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Empowering Online Idea Management for Civic Engagement with Public Displays and Social Networking Services

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Abstract

Idea Management (IM) is the process of requesting, collecting, selecting and evaluating ideas to develop new and innovative products, services or regulations, or to improve existing ones. The process is supported by dedicated Idea Management systems (IMS), which lets people propose ideas, as well as rate and place comments on other users' suggestions. When used in the civic domain, IM serves as a tool to engage citizens in processes of innovation of public services, laws, and regulations. A key ingredient in the success of IM is the community of participants. The larger the community, the more diverse views are likely to appear and diversity of views increases the chances of discovering valuable ideas that can lead to innovations. However, having a large number of people participating in IMS is a hard challenge; it requires an understanding of the people and their needs, and designing the technology to match these characteristics.

In this thesis, we aim at involving the society at large into IM processes. Achieving this ambitious goal requires integrating IMS with people's everyday life tools and spaces of participation. We understand that tools for civic engagement should engage people on their own terms and should be readily available. We meet these requirements by proposing an approach that integrates IMS into common physical and virtual spaces of participation enabling people to participate in IM using ordinary tools and without having to step outside their daily habits.

In a systematic and extensive study of the literature about technologies used to foster civic engagement in innovation processes, we found that the choice of technology and its "situatedness" is essential in granting ease of public access and promoting inclusive processes of civic engagement. We also discovered that civic engagement technologies still have room to improve their use of multiple channels of participation. In this regard, we saw social networking sites such as Facebook and Twitter as having a strong potential to lower participation barriers and engage citizens, considering how pervasive these sites are today as daily tools.

We show how the lessons learned can be applied in practice by presenting two solutions to increase participation in IMS. The first solution is a platform that extends IMS by integrating them into displays located in public spaces. From this experience, we found that taking the right instruments to where people actually are is important to address specific inequalities regarding access to technology. We also saw that the display represented for citizens not only an opportunity to make their voice being heard but also an occasion for socialization. The second solution is a model and tool that empower IMS through Facebook services. Here we found that the integration with Facebook facilitated participation by reducing the friction related to getting informed and involved in IM. Also, the participants reported that the familiarity and easy to use of Facebook features represented an advantage for participation. We informed the design of both solutions with large- and medium-scale data analysis studies on the behavior (individual and collective), practices, and motivation factors of IM communities' participants.

Keywords

Idea Management, Civic Engagement, Social Network, Open Innovation, Crowdsourcing, Collective Intelligence

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Contents

Chapter 1

Introduction

In the original Greek definition, *democracy* referred "the right of people to decide about subjects that affect their daily life" [144]. Originally, Athenians placed decisions in the hands of free adult male citizens through public debates [68]. From that time up to now, democratic participation of citizens in the making of governance decisions has taken many forms throughout history, being voting the most common one. However, *participation in democracy* is not restricted to efforts towards influencing elections but to participation in activities that benefits local communities or societies as a whole [49]. Examples of participation include assisting to town halls, volunteering, protesting, campaigning, and other forms of participation at various levels (i.e., local, community, national, regional) in institutions that governs people's life.

Although democracy is seen as the ideal and most common form of government —at least in western countries— previous research has found that people have started engaging less in democratic processes [59, 97, 105, 165, 186] and placing less trust in their representatives [52, 144, 171, 189]. For some political scientists, the layers of representation introduced by our modern democracies have shrunk rather than extended the community that can take part in political decisions making people feel that they have lost the ability to shape the future of subjects that affect their daily lives [22, 129]. Response to this perceived deficit in democracy might come from generating opportunities of direct participation at different levels of

decision-making processes [135, 179]. Motivated by the potential of information and communication technologies (ICT) to enable new and innovative opportunities for participation, an increasing number of governments and civil society organizations have begun to engage citizens in public consultations oriented to address issues in planning [67], budgeting [205], and innovation of public services [155]. Promises of technology include reaching both scale and quality of participation by helping to overcome limitations present in traditional spaces of public consultations, such as town halls and public hearings, which are fixed to specific times. People reported not having time to show up in these meetings [171] possibly because of demands of daily life, lack of flexibility in their schedules, child rearing, or career-building activities [91]. In addition, scholars found that in some occasions these spaces of participation are dominated by special interest people, making hard for ordinary citizens to voice their opinions [38, 108, 144].

Technology enables institutions to engage the public more directly and to harness the *collective intelligence* distributed across the citizenry to eliciting ideas and proposals. Crowdsourcing is one form they use to engage people in tasks published online as open calls for anyone to participate [34, 66, 113]. The "crowd" here refers to a collection of people who are aware and self-select to participate on the open call defined by the "crowdsourcer" (i.e., governments, institutions, or civic organizations) [60]. In the civic domain, it has been used for several purposes, ranging from crowdsourcing the entire solution to social problems (e.g developing a formula for predicting solar flares [32], submitting the best cost-cutting proposal for government operations [33]) to involving the citizenry in citizen science projects (i.e., projects in which volunteers contribute to research tasks [164], including data collection [27, 209], classification [167, 187], and analysis [50, 162]) to the completion of small-tasks (e.g. reporting street potholes [126, 202], discovering malaria and dengue infection focuses [47, 151]).

For the matter of this thesis, we are interested in the application of crowdsourcing to crowdsource ideas for public-interest issues, being the

reform of a policy, the update of an urban plan, the allocation of public budget, or the innovation of a public service [1]. If executed through proper means, idea crowdsourcing can promote inclusiveness in two forms. First, by including ordinary citizens into processes that before were reserved exclusively to politician and public servants and second, by creating new spaces where ideas, proposals, and opinions of individuals can be heard, discussed, and put into practice [8, 70, 136, 163].

Idea crowdsourcing allows "idea crowdsourcers" (i.e., governments or civic organizations who crowdsource the ideation of solutions) to reach information sources not easily accessible through other means and extend the knowledge search to large pools of cognitively diverse problem solvers [8]. Achieving the goal of efficient knowledge search in crowdsourcing ideas requires a well-structured process that allows for requesting, collecting, selecting, rewarding and evaluating ideas that can lead to innovation. This process, known as *Idea Management* (IM) [128, 20], has been empowering several innovation initiatives in the civic domain, e.g., urban planning [14, 19, 80, 90, 89], law making [6, 25, 136, 152, 184], budget allocation [83, 96], and public service innovation[142, 155, 159, 168, 218]. Back in time, organizations opened their innovation processes by soliciting suggestions and ideas from customers, employees, and members through physical "suggestion boxes" located in common areas [69]. The emergence of social and collaborative web-based technologies has transformed the old-fashioned mechanisms to collect customer recommendations (e.g., suggestion boxes) into active, sophisticated, and dedicated *Idea Management Systems* (IMS), which lets people propose ideas, as well as give feedback on other users' suggestions [115]. Examples of popular IMS are IdeaScale[1], Crowdicity[2], Kindling[3], Ideas4all[4], Bright Idea[5], IdeaGlow[6], Imaginatik[7],

[1]http://ideascale.com
[2]http://crowdicity.com
[3]https://www.kindlingapp.com
[4]https://en.ideas4all.com
[5]http://www.brightidea.com
[6]http://web.ideaglow.com
[7]http://imaginatik.com

Mindmixer[8], Neighborland[9], and Spigit[10]. The offering and markets are growing. Contributions of participants to provide valuable ideas are seen as strategic assets in the success of IM initiatives [58]. In this sense, the larger community of participants, the more diverse views are likely to appear [84, 116, 118, 135, 231]; more diversity increases the chances of producing valuable ideas [26, 65, 107, 121, 122, 132, 154, 174, 212, 230]. However, achieving mass participation online is a hard challenge, it requires an understanding of the people and their needs, as well as designing the proper technology to match the characteristics of users and purpose of the community [125].

In this thesis, we study how to increase participation in IMS used for civic engagement. Through an extensive study of the literature about technologies used to foster civic engagement in innovation processes, we found that the choice of technology and its "situatedness" (i.e., specific place of location) is essential in granting ease of public access and promoting inclusive processes of civic engagement. We also discovered that civic engagement technologies still have room to improve their use of multiple channels of participation. In this regard, we saw social networking sites, such as Facebook and Twitter, as having a strong potential to lower participation barriers and engage citizens, considering how pervasive these sites are today as daily tools. We show how the lessons learned can be applied in practice by presenting two solutions to increase participation in IMS. The first solution is a platform that extends IMS by integrating them into displays located in public spaces. The second solution refers to a model and tool that empower IMS through Facebook services. We informed the design of both solutions with large- and medium-scale data analysis studies on the behavior (individual and collective), practices, and motivation factors of IM communities' participants.

[8]https://www.mindmixer.com
[9]https://neighborland.com
[10]http://spigit.com

1.1 Motivation

Today's societal challenges (e.g., sustainable agriculture and forestry, demographic change and well-being, clean and efficient energy sources, smart and green transportation, electoral reforms) are commonly characterized by diverse interpretations and contradictory solutions. Because of the increase in the complexity of public choices and the unpredictable and ever-changing nature of problems the relevant information, knowledge, and perspective would be difficult to discover without bringing to the table new type of knowledge and a wider palette of opinions, ideas, and competences. The collective intelligence of the people allows, under the right conditions[11], for the generation of useful information, ideas, solutions, proposals, and knowledge that can inform better policies, services, and plans [29, 135, 168, 212]. Expert may know how to fix a problem, but with the knowledge coming from the people they can have at hand perspectives, interpretations, and contextual information that may be important at some point [35, 51, 57, 222]. The claim stands on various experiments that have been run around the world and which have shown how ordinary citizens can produce smart proposals even on highly technical discussions [76, 226].

A key ingredient in the emergence of collective intelligence is the cognitive diversity[12] of the group of people [110, 174]. Given the self-selection nature of the idea crowdsourcing method [213], i.e., the participants are not invited randomly to participate as in polls and surveys but they initiate the participation themselves, we understand, based on previous research (e.g., [116, 118, 135]), that our chances to have cognitive diversity increase by the inclusion of the largest possible segment of the population and thus

[11] In Hong and Page's theorem of Diversity Trumps Ability, they state that the four conditions that favor the emergence of collective intelligence are: i) the problem should be challenging enough to justify the involvement of a group in the solution; ii) solvers should be relatively smart; iii) there should be a great variety thoughts within the group; iv) the population from where the solver are selected should fairly large [111].

[12] Cognitive diversity refers to the "different manners in which the people approach a problem." It stands for the diversity in the representation of problems and situations, in the generation of solutions, and in the interpretation of the causes and effects of the solutions proposed [174]

the largest amount of information, views, knowledge, and experience that may matter at the moment of crafting solutions for public-interest concerns. Achieving mass participation is not an easy endeavor, however, promises of the Internet and current technology allow us to reach scales larger than ever before. Any attempts at using online tools to engage citizens in the democracy should, first of all, confront the question of the digital divide, i.e., inequities in Internet access by different sectors of the population; otherwise, the existing social differences can be deepen. Because of today's pervasiveness of cell phones apparently, there is no longer significant disparities in the access to the Internet [203], but the main issue has become reaching out and pulling different sectors of the society into the online discussion and decision-making processes [141]. With the involvement of a large number of people, we increase the possibilities of having enough diversity, which is essential to produce valuable ideas and solutions [26, 65, 107, 121, 122, 132, 154, 212, 230].

1.2 The Problem

In this thesis, we aim at including diverse sectors of the society in IM by enlarging the communities that support online IM processes. Having a large number of people participating in online communities is, however, a hard challenge. Previous research reported that half of the 2,872 Usenet groups for health support had fewer than 30 contributors. Similarly, it has been discovered that the median contributors of 9,000 public-sharing information wikis in 2011 was only seven [130]. We found the same pattern in communities that support IM. About half of IdeaScale's public-access IM initiatives (221 out of 456) have no more than 40 contributors [194]. In the context of IM, low rates of participation can reduce the chances of IM organizers to discover promising ideas, new opinions and innovative knowledge that can potentially contribute to achieving better services and policies. A low turnout can even undermine the value of the result and discredit the entire process.

Attracting people to virtual communities has been previously investigated by social scientists. In fact, it has been identified as one of the top fundamental problems in the design of technologies that support online communities [130]. The literature contains a rich discussion of different strategies to promote online communities. On the one hand, the importance of interpersonal recruiting has been emphasized by some scholars, here, techniques range from personalized word-of-mouth [161] to recruiting through community member's social networks [77]. On the other hand, impersonal advertising has been reported to be also effective to attract people to new communities [217]. Also, scholars have remarked the importance of the visual aspects of technologies (i.e., graphic design of the site [78, 221], quality of the information displayed [206], signs of activity in the community [43]) at the moment of driving traffic to communities. Another crucial task in designing online communities is keeping people participating. In this sense, research has shown that these virtual spaces experience high rates of dropouts, especially of newcomers [63, 175]. Here, the literature recommends establishing positive and friendship initial interactions with new people [15]. The use of welcoming and inclusive (i.e., "we" instead of "you") language in the first contact has reported to be effective in keeping newcomers around [36, 134]. Kraut et al. have also suggested encouraging newcomers to self-disclose themselves through public profiles or introduction threads [130]. There is no an explicit agreement in the literature about the impact of entry barriers in the engagement and commitment of people to communities. On one side, a group of scholars —inspired mainly by the classic experiment of Arison and Mills [16]— have found that entry barriers make people more committed to groups and communities [223]. Drenner et al., on the other side, have noticed the downside of entry barriers when recruiting new members to groups, demonstrating that entry barriers drive away people that might be interested in contributing to the communities [62].

We base our approach on Drenner's results hypothesizing that lowering barriers of participation will increase our chances of having large and

potentially cognitive diverse crowd, who has the ability to generate useful ideas. We start by recognizing that the design of current technologies for civic engagement (e.g., IMS) imposes barriers and initiation rituals (sign-ups, learning) that might discourage participation. They work disconnected from the physical and virtual places where citizens spend their daily routines [91]. This disconnection forces the people to be committed to separate spaces and processes and to use tools that are unfamiliar to them. For example, discussions hosted in the state of the art of IMS require that citizens sign up into these platforms and return regularly to them to participate. Enlarging the community of participants and potentially the range of voices implies for us the design and implementation of tools that integrate IMS with ordinary physical and virtual spaces of participation enabling people to participate in IM using ordinary tools and without having to step outside their daily habits.

1.3 Methodology

In answering the problem defined before, we use the following methodology.

1. We conducted a review of the literature on technologies to facilitate processes of discussion of ideas to address public-interest problems;

2. We studied online communities that support IM processes, specifically their characteristics as well as the individual and collective behavior of their members;

3. We investigated the factors that drive people to IM processes and which are the prominent characteristics of the group of participants;

4. We designed, implemented and tested a platform that integrates an IMS with public displays located in popular zones of cities;

5. We examined the mechanisms proposed today to integrate IMS with social networking sites, like Facebook and Twitter, and analyzed their

effectiveness in increasing the number of participants in IM processes and contributions;

6. We studied the feasibility of Facebook as a tool to carry out IM tasks (i.e., idea suggestion, voting, commenting, content processing and synthesizing);

7. We developed a system that integrates an IMS with Facebook looking to bring IM closer to today's largest virtual spaces of participation.

Next, we present details about each of these steps explaining their goals and how findings in one step triggered the research in the next one.

We conducted an extensive and systematic review of state of the art on technologies used to promote civic engagement in processes of discussion of ideas that can lead to solutions to social issues, such as the innovation of public services. In this phase of the work, we reviewed papers looking to understand what technologies are proposed to support this processes, which is the primary role they fulfill in the process (i.e., collect ideas, gather opinions, make decisions, educate citizens), what strategies and methods are proposed to engage the people into the process, and what methodologies are used to structure, organize, and guide citizens toward a more effective participation.

To complement the study of state of the art, we delved deep into the communities that support online IM processes. Taking IdeaScale, one of the today's leading IMS, as a test bed we first conducted a qualitative analysis of 166 IM communities deriving a set of archetypes that define the main characteristics of the communities that live inside this platform. Next, we applied Machine Learning techniques to identify patterns in the collective and individual behavior of these communities. Aiming to deepen our understanding of IM communities, we examined the profile of the participants and the motives that drive them to contribute to the reform of laws through a real case of IM for policy-making.

From the study of the state of the art, we realized the potential of

using public display to bring IMS closer to common spaces in cities and in this way granting ease of public access and promoting inclusive processes of civic engagement. We developed a model to integrate IdeaScale with public displays and implemented a multi-channel platform of participation, allowing people to take part in discussions about local issues either through an online tool (IdeaScale) as well as via an onsite system connected to public display. By deploying the platform in common areas of the city of Trento, Italy, we found that taking the right instruments to where people actually are —both offline and online— is crucial to achieve participation.

After experimenting with public displays placed in strategic urban locations as a way to bring IMS closer to people's daily routines, we started to investigate how to achieve the same goal but in "online public spaces." Recognizing that social networking sites like Facebook or Twitter have been dominating online activity becoming the preferred virtual space of socialization, communication, and participation among the Internet users, we investigated how state of the art IMS are integrated with social networking site and how effective are the current integration techniques. In addition, we studied the feasibility of Facebook features to instrument IM processes. Here, we proposed a method to carry out IM tasks (i.e., innovation problem submission, idea suggestion, voting, commenting, moderation, and content processing) through Facebook functionalities and tested it through two independent studies looking to i) understand its effectiveness in helping organizations to capture valuable ideas from their Facebook communities; ii) discover the suitability of Facebook's features to instrument IM; iii) learn if conducting IM in Facebook actually helps to increase participation.

We learned two key lessons from our previous studies. On the one hand, existing practices to integrate IMS with social networking needs to be re-designed since they are ineffective in increasing the level of participation and contributions and fail to leverage on the potential of social networks as incubator of ideas. On the other hand, we discovered that apart from being effective to collect ideas that can lead to innovations,

Facebook is an appropriate tool for carrying out discussions and deliberations because of the way it supports conversations by threading comments to a post in a single, flat and chronological hierarchy and because of the variety of features its offers to express ideas and opinions. However, in testing Facebook's technical affordance to instrument IM tasks, we found that its standard features are particularly limited when having to synthesize and process the unstructured and disorganized corpus of information (ideas, comments) generated during IM processes. Finally and motivated by these findings, we developed a model and a tool that integrate IMS, such as IdeaScale, with Facebook allowing people to participate (submit ideas, place comments) on IM processes without leaving Facebook and using only Facebook's native features like posts, hashtags, comments, and groups. The tool is equipped with an algorithm that keeps synchronized both platforms (Facebook and IMS) replicating the ideas and comments published on the IMS on Facebook and vice versa. This proposal is another concrete effort of this work toward bringing civic participation platforms closer to the large and diverse community of Facebook users, which apart from reaching wider and larger sources of information, helps to reduce the participation barrier.

1.4 Contributions and Results

The contributions of this thesis can be summarized in four categories: i) analysis of state of the art, where we conduct an extensive study on civic technologies; ii) empirical studies, based on experiments conducted with the purpose of understanding the domain of IM, social networks, and civic participation; iii) interventions, which represent our proposals designed to increase the level of participation on IMS for civic engagement; iv) software prototypes, which refer to the software prototypes we implemented throughout our work.

1.4.1 State of the art on Civic Technologies

Our systematic review of the literature on information and community technologies (ICT) proposed to facilitate processes of collective creation of solutions and innovations for social issues contributes to provide researchers, designers and practitioners, a starting point to understand the academic state of the art and the existing opportunities to design and evaluate ICT that can help to improve our democracies. It sheds light on the understanding that academic research in civic technology is still emerging, leaving room still to make substantial contributions to the field. It is clear that there are opportunities for civic technologies to improve the use of multiple channels of participation (e.g., public display, social networks, dedicated platforms) promoting more pervasive means of citizen engagement. Also, we found that civic technologies are still not making effective use of open government data to improve the quality of participation. Another interesting finding was that civic technologies are mainly proposed to support consultative processes (e.g., gather ideas, collect feedback), remaining open the question about their feasibility to support more binding processes. For more, see Chapter 2.

1.4.2 Empirical studies

- *IM Community Archetypes.* In our qualitative study of the communities that support IM processes, we identified how and by who IMS are used in practice. Employing an open coding method [53, 124], we found a set of aspects that were common in communities. After grouping the communities by similarities in these aspects, we discovered a group of emerging archetypes that characterize the type (e.g., business, governmental, not formal organization) and domain of the organizations (e.g., technology, civic, social) that runs the IM process and the purpose for running the community (e.g., feedback, innovation, discussion). From this analysis, we learned, among others, that communities related to technology largely focus on incremental or cor-

rective feedback, that communities on social themes tend to seek for more innovative ideas, and that communities without the backup of a formal organization tend to incorporate more discussion. More details about this study can be found in Chapter 3.

- *Collective and individual behavior in IM communities.* From our quantitative analysis of 166 communities that support IM processes, we discovered that communities behave following five patterns. A general finding, here, is that a main peak is present in each of the patterns. The peak indicates a localized period of predominant activity, which could be explained by external events, such as dissemination events that trigger it. Except for one of the patterns, the level of activity decreases after the peak. We also observed in this study that these behavioral patterns are apparently influenced by the intervention of moderators. A complete description of the study is presented in Chapter 3.

- *Profile and motivation factors of IM participants.* By studying a real case of crowdsourced law reform process supported by IMS, we learned that the participants were mainly well-educated, full-time working professional males, including both civically active and less active participants. They showed to be motivated by a mix of intrinsic and extrinsic factors [54, 146, 193]. Intrinsic motivations included fulfilling civic duty, affecting the law for social reasons, to deliberating with and learn from peers. Extrinsic motivations included changing the laws for financial gain or other benefits. Chapter 4 introduces this study in details.

- *The effectiveness of the Share/Tweet button.* In this study, we analyzed the practice of promoting idea campaigns in social networks via the well-known Share/Tweet button (the most extended mechanism of integration between social networks and IMS). We examined data from about 53 civic participation initiatives collected from the

IMS IdeaScale and unveiled a considerable misconception about the effectiveness of the practice. The findings we reported in this study showed that the Share/Tweet buttons are, in general, not effective in helping IM platforms to increase participation or productivity. For more details please refer to Chapter 7.

1.4.3 Methods

- *Approach to carry out IM tasks on Facebook.* Recognizing the difficulty of attracting people to contribute in communities that support IM initiatives and understanding that most organizations from different sectors (business, not-for-profit, governmental) have been striving to grow active communities on Facebook, we propose an approach that that allows carrying out IM tasks (i.e., innovation problem submission, idea suggestion, voting, commenting, moderation, and content processing) through Facebook features. In this way, we help organizations to conduct IM in Facebook, enabling them to harvest ideas from their already established Facebook communities. Details of the approach can be found in Chapter 6.

- *Model to integrate IMS with Facebook.* Motivated by the potential of Facebook as an incubator of ideas and proposals that can fuel IM processes, we developed a model that integrated the IMS IdeaScale with Facebook enabling Facebook users to participate in IM processes by using a familiar technology such as Facebook. The model is presented in Chapter 8.

- *Approach to integrating IMS with public displays.* Looking to involve the citizenship at the places where they normally are, we propose an approach to integrate the IMS IdeaScale with public display deployed at physical locations within cities. In Chapter 5, we introduce details of the approach.

1.4.4 Software prototypes

- *Agora 2.0*[13] is a platform we developed to implement the approach proposed to integrate IMS with public displays by combining the potential of public displays and the power of online platforms to create a synchronized online and onsite system oriented to promote the participation of the citizens in discussions regarding local public concern issues. Chapter 5 presents the tool in more details.

- *Social Ideation App*[14] is a tool that integrates IdeaScale IMS with Facebook. It implements the model mentioned before and also an algorithm that synchronizes the content generated on both platforms (i.e., ideas, comments) enabling users of IdeaScale and Facebook to access the same information. Please refer to Chapter 8 for more details about the tool.

- *IdeaScaly*[15] is an IdeaScale RESTful API library client that supports about 50% of IdeaScale API methods (e.g., create and delete ideas, attach files to ideas, vote up/down on ideas, post comments on ideas and comments, get the list of recent, top, and hot ideas, add new members to communities, get information about community members, and get the list of recent, top, and hot ideas). It was implemented to facilitate the collection of information on IdeaScale communities and until now is the first and only API library client for IdeaScale, which is available for free in a public repository on Github.

- *Report by Twitter*[16] is a tool that allows collecting citizens' ideas and opinions about public interest issues through hashtag-supported social networks, like Twitter. In its first version, it leverages exclusively on the existing features of Twitter, i.e., posts, replies, retweets, and hashtags. It can be used as a stand-alone application, or it can be

[13]https://github.com/joausaga/agora20
[14]https://github.com/joausaga/social-ideation
[15]https://github.com/joausaga/ideascaly
[16]https://github.com/joausaga/reportbytwitter

integrated with existing tools. We could not test the tool through real-case studies or controlled experiments but still, represents a contribution of this thesis.

1.5 Structure of the Thesis

Most of the content presented in this thesis is based on several research publications on the topic of this work.

Chapter 2. Civic Technology for Social Innovation
Even though in the last years there has been a growing interest in open government technologies and tools for citizen participation in democracy, the academic research in civic technology is relatively recent and still emerging. In this chapter, we present an extensive and systematic review of the literature on technologies that have been proposed to facilitate the engagement of citizens in decision-making and problem-solving processes. This chapter is an extension of the paper submitted to the journal Computer Supported Cooperative Work (CSCW) [197].

Chapter 3. Idea Management Communities in the Wild
IM communities have the potential to transform organizations through innovation. However, building successful communities is a challenging endeavor that requires a significant amount of both community management and technological support. In this chapter, we study 166 IM communities in the "wild" —communities openly available on the IMS Ideascale— to better understand how they are used in practice, and by whom. The results of this study have been published at CTS (Collaboration Technologies and Systems) [195].

Chapter 4. Participants' Motivation Factors and Profile in IM for Policy-Making
Despite the increasing number of crowdsourcing initiatives in democracy, little is known about the profile of the crowd and what drives their partic-

ipation. Consequently, the crowd that takes part in these initiatives has remained an unmapped entity. Knowing the crowd's profile and motivation factors can help organizers to use crowdsourcing more efficiently. By drawing on data from a real case of IM for policy-making, in this chapter, we analyze the demographic profile of the crowd, the motives that move them to take part in the process, and their expectation to affect the law. The content of this chapter has been published in the Journal of Information, Communication & Society [7].

Chapter 5. Agora 2.0: Enhancing Civic Participation through a Public Display

Web-based tools for civic engagement, while promising, are still disconnected from meaningful physical locations where citizens usually meet and might limit the involvement of a considerable portion of the citizen population. In this chapter, we present a system, Agora 2.0, composed of an onsite interactive public display and an online site. The chapter introduces the analysis of the requirements, the system prototype, and its evaluation during deployments at the University of Trento and in the public relations office of the city of Trento, Italy. This research work has been published at C&T (Communities & Technologies) [200].

Chapter 6. Idea Management in Social Network

While IMS helps in managing IM processes, we have discovered that IM organizers have problems to establish, inside these platforms, communities able to support IM initiatives; they struggle to attract enough participants. Acknowledging that most organizations have today a presence on Facebook and are striving to grow active communities inside this social network, we present in this chapter an approach that helps organizations in harnessing the creativity of their already established Facebook communities instead of starting innovation communities inside IM platforms. The main content of the chapter has been extracted from the paper presented at CTS (Collaboration Technologies and Systems) [196].

Chapter 7. On the (In)Effectiveness of the Share/Tweet Button
In order to increase the visibility of IM initiatives and to attract participants (members of the initiatives), increasingly IMS leverage on social networks, such as Facebook and Twitter. In this chapter, we introduce a study in which we evaluated the effectiveness of this practice. Here, we are particularly interested in understanding the effectiveness of the common Share/Tweet button featured by most modern Web sites, including IMS. These results presented in this chapter have been published in the Journal IEEE Internet Computing [198].

Chapter 8. Empowering Online Idea Management through Social Networking Services
Working almost disconnected from main virtual spaces of participation and discussion, i.e., social networks, IMS are losing the opportunity to reach large and active online communities to enriching IM processes with diverse opinions, fresh perspectives, and new ideas. Moreover, the proper integration of both tools will reduce the participation barrier and allow citizens to take part in IM by using familiar technologies, such as social networks. This chapter presents a model and an algorithm that allow integrating IMS with Facebook. The proposal has been validated in the "wild" through a real case of IM for public sector innovation conducted in collaboration with a city councilman of Asuncion, Paraguay.

Chapter 9. Conclusion
Final discussion of the current research work, including its limitations, and future works are presented in this chapter.

1.6 List of Publications

- Gianluca Schiavo, Marco Milano, Jorge Saldivar, Tooba Nasir, Massimo Zancanaro, and Gregorio Convertino. Agora 2.0: Enhancing

civic participation through a public display. In Proceedings of the *6th International Conference on Communities and Technologies (C&T), pp. 46-54.* ACM, 2013.

- Jorge Saldivar, Cristhian Parra, Carlos Rodríguez, Luca Cernuzzi, and Vincenzo D'Andrea. Participa: Fostering civic participation for public services innovation. In *13th Participatory Design Conference.* 2014.

- Tanja Aitamurto, Jorge Saldivar, and Juho Salminen. Self-selection In Crowdsourced Democracy: A Bug Or A Feature?. In *GROUP Conference.* ACM, 2014.

- Jorge Saldivar, Carla Vairetti, Carlos Rodríguez, Florian Daniel, Fabio Casati, and Rosa Alarcón. Analysis and improvement of business process models using spreadsheets. In *Information Systems 57: 1-19.* Elsevier, 2016.

- Jorge Saldivar, Carlos Rodriguez, Florian Daniel, Fabio Casati, and Luca Cernuzzi. On the (in)effectiveness of the Share/Tweet button: A study in the context of idea management for civic participation. In *IEEE Internet Computing, pp. 1, 5555.* IEEE, 2016.

- Tanja Aitamurto, Hélène Landemore, and Jorge Saldivar. Unmasking the crowd: participants' motivation factors, expectations, and profile in a crowdsourced law reform. In *Information, Communication & Society: 1-22.* 2016.

- Tanja Aitamurto, Kaiping Chen, Ahmed Cherif, Jorge Saldivar, and Luis Santana. Civic CrowdAnalytics: Making sense of crowdsourced civic input with big data tools. In Proceedings of the *20th International Academic Mindtrek Conference, pp. 86-94.* ACM, 2016. (***Best paper award***).

- Jorge Saldivar, Florian Daniel, Fabio Casati, and Luca Cernuzzi. Idea Management in Social Networks: A Study of how to Tap into the Ideas

of Facebook Communities. In Proceedings of the *17th International Conference on Collaboration Technologies and Systems (CTS), pp. 3-10.* IEEE, 2016.

- Jorge Saldivar, Marcos Báez, Carlos Rodríguez, Gregorio Convertino, and Grzegorz Kowalik. Idea Management Communities in the Wild: An exploratory study of 166 online communities. In Proceedings of the *17th International Conference on Collaboration Technologies and Systems (CTS), pp. 81-89.* IEEE, 2016.

- Tanja Aitamurto and Jorge Saldivar. Examining the Quality of Crowdsourced Deliberation: Respect, Reciprocity and Lack of Common-Good Orientation. *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems.* ACM, 2017.

- Jorge Saldivar, Cristhian Parra, Marcelo Alcaraz, Rebeca Arteta, and Luca Cernuzzi. Civic Technologies for Social Innovation: A Systematic Literature Review *(submitted).* In *Computer Supported Cooperative Work Journal (CSCWJ).* 2017.

- Tanja Aitamurto and Jorge Saldivar. The Irrationality Rational and Quickly-Satisfied Crowd: Motivational Factors in Crowdsourced Policymaking *(submitted).* In *Computer Supported Cooperative Work Conference.* 2017.

Chapter 2

Civic Technology for Social Innovation[1]

with Cristhian Parra, Marcelo Alcaraz, Rebeca Arteta, and Luca Cernuzzi

2.1 Introduction

Information and communication technologies (ICT) for governance and democracy is an emerging trend, with a growing focus on facilitating citizens' influence on government decisions [56], policies and laws [181, 7, 72]. Although not new —terms like e-government have been around since the mid 1990s [190]—, up until recently the primary focus of these technologies was on optimizing the functioning of public sector organizations and improving the delivery of government services. This new trend of "Civic Technology" focuses on participation and has attracted more than $400 million of investment between 2011 and 2013 [177][2]

Academic and non-academic literature has referred to "Civic Technology" from both government-centric and citizen-centric perspectives. A

[1]Chapter based on an article that is pending for publication

[2]For more, see
`http://www.slideshare.net/knightfoundation/knight-civictech`.

government-centric definition presents it as the "use of technology by cities for service provision, civic engagement, and data analysis to inform decision making" [183]. A citizen-centric definition presents it as "platforms and applications that enable citizens to connect and collaborate with each other and with government" [211][3]. What is common to both perspective is the objective of civic technology: enabling participation in democratic governance (i.e., the many activities citizens undertake to negotiate living together in society). We therefore define *"Civic Technology"* as **technology (mainly information technology) that facilitates democratic governance among citizens**.

Democratic participation and citizenship have taken many forms throughout history. For the ancient Athenians, democratic citizenship meant direct participation of all the citizenry in all major issues through public debates [106]: a radical but not fully inclusive democracy as the political franchise was limited to adult males. In our modern *representative* democracies, inclusion is universal but participation is limited to the casting of a ballot every number of years. Both ancient direct and modern representative forms of democracy share the need for an active participation of citizens "able to take part in the decision-making processes of the state" [129]. In our modern democracies, this active participation is in deficit: there is less engagement, trust, and empowerment for the people [144]. The response to this deficit might come from a revival of participatory democracy [179], a model that extends participation beyond voting and which, according to recent empirical evidence, is welcomed and enjoyed by citizens under certain circumstances [179, 88]. Motivated by the potential of ICTs for enabling new and innovative processes of participatory democracy, we study what technologies are proposed and evaluated in academic literature to further its ideals.

Facilitating more participation in democracy is a broad topic. A wide range of activities and processes count as participation [192]. We focus our

[3]For a discussion on the term, see
`https://medium.com/@emilydshaw/debugging-democracy-bfa68e37967b`

exploration on **how *civic technology* can be useful in facilitating processes that seek to collaboratively create solutions for social issues or innovations for public services**, or in more simple terms, **facilitating social innovation**.[4]

Our goal with this review is to provide researchers, designers, and practitioners, a starting point to understand the state of the art in academic literature, and the existing opportunities to design and evaluate ICT that can help to improve our democracies. The scope of our review is limited to the following research questions:

- **RQ1**. What technologies are proposed to support civic engagement in the processes of collective construction of solutions for public-interest issues?;

- **RQ2**. For technologies identified in **RQ1**, what role do they fulfill in the process? (e.g., to gather opinions, make decisions, educate citizens, etc.);

- **RQ3**. What are the benefits of applying the technologies identified in **RQ1**? (e.g., increased participation, enhanced community engagement, increased awareness, etc.)

As part of **RQ1**, we placed a particular emphasis in investigating:

- **RQ1.a**. Intended target users (e.g., young adults, senior adults, general population, activists groups, city residents, etc.);

- **RQ1.b**. Location and scale of use (e.g., cities, countries, local districts or communities, regions, national states, etc.)

[4]Defining social innovation:
`https://www.gsb.stanford.edu/faculty-research/centers-initiatives/csi/defining-\social-innovation`

2.2 Method

Our systematic literature review consisted of the following steps: (1) we started by formulating our research questions about *Civic Technology* for facilitating social innovation; (2) based on these questions, we established a search protocol that defined where (online repositories) and how (search strings) to find relevant academic literature; (3) we also defined inclusion and exclusion criteria to limit the scope of our review; (4) conducted the search and obtained the resulting academic abstracts; (5) and coded and evaluated these abstracts based on the exclusion and inclusion criteria, producing a pre-selection of research articles to read in full; (6) we applied the same set of criteria to the pre-selection, after reading them at length, to produce the final list of selected articles; (7) and finalized our process by coding and analyzing the final selection in terms of the dimensions we presented in the background. This section explains the details of our method.

2.2.1 Search protocol and terms

Since our focus is on *proposed and evaluated* ICTs, the first criterion was to select sources that contain computer science research articles. The second criterion was to select sources that have a high coverage of this field by indexing a large number of journals and conference proceedings. Following these criteria, we selected nine repositories of computer science research articles, which are listed in Table 2.1, in alphabetical order.

After selecting our sources, we defined a list of terms to search based on our research questions. The logical operator OR was used in the search string to include related terms, for instance, civic and citizens; engagement and participation; collaboration and discussion. We further employed the logical operator AND to join together different sets of related terms. The resulting search string that contains all the search terms and logic operators is the following:

Table 2.1: Electronic literature sources in alphabetical order

Source	URL
ACM Digital Library	http://dl.acm.org/advsearch.cfm
Elsevier ScienceDirect	http://www.sciencedirect.com
Emerald	http://www.emeraldinsight.com
IEEE Xplore	http://ieeexplore.ieee.org
ISI Web of Knowledge	http://www.isiknowledge.com
SAGE	http://online.sagepub.com
SpringerLink	http://link.springer.com/advanced-search
Taylor and Francis	http://www.tandfonline.com
Wiley InterScience	http://www3.interscience.wiley.com

(civi **OR** citizen*) **AND** (engagement **OR** *participation) **AND** (technology **OR** internet **OR** online **OR** application **OR** crowdsourc* **OR** platform **OR** web) **AND** (*deliberati* **OR** collaboration **OR** consult* **OR** discuss* **OR** ideation **OR** *making **OR** planning)*

In some repositories, their search functionality supported the use of wildcards like "*" to represent zero or more alphanumeric characters at the beginning or end of a term. We used this functionality when available to include multiple variations of the same term, for instance, "*" at the end of "citizen" leads to citizen, citizens, citizenship, and citizenry. In almost all cases, the search was performed in the abstracts of papers but in one of the sources, SpringerLink, we use the full texts because the search engine does not support querying abstracts.

Our search was limited to articles written in English and represented recent research. We defined recent as published since 2009 as some important events about technology and democracy happened that year: Iceland conducted the first constitution reform process to include online citizen participation [136] and the US government published the Open Government Declaration[5], referenced by [137] as what allowed civic technologies

[5]Transparency and Open Government declaration: `https://www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment`

to get momentum.

2.2.2 Inclusion and exclusion criteria

Two other criteria were taken into consideration: (1) we only included articles that proposed a specially developed ICT solution (e.g., websites, mobile apps, APIs, combination of platforms, etc.) