

# E-participation initiatives for local government services: A systematic literature review on stakeholder objectives and evaluation approaches

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*Abstract: Evaluating e-participation initiatives is critical to understanding their impact on democratic processes, public policy, and societal welfare. However, existing evaluation frameworks often neglect the complexities of multi-stakeholder environments. Through a systematic literature review of 47 empirical cases, this gap is addressed by developing a typology of evaluation categories (supply-side, user activity, public value, political, and societal impact) and a comprehensive evaluation framework that accounts for the diverse objectives of all the involved stakeholders – technology providers, local governments, and citizens. By integrating short-term engagement metrics and long-term societal outcomes, the framework ensures more accurate assessments of e-participation success. We argue that adopting a multi-stakeholder approach in evaluation can significantly enhance the effectiveness, inclusivity, and sustainability of e-participation initiatives. Our findings challenge current evaluation practices and provide guidance for practitioners aiming to optimize governance, improve public services, and empower citizens through more robust evaluation methods. This study lays the foundation for systematic evaluation methods that consider stakeholder objectives, crucial for advancing e-participation research, and policy.*

*Keywords: Citizen engagement, E-participation, E-participation evaluation, Literature review, Participatory processes*

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## 1. Introduction

Citizen participation in government processes has increasingly become a key topic in the political field and it relates to citizen engagement in decision making and public affairs (Grimmelikhuijsen & Welch, 2012). Although public participation in decision making is an old topic, more recently, digital technologies have profoundly disrupted the field, altering the long-established relationship between the political and public state, especially for local governments, as they constitute a new outlet of interactive communication with citizens, revitalizing local democracy in public discourses (Tejedo-Romero & Ferraz Esteves Araujo, 2020; Steinbach et al., 2019). These interactive communication channels reach a wider audience, enable informed citizen contributions (Garrido-Rodríguez et al., 2019), facilitate deliberative dialogue between government and citizens, and increase public trust (Wirtz et al., 2018).

The variety of digital citizens participatory processes around the world is diverse, ranging from crowdfunding of public services, place-based networks and community forums (Patel et al., 2013), digital participation games and mobile apps (Desouza and Bhagwatwar 2014), urban screens and interfaces, sensor-based systems for real-time data collection (Cazacu et al., 2021), or government-led online platforms for civic debates (Kersting, 2012). Social media, too, are considered participatory tools as they have the potential for interaction, although they have been used mostly for government dissemination of information (Mergel & Desouza, 2013). Such a rapid development of a large and multi-varied range of online citizen participation initiatives has caused a highly fragmented view of what online citizen participation entails, which has been further exacerbated by being incorporated within the concepts of e-government (Twizeyimana & Andersson, 2019; Tejedo-Romero & Ferraz Esteves Araujo, 2020); open government (Tai, 2021; Dawes et al., 2016), CivicTech (Wilson & Chakraborty, 2019; May & Ross, 2018; McNutt et al., 2016; Le Dantec et al., 2016; Saldivar et al. 2019; Patel et al., 2013), collaborative government (McGuire, 2006), e-participation (Oredo, 2022; Millard et al., 2009; Kubicek, 2010; Royo et al., 2020).

Moving beyond this conceptual ambiguity, we refer to the phenomenon of citizen participation in public matters through digital technologies as e-participation and define it as a government-led participatory process, enabled by digital technologies, to facilitate a more efficient and inclusive citizen engagement in public matters; allowing citizens to provide input in public-decision making and prompt government to become more responsive (Wirtz et al., 2018; Cho et al., 2020). More specifically, drawing on Arnstein's ladder of participation (1969) and the IAP2 spectrum of public participation (2018), a key element of e-participation is the fact that citizen engagement can be associated with citizens' more active roles of public participation. For Arnstein (1969), citizen participation progresses from passive information access to more active roles such as consultation, decision-making, and co-creation. Similarly, the IAP2 spectrum (2018) identifies five stages of e-participation: informing, consulting, involving, collaborating, and empowering citizens. Unlike e-government, which often involves one-way interaction, e-participation emphasizes higher levels of engagement, requiring active citizen roles such as providing feedback, co-developing solutions, and holding decision-making authority (Rozas et al., 2018).

However, despite the high expectations on the impact of digital technologies on participatory processes, their long-term uptake has, so far, been limited (Lindman et al., 2020). Evidence suggests that e-participation systems designed for consultation and dialogue between citizens and governments often fail to achieve the expected objectives and levels of take-up (Toots, 2019). E-participation systems have been criticized for limited results and acceptance (Charalabidis et al.,

2014; Kubicek and Aichholzer, 2016). Their limited success is often linked to a supply-side focus, neglect of user needs, and poorly defined implementation practices that overlook the socio-cultural and institutional contexts of all the involved groups of stakeholders (Janssen et al., 2017). This is especially challenging for smaller municipalities with resource and expertise constraints (Cho et al., 2020).

The growing interest in understanding the value of e-participation from the perspective of all the involved stakeholders (Hamm et al., 2023) has spawned increasing attention not only in relation to benefits and added value but also in relation to e-participation evaluation (Osman et al., 2014; Oredo, 2022). An e-participation initiative that seems effective to one stakeholder group may not be perceived the same by another (Rowe & Frewer, 2004). For instance, governments may be satisfied with the inflow of ideas from citizens, whereas citizens might feel dissatisfied because their contributions ultimately do not translate into governmental action or implementation. Therefore, it might be more sensible to differentiate evaluation according to the type of outcome that a given stakeholder is seeking and to bear in mind that each stakeholder group will have its own set of desired outcomes (Rowe & Frewer, 2004). Thus, when evaluating e-participation initiatives, it is important to differentiate among the various stakeholder perspectives.

Furthermore, scholars like Du et al. (2019) and Lindman et al. (2020) have contended that evaluating e-participation poses considerable challenges which cause many approaches to oversimplify the process, relying on broad generalizations of assumed benefits or speculative outcomes instead of empirical evidence. Therefore, it falls short in offering a comprehensive understanding of the real impact of e-participation (Dawes et al., 2016; Lindman et al., 2020; Ubaldi et al., 2019).

While Tai (2021) highlights an apparent gap between hypothesized effects and empirical evidence in assessing the impact of e-participation initiatives, Ubaldi et al. (2019) advocate for evidence-based evaluation and for more empirical cases to demonstrate the value of e-participation initiatives. As yet, the absence of robust evidence for the effectiveness of e-participation platforms underscores the need for more critical assessment methods (Kusters et al., 2018). Furthermore, despite the identification of various evaluation approaches targeting specific aspects of e-participation, to the best of our knowledge, the literature remains quite fragmented, focusing on assessing some elements but rarely informing on suitable methods of evaluation or not considering the multi-stakeholder nature of e-participation. According to Dawes et al. (2016) and Oredo (2022), instruments for a systematic and comprehensive evaluation that can be used to gauge the success of e-participation processes from the perspective of all the involved stakeholders are still missing.

Based on these premises, the objectives of this paper are: 1. develop a typology of stakeholder objectives, evaluation categories and methods of evaluation which comes from the analysis of empirical cases; 2. develop a multi-stakeholder evaluation framework that establishes clear evaluation approaches based on types of stakeholder's objectives. Therefore, this paper presents a systematic literature review (SLR) of articles which analyze e-participation initiatives at an empirical multi-stakeholder level. A keyword-centric search strategy was used across multiple academic databases (Scopus, Web of Science, ACM and AISel) to ensure comprehensive coverage of relevant literature.

While various forms of government manage e-participation, this paper focuses on projects implemented by municipalities as they provide a valuable context due to their reputation as

laboratories of democracy focused on community-level problem-solving (Cho et al., 2020). This study serves as an exploratory first step toward systematization of evaluation methods that consider diverse stakeholder objectives, crucial for advancing knowledge, practices, and policies in e-participation governance and determining the success of e-participation.

As we will discuss in section 2, to address the limitation of existing literature, our paper will introduce a comprehensive evaluation framework that integrates stakeholders' objectives, evaluation criteria, and methods. This framework aligns evaluation criteria and methods with the objectives of each stakeholder, promoting a multistakeholder approach to e-participation evaluation. By doing so, it advances the field of e-participation governance and represents a step toward clearer and more comprehensive governance models.

## **2. Theoretical context**

### **2.1. Related works**

This subsection is organised into four different parts, based on the specific typology of the analysed paper comprising review works, conceptual papers, research-based articles and policy-related documents.

#### **2.1.1. Review works**

Among the first attempts to review e-participation evaluation, Rowe & Fewer (2004) found that most of the analyzed literature adopted process-related criteria (how well an initiative is conducted) but only few articles adopt outcome-related approaches (if an initiative has achieved its objectives and has created the envisaged impact). Although outcome evaluation is much more desirable, it is more difficult to obtain reliable results as there is not a clear definition of an end point and effects might impact people who were not part of the process. Therefore, process evaluation is frequently used as an alternative evaluation approach (Rowe & Fewer, 2004). Pratchett et al. (2009) conducted a systematic review on e-participation success factors, identifying criteria like networking, skill development, community improvement, and increased community influence. Finally, Saldivar et al. (2019) provide a multi-dimensional evaluation, considering increase in participation, awareness, and impact on decision-making. Although these approaches acknowledge different types of engagement and long-term impacts, they do not sufficiently emphasize the differences of evaluation approaches according to stakeholder groups.

#### **2.1.2. Conceptual works**

Among the most relevant conceptual works, Kubicek (2010) focused on evaluating the effects of e-participation and identified success criteria such as gaining new ideas, increased acceptance of proposed measures, outreach, inclusivity, influence on decision-making, and satisfaction. Although this study considers outcome-related criteria, it overlooks a multi-stakeholder approach, such as recognizing that government and citizens may have differing expectations for the process and may thus apply distinct success criteria in their assessments. For example, Pina et al. (2017) evaluate citizen participation effectiveness from a local government's perspective, analyzing local managers' expectations in Germany, Austria, and Spain. Through a survey on e-participation in climate change programs, the study compares these managers' views on the impact of e-participation, providing insights into success and failure factors in environmental citizen engagement.

Macintosh and White (2008) propose an evaluation framework based on three perspectives: democratic, project, and socio-technical. The democratic perspective considers to what extent e-participation affects policy; the project perspective looks at the specific objectives of the e-participation initiative, such as engaging with a wider audience or providing feedback to citizens; the socio-technical perspective considers how the technology design directly affects the outcome. Interestingly, Macintosh and White (2008) also identify several methods for measurement of the evaluation. However, although the authors recognise the importance of considering all the stakeholders in the evaluation process, it remains unclear which stakeholders are considered in each perspective. In particular, the framework does not distinguish between project objectives based on stakeholder type, evaluation categories based on the type of objectives, or evaluation methods based on the category of evaluation.

### 2.1.3. Research works

Padovani et al. (2018) identify as evaluation criteria stakeholders' engagement and satisfaction in the process; balance between process efficiency and governmental effectiveness, costs versus benefits. Therefore, their evaluation focuses on process-related criteria and does not consider the sustained impact that arises in the long-term such as enhanced trust in government, more transparency and citizens impact on decision-making.

Parycek et al. (2014) provide a four-level framework: political, technical, social, and methodological level. Political evaluation focuses on the influence on political decision-making; technical evaluation focuses on platform and tools usability and suitability; social evaluation looks at measuring the level of community-building and digital connection reached; methodological evaluation looks at the effectiveness of the deliberation model, dissemination activities and effectiveness of engagement tactics.

Aichholzer et al. (2016), address the evaluation gap in e-participation, particularly in climate protection, by exploring methods to assess various forms of participation (information sharing, consultation, and cooperation) and measuring impacts like CO<sub>2</sub> reduction. Using a flexible framework, they distinguish between output, outcome, and impact to reflect different goals of the government and participants. They differentiate success criteria based on participation and type and stakeholder perspective, offering adaptable indicators for assessing future processes.

Irani et al. (2012), Scott et al. (2009), Oredo (2022) and Osman et al. (2014), starting from a critique of the predominant focus on the supply side perspective, argue that evaluation needs to address the benefits to the citizens, since they are the most important stakeholder of e-government activities. Accordingly, their satisfaction plays a central role in e-participation success. Scott et al. (2009) categorize e-government evaluation into supply side and demand side. Supply side focuses on service delivery, while the demand side emphasizes the government-citizen relationship. They argue that e-government failures often result from neglecting citizens' priorities. Osman et al. (2014) critique existing user satisfaction-focused evaluations and propose a comprehensive method considering benefits, costs, risks, and opportunities. Therefore, they mostly focus on process-related evaluation but overlook outcome-related evaluation, especially in relation to the longer-term effects of e-participation.

#### 2.1.4. Policy-related works

Developed by the United Nations as part of their e-Government Survey, the Local Online Service Index (LOSI) incorporates both process and outcome-related dimensions into its evaluation of e-government at the municipal level (Unpan, 2022). LOSI mostly assesses service delivery and transparency but also consultation platforms, and other tools fostering public engagement. LOSI's methodology addresses gaps in multi-stakeholder perspectives by emphasizing both user satisfaction and governmental effectiveness, making it a practical tool for assessing both immediate and sustained impacts of local e-participation efforts. However, it mostly focuses on how well local governments offer online services (like information availability, transactional services, etc.), rather than measuring how effectively these platforms facilitate citizen engagement or interaction and it fails to capture feedback quality.

Finally, Millard et al. (2009) introduce three levels of e-participation evaluation: operational output, middle-level outcomes (benefits for stakeholders), and top-level impact (societal objectives).

Table 1 provides a summary of the main evaluation approaches identified in the analyzed literature.

*Table 1: Summary of previous studies on e-participation evaluation*

<b>Authors</b>	<b>Evaluation approaches</b>	<b>Article type</b>
Rowe and Frewer (2004)	Process related criteria Outcome related criteria	Review
Pratchett et al. (2009)	Participant development of networking and skills Level of improvement within a community Community influence on decision-making	Review
Saldivar (2018)	Increase in participation Increase in level of awareness Impact on decision-making	Review
Kubicek (2010)	Gaining new ideas Increased acceptance of proposed measures Outreach and inclusivity Influence on decision-making Satisfaction with the process and its efficiency	Conceptual
Macintosh & White (2008)	Democratic criteria Project criteria Socio-technical criteria	Conceptual
Aichholzer et al. (2016)	Output evaluation Outcome evaluation Impact evaluation	Research

Padovani et al. (2018)	Stakeholders' engagement and satisfaction in the process Balance between process efficiency and governmental effectiveness Costs versus benefits	Research
Parycek et al. (2014)	Political level - influence on decision-making processes Technical level - platform and tools usability and suitability Social level - community-orientation Methodological level - effectiveness of engagement tactic	Research
Scott et al. (2009)	Supply side Demand side	Research
Osman et al. (2014)	User satisfaction based on benefits, costs, risks and opportunities of users	Review
Millard et al., (2009)	Base level - operational output Middle level - benefits of the project for stakeholders Top-level - societal objectives/public values	Policy-related
LOSI (Unpan, 2022)	Institutional framework Content provision: technology Service provision: participation and engagement	Policy-related

## 2.2. E-participation as a multi-stakeholder environment

The general agreement that the public sector involves a variety of stakeholders should also be transferred to the realm of e-government and, more specifically, of e-participation (Rowley, 2011).

In fact, according to Randma-Liiv (2021) and Dawes et al. (2016), e-participation processes should be seen as multi-stakeholder environments meant as the result of the collaboration among loosely-connected actors coming from very different regulatory contexts, interests, expectations, incentives, and cultures. Drawing on Randma-Liiv (2021), this paper specifically focuses on three type of actors: the local government which is usually in charge of ensuring the strategic and operational management of e-participation and covers the tasks of final decision making, information collection and processing; the technical platform provider, either represented by ICT experts, developers, NGO or research institutions, whose role is to oversee technological and functional aspects of the used digital tools; citizens as input providers but also as ultimate beneficiaries of e-participation initiatives.

