marcel Bogers, and Dennis Hilgers. 2019. Citizen participation in public administration: investigating open government for social innovation. R&D Management 49, 3 (2019), 343–355.

[54] Ethan Seltzer and Dillon Mahmoudi. 2013. Citizen Participation, Open Innovation, and Crowdsourcing: Challenges and Opportunities for Planning. Journal of Planning Literature 28, 1 (2013), 3–18. doi:10.1177/0885412212469112

[55] Timon Sengewald and Tim Posselt. 2022. A Taxonomy of Engagement Barriers for Municipal Climate Action Planning: Work in Progress. Wirtschaftsinformatik 2022 Proceedings (2022), 9.

[56] Timon Sengewald, Tim Posselt, and Manuel Riemer. 2023. Who's got the power? - Examining the impact of digital open innovation platforms on social power dynamics in smart municipalities. In Proceedings of the 2023 Computers and People Research Conference, 2023. Pamona, CA, USA.

[57] Timon Sengewald, Tim Posselt, and Manuel Riemer. 2024. Influence of Digital Open Innovation Platforms on Power Differentials within Municipalities. In Proceedings of the 2024 Computers and People Research Conference, May 29, 2024. ACM, Murfreesboro TN USA, 1–7. doi:10.1145/3632634.3655877

[58] Erete Sheena and Jeniffer O. Burrell. 2017. Empowered Participation: Exploring How Citizens Use Technology in Local Governance. 2017. CHI 2017, Denver, CO, USA. http://dx.doi.org/10.1145/3025453.3025996

[59] Göran Smith and Johan Sandberg. 2018. Barriers to innovating with open government data: Exploring experiences across service phases and user types. IP 23, 3 (2018), 249–265. doi:10.3233/IP-170045

[60] Esther Turnhout, Severine Van Bommel, and Noelle Aarts. 2010. How Participation Creates Citizens: Participatory Governance as Performative Practice. E&S 15, 4 (2010), art26. doi:10.5751/ES-03701-150426

[61] Carina Veeckman. 2015. The City as Living Laboratory: Empowering Citizens with the Citadel Toolkit. Technology Innovation Management Review 5, 3 (2015), 6–17.

[62] W. H. Voorberg, V. J. J. M. Bekkers, and L. G. Tummers. 2015. A Systematic Review of Co-Creation and Co-Production: Embarking on the social innovation journey. Public Management Review 17, 9 (2015), 1333–1357. doi:10.1080/14719037.2014.930505

[63] Lori M. Weber, Alysha Loumakis, and James Bergman. 2003. Who Participates and Why?: An Analysis of Citizens on the Internet and the Mass Public. Social Science Computer Review 21, 1 (2003), 26–42. doi:10.1177/0894439302238969

[64] Jane Webster and Richard T Watson. 2002. Analyzing the Past to Prepare for the Future: Writing a Literature Review. MISQ 26, 2 (2002), xiii–xxiii.

[65] Stephen M. Wheeler. 2008. State and Municipal Climate Change Plans: The First Generation. Journal of the American Planning Association 74, 4 (2008), 481–496. doi:10.1080/01944360802377973

[66] Fons Wijnhoven, Michel Ehrenhard, and Johannes Kuhn. 2015. Open government objectives and participation motivations. Government Information Quarterly 32, 1 (2015), 30–42. doi:10.1016/j.giq.2014.10.002

[67] Alexander Wilson, Mark Tewdwr-Jones, and Rob Comber. 2019. Urban planning, public participation and digital technology: App development as a method of generating citizen involvement in local planning processes. Environment and Planning B: Urban Analytics and City Science 46, 2 (February 2019), 286–302. doi:10.1177/2399808317712515

[68] Qianli Yuan and Mila Gasco-Hernandez. 2021. Open innovation in the public sector: creating public value through civic hackathons. Public Management Review 23, 4 (2021), 523–544. doi:10.1080/14719037.2019.1695884