

Public crowdsourcing: Analyzing the role of government feedback on civic digital platforms

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Abstract

Government organizations increasingly use crowdsourcing platforms to interact with citizens and integrate their requests in designing and delivering public services. Drawing on attribution theory, this study asks how the causal attributions of the government response to a citizen request affect continued participation in crowdsourcing platforms. To test our hypotheses, we use a 7-year dataset of both online requests from citizens to government and government responses to citizen requests. We focus on citizen requests that are denied by government, and find that the reasoning for denying a request is related with continued participation behavior. Citizens are less willing to collaborate further with government via the platform, when their requests are denied although the locus of causality is with the government. This study contributes to research on the role of responsiveness in digital interaction between citizens and government and highlights the importance of rationale transparency to sustain citizen participation.

1 | INTRODUCTION

Public sector organizations increasingly leverage digital platforms to interact with citizens and enhance their participation in service design, delivery and decision-making (De Vries et al., 2016). A promising way to stimulate digital citizen-government interaction is the use of crowdsourcing (Howe, 2008; Liu, 2017a) as an open innovation

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mechanism by which organizations engage an external voluntary crowd of individuals via digital platforms (Afuah & Tucci, 2012; Howe, 2008). Crowdsourcing platforms allow government organizations to co-create public infrastructure and services with citizens by seeking and providing feedback on their inputs (Chesbrough & Di Minin, 2014; Lember et al., 2019). Previous research has shown that crowdsourcing can reduce the distance between citizens and government, strengthen mutual understanding and public trust (Ingrams et al., 2020; Mergel & Desouza, 2013), while also delivering societal benefits (Kohler & Chesbrough, 2019; Randhawa et al., 2019).

Despite the benefits of crowdsourcing platforms for both citizens and government, an ongoing challenge is how to incentivize platform users and sustain citizen participation (Ansell & Miura, 2020). Although previous research has investigated citizens' initial motivation to participate in crowdsourcing platforms (Abu-Tayeh et al., 2018; Schmidhuber et al., 2019; Wijnhoven et al., 2015), how to ensure their continued participation has largely been ignored so far. This study thus focuses on citizens' continued use of crowdsourcing platforms and in particular, if and to what extent government feedback has an effect on continued participation.

Till date, there is scant research on the effect of government feedback on subsequent citizen participation, even though feedback is a commonly seen feature across many crowdsourcing platforms, and citizens who make the effort to share input and requests with the government may obviously expect that these will be considered and taken seriously (Ansell & Miura, 2020; Simmons & Brennan, 2017; Thomas, 2013). Accordingly, we posit that the more transparent the government is about processing citizen requests, the more willing citizens are to continue collaborating with the government, in particular, when their requests are denied in the first place. We thus argue that citizens' continued participation is conditional on rationale transparency (De Fine Licht, 2014; Grimmelikhuisen et al., 2021); that is, the government's reasoning for denying a citizen's request provided in the form of a written response via the crowdsourcing platform. In this article, we use a 7-year dataset from a local government crowdsourcing platform and draw on attribution theory (Harvey et al., 2014; Heider, 1958) to investigate communication patterns between citizens and the government, and examine how the type of government response to citizen requests affects their future participation behavior.

Our study makes three distinct contributions. First, we respond to calls for more research on the effectiveness and responsiveness of digital government (Gil-Garcia et al., 2018; Simmons & Brennan, 2017), and complement prior literature on citizen participation in crowdsourcing by focusing on continued participation. We uncover the consequences of a lack of government responsiveness (Mulgan, 2000), that is, when government does not pursue the citizens' expectations by denying their requests, and study how causal attributions associated with the government response affect continued participation in crowdsourcing platforms.

Second, by using longitudinal data and measuring participation over time, this study complements prior literature on citizens' motivation to participate in crowdsourcing by investigating the effect of the type of government response on continued participation. Relatedly, we contribute to research on how governments can design their response to citizens so as to motivate their continued participation on crowdsourcing platforms. While Sjoberg et al. (2017) found that government's decision transparency (i.e., decision on whether the citizen requests can be considered) is related to future citizen participation, this study focuses on rationale transparency. This is not just important from a theoretical perspective, but also has practical implications on how governments can incorporate feedback mechanisms in designing platform interactions (Leckel et al., 2021).

Third, by using digital traces of actual citizen–government interaction (see Robinson, 2017), we apply recent methodological advances in research. When using platforms, individuals produce “massive quantities of information” (Janssen & van den Hoven, 2015: 662), such as user-generated content, structure of relationships, or geospatial data. Big data analysis and applying computational social science methodology allow us to analyze large-scale datasets for the purpose of creating public value and studying social behavior (Mergel et al., 2016). In doing so, we address the call by Kowalski et al. (2020) to draw on large online datasets for public decision-making and use citizen requests and government's written responses to understand citizen behavior on digital platforms.

2 | LITERATURE REVIEW, THEORY, AND HYPOTHESES

2.1 | Principles of crowdsourcing

Crowdsourcing is an open innovation mechanism by which organizations engage with a crowd of individuals via online platforms to tap into external knowledge sources in their internal innovation process (e.g., Afuah & Tucci, 2012; Jeppesen & Lakhani, 2010). In this way, digital platforms support social interactions, mass communication and sharing of user-generated content (Leckel et al., 2021).