The centrality of different stakeholders to the long-term effectiveness of an organization is indeed an old argument started by the seminal work of Freeman (1984). In fact, beside the design of the technological component, complex socio-technical systems require a structure that coordinates the relations and behaviors of the parties that operate the system, since, differences among stakeholders, if not properly addressed, might hinder cooperation, cause tensions and lead to poor participation and contribution to the initiative (Rowley, 2011; Irani et al., 2012; Osman et al., 2014).

Given this complexity, the potential for lasting impact in e-participation can be maximised when initiatives are considered as multi-stakeholder environments, focusing on the interaction of different factors and stakeholders in a specific context offers a more realistic understanding of the phenomena (Kautz & Cecez-Kecmanovic, 2013).

McNutt et al. (2016) emphasize that research has overlooked the multi-stakeholder context in e-participation governance. Governance is primarily understood as a politically charged notion that signifies “to govern” and it has to do with the balance of relations within a structured or networked space (Gorwa, 2019). In this project we consider governance as a set of formal and informal arrangements (norms, rules, regulations, etc.) which involve the intentional – direct or indirect – intervention in the activities of a group of stakeholders, with the intention to change a stakeholder’s modus operandi (Koop & Lodge, 2015). Accordingly, governance frameworks are systems that structure the course of actions that a set of stakeholders may choose to regulate their behavior through standard-setting, rule-making, monitoring, supervision and enforcement (Bharosa, 2022). In e-participation, critical governance decisions might involve defining the goals and benefits for each stakeholder and corresponding evaluation methods, assigning coordination rights and responsibilities, and ensuring compliance with legal and ethical standards (Scharpf, 1997).

Indeed, establishing efficient governance mechanisms is a major barrier to e-participation adoption, particularly in the public sector, where the absence of governance models for implementation and evaluation coordination may lead to strategic uncertainties and poor project performance (Letto et al., 2023). Therefore, since each stakeholder is likely to evaluate e-participation against their criteria and will be more or less satisfied with the outcomes based on their expectations, evaluation should have a multidimensional scope which reflects each actor’s perspective and expected benefits. Nonetheless, this is a key governance element that remains unaddressed in the literature and practice (Oredo, 2022; Osman et al., 2014).

### **3. Research methodology**

#### **3.1. Planning and preparation of the study**

We follow Tranfield et al. (2003) and Kitchenham and Charters (2007) for conducting an SLR. The underlying methodology consists of four sequential phases: 1. planning the review process, that is, specifically formulating the research proposal and developing the research protocol to reduce the researcher bias; 2. conducting the review process; 3. reporting and disseminating the findings, and 4. developing suggestions for future directions. The review aims at theory building, by organising the existing research on local government e-participation initiatives (Webster & Watson 2002). Therefore, following Gioia et al. (2013), broader categories were developed for systematising the data. These are type of initiative, level of engagement, e-participation tools, involved stakeholder objectives, evaluation approach of initiative, and assessment of evaluation.

### 3.2. Data collection

A keyword-centric approach was adopted to identify relevant articles. For gaining a comprehensive coverage of the existing literature on e-participation in municipal and multi-stakeholder contexts, the following search string was developed:

*Municipality OR Municipalities OR local government (Title, Abstract, Keywords)*

AND

*Stakeholders OR actors (Full Text)*

AND

*E-participation OR CivicTech OR Civic Tech OR Civic Technology OR e-government Or open government (Title, Abstract, Keywords)*

The selection of keywords was based on an initial brief screening of important literature on e-participation in the municipality context and iteratively refined during the identification and search phase (Rowley & Slack 2004). We intentionally did not include the evaluation aspect in the search string since this would lead to the risk of missing relevant articles. Furthermore, multiple synonyms were included to ensure a robust search. To achieve representative coverage of relevant literature, a hybrid approach for the sources of the SLR was applied. The final database selection included four academic databases. The ACM database was included because of the in-depth focus on technological research topics. The Web of Science and the SCOPUS databases were included because of the breadth of coverage of various research domains. Finally, the AIS database was included as it covers (among others) five of the leading conferences in information systems research. The search was conducted in May 2023.

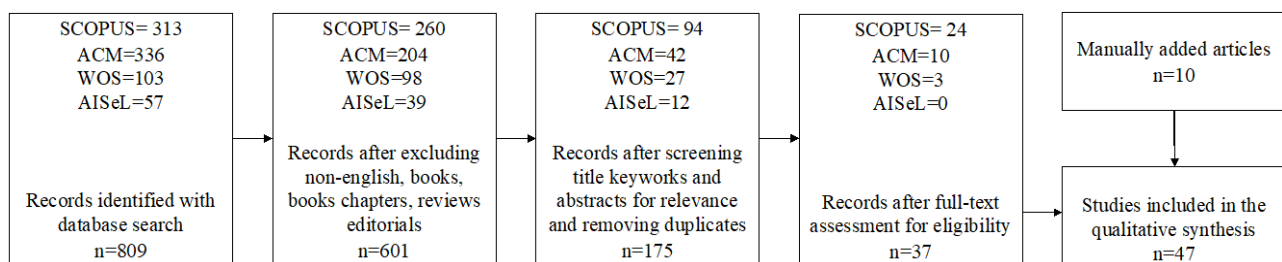
Table 2: Inclusion and exclusion criteria

<b>Inclusion criteria</b>
Peer-reviewed article
English language
Empirical Analysis of e-participation* initiatives at the municipal level
The article must discuss the e-participation initiative objectives (later stage)
The article must discuss the impact, evaluation or added value of the e-participation initiative
Articles from the last 10 years (2013-2023)
<b>Exclusion criteria</b>
Literature reviews
Conceptual or theoretical papers

Information layer of participation ONLY
Articles which talk about the penetration, integration and general use of e-participation within a municipality
Technical articles which discuss technology development only but no implementation
Articles which associate the municipality characteristics with the degree of success of the project

As the databases differ in their formats and indexing, minor adjustments were made to the specific search strings when necessary (for specific search strings per database, please see Appendix II). Based on the predefined search terms and databases, the initial keyword search yielded 809 hits. After the removal of results not qualified as academic publications (e.g., editors’ comments, editorials, book reviews, student theses, news) 601 distinct hits remained. Subsequently, to check whether a hit fit the research scope, an initial screening of the title, abstract and keywords defined by the author or database was conducted, and duplicates were removed. A total of 175 hits were identified as eligible for a full-text screening based on the developed and applied inclusion and exclusion criteria (Table 2). For example, peer-reviewed articles from the last 10 years (2013-2023) were focused on, since the investigated phenomena is still relatively new. After full-text screening 37 hits remain as relevant entries. The selection of additional final hits was based on the same eligibility process and criteria used for the keyword search. Ten relevant articles were added manually, resulting in 47 final hits (Figure 1). These papers were identified as highly relevant through a manual review of reference lists and expert recommendations to address gaps in the automated search.

Figure 1: Flow of the search process



### 3.3. Data analysis

During the data analysis, firstly, data were organised into pre-established broader categories using descriptive code names: type of initiative, level of engagement, e-participation tools, involved stakeholder objectives, evaluation approach of initiative, assessment of evaluation (cf. Gioia et al., 2013). Secondly, using an open coding approach, the articles were thoroughly read and inductively coded from empirical to conceptual. This method abstracts concepts from the subjective interpretation of the data and identifies emerging themes. Following Gioia et al. (2013), the first-order analysis was done with an open coding approach, and codes were organised into broad categories using descriptive names based on the main topic addressed in the coded text. During the second-order analysis, axial coding was used to identify similarities and differences among the first-order codes. This process merged related topics into new, higher-order, more abstract themes. In the third and fourth-order analyses, axial coding was also used for further abstraction into broader

categories (Strauss & Corbin 1998). The creation of categories and typologies proved to be a complex process, involving a five-round thematic analysis with coding that required making judgments, compromises, and applying a high level of abstraction, alongside a meticulous examination of each article to identify stakeholders' objectives, evaluation categories, and methods. A sample of the coding process can be found in Table 3.

Table 3: Example of coding process following Gioia et al.'s approach (2013)

First-order concepts - open coding	Second-order themes, axial coding	Third-order themes, axial coding	Aggregate micro dimensions	Aggregate macro dimensions
<p><i>"The overall average quality of deliberation score was 3.66 with the median 4 and the standard deviation 1.065" (A22)</i></p> <p><i>"The authors assessed the approach by comparing the citizen-generated ideas to ideas generated by city experts, concluding that user-generated ideas are less innovative but provide more user benefit" (A40)</i></p> <p><i>"Managers agreed that the proposals made by citizens were partially viable and that some of the comments were feasible" (A8)</i></p>	Degree of feasibility of citizens' proposals	Quality of contribution made by citizens	Citizen's contribution to public value	Public value evaluation
<p><i>"The collected organised insights will be expressed in plans, projects and activities in the areas of sustainability" (A34)</i></p> <p><i>"Inputs from participants about the hydrological regime and alterations of temporary rivers were key to improve the diagnosis" (A 45)</i></p> <p><i>"It has to be highlighted that none of the four winning ideas in any of the competitions have been implemented" (A11)</i></p>	Extent to which citizens' input was used/considered by local government for service improvement			
<p><i>"38 initial proposals were submitted, and 17 final proposals for voting were approved, costed and published" (A27)</i></p> <p><i>"The contest has achieved a result of ten compelling new public service prototypes and several hundred ideas to improve the local public services in Shanghai" (A7)</i></p>	Nr. of ideas/prototypes developed by citizens	Quantity of contribution made by citizens		

<p><i>“86 ideas were posted to the website by 73 individuals. Each idea describes a solution to a problem identified by the author” (A40)</i></p> <p><i>“60 residents attended an informative meeting about the participation process and submitted over 84 written suggestions” (A6)</i></p>				
<p><i>“63 place names, 1484 points collected in the Lombok project, only 367 place names had complete information on alternative names, meaning, and history behind the names, btw 825%” (A14)</i></p> <p><i>“700 evaluations of old buildings, 39 written memories, 12 images and 106 markings for personally important buildings, 228 posts shares using the hashtag” (A16)</i></p>	<p>Quantity of produced citizens' knowledge in citizen science projects</p>			
<p><i>“For each post, we also tracked the council's reply to any follow-up comments made by the respondents” (A1)</i></p> <p><i>“During the 15 months of our data collection period, eight managers left 54 comments, accounting for about 1.4% of the total comments of the forum. Examining the 20 most discussed ideas, only three managers contributed, making six comments” (A22)</i></p> <p><i>“the calculated stakeholder engagement index (E) for local governments and municipal mayors for several Kosovo municipalities” (A29)</i></p>	<p>Amount of provided feedback to citizens' enquiries</p>	<p>Quantity of contribution made by local government through its active participation</p>	<p>Local government contribution to public value</p>	
<p><i>“Low number of resolved complaints, low participation of government” (A44)</i></p> <p><i>“The findings show that only 25 initiatives (0.26%) received any solution, being 88% of the successful petitions at the federal level, and the rest 12%- at the municipal level”. (A23)</i></p>	<p>Nr. of resolved citizen's complaints</p>			

<p><i>“We attempted to integrate two of the projects into the city council processes [...] in both of these projects, the level of engagement from the council was low” (A40)</i></p> <p><i>“Competitions were successful, and new apps were made” (A41)</i></p> <p><i>“Open datasets provided by the municipality of Thessaloniki were used to develop 12–14 new applications during each hackathon” (A41)</i></p>	<p>Creation of new services</p>	<p>Quality of contribution made by local government through its active participation</p>		
<p><i>“The codesigned ICT would result in increased efficiency, thus freeing up time and allowing staff to do other work” (A4)</i></p> <p><i>“Citizens gave feedback to the municipality on the status of their neighborhood and the municipality reciprocated this by taking timely action”(A18)</i></p> <p><i>“Lack of government’s feedback to the reports” (A17)</i></p> <p><i>“A selected indicator of improved service delivery was the expected improvement in response time – as related to reported service faults” (A9)</i></p>	<p>Improvement of the delivery of public services</p>			

Secondly, articles were individually scrutinised to identify which evaluation category/ies and types of stakeholder objectives were used. The results were put into the evaluation category/method of evaluation matrix (see Table 7) and the objectives/evaluation category matrix (see Table 8). Finally, the two matrices were integrated together to develop a framework that recommends the best evaluation approaches based on the type of stakeholder and its objective (see Figure 2). On this basis, suggestions and future directions for research were derived.

## 4. Findings

### 4.1. Toward a typology of stakeholder objectives

#### 4.1.1. Local government objectives

Local government is usually the initiator of e-participation initiatives. Its objectives were identified in all 47 articles and divided into four broad categories: increase e-participation usage, enhance service delivery, design policy and improve societal welfare (Table 4).

“Increase e-participation usage” refers to the local government wanting to maximise the use and adoption of e-participation platforms by reaching a higher number of users, making the process

more inclusive by targeting specific demographic groups - such as youth (A2, A32) or women (A38) - or increasing citizens' interaction through comments or feedback.

“Enhancement of service delivery” refers to the local government seeking citizens' input for improving existing services, introducing new or modifying existing ones. Examples include e-participation apps with integrated PPGIS (Public Participatory Geographic Information Systems) for more accurate problem reporting (A30) or apps which allow reporting issues about public services in real-time (A44).

“Policy design” objectives relate to the local government trying to involve citizens in the decision-making process by considering their input during policy design. Therefore, initiatives such as participatory budgeting (A10), citizen petitions (A23), forums and polls (A35) are used by governments to gather knowledge which might be incorporated into future plans and political agendas.

Finally, “improve social welfare” aims at local governments wanting to gather citizens' inputs - e.g. preferences, opinions, priorities, ideas, and feedback - to better understand their needs so that the long-term living conditions of the broader population can be enhanced. Societal welfare can be pursued in several ways, including, for example, improved public spaces (A5, A14), more healthy living conditions (A6, A21), a more sustainable environment (A33), more efficient energy consumption (A21, A46) or better management of the environment (A45).

#### **4.1.2. Technology provider objectives**

Technology providers usually oversee all the functional and technological aspects of the participatory process. Their objectives were identified as: “testing a technology” in a specific participatory context, “testing a platform functionality”, and “testing the operational efficiency of a participatory process” (Table 4).

For example, VR was tested in A5 and A26 to enhance citizen experience and boost engagement, while gaming was tested in A19 and A26 to increase citizen motivation. Secondly, technology providers are interested in testing participatory platforms (web-based, mobile app, social media) in relation to their operational functionalities and ease of use. Finally, they might also be interested in assessing the effectiveness of a given participatory process (e.g. codesign, crowdfunding, participatory budgeting) in achieving specific goals. Overall, technology providers' objectives could be clearly identified in 38 articles.

#### **4.1.3. Citizen objectives**

Citizens, together with the government, are the ultimate beneficiaries and users of e-participation formats. Their objectives were clearly identified in 38 articles. First, citizens decide to get involved in e-participation to become “empowered” (Arnstein, 1969), meant as their capacity to influence policy design and political processes through their input (Table 4). Citizen input can take many forms, including opinions or votes (A27), proposals for local government planning (A36), petitions, budgets, suggestions for legislative processes (A23, A27, A35) or for the development of urban development plans (A25, A26). Indeed, the opportunity to exert real impact is considered the most important reason for citizens to become involved (Arnstein, 1969).

Secondly, citizens might seek to “solve problems”, usually related to the delivery of public services, asking for municipality support (Table 4). For example, the app developed in A30 allowed users to report issues with the inclusion of photos and locations for more accurate problem-solving. In A44, citizens could lodge complaints about public services, while in A32, they received real-time support. Third, citizens might want to contribute to e-participation processes to “improve societal welfare”. In this case, citizens' input might consist of specific knowledge, such as evaluations of historical buildings to help compile an inventory of the city's cultural heritage (A16). Alternatively, they can also undertake reporting activities - e.g. citizen science - on environmental issues such as the ecological status of river basins (A45). Citizens can also contribute to societal welfare by adopting a behaviour such as joining Positive Energy Districts (A46) or using smart meters (A21) to monitor and adjust energy consumption habits. Ultimately, citizens are also keen to “share their ideas” simply because they desire their voices to be acknowledged and valued (table 4). This can occur in various contexts, such as codesign initiatives for urban development (A1, A17) or suggestions to improve public services (A8, A20, 29). Unlike the other three types of objectives, participation via sharing ideas may not necessarily offer citizens direct benefits or empower them in policy-making processes, but it will be used by local governments to better understand their needs.

Table 4: Typology of objectives and associated stakeholders

Types of objectives	Associated stakeholder/s
Increase e-participation usage (n=10)	Local government
Enhance public services (n=12)	Local government, citizens
Policy design (n=14)	Local government, citizens
Improve societal welfare (n=15)	Local government, citizens
Solve problems (n=5)	Citizens
Test appropriateness of a technology (n=10)	Technology provider
Test functionality of a platform (n=16)	Technology provider
Test the efficiency of a participatory process (n=12)	Technology provider

## 4.2. Toward a typology of evaluation categories and methods of evaluation

The five broad evaluation categories identified from the coding process are supply-side evaluation, activity evaluation, public value evaluation, political impact evaluation, and societal impact evaluation (Table 5). Each category was further divided into evaluation criteria (Table 5) and, for each evaluation criterion, corresponding methods of evaluation were identified (Table 6).

### 4.2.1. Supply-side evaluation

As recognised in previous studies (Kubicek, 2010; Macintosh & White, 2008; Paricek et al., 2014), supply-side evaluation focuses on the quantity and quality of devices or products offered to citizens

for information, communication and engagement (Aichholzer & Westholm, 2009). Therefore, it looks at the appropriateness of devices for different target groups, their usability, efficiency and suitability (Aichholzer & Westholm, 2009). This category is further divided into three criteria: technological suitability, platform usability, and operational effectiveness. Technological suitability focuses on assessing the performance of a given technology (e.g. AI or VR) in supporting an e-participation process. For example, technologies such as gaming (A25) or VR (A26) can be tested in relation to their capacity to motivate citizens and increase engagement. As for methods of evaluation, citizen surveys were used in three cases. For example, in A5, VR's impact on voting confidence was measured. Two cases employed simulations and functional tests of the platform. Both methods can be considered equally suitable. Platform usability focuses on assessing a platform's ease of use or user-friendliness, and citizen surveys are mostly used to measure the perceived ease of use or assess the overall user experience. One article (A47) used local government surveys; however, since citizens are the larger user group of the platform, their opinions should be prioritised.

Finally, operational effectiveness assesses stakeholders' satisfaction with the overall process and/or their beliefs in the platform's ability to achieve its objectives efficiently (Macintosh & White, 2008). Operational effectiveness was measured using citizen surveys (n=5), citizen interviews (n=4) or local government interviews (n=7). In three articles, both local government and citizens were used as data sources. For instance, in A6, a post-evaluation survey was administered to both citizens and public managers engaged in a crowdsourcing initiative. This survey aimed to assess their perceptions regarding the effectiveness of the process. Conversely, in A43, semi-structured interviews were conducted with all stakeholders involved in a smart city project. The objective was to gain insight into their perspectives on the initiative. While a more comprehensive evaluation of operational effectiveness would involve input from both citizens and local government sources, the findings indicate that most articles predominantly featured the perspective of only one stakeholder group. Specifically, local government representatives were primarily interviewed, while citizens were often both surveyed and interviewed.

#### **4.2.2. User activity evaluation**

Consistent with previous studies (Padovani et al., 2018; Kubicek, 2010; Saldivar, 2018), user activity evaluation focuses on assessing citizens' engagement with the platform (Aichholzer & Westholm, 2009). Engagement, here, refers to the interactive actions performed by citizens when using the participatory platform, usually requiring low effort, such as joining, subscribing, liking, sharing, posting, voting, commenting, and so on. Specifically, activity evaluation was used to measure either the outreach, the representativeness or the inclusivity of a certain e-participation process. Quantitative engagement metrics, such as nr. of platform users, subscribers, participants, comments, reactions and so on, were used as the main method of evaluation. Although this form of evaluation does not measure the specific benefits or additional value provided by the process (Millard et al., 2009), it was widely utilised (n=20), primarily due to the convenience of gathering evaluation data. It is also important to consider that measurements should be complemented by comparing metrics, such as the size of the target population, or utilising appropriate benchmarking. However, these comparisons were found in two articles only.

### 4.2.3. Public value evaluation

As Kubicek (2010) and Millard et al. (2009) discussed, public value evaluation focuses on the contributed content, either from citizens or the government, to the e-participation processes and the resulting public value stemming from it. Specifically, the focus lies on how citizens contribute to e-participation processes by providing ideas, suggestions, proposals or relevant knowledge that local governments might use for public value creation, such as service improvement. Local government contribution evaluation focuses on the extent to which the government contributes to public value creation by providing feedback to citizens, replying to their questions or comments, and addressing complaints. For instance, in A44, the efficacy of a co-design process was evaluated based on the proportion of resolved complaints within a mobile application designed for public transport feedback. Local government activities evaluation is only used in six cases. In terms of evaluation methods, citizen contribution was assessed through citizen engagement metrics such as nr. of ideas, proposals or suggestions. Content analysis, although considered more valuable but resource-intensive (Kubicek, 2010), was only used in three cases. For example, in A40, citizens' ideas for urban planning were evaluated by experts to determine their viability for project implementation. In A22, the quality of citizens' ideas was assessed using content analysis methods. In some cases, proposed ideas were subjected to community voting processes (A11). Nonetheless, the most voted ideas were rarely implemented, and citizen contribution was mostly used as informative material. In terms of local government contribution, local government engagement metrics such as nr. of replies to citizens' enquiries, number of solved complaints, and nr. of provided feedback were used.

### 4.2.4. Political impact evaluation

Consistently to Parycek et al. (2014), Macintosh & White (2008) and Saldivar (2018), political evaluation focuses on assessing to what extent an e-participation process enables citizens to gain more power in influencing public decision-making and increase the legitimacy of public deliberation.

This category is further divided into two evaluation criteria: effective and inspirational evaluation. Effective evaluation assesses when citizens' input, in the form of voting or proposals, has a real impact on political decisions. Inspirational evaluation (n=4) is used when citizens' input does not have a real impact on decision-making; however, it is used by policymakers as an inspirational source or used to gauge an impression on priorities among different options. In terms of evaluation methods, effective political evaluation was measured by providing evidence that citizens' input was used for bringing changes. For instance, in A23, evidence was provided by tallying resolved petitions; in A27, citizen budget allocations were included in the municipality budget, and A45, citizen water management ideas were incorporated into future plans. In inspirational political evaluation, local government interviews were used as the main method. In this case, interviewees mentioned that citizens' input would be considered for future local government agendas, but it remained unclear which input would be utilised and how. For instance, in A6, public managers acknowledged that citizens' proposals were deemed partially viable, with the potential inclusion of some comments in future municipal policies, but without specifying which comments would be considered and how.

#### 4.2.5. Societal impact evaluation

Societal impact evaluation refers to the long-term effects and benefits created by an e-participation initiative in terms of societal values such as inclusion, sustainability, democracy, etc. (Pratchett et al., 2009; Macintosh & White, 2008; Parycek et al., 2014; Millard et al., 2009). It can be used in relation to changes in behaviour, attitudes, or a general improvement of the living conditions. Specifically, behavioural evaluation (n=3) assesses the extent to which e-participation has changed citizens' attitudes or behaviour (Whitmarsh et al., 2011). For example, in A21, the reduction of energy consumption was evaluated by assessing a change in consumption behaviour through the adoption of smart meters able to monitor consumption data. Nonetheless, considering the difficulties of assessing behavioural changes, this evaluation criteria is rarely used (cf. Whitmarsh et al., 2011). Methods of evaluation include either evidence, as in A21, or the less accurate author's understanding of the situation and insights developed through reflective practices and analysis of the case. Wellbeing evaluation (n=4) seeks to assess the long-term impact of e-participation on the broader societal well-being, for example, the improvement of urban spaces (A13), the natural environment (A45) or it focuses on issues such as poverty reduction or the health conditions of minorities (A33). Evidence or local government interviews were equally used as evaluation methods in these cases.

Table 5: Description of categories and criteria of e-participation evaluation

<b>Evaluation category</b>	<b>Evaluation criteria</b>	<b>Description</b>
Supply-side	Technological suitability	Functional performance of a given technology in supporting e-participation processes.
	Platform usability	Perceived ease of use and user experience with the platform.
	Operational effectiveness	Stakeholders' satisfaction with the process in relation to its efficiency and effectiveness in achieving the scope it was developed for.
User activity	Citizen engagement	Citizens' outreach, representativeness or inclusivity of a certain e-participation process.
Public value	Citizen contribution	Amount and quality of the contribution made by citizens to the e-participation initiative.
	Local government contribution	Amount and type of contribution to public value creation through local government active participation.
Political impact	Effective	Extent to which citizens input has a real impact on decision-making processes.
	Inspirational	Extent to which citizens' input has an inspirational impact on decision-making processes.
Societal impact	Behavioural change	Change in citizens' attitudes or behaviour.
	Wellbeing	Extent to which the initiative brings long-term beneficial impact to the society at large.

Table 6: Description of evaluation methods

<b>Evaluation method</b>	<b>Description</b>
Citizen data-based	Surveys or interviews with citizens as the main source of data.
Government data-based	Surveys or interviews with local government staff as the main source of data.
Citizen engagement-based	Nr. of posts, shares, likes, downloads, visits, registrations, content produced, submissions, participants, ideas or proposals, prototypes developed, comments, contributions, users, reports or complaints, votes, discussions, respondents.
Government response-based	Nr. of replies to citizens' enquiries, solved complaints, provided feedback, nr. of posts.
Content analysis-based	Type of input provided by citizens for co-creation initiatives and its quality.
Outcome-based	Nr. of implemented ideas, implemented decisions, implemented proposals, budget allocation, and new services.
Author insights-based	Authors' insights disclosure into what worked or not worked based on direct observations, functional tests, controlled experiments, and reflective learning.

Based on the above findings, table 7 provides a summary matrix of the evaluation methods used for each criterion. Overall, methods have been categorised according to the source of data. The findings show that the provision of quantitative and qualitative evidence of the impact of e-participation processes, although it offers robust support, is rather challenging to identify and doesn't happen very frequently (n=12). Government data-based methods offer weaker support for political and societal impact evaluation as they might provide biased results. Author insights-based methods are suitable for supply-side evaluation but less indicated for societal impact evaluation as they lack the relevant stakeholders' perspective.

Table 7: Summary of evaluation categories with the corresponding evaluation methods

Evaluation category	Evaluation criteria	Evaluation methods						
		Citizen data-based	Government data-based	Citizen engagement-based	Government response-based	Content analysis-based	Outcome-based	Author insights-based
Supply side	Technological suitability	4		1				2
	Platform usability	8	1					
	Operational effectiveness	9	8					2
User activity	Citizen engagement			19				1
Public value	Citizen contribution			15		3		
	Local government contribution				6			
Political impact	Effective						9	
	Inspirational		4					
Societal impact	Behavioral change						1	2
	Wellbeing		2				2	

### 4.3. A multi-stakeholder approach to e-participation evaluation

Reflecting on the multistakeholder nature of e-participation and drawing inspiration from Rowley (2011), Table 8 pairs the stakeholders' objectives identified in Table 4 with appropriate evaluation criteria.

Table 8: Stakeholder objectives and evaluation approaches matrix

		Stakeholder objectives							
Evaluation criteria/category		Increase usage	Enhance public services	Policy design	Improve societal welfare	Solve problems	Test platform	Test process	Test technology
Supply-side	Technological suitability								4
	Usability						4		
	Operational effectiveness						4	3	3
User activity	Citizen engagement	8	2		1				
Public value	Citizen contribution	2	3		6				
	Local government contribution		4			2			
	Effective			5					
Political impact	Inspirational			2					
Societal impact	Behavioural change				2				
	Wellbeing				3				
n/a	n/a		2	5	7	3	8	5	3

When examining the matrix from the left to the right column, it becomes evident that the most pertinent evaluation criterion for the government's objective of increasing usage is citizen engagement, as indicated by the majority of articles (n=8). Additionally, citizens' contribution can serve as a viable measure, as the volume of content provided by citizens offers insights into platform activity (n=2).

Evaluation of public service enhancement involves assessments of both citizens and local government contributions. From the government's perspective, citizen contribution evaluation concentrates on citizen-generated content that informs governmental understanding of needs or improves service delivery. Conversely, local government contribution evaluation, from citizens' viewpoints, measures governmental responsiveness and willingness to engage with citizens. Higher local government engagement typically correlates with greater citizen satisfaction, as citizens feel their voices are heard. While citizen engagement was utilised in two instances, it may be perceived as less comprehensive, as usage metrics alone may not fully capture the depth or quality of citizen contributions.

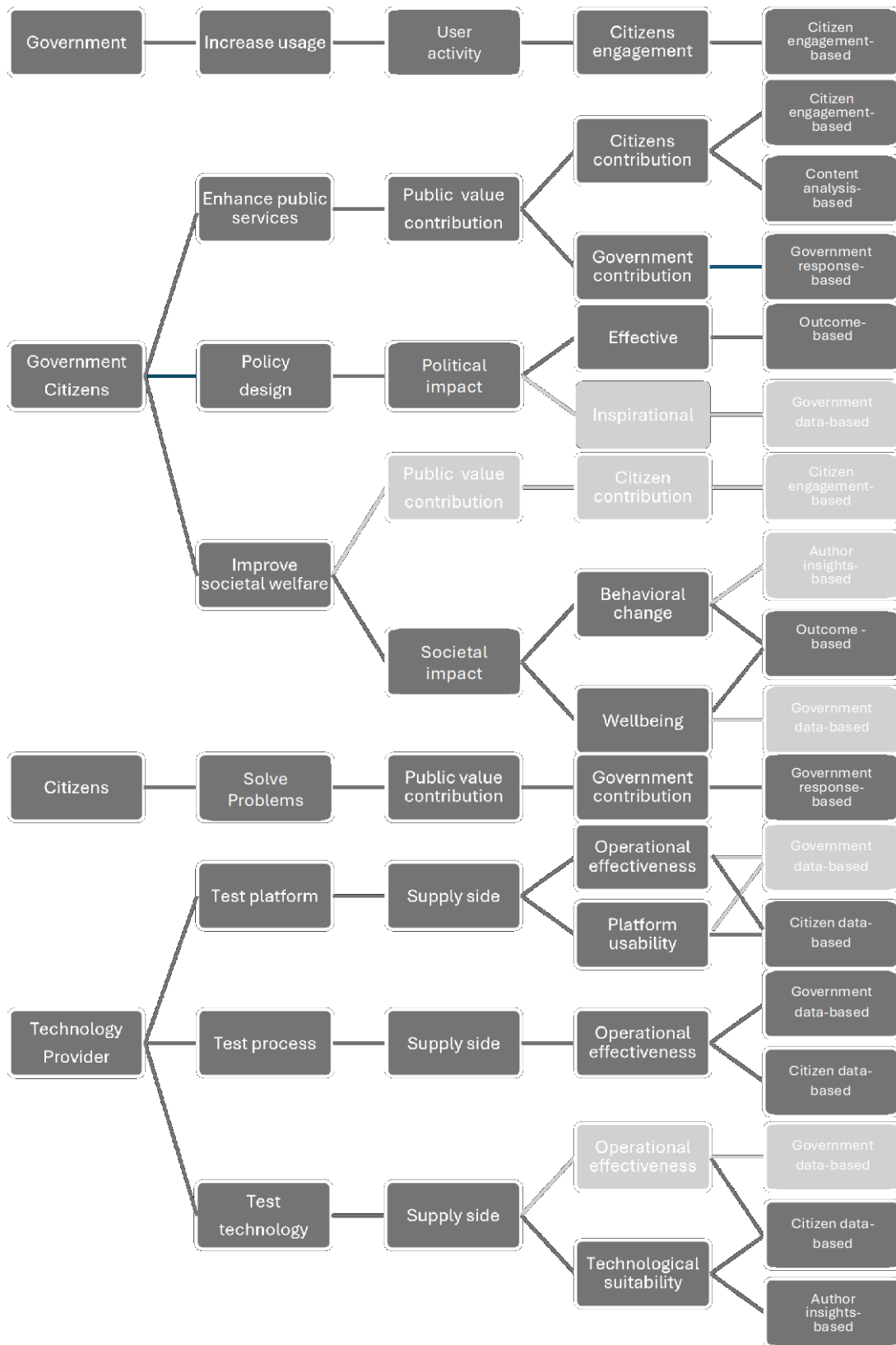
Policy design objectives were predominantly assessed through effective political evaluation, with inspirational evaluation employed in two cases. It can be contended that politically effective evaluation carries greater significance, showcasing to citizens the concrete impact of their input, especially when supported by outcome-based methodologies, thereby providing a more objective assessment. However, it is worth noting that the evaluation of policy design objectives was absent in five articles.

Similarly, the objectives of enhancing societal welfare were not addressed in seven articles, while in six articles, they were evaluated through citizen contribution. However, this method only assesses the extent and way citizens contributed to the initiative without directly measuring societal improvement. Societal impact evaluation, which is most suitable for assessing welfare enhancement, was employed in five cases only. Furthermore, evidence was provided in only three instances, with the remaining articles relying on local government or author-sourced methods. Crucial to note is depending on the perceived impact from stakeholders who aren't the primary beneficiaries can lead to biased evaluations, especially when assessing societal issues (A12) or behavioural changes (A32).

For evaluating technology providers' objectives, operational effectiveness evaluation emerged as the most suitable approach for testing process efficiency. Assessing platform functionality can be done through either usability or operational effectiveness evaluation. Usability evaluation, focusing on perceived ease of use and user experience, should ideally incorporate surveys from both local government and citizens. Given that citizens are the primary users, citizen surveys are generally more appropriate. Operational effectiveness can be assessed through interviews or surveys with either local government or citizens, with citizen engagement-based methods preferred, similar to usability evaluation. The appropriateness of a technology is typically evaluated through technological suitability, which emphasises technology performance. However, operational effectiveness evaluation was also utilised in some cases. In such instances, citizen engagement-based or author insights-based methods, such as experiments or tests, are equally suitable. It's worth noting that in 16 cases, no specific evaluation criterion for technology providers' objectives could be identified.

Integrating objectives, evaluation criteria, and evaluation methods allows us to synthesise a multi-stakeholder evaluation framework (Figure 2). The framework enables the identification of the most accurate evaluation approach for each stakeholder type, considering the level of objectivity in the evaluation category and the utilised methods. While for some stakeholder objectives, there is only one type of approach, others may warrant more options.

Figure 2: Multi-stakeholder evaluation framework for e-participation<sup>1</sup>



<sup>1</sup> In instances where multiple options are applicable, light grey boxes highlight approaches that offer less robust evaluations, either due to criteria limitations or methodological shortcomings.

## 5. Discussion

The analysis of existing literature has revealed that while current evaluation frameworks identify various dimensions of evaluation, they tend to focus on specific stakeholder perspectives or short-term outcomes. However, they often neglect the multi-stakeholder nature of e-participation. Nonetheless, although scholars like Osman et al. (2014) and Oredo (2022) acknowledge such a multi-stakeholder nature of e-participation, it remains largely overlooked in practical evaluations. Therefore, building on the premise that e-participation involves diverse stakeholders, such as local governments, technical platform providers, and citizens, each with distinct objectives and expectations, this paper has proposed 1. Five different categories of evaluation and corresponding methods; 2. A framework that aligns evaluation approaches with each type of stakeholder and corresponding types of objectives. Therefore, the proposed framework aims to address the gaps in existing evaluations by offering a more comprehensive and stakeholder-specific approach, which allows for selecting evaluation criteria and methods that align with each stakeholder's objectives.

For example, the findings suggest that, while technology providers prioritise objectives related to the operational aspects of e-participation, local governments and citizens are more interested in objectives related to the demand side and long-term impact. Furthermore, the findings show how citizens and local governments partially align objectives. Although from two different perspectives, they both aim to improve societal welfare, enhance public services, and make policy design more democratic. Nonetheless, the findings confirmed differences in the evaluation criteria. While local governments might be satisfied with a given process as they mostly consider user activity evaluation, citizens might not. Therefore, during evaluation, it is important to be aware of what criteria are relevant for each stakeholder.

In relation to the different categories of evaluation, it was found that user activity and public value evaluation are used mainly due to the relative simplicity of their assessment methods. However, they fail to consider the longer-term effects of e-participation. While previous studies (Macintosh & White, 2008; Padovani et al., 2018; Saldivar, 2018; Kubicek, 2010) have identified these categories, they predominantly concentrate on citizen engagement, neglecting the pivotal aspect of local government engagement, which is paramount in incentivising citizen participation (Letto et al., 2023).

Furthermore, from the analysis, it emerged that these categories should be integrated with benchmark measures for a more accurate evaluation. This inclusion allows for the determination of the satisfaction level regarding the outcomes. Supply-side evaluation was also frequently employed. This finding aligns with Medaglia's (2011) conclusions, underscoring a technocentric evaluation perspective. However, this approach fails to assess longer-term benefits, such as societal welfare (Gordon & Lopez, 2019) or citizens' empowerment (Irani et al., 2012; Oredo, 2022; Osman et al., 2014). Political and impact evaluation, although focusing on the longer-term effects of e-participation, was the least used category. In both cases, evidence-based methods are preferable as they can provide more intersubjectively comparable results.

It was also found that the quantitative and qualitative evidence of the impact of e-participation processes is rather challenging to identify (cf. also Millard et al., 2009). This aligns with Parycek et al. (2014), who confirms that citizens' input usage by decision-makers remains unclear in most evaluation processes. Particularly, societal impact evaluation, which is most suitable for assessing the local government's objective of welfare enhancement, was rarely employed. Furthermore,

evidence was provided in only three instances, with the remaining articles relying on local government or author-sourced methods. Although only used in six cases, government activities evaluation is a very important criterion as the more the local government engages, the better and more efficient will be the delivery of public services (Cucciniello et al, 2017). By contrast, lacking local government engagement may decrease citizen motivation to participate (Letto et al., 2023).

Finally, by addressing the diverse perspectives of stakeholders, the framework helps to prevent the dominance of any one group's interests, thus promoting a more balanced and comprehensive evaluation process. Finally, the framework also emphasises the importance of evaluating long-term impacts in addition to short-term engagement metrics. These long-term impacts can include improvements in societal welfare, democratic decision-making, and the quality of public services.

By ensuring a multistakeholder approach to e-participation evaluation, the framework contributes to the field of e-participation governance and, therefore, it should be seen as a step toward more clear and comprehensive governance models of e-participation.

From a practical perspective, the study's findings suggest the following strategies for enhancing the effectiveness and sustainability of e-participation initiatives:

1. Adopt a multi-stakeholder approach: local governments should incorporate a variety of perspectives when evaluating e-participation initiatives. This would help them better understand the diverse impacts of these initiatives and ensure that the needs and expectations of all stakeholders are addressed.
2. Use multiple evaluation methods: A combination of quantitative engagement metrics, qualitative content analysis, and outcome-based methods is necessary to comprehensively assess the impact of e-participation. Benchmark measures should also be included to ensure a more accurate evaluation of outcomes.
3. Focus on long-term effects: While short-term engagement metrics (like participation rates) are important, it is essential to evaluate the long-term societal impacts of e-participation, such as citizen empowerment and improved governance.

## 6. Conclusions

We conducted a literature review of 47 articles on empirical cases of e-participation initiatives at a municipal level, regarded as a collaborative effort of multiple actors and including information on impact or evaluation. From an inductive analysis of empirical case descriptions, we developed a typology of categories (supply side, activity, public value, political and societal impact evaluation) and methods of evaluation and an evaluation framework that establishes clear evaluation approaches based on types of stakeholder's objectives.

This study represents an initial exploration into systematic evaluation methods crucial for advancing knowledge, practices, and policies in e-participation governance and assessing its success. Future research should replicate this approach to identify specific evaluation categories and methods tailored to different levels of e-participation, such as co-design or co-decision processes (Arnstein, 1969). Furthermore, while our study focuses on municipalities and three key stakeholders, future research could expand to include other stakeholders, like specific business partners or additional local government bodies. Exploring gray literature may also yield valuable insights. In summary,

our findings mark an important first step in developing tools to evaluate e-participation success from a multi-stakeholder perspective comprehensively.

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### Author Contributions

Both authors, BI and AU worked closely together during manuscript development. BI and AU developed mutually the idea of this review, the search string for data gathering and the implications of the findings. BI led the data collection and analysis activities, wrote the first draft of the introduction, background, results, discussion and conclusion section, and led the revision activities. AU designed the methodological approach, was involved in data collection and analysis and wrote the first draft of the method section. He revised the first draft of the manuscript and was also actively involved in the revision of the submitted manuscript. All authors have read and agreed to the published version of the manuscript.

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## Appendices

### Search strings

Table 9: Databases, years, terms and fields searched

Database	Years	Search String	Search fields
SCOPUS	2013-2023	"Civic Tech" OR CivicTech OR "Civic Technology" OR "E-participation" OR "e-government" OR "open government" OR Municipality OR Municipalities OR local government AND Stakeholders OR Actors	Title and abstract and keywords
			All fields
ACM, WoS, AISel	2013-2023	"Civic Tech" OR CivicTech OR "Civic Technology" OR "E-participation" OR "e-government" OR "open government" OR Municipality OR Municipalities OR local government AND Stakeholders OR Actors	Abstract
			All fields
	2013-2023	"Civic Tech" OR CivicTech OR "Civic Technology" OR "E-participation" OR "e-government" OR "open government" OR Municipality OR Municipalities OR local government AND Stakeholders OR Actors	Title
			Abstract
			All fields
	2013-2023	"Civic Tech" OR CivicTech OR "Civic Technology" OR "E-participation" OR "e-government" OR "open government" OR Municipality OR Municipalities OR local government AND Stakeholders OR Actors	Keywords
			Abstract
			All fields
	2013-2023	"Civic Tech" OR CivicTech OR "Civic Technology" OR "E-participation" OR "e-government" OR "open government" OR Municipality OR Municipalities OR local government AND Stakeholders OR Actors	Abstract
			Title
			All fields
	2013-2023	"Civic Tech" OR CivicTech OR "Civic Technology" OR "E-participation" OR "e-government" OR "open government" OR Municipality OR Municipalities OR local government AND Stakeholders OR Actors	Title
			All fields
			Keywords
	2013-2023	"Civic Tech" OR CivicTech OR "Civic Technology" OR "E-participation" OR "e-government" OR "open government" OR Municipality OR Municipalities OR local government AND Stakeholders OR Actors	Title
			All fields
			All fields
	2013-2023	"Civic Tech" OR CivicTech OR "Civic Technology" OR "E-participation" OR "e-government" OR "open government" OR Municipality OR Municipalities OR local government AND Stakeholders OR Actors	Abstract
		Keywords	
		All fields	
2013-2023	"Civic Tech" OR CivicTech OR "Civic Technology" OR "E-participation" OR "e-government" OR "open government" OR Stakeholders OR Actors		Title

		Municipality OR Municipalities OR local government AND Stakeholders OR Actors	Keywords
			All fields
	2013-2023	"Civic Tech" OR CivicTech OR "Civic Technology" OR "E-participation" OR "e-government" OR "open government" OR Municipality OR Municipalities OR local government AND Stakeholders OR Actors	Keywords
			All fields

## Literature basket

Table 10: Summary of articles identified in the literature with corresponding codes of references.

Article code	Article title	Authors
A1	Citizen engagement on local government Facebook pages: Experience from Aotearoa New Zealand	Alam et al. (2022)
A2	Youth e-participation as a pillar of sustainable societies	Rexhepi et al. (2018)
A3	Motivations to use a mobile participation application	Ertiö et al. (2016)
A4	Developing capacity through co-design: the case of two municipalities in rural South Africa	Jacobs et al. (2019)
A5	Using Virtual Reality to Increase Civic Participation in Designing Public Spaces	van Leeuwen et al., (2018)b
A6	Crowdsourcing'' as a tool for e-participation: two experiences regarding CO2 emissions at municipal level	Royo & Yetano (2015)
A7	Governments' social media use for external collaboration	Wang & Medaglia (2017)
A8	A new path for the public sector: How to design a co-created strategy in higher education	Rapp et al. (2016)
A9	E-government strategy formulation in resource- constrained local government in South Africa	Osah & Pade-Khene (2020)
A10	A Framework for Evaluating the Impact of E-Participation Experiences	Pérez-Espés et al. (2014)
A11	Implementation of Social Media Concepts for e-Government: Case Study of a Social Media Tool for Value Co-Creation and Citizen Participation	Díaz-Díaz & Pérez-González (2016)
A12	Critical Success Factors of Open Government and Open Data at Local Government Level in Indonesia	Sayogo & Yuli (2018)

A13	Co-Creating Public Value in E-Government: A Case Study of Korean Municipal Government Websites	Lee-Geiller & Taejun (2019)
A14	A Citizen Science Approach for Collecting Toponyms	Perdana & Ostermann (2018)
A15	Decide Madrid: A Critical Analysis of an Award-Winning e-Participation Initiative	Royo et al. (2020)
A16	Crowdsourcing Local Knowledge with PPGIS and Social Media for Urban Planning to Reveal Intangible Cultural Heritage	Nummi (2018)
A17	Virtual Environments as Enablers of Civic Awareness and Engagement	Bellavista et al. (2020)
A18	Smart Neighbourhood Learning - the case of MyNeighbourhood	Petersen et al. (2015)
A19	Exploring the effects of game elements in m-participation	Thiel & Lehner (2015)
A20	Digital Pop-Up: Investigating Bespoke Community Engagement in Public Spaces	Fredericks et al. (2015)
A21	Citizen Co-designed and Co-produced Smart City: Japanese Smart City Projects for "Quality of Life" and resilience	Kudo & Granier (2016)
A22	Examining ideation processes in online invited spaces	No et al. (2016)
A23	People's outcomes for public decision making in Russia	Vidiasova et al. (2017)
A24	Challenges and Opportunities for ICT in Co-production: A Case Study of Public Service Innovation in an Italian Municipality	Leonardi & Not (2022)
A25	Plan Your Brisbane: Exploring Game Design for Civic Engagement	O'Donnell (2018)
A26	Effectiveness of Virtual Reality in Participatory Urban Planning	van Leeuwen et al. (2018a)
A27	Participatory Budgeting: Combining Smart Cities and Open Data	Skouloudakis & Christopoulou (2022)
A28	Collective Opinion Formation for Public Decision Making in Local Governments	Tian & Cai (2016)

A29	Adoption of social networks as Web 2.0 citizen engagement tool in the local e-government context	Rexhepi et al. (2021)
A30	Designing An M-Government Solution: Enabling Collaboration Through Citizen Sourcing	Lönn et al. (2016)
A31	An Exploratory Study of Social Networking Services as a Potential Vehicle for E-Participation in the City and County of Honolulu	Harris & Winter (2013)
A32	Learning to Be Sustainable in ICT for Development: A Citizen Engagement Initiative in South Africa	Pade-Khene & Lannon (2017)
A33	ICT-Based Participation in Support of Palestinian Refugees' Sustainable Livelihoods: A Local Authority Perspective	Aradeh et al. (2020)
A34	Using Decision Support System to Enable Crowd Identify Neighborhood Issues and Its Solutions for Policy Makers: An Online Experiment at Kabul Municipal Level	Jawad et al. (2021)
A35	E-Government Portal for Optimizing Services to Laguneño: An Analysis	Balahadia (2018)
A36	Applying the Open Government Principles to the University's Strategic Planning: A Sound Practice	Moreno-Carmona et al. (2020)
A37	A Web-Based Public Participation System that Supports Decision Making	Mahmoud & Arima (2011)
A38	Digital Youth Participation - Evaluation, Lessons Learned and Success Factors of a Cross-National Project	Parycek et al. (2014)
A39	The Outreach of Participatory Methods in Smart Cities, From the Co-Design of Public Services to the Evaluation: Insights From the Athens Case Study	Pautasso et al. (2021)
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