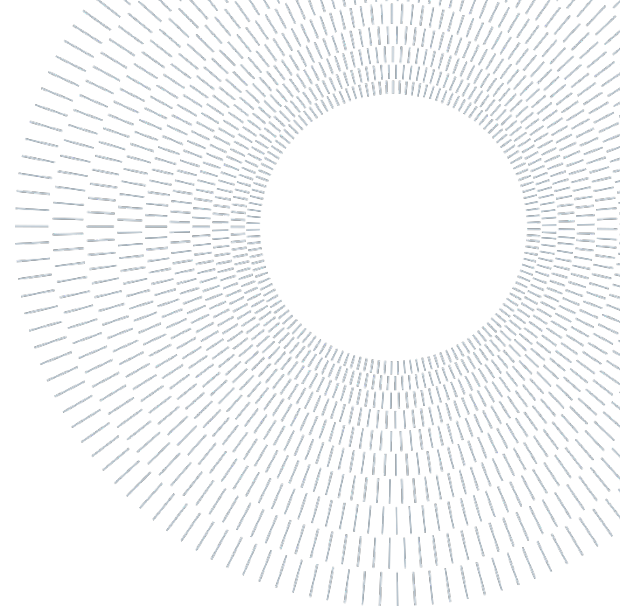




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EXECUTIVE SUMMARY OF THE THESIS

Engaging the crowd to solve complex problems in the Public Sector: a bibliometric literature review and an empirical analysis of nine international case studies

TESI MAGISTRALE IN MANAGEMENT ENGINEERING – INGEGNERIA GESTIONALE

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ACADEMIC YEAR: 2021-2022

Introduction

In the past years, companies, non-profit organizations and public institutions have often implemented processes to involve customers and citizens in the knowledge creation to solve problems of very diverse nature, ranging from firms seeking solutions to micro-tasks through crowdsourcing to governments organizing events to involve citizens in decision-making through citizen participation.

However, in more recent years a new kind of phenomenon has emerged, which has been applied by public institutions and non-profit organizations to deal with very complex, societal challenges like climate change and the covid-19 pandemic [1].

This was, for instance, the case of [EUvsVirus](#), a hackathon of unprecedented size sponsored by the European Commission [1] which brought citizens, businesses and public organizations together, to

show unity in the response to the Covid-19 pandemic.

This novel phenomenon, which will be named “crowd engagement”, shows some elements which belong to the concepts of “open innovation”, “citizen participation” and “crowdsourcing” [2], but combines them in a distinctive way that gives it a different and more profound identity.

To better explore and define this identity, we conducted a bibliometric systematic literature review to understand the theoretical boundaries defining crowd engagement and to identify the characteristics that differentiate it from the other three mentioned methodologies. This will be discussed in the first chapter of this thesis, which will have the objectives of exploring how the process of crowd engagement has been shaped and defined by the literature and delineating a future research agenda for crowd engagement

After having discussed the results of the systematic literature review, a second chapter was devoted to answering one of the questions that emerged from its future research agenda, which called for an

exploration of crowd engagement's benefits and challenges. To do so, a sample of nine international cases has been selected and analyzed through a process of qualitative research based on semi-structured interviews.

1. Systematic literature review

Research methodology

The starting point of the systematic literature review was the selection of a sample of publications to be explored regarding crowd engagement. Two bibliometric approaches were then combined to provide a robust and insightful understanding of the literature [3]. As the first one, we applied the co-citation analysis, with the purpose of exploring the publications building the theoretical foundations of crowd engagement. As second approach, a text mining analysis was instead applied to provide a content-driven review of the sample, providing conceptual insights into the novel process.

Sample selection

The first step of the systematic literature review was to select a sample of documents regarding crowd engagement on which to conduct the following bibliometric analysis. The appropriate database chosen for this purpose was Scopus. Among its many documents, those potentially relevant to the research were found by using the following research string:

("Open innovation" OR "Co creat" OR "Crowdsourcing" OR "Citizen engagement" OR "Collective Intelligence" OR "Collaborative innovation" OR "Collaborative research" OR "Participatory design" OR "Quadruple helix") AND ("Public" OR "Private" OR "Government*" OR "Firm*" OR "Incumbent" OR "Compan*" OR "Organization*")*

Furthermore, only articles or book chapters belonging to the fields of "Business, Management and Accounting", "Computer science" or "Social sciences", being classified as "gold", "hybrid gold" or "bronze", marked as "final" and written in English were considered.