While crowdsourcing is mostly associated with the private sector, the public sector has also been turning to online platforms to innovate public services (Liu, 2017a), a practice referred to as “citizensourcing” (Lukensmeyer & Torres, 2008) or “open innovation in the public sector” (Mergel & Desouza, 2013; Pedersen, 2020). Here, government organizations use crowdsourcing platforms to integrate citizen requests and inputs in designing and delivering public services and infrastructure (Mergel & Desouza, 2013; Nam, 2012). Thus, public administration reaches beyond the predefined perspectives of those within the organization to engage in a dialogue with citizen communities, inviting them to participate and share their needs and ideas (Chesbrough & Di Minin, 2014; Randhawa et al., 2019). Organizations can use crowdsourcing in various ways across operational and strategic projects (Randhawa et al., 2019) to collaboratively design and monitor public services (Moon, 2018), and leverage external knowledge at different stages of the policy cycle (Taeihagh, 2017). For example, citizen input can be integrated in the policy-making process (Liu, 2017b), budget planning (Shybalkina, 2021), crisis and emergency management projects (Harrison & Johnson, 2019), or infrastructure maintenance (O'Brien et al., 2017).

The principle behind crowdsourcing is “broadcast search” (Jeppesen & Lakhani, 2010), meaning that a seeker issues an open call to solicit external participation and contribution in solving problems or executing tasks (Afuah & Tucci, 2012). Potential solvers then self-select whether they contribute to the tasks, to what extent, and with what resources (Benkler, 2002). The economic benefit of such a mechanism is the efficient allocation of “open tasks” to those contributors who either have the specific knowledge required and thus incur lower costs in solving the respective task, or have the highest motivational stimulus to work on the task.

Crowdsourcing tasks demand that a complex problem be separated into smaller modules that can be solved independently of each other. Benkler (2002) calls this the requirement of granularity. A supporting condition is the scale and scope of the network of contributors: the larger the number of peers in the solver community (participants or contributors) and the more heterogeneous their knowledge, the larger the probability that a task will be selected by a participant and solved efficiently (Hilgers et al., 2010). Consequently, how to motivate citizens to participate as a solver is a crucial question for both research and practice.

Research focusing on the solvers has considered how motivations and incentives affect their participation and contribution to crowdsourcing efforts (e.g., Boudreau et al., 2011; Mergel & Desouza, 2013; Wijnhoven et al., 2015). Research on seekers has concentrated on specific aspects such as the managerial challenges in dealing with online intermediary platforms (Sieg et al., 2010), issues faced in implementing crowdsourcing projects (Lüttgens et al., 2014) and the role of intermediary capabilities and practices in helping them overcome barriers to crowdsourcing (Randhawa et al., 2017). However, little research has investigated how seekers engage with solvers to solicit input (Dahlander & Piezunka, 2014) and integrate these into their internal innovation efforts (Piezunka & Dahlander, 2015).

Meanwhile, the impact of interacting with citizens as solvers in public crowdsourcing processes has been widely recognized (Ansell & Miura, 2020; Clausen et al., 2020). Besides producing tangible solutions to public challenges that deliver societal benefit, crowdsourcing initiatives also transform the relationship between citizens and government (Hansson et al., 2015; Mergel, 2015). Here, citizens are not purely “value receivers” but are also “value co-creators” (von Hippel, 2005). Such co-creation, however, relies on citizen participation in crowdsourcing platforms (e.g., Nam, 2012). Yet, incentivizing platform users and sustaining citizen participation remains a key challenge for government organizations (Ansell & Miura, 2020). This highlights the need to investigate how governments can interact and engage with citizens in order to motivate them to contribute on digital platforms.

2.2 | Role of feedback in crowdsourcing

Previous research on platform interaction emphasized the role of feedback in crowdsourcing, highlighting the relevance of the platform provider's responses to users as to whether their input can be leveraged (Ansell & Miura, 2020; Simmons & Brennan, 2017; Thomas, 2013). In general, revealing organizational work to users, also known as operational transparency, is found to enhance consumers' perceptions of the organization (Buell et al., 2021; Buell & Norton, 2011). Thus, citizens' observation of government performance improves their understanding of the work done by government so that they are more likely to appreciate their effort. Similarly, if citizens can experience government efforts in collaborative public service delivery, citizens' feelings of making a meaningful contribution to public service delivery increase. These feelings of personal efficacy then may stimulate citizens' willingness to continue participating, as they know that their inputs are being leveraged and their own engagement has an impact on public service delivery and quality. We argue that such personal efficacy can be strengthened by responding to individual requests to show that citizen input is taken seriously.

While citizen inputs need to be taken seriously, this however, does not mean that government can comply with every request. When being responsive, government is expected to *attempt* to satisfy citizen request, rather than accepting all citizen inquiries (Liao, 2018). Yet, transparency on "how and why a decision was taken" and incorporating these characteristics in their response allows citizens to understand the complexities and dilemmas of government decision-making (Grimmelikhuijsen et al., 2021: 18). Transparency in decision-making is shown to decrease the psychological distance between citizens and government, and build and strengthen trust between them (Meijer, 2009). In the context of crowdsourcing, we expect that the transparency of decision-making influences citizens' willingness to continue participating in the crowdsourcing platform. Whereas decision transparency represents the government's decision on whether the citizen request can be considered (i.e., the problem can be fixed) (De Fine Licht, 2014; Grimmelikhuijsen et al., 2021), in this paper, we focus on rationale transparency, that is, the justification of the government for denying a request.

Previous research has already provided first evidence that decision transparency, as a form of dichotomous feedback on whether a request is approved or denied, is positively related to citizen participation. Sjoberg et al. (2017) found that a successful first experience on a platform with the citizen submission leading to an improvement of a situation (i.e., the problem being fixed) is positively associated with their continued participation effort.

In contrast, we examine how rationale transparency, a more qualitative government feedback justifying its denial of a citizen request, provided as a text comment via the crowdsourcing platform, is related to citizen participation. Our study focuses on how the characteristics of a government response following a denial of a citizen request influence future behavior. By drawing on attribution theory, we conceptualize the link between rationale transparency and citizens' future participation and argue that causal attributions associated with the government response are related to citizen behavior.

2.3 | Theoretical framework and hypotheses

In the context of crowdsourcing, we assume that government response explaining why citizen request was denied triggers the citizens' related emotions, which in turn shape their future participation behavior. This is why we draw on *attribution theory* that posits that people have an innate interest in understanding the causes of successes or failures (Harvey et al., 2014; Heider, 1958). Accordingly, behavior is explained by attributions assigned to actions, and these causal inferences influence evaluations and future behavior (Swanson & Kelley, 2001; Weiner, 1985). Attribution is thus the process through which an individual refers the cause of an actor's behavior (Calder & Burnkrant, 1977).

Attribution theory describes three attributional dimensions that are linked to behavior (Weiner, 1985): (1) the locus of causality, (2) stability, and (3) controllability. First, the *locus of causality* denotes whether a perceived cause of an outcome is internal or external (Weiner, 1980). A cause is internal if it relates to individual characteristics, and external if it refers to someone in the environment (Heider, 1958). In the context of crowdsourcing, an internal cause for request denial relates to the citizen submitting the request; for example, due to the citizen providing insufficient information to process the request. In contrast, an external attribution for a denial takes the form of blaming the government for the outcome (see Harvey et al., 2014); for example, if the denial is because the government does not prioritize the issue or lacks resources to address it. At the same time, the cause is also external if another organization, and not the government, is responsible to answer the citizen request; and so the citizens should not blame the government for denying the request. Accordingly, we distinguish between outcomes attributed to internal factors related to citizens as platform users, to external factors related to the government as the platform provider, and to external factors related to other organizations.

If a request is denied and the locus of causality is within the government, citizens might feel frustrated and disappointed with the government for ignoring their inputs, which could result in their withdrawal from using the platform. However, if a request is denied due to internal causes, users might feel embarrassed by their insufficient effort in formulating the request, but value the government response and feedback which might motivate them to continue participating. If the denial of a request is attributed to external causes such as another organization, and not the government, being responsible for the request, again citizens might appreciate the clarification, so there is no reason to discontinue their participation. This leads to the following hypothesis:

Hypothesis 1. *Citizens are more likely to submit a follow-on request (H1a) /Citizens submit more requests (H1b) if the denial of the first request is attributed more to internal factors and external factors than to local government's factors.*

Second, *stability* relates to the “perceived variability or permanence of a causal factor” (Harvey et al., 2014: 131). Stable and unstable factors differ, and causes can vary over time depending on the attribution. Whereas Weiner (1985) theorizes that stability is related to positive behavioral outcomes, previous studies applying attribution theory also found a negative effect of stability on behavior (Willner & Smith, 2008). In the context of crowdsourcing, we assume that citizens are more likely to continue using the platform, if the reasons for denial of a request are attributed to unstable factors, and thus the cause is temporary; for example, due to lack of resources or if the problem is related to a specific event. If the cause is permanent such as legal or regulatory reasons preventing implementation of citizen input, the denial might result in frustration. Consequently, we hypothesize:

Hypothesis 2. *Citizens are more likely to submit a follow-on request (H2a) /Citizens submit more requests (H2b) if the denial of the first request is attributed more to unstable factors than stable factors.*

Third, *controllability* is defined as the “extent to which an observer perceives the cause of an outcome to be under someone’s volition” (Harvey et al., 2014: 131; Weiner, 1985). Controllable and uncontrollable factors are operationalized as blame or responsibility (Corrigan et al., 2000). In the context of crowdsourcing, we are interested in whether the platform provider is to blame about the denial of the request. If the government is not responsible for a citizen request submitted via the crowdsourcing platform, the locus of causality is attributed to another organization. This also highlights the interrelatedness of the causal dimensions, as there is some overlap of controllability dimensions with the other two (Harvey et al., 2014). Following Weiner (1980), we assume that behavior attributed to controllable factors is associated with negative responses. This means that citizens are not willing to continue participating if their requests are denied due to controllable factors. If, however, behavior is attributed to uncontrollable

factors, citizens might sympathize and still be willing to support the local government. Thus, we propose the following hypothesis:

Hypothesis 3. *Citizens are more likely to submit a follow-on request (H3a) /Citizens submit more requests (H3b) if the denial of the first request is attributed more to uncontrollable factors than controllable factors.*

3 | DATA AND METHODS

3.1 | Research context

We chose an online platform, where an Austrian local government calls for participation in infrastructure management (e.g., O'Brien et al., 2017; Sjoberg et al., 2017). Individuals are free to join the platform and share requests on infrastructural defects such as fixing a pothole or a broken streetlight. From 2013 onwards, approximately 3500 requests are posted per year via digital channels. To report an infrastructural defect, individuals describe the issue, choose a category (e.g., traffic), provide the defect's location, and share a picture if available. The request is then posted on the platform accessible to platform visitors. Government processes the citizen request and decides whether the defect can be fixed. Subsequently, the government responds by changing the status of the request via a traffic light system and by commenting on the request. If the issue cannot be fixed, the government usually adds a text comment explaining why the request is denied. These comments are personalized and dependent on the citizen request.

3.2 | Data description

To test our hypotheses, we needed rich data on citizen–government platform interactions in order to analyze both the government response to citizen request and the respective citizens' future participation behavior. Two of the authors have had a long-standing research partnership with the respective local government for several years and knew about the government's intent to strengthen platform participation. Due to the relevance of this study's aim and implications, the local government was willing to share anonymized data on platform's citizen–government interactions. In March 2019, we obtained raw platform data directly from the local government. Three datasets display 23,249 citizen requests, 71,793 comments by both government and citizens, and 7989 individual users. The unit of analysis is the individual platform user who is linked to a unique user ID.

3.3 | Dependent variables

We measure citizen's continued participation behavior twofold: First, we are interested in the immediate reaction after experiencing the denial of a request in the short run (*follow-on request*). Second, we want to understand the consequences of a denial for citizen's participation behavior in the long run (*total number of requests*).

Follow-on request: By using the user ID, we can examine if a user has submitted a request after having received government response (Hypotheses 1a, 2a, and 3a). This continued participation behavior is measured by a request at T_{1+x} after having sent a request at T_1 and received government response on request between T_1 and T_{1+x} . Forty users shared the same request twice within a few minutes. We assume that these users had technical problems, and removed these from our sample.

Total number of requests: This variable refers to the number of requests submitted to the platform per individual user (Hypotheses 1b, 2b, and 3b).

3.4 | Independent variables

To operationalize the causal attributions of the government response, we proceed as follows. In a first step, we conducted a content analysis of the government comments to citizen requests to examine government explanation for not fixing the defect and sending a denial. If a request is labeled as “nonfixed,” the government usually gives a reason for the denial of the request by adding one or more text comments. The content analysis of the comments was based on two rounds of coding. In the first round, we chose an analytical approach where a team of three coders analyzed the data without a predefined coding scheme and identified common themes. After the first round, we discussed the coding outcomes, reflected on common themes and developed a schema of categories. In a second round, we used the schema to classify the government comments per request to a category. To ensure reliability, we reflected on the schema of categories, added numerous examples to each category, and regularly held operational discussions (Titscher et al., 2000). Table 1 summarizes the nine categories of reasons for government’s denial of citizen requests which are explained in the following.

Approximately 17% of the first requests were denied due to a lack of government responsibility to fix the defect. That is, government is unable to act as it is not responsible for the area, issue or problem. For example, the government answered: *“Unfortunately, we cannot help here because it is a private property. Please contact the property management directly.”*

In 27% of the first requests, the government as the platform provider did not have the authority or responsibility to solve the issue, but as a service forwarded the request to the responsible organization such as the neighbor city, the state government, or a public enterprise, as illustrated by the following example: *“Thanks for the suggestion. We have informed the state government about your request.”*

In approximately 2% of the first requests, information important for fixing the defect such as the exact location of the problem was requested by the government but not provided by the user. According to the government, it was then not possible to fix the problem.

Nine percent of the first requests were not complied with because the government saw no need to change the current situation, and the current solution is consistent with guidelines and instructions. For example, the government responded that *“[...] no vehicle without a license plate was found on the street”* or that *“[...] it was determined that the shrubs are cut properly and according to the local regulations. There is no need for action.”*

Approximately 13% of the first requests were denied, as government is not able to fix the problem due to resource constraints or because other issues took higher priority. For example, the government answered that *“[...] the sidewalk and barrier are in a ‘roadworthy’ condition, and a renovation is currently not possible for financial reasons.”*

Approximately 24% of the first requests were not fixed due to legal issues meaning that attending to the citizen request would be in violation of data-protection law, traffic safety or other legal restrictions. The following government response illustrates this: *“the lights [...] will be switched off at 11 pm. For reasons of nature conservation, longer switch-on times are not possible.”*

If a problem had to be fixed at a later stage and was thus postponed, the government answered, for example, that *“[...] a structural separation is being considered. A date for the implementation cannot be fixed at present—however, at the earliest, it will be in 2015.”* Approximately 2% of the first requests were not fixed, and government has not provided an explicit reason for denying the request, as illustrated by the following example: *“[...] the signs were removed, and no new signs were mounted.”* Finally, approximately 4% of the requests were not fixed due to reasons specific to the event such as a fair.

In a second step, we reviewed literature on attribution theory to better understand the principles and mechanisms of causal attributions—locus of causality, stability, and controllability. In a third step, the reviewed literature is used to classify the categories of reasons to the causal attributions (see Table 1). In terms of *locus of causality*, we distinguish whether the cause of the denial is internal, directed toward the local government (reference category), or external. We categorized the citizen as the locus of causality if important information from citizen is missing. This is because the government is not able to proceed with the request and possibly comply with it, as the citizen has not

TABLE 1 Government's reasons for denying citizen request

Category of reason	Description of reasons	First requests		Causal dimensions		
		#	%	Locus of causality	Stability	Controllability
Lack of government responsibility	Problem is located at private grounds, other organizations (e.g., other city) are responsible for the area/issue/problem, or there is no opportunity for action	540	16.6	External	Stable	Uncontrollable
Request forwarded due to lack of government responsibility	Problem was not solved by government, but forwarded to responsible organization or department	866	26.61	External	Stable	Uncontrollable
Missing information from citizen	More information from user is required which he or she has not provided	70	2.15	Internal	Unstable	Uncontrollable
Current solution adequate	Problem not comprehensible, current solution is adequate, no need for change	283	8.69	Internal	Unstable	Controllable
Resource constraints	Lack of resources or prioritization	409	12.57	Government	Unstable	Controllable
Legal issues	Legal affairs (also data-protection law) or in terms of traffic safety	796	24.45	External	Stable	Uncontrollable
Request postponed	Problem solved at a subsequent date, discussed once more at a later stage	107	3.29	Government	Unstable	Controllable
No reason	No explicit reason, no final feedback from government	70	2.15	Government	Unstable	Controllable
Others	Problems specific to events, single situations (in particular, answers to questions)	114	3.50	External	Unstable	Uncontrollable
Sum		3255	100			

provided sufficient information. Similarly, if citizens make a request to change a situation that is not necessary to change, the locus of causality is internal. The locus of causality is with the government if citizen requests cannot be accepted due to resource scarcity, and citizens might blame the government for not prioritizing areas they are interested in. Similarly, if a citizen request is postponed or no explicit reason is mentioned for denying the request, citizens might not understand the government decision. In contrast, if the government is not responsible for the problem, the locus of causality is external. Similarly, if a request is denied due to legal reasons, citizens usually know that local government must decide according to policies and procedures.

Stability is a dummy variable, taking value 1 for unstable and value 0 for stable. We categorize a lack of government responsibility as a stable cause due to the permanence of the causal factor (Harvey et al., 2014). This means that the cause will hardly change over time. Also, denials due to legal reasons are classified as stable causes, as this basis for the government decision to deny the request might not change in the near future. In contrast, if a request is

denied due to resource constraints, the cause is classified as unstable, as there might be resources available at a later stage.

Controllability as a dummy variable considers controllable (value 0) and uncontrollable (value 1) causes. The cause is controllable if resolving the issue is under the government's volition, and it can deal with the request through some effort and resources. In contrast, we classified lack of government responsibility or missing information from citizen as uncontrollable causes, as government is not able to change the cause. Similarly, when problems relate to specific events or legal issues, the local government is not able to intervene. The government can only decide on the prioritization of duties, the adequacy of current solutions, and the elaborateness of the response to citizens. Therefore, these reasons are classified as controllable.

3.5 | Control variables

Relating to the individual user, we controlled for the platform user's *tenure*, as the years since sharing the first request. First requests were made in 2013. The higher the variable, the longer citizens are already using the platform. Also, we controlled whether an individual has shared a request after *registration* (value 1) or posted anonymously (value 0). With respect to the characteristics of the government response, we controlled for *response_length* as the length of all government comments on the citizen request. Value 1 indicates a word count of more than 30, value 0 refers to a word count of 30 and below. Additionally, as each request and comment is tagged with a timestamp, we are able to calculate the time from when the request was posted to the first comment written by the government. Three categories are used to measure the variable *response_time*: within 12 h (reference category), within 24 h, and more than 24 h after having submitted the request. Finally, if the government thanks the user for the request via a comment, the value of the variable *response_thanks* is 1.

3.6 | Empirical approach

To be able to test the effect of government response on continued participation behavior, we had to merge the three datasets by using the unique user ID. We then used the merged dataset to conduct multiple analyses. In model 1, a binary logistic regression model was run to measure the individual's probability of submitting a follow-on request. In model 2, a negative binomial regression analysis was conducted to measure the influence of the first-time experience on the overall number of requests submitted by a user. As the dependent variable is a count variable taking nonnegative integer values, a count data model was chosen. The data is over-dispersed, meaning that the variance is higher than the mean. We chose to carry out a negative binomial regression analysis, as the likelihood ratio test is significant ($p = 0.000$), suggesting that the negative binomial model is more appropriate than the Poisson model (Karazsia & Van Dulmen, 2008).

The following sample was chosen for conducting the analysis: First, the models only include active users who shared one or more request(s) and whose first request was denied by the government. Second, we included those users who shared their first requests between January 2013 and March 2018. First requests made from April 2018 to March 2019 are excluded from the sample, as we cannot observe continued participation. Third, only first requests with a final decision (i.e., approved or denied) are included.

4 | RESULTS

Table 2 provides the descriptive statistics of the sample, and Table 3 shows the findings of model 1 on individual's probability of sending a follow-up request and model 2 on the overall number of requests.

In terms of non-hypothesized effects, we found that the probability of submitting a follow-on request increases with tenure. Registered users are more likely to submit a follow-on request, which might be explained by users' initial intention to continue participating. The findings further indicate that the characteristics of the government response such as the length, latency, and their appreciation for citizens' participating in infrastructural maintenance do not relate to the probability of submitting a follow-on request. In model 2, the results on the non-hypothesized effects do not change regarding sign and significance levels of the coefficients, except for *response_time*. Accordingly, a long waiting time for government response seems to have a small but negative effect on the overall number of requests submitted, compared to a government reaction to the first request submitted within 12 h.

In terms of the hypothesized effects, the results show that both the probability of submitting a follow-on request and the total number of requests partly depend on the causal attributions associated with the government response. More specifically, if a request that is within the government's locus of causality versus citizens' internal locus was denied, the probability of submitting a follow-on request decreases, however, not at the 10% significance level. But, an external locus of causality has a positive effect on the probability of submitting a follow-on request compared to the government's locus of causality, so results partly support Hypothesis 1a. Similarly, the local government's locus of causality has a significant negative effect on the total number of requests. Findings indicate that, if

TABLE 2 Descriptive statistics

Variable	Mean	SD	Min	Max
Outcome variables				
Follow-on request	0.31	0.46	0	1
Total number of requests	2.60	7.27	1	216
Independent variables				
Locus of causality				
Internal	0.11	0.31	0	1
External (local government)	0.18	0.38	0	1
External (other parties)	0.71	0.45	0	1
Stability				
Stable	0.68	0.47	0	1
Unstable	0.32	0.47	0	1
Controllability				
Controllable	0.27	0.44	0	1
Uncontrollable	0.73	0.44	0	1
User				
Tenure	4.04	1.53	1	6
Registration	0.31	0.46	0	1
Government response				
Response_length	0.71	0.46	0	1
Response_time				
Within 12 h	0.60	0.49	0	1
Within 24 h	0.20	0.40	0	1
More than 24 h	0.19	0.40	0	1
Response_thanks	0.33	0.47	0	1

Note: $N = 3255$.

TABLE 3 Findings of regression analysis

Variables	(1) Model 1 Follow-on request	(2) Model 2 Total number of requests
Locus of causality: internal	0.131 (0.161)	0.191** (0.0747)
Locus of causality: external	0.844** (0.409)	0.820*** (0.183)
Stability: unstable	0.0877 (0.210)	0.253*** (0.0944)
Controllability: uncontrollable	-0.676** (0.343)	-0.456*** (0.152)
Tenure	0.240*** (0.0266)	0.189*** (0.0121)
Registration	0.872*** (0.0813)	0.773*** (0.0378)
Response_length	-0.0985 (0.0869)	-0.0159 (0.0408)
Response_time = 1	-0.0734 (0.101)	0.0434 (0.0463)
Response_time = 2	-0.102 (0.103)	-0.113** (0.0485)
Response_thanks	0.0421 (0.0841)	0.0483 (0.0393)
Constant	-2.149*** (0.265)	-0.524*** (0.118)
Log likelihood	-1911.86	-6521.99
Model fit	214.52***	763.37***
Observations	3255	3255

Note: SEs in parentheses.

*** $p < 0.01$; ** $p < 0.05$.

the denial of request is attributed to internal locus of causality or external locus of causality, the total number of requests is significantly higher, so Hypothesis 1b is supported.

In terms of stability, findings show that an unstable attribution has a positive effect on continued participation. However, the effect is significant in model 2 only, so while Hypothesis 2a is not supported, Hypothesis 2b is. Contrary to our hypothesized relationship, the effect of the causal attribution controllability is significantly related to the number of total requests. This means that government responses attributed to uncontrollable factors are negatively and significantly associated with the total number of requests, so we cannot support Hypothesis 3a,b.

To visually examine the hypotheses, we studied the hypothesized effects by means of total effect size plots. The total effect sizes depict the magnitude of the effect that the predictor variables have on the response variable in the model when these variables are increased from their minimum to their maximum amount. So, we are able to directly compare the effect sizes of predictors. Each effect (odds ratio and incidence rate ratio) is shown as a dot, and the horizontal bar indicates the confidence interval for the estimated effect (Jann, 2014). The different colors suggest

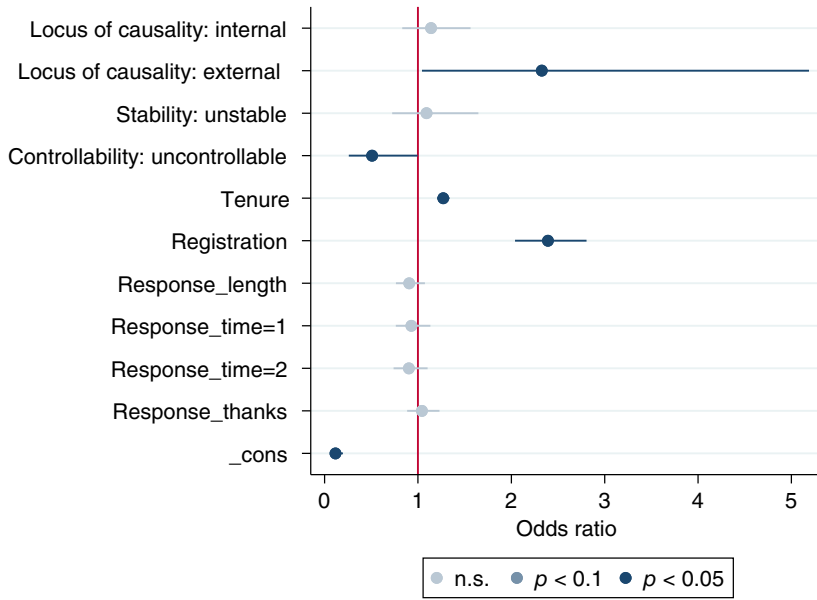


FIGURE 1 Effect sizes, model 1

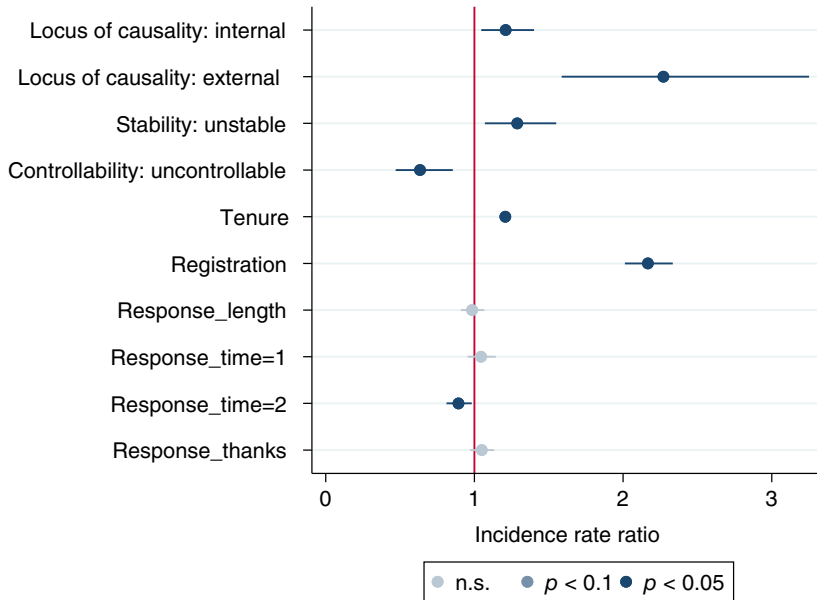


FIGURE 2 Effect sizes, model 2

the significance level of the effect. In Figure 1, the effects plot of model 1 shows the odds ratios in terms of the dependent variable of the follow-on request. In Figure 2, the effects plot of model 2 illustrates the incidence rate ratios (IRR) in terms of the dependent variable total number of requests, representing the change in the dependent variable in terms of a percentage increase or decrease. An IRR above 1 means an increase and a value below 1 a decrease.

5 | DISCUSSION AND IMPLICATIONS

5.1 | Discussion

This article examines the citizens' submission process over time based on a 7-year pool of both online requests from citizens to the local government and government responses on citizen requests. Online community-based platform users do not compete with each other, and the success of one request or idea does not exclude the success of another. Consequently, the requests are independently considered by the government, and the users can support each other and the local community as a whole to improve the public service and infrastructure quality by providing more ideas and information on the issues. This makes the crowdsourcing platform a significant avenue to deliver societal value (Ahn et al., 2019). The success of such a platform is, however, conditional on citizens' participation and their regular reporting of infrastructural defects. This paper argues that continued participation behavior depends on government's transparency about how to process citizen requests. Little is known about how government feedback affects platform participation behavior. Consequently, this study examines the effect of the government's reasoning for denying a citizen request on continued citizen participation. Drawing on attribution theory, we attribute the government response to causal dimensions such as locus of causality, stability, and controllability, and link these attributions to future participation behavior.

In analyzing how the local government as the platform provider processes citizen requests, we distinguish between requests that are approved by government and those that are denied. In line with previous research on decision transparency (Sjoberg et al., 2017), this study found upfront a negative effect of a request's denial on the probability of submitting a follow-on request meaning that government's responsiveness to platform users is positively related to future participation.¹ Beyond this finding, we delve deeper into elucidating the behavior of users whose requests have been denied.

We shift focus to the notion of rationale transparency to reveal the role of government responses to citizen requests in achieving continued citizen participation even after their first request is not approved. Our findings show that the citizens' decision to continue participating is not dependent only on the government decision whether to approve or deny the input, but is multifaceted. The likelihood of continued participation depends on the causal attributions associated with the response provided by the government when denying their request.

We find that continued participation is related with the locus of causality attributed to the government response. If a request was denied due to an internal or an external locus of causality, the denial does not have a negative effect on future participation. In contrast, if the locus of causality is with the local government, citizens show a lower level of participation behavior compared to denials that are attributed to internal or external causes. For example, citizens may not understand why the government has no financial resources or organizational capacity to fix problems that they perceive as most pressing. They may perceive the setting of priorities as unfair and conclude that the government is not working hard enough to solve citizens' problems. In contrast, if the government is not able to comply with the request as another city or organization is responsible, citizens seem to accept the denial due to the external locus of causality and value the platform's support.

In addition, the stability of factors attributed to the government response seems to have an effect on citizen platform behavior. If the response is attributed to stable factors such as legal reasons, findings point to a lower level of platform participation, compared to responses attributed to unstable factors. Lower participation rates in terms of stable factors might be explained by the low perceived effectiveness of the platform for citizen needs. Besides, contrary to our hypothesized effect, controllability is positively related with future participation. This means that, if citizen requests are denied and the government response is attributed to controllable factors, they are more likely to continue submitting requests via the platform. This is somewhat counter-intuitive. While we expected that citizens may blame the government for not approving requests within their control, citizens seem to respect government's decision when provided with reasons such as a lack of prioritization or adequacy of the current solution. These reasons likely help citizens to understand the government's decision. In contrast, if realizing the citizen input is not within government's control, they might stop using the platform, as they assume the government is unable to deal with similar issues in the future.

5.2 | Theoretical contribution

Several implications for theory arise from our findings. First, we advance insights on how public sector organizations can implement crowdsourcing to develop new ways to address public service and infrastructure issues (Chesbrough & Di Minin, 2014; Randhawa et al., 2019). In particular, by investigating citizens' behavioral responses to a denial of citizen request in the context of a crowdsourcing platform, and how citizens deal with government responses, we contribute to the scant research on the role of public sector organizations in motivating citizens to contribute continuously (Wijnhoven et al., 2015). By using longitudinal data and measuring participation over time, this study uncovers the important role of the government response to citizens' inputs. In doing so, we add to the limited crowdsourcing research that demonstrates that, besides the input generation process, the input evaluation process (i.e., the government filtering and responding to inputs), is also crucial in determining individuals' willingness to continue their contributions in future (Piezunka & Dahlander, 2015, 2019).

In particular, we show that governments can leverage a hitherto underused form of feedback—denials—to encourage citizens to bond with them. On the one hand, asking citizens for input on infrastructural defects and then refusing to consider their input can have unintended consequences. On the other hand, if designed and used well, denials can signal to citizens that the government is interested in receiving their inputs and in building relationship with them. This finding highlights the importance of managing the “human side” on digital platforms (Bogers et al., 2018), and how personalized communication matters in terms of user behavior in online communities (Randhawa et al., 2017). It also reinforces the government's need to interact with citizens continuously to sustain their participation.

Second, learning about the factors that motivate citizens to continue participating also has implications for designing crowdsourcing platforms (Kohler & Chesbrough, 2019; Leckel et al., 2021). Platform interaction greatly depends on how platform providers design the communication interface to allow seekers to leverage crowdsourcing effectively (Randhawa et al., 2018). From the seekers' perspective, closing the feedback loop and providing responses to solvers' requests is shown to be crucial for users' motivation (Ansell & Miura, 2020; Simmons & Brennan, 2017; Thomas, 2013). This study sheds light on *how* seekers can provide feedback effectively to motivate citizens to continue participating on crowdsourcing platforms. In line with previous crowdsourcing research (e.g., Piezunka & Dahlander, 2019), our findings show that the way governments word denials matter, and we further disentangle the mechanisms through which feedback on denials affect citizens' willingness to continue interacting with the government. We thus highlight the need for governments to carefully design their responses to citizen requests to sustain their participation on crowdsourcing platforms.

Third, this article contributes to the analysis of the temporal dynamics of citizen–government interaction by using longitudinal data. Using digital traces (Robinson, 2017), this study has investigated actual citizen–government interaction and has thus counteracted the possible measurement errors of survey-based research. In crowdsourcing platforms, users are social actors whose behavior is largely open to observation by others. We use this potential to learn more about how citizens interact on digital platforms, and what effect their experience on the platform has on their future participation.

5.3 | Implications for practice

Governments increasingly use crowdsourcing applications worldwide. However, the goals and the citizen motivation to participate on crowdsourcing platforms vary (Wijnhoven et al., 2015). Our results provide guidance for public managers who wish to stimulate digital interaction with citizens and design crowdsourcing platforms for better citizen–government knowledge exchange.

We found that the first-time experience of citizens is significantly related to future participation behavior. If platform initiators wish to increase platform activity and want users to stay engaged, they are advised to focus on the

first-time experience and the reaction to user input. For example, if government is not responsible for a request, the locus of causality should be carefully explained to citizens. Thus, the government should consider providing information about its responsibilities and educating citizens about its scope of influence.

Additionally, government's resource constraints are a significant barrier to future participation behavior. The government has a few options to respond to such requests: allocate more financial resources to infrastructural maintenance when starting a crowdsourcing platform, provide information about the availability of organizational and financial resources for solving problems, or provide citizens with resources for solving infrastructural problems that they are able to administer and integrate them in prioritizing the problems.

5.4 | Limitations and future research

Some study limitations are worth noting. First, this study makes a first step toward analyzing government responses to citizens' requests by drawing on attribution theory. Despite this is a new approach, future research might take a closer look at the design of denials and the interrelation between the causal attributions associated with government responses. Besides, although government feedback and thus the efficacy of submitting requests plays a significant role in future participation behavior, other factors must also be considered. For example, crowdsourcing platforms are not only based on the interaction between seekers and solvers, the online community users' reaction to requests can also influence platform behavior. Future research can thus analyze to what extent the social dynamics influence individual user participation in online community-based platforms (Randhawa et al., 2016).

Second, in line with our theoretical model, our focus was to explain continued citizen participation when experiencing a denial of a request in the first place. We assume that these citizens are no longer willing to contribute actively to crowdsourcing and stop using the platform. To derive detailed implications for the design of crowdsourcing platforms, a deeper understanding of this exit option is required, as negative experience accompanied by anger and frustration may have undesirable consequences for the government and worsen the citizen-government relationship. Consequently, it is pertinent to investigate whether users also stop participating in other contexts, they voice via other channels or start gaming (Peeters et al., 2020).

Third, the study's setup only includes the evaluation of citizen requests by government responses. Future research can analyze the quality of citizen requests and government responses. A content analysis of platform content might shed light on citizens' perceptions of the initiative and government in general, but also evaluate the effect of platform content on individual performance.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

Data subject to third party restrictions.

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ENDNOTE

¹ As a preliminary analysis, we replicated the study by Sjöberg et al. (2017) and tested whether the government decision on whether to approve or deny the citizen request has an effect on the probability of submitting a follow-on request and the total number of requests. Findings available on request from the authors.

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