All the selected keywords were approved and suggested by a sample of thirteen external actors, made of academics and experts of the open

innovation and citizen participation processes, who indicated them as solid proxies for the phenomenon of crowd engagement. Indeed, given the very recent nature of the novel process, it was expected that it had not been explored by the literature under the new definition of "crowd engagement". However, parts of already existing processes could help in defining this phenomenon as they share some elements with it, leading to the inclusion of certain concepts provided by experts to support the explanation of the phenomenon. Finally, the second group of keywords, was used to make sure that it was possible to clearly identify whether the initiator discussed in the paper was a public institution, a non-profit organization or a private company, as only the first two would be associated with crowd engagement concept.

The following steps of selecting the documents based on screening their abstracts and texts led to a final sample of 194 publications about crowd engagement. While performing these steps, additional 112 articles about the application of similar processes by private companies to involve external actors in the solution of problems were kept, forming a separate sample of literature to be used to exclusively analyze the elements that could be considered useful to compare with the phenomenon of crowd engagement.

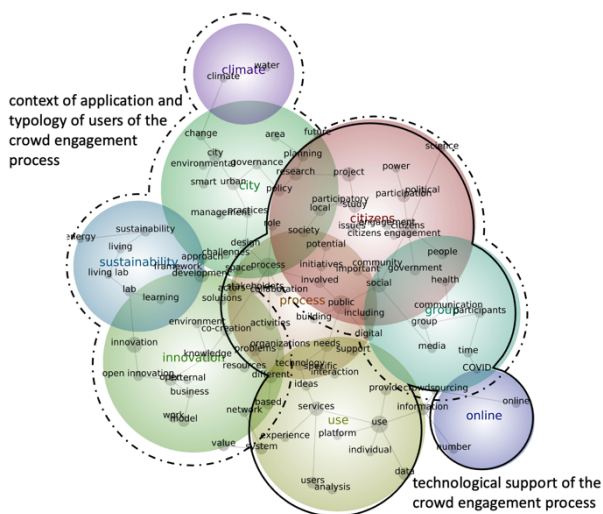
Results of the co-citation analysis

The main co-citation analysis was conducted on the sample of publications regarding crowd engagement to understand and define the theoretical foundations of the process [3]. Moreover, a supplementary analysis was performed only on the additional literature about similar methodologies applied by private companies to enable a comparison to better identify what makes crowd engagement a unique phenomenon. The main analysis results show how the process theory is rooted in publications organized in three knowledge clusters focused on open innovation, crowdsourcing, and co-creation and citizen participation, with the first three concepts being discussed taking the perspective of public institutions. The results from the additional literature show the same three clusters, sharing some seminal papers with the main analysis, though adopting the point of view of private companies and excluding the concept of citizen participation. However, the presence in the main

analysis of publications regarding open innovation's applications to reach sustainability [4] sets apart the two results. Consequently, it is shown how crowd engagement theory is rooted in the concepts of open innovation, crowdsourcing, co-creation, and citizen participation [2], which are combined with one sustainability in creating the unique identity defining the novel process.

Results of the text mining

Figure 1 Text mining results



The text mining analysis was conducted to generate insights into the concepts underlying publications about crowd engagement [3]. The results (Figure 1) showed how the process answers to the growing citizens' demand for a change in their relationship with public institutions that grants them more active participation in the decision-making process. Moreover, crowd engagement's potential to solve very complex societal challenges emerges, as shown by numerous examples of its application to manage natural disasters, climate change and the covid-19 pandemic [1]. Furthermore, the concept of sustainability appears to be particularly relevant, as it often acts as the final purpose of these initiatives, with cities becoming the primary contexts for these initiatives to unfold.

Finally, the analysis shows the very important role played by technology in the context of crowd engagement, as it supports and enables its implementation, improving the reach of the initiatives by making it possible for otherwise marginalized people to be included, while also

offering a way to overcome physical and geographical barriers.

Theoretical and practical implications

The systematic review adds to the literature a definition of the process of crowd engagement. Moreover, it identifies its main features, demonstrating how sustainability is a core concept of the phenomenon, actively shaping its identity and scope. Finally, it was highlighted how crowd engagement is applied to manage macro-tasks, with the problems to be solved showing high complexity and impacting society at large.

From a practical perspective, it was shown how using digital tools, like platforms, can support and enable a truly broad involvement of the citizens. Moreover, initiators should be aware of the risk that the final crowd involved is not representative of society at large, therefore limiting the legitimacy of the process' results, and design the initiatives to effectively overcome this challenge.

Limitations

The main limitation is given by the fact that, as a result of the novelty of crowd engagement, the literature to be analyzed had to be selected using some "proxies" of the process as keywords. However, to guarantee the robustness of the results, the research string used on the Scopus database was improved and validated by a pool of experts and academics.

2. Qualitative research

Research objective

The conclusions of the systematic literature review discussed how crowd engagement combines specific elements from open innovation, crowdsourcing, citizen participation and co-creation with the concept of sustainability, shaping so its distinctive identity. This puts crowd engagement in a unique position with respect to the other mentioned concepts. Consequently, it is reasonable to expect that crowd engagement's defining challenges and benefits will show some differences and peculiarities with respect to those of the other processes. This suggests that there is

still a gap in crowd engagement's theory that needs to be filled, motivating the effort to go beyond the analysis of existing literature and conduct qualitative research on a sample of case studies to answer the following research questions:

RQ 1: "What are the challenges of the crowd engagement process?"

RQ 2: "What are the benefits of the crowd engagement process?"

Research methodology

Given the explorative nature of the research, it was decided to follow the case-study approach (Eisenhardt, 1989).

Following the analysis of the challenges and benefits of crowd engagement already discussed by the publications included in the sample used for the systematic literature review, the research proceeded by adopting an inductive approach while performing the coding procedure of the transcriptions of the interviews of the selected case studies. The generated results were then compared with those from the literature to identify which empirical findings provided a novel contribution to crowd engagement's theory.

Sample description

The sample to be studied for the identification of the challenges and benefits of crowd engagement was made of 9 cases, highlighting different possible applications of the process.

It was chosen to take the perspective of the initiator as it allowed for a deeper comprehension of the process, enabling a better assessment of the relationship between the findings and the initiative's characteristics. Indeed, only the initiators could provide insights into all the steps of the initiatives, as participants could have discussed only the phases in which they had been directly involved.

The different cases were selected making sure that they would bring different perspectives on the research questions, according to the principles of purposive sampling. Moreover, each one of them had to respect some selection criteria to be accepted. According to the provided description of crowd engagement, the cases had to be focused on the solution of complex societal problems, the initiator had to be either a public institution or a

non-profit organization and citizens had to be involved, sometimes at an international scale, in the solution of the problem.

Most of the cases were identified based on some prior research by [Nesta](#) (Nesta, formerly the National Endowment for Science, Technology and the Arts is an innovation foundation based in the UK which acts as the main reference for the practitioners on the topics of collective intelligence) therefore fulfilling the required criteria to be included in the sample. It was so possible to define the initial sample of 6 cases to be analyzed, which was expanded according to the principles of "snowball" and "data saturation" thanks to contacts suggested and provided by the interviewees, bringing the final count to 9, with a total of 10 conducted interviews. Finally, the interviewees were all people who directly participated in the initiative's design and implementation as part of the initiator's team or founders.

Data collection and analysis

The data analyzed during the research was obtained from different sources to enable their triangulation, combining primary and secondary resources like webpages and reports. The semi-structured interview methodology was chosen as it could be adapted according to the needs of each case. The so collected data was then analyzed through the inductive coding of the interviews' transcripts. Finally, the robustness and validity of the generated results were guaranteed by a thorough process to reach intercoder reliability.

Results of the qualitative research

The coding phase led to the generation of two coding trees, respectively showing 14 challenges and 13 benefits of crowd engagement (Figure 2). It was possible to classify the challenges based on what aspect of the crowd engagement effort originated them, distinguishing between initiators of the process, the engaged crowd, the contributions provided by the participants and the organizational design of the initiative. Moreover, it stood out how the process' benefit could be related to the effects of strengthening democracy, increasing social value, supporting innovation and solving and managing complex problems. Out of the 29 findings, 6 represent novel contributions to

the theory of crowd engagement, as they have not been discussed by the existing literature.

Finally, it was possible to connect the challenges and benefits of each case with the span and intensity of the corresponding initiative, meaning respectively the number of participants involved and how actively they were engaged by the initiators in the process [5].

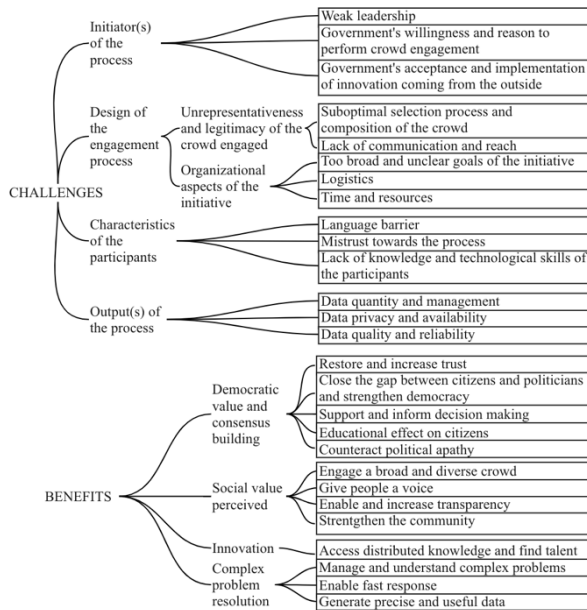


Figure 2 Coding trees of the challenges and benefits of crowd engagement

Theoretical and practical implications

This research adds to the literature about crowd engagement 6 novel challenges and 6 benefits which have not been discussed in existing publications. Moreover, it enriches the already existing literature by expanding the knowledge about certain challenges and benefits. Finally, it shows how there is a connection between some of the findings and the span and intensity of a crowd engagement initiative.

From a practical perspective, having associated each challenge with the element of the crowd engagement effort originating it, helps initiators understand on which levers to act to overcome them. Furthermore, this research provides useful insights into how to design the initiative's span and intensity [5] according to the benefits sought, while also anticipating the most relevant challenges that will result from such a choice.

Limitations

The main limitations of this qualitative research are represented by the number of cases and interviewees included in it, as additional ones could have led to the discovery of other challenges and benefits. Moreover, inductive coding can be affected by the researcher's subjectivity, which thanks to the intercoder reliability process, was minimized. Finally, the inductive nature of the research might make it difficult to statistically generalize some of its results.

3. Conclusions and future research agenda

This thesis made it possible, through a systematic literature review, to define crowd engagement, identifying its main features, applications and contexts, while exploring through qualitative analysis the main benefits and challenges of this novel process.

In the first chapter, the co-citation analysis highlighted how crowd engagement's theoretical foundations combine elements from the methodologies of open innovation, citizen participation, crowdsourcing [2] and co-creation [5] with the concept of sustainability [4] to shape the process' distinctive identity.

By complementing these findings with those from the text mining analysis it was possible to define the characterizing features of the process. To start with, crowd engagement involves a self-selected and generally unskilled crowd of citizens in a process of co-creation of value with the initiators, which are either public institutions or non-profit organizations. The initiatives, which are characterized by an open call, can take place both offline and online, often combining the two approaches, and might have a very wide reach, sometimes going beyond national boundaries. Moreover, instead of asking the participants to individually solve micro-tasks, crowd engagement is focused on engaging citizens according to a co-creation approach to support initiators in the processes of decision-making, defining problems and solving macro-tasks. Indeed, the crowd is sometimes even mixed in ecosystems of problem-solving with firms, experts, and specialized communities in the logic of multi-stakeholder ecosystems. Finally, crowd engagement, is

generally applied to solve very complex and transversal problems impacting society at large, like climate change, with sustainability often being the final purpose driving the process [4]. These considerations lead to the following final definition of the phenomenon provided by the thesis:

“Crowd engagement is the process by which public institutions or nonprofit organizations engage an often self-selected and unskilled crowd of citizens, both in online and offline initiatives, to manage and solve, through the co-creation of partial solutions or problem definitions, very complex challenges related to sustainability and affecting society at large”

Once having properly defined crowd engagement, it was possible to identify 14 challenges and 13 benefits of the phenomenon, through a process of qualitative research on a sample of nine cases. It was possible to discuss the causes of the identified challenges, highlighting how the culture of the initiator might significantly limit the success of the process, especially in the case of public institutions, where there might be inertia and resistance to accepting and implementing the ideas generated by external and non-expert actors. It was also concluded that crowd engagement’s benefits can be exploited by initiators for different purposes, especially to strengthen democratic processes, by bringing citizens and politicians closer together and restoring people’s trust in politics. Moreover, the process’ potential to solve complex problems, defined in the systematic literature review, was grounded in the process’ benefits of enabling fast response [1], improving the understanding of complicated situations, and quickly generating precise data.

Furthermore, it was concluded that there is a relationship between the challenges and benefits, and the span and intensity of a crowd engagement effort. It was so possible to establish that some of the findings appeared to be independent of the mentioned variables. This is true for the challenge of properly communicating the initiative to the participants, which initiators always need to manage, and the benefits of supporting decision-making and solving complex problems. On the other hand, other challenges appeared to be amplified by these variables’ values. This is exemplarily shown by the fact that the higher the intensity gets, the more difficult it will become for initiators to manage and analyze the overwhelming number of contributions collected from the participants, as the greater freedom given

to them will lead to higher variability in their submissions. Similar considerations are true for most of the benefits strengthening democratic values, made possible only by a high level of intensity.

In conclusion to the systematic literature review, a future research agenda on crowd engagement was defined. In particular, the questions call for further investigation into how initiators can make sure that the process is truly representative of society at large while also asking to better understand under which conditions digital technology acts as an enabler for participation instead of causing the marginalization of people with little digital skills. It also suggests exploring possible collaboration between public institutions and private companies to initiate the process. Moreover, the qualitative research provided some guidelines for the future development of the subject, mainly focusing on the need to understand how to overcome each defined challenge and purposefully leverage all the identified benefits. It also calls for further investigation into the relationship between the design of the span and intensity of crowd engagement initiatives and the resulting benefits and challenges.

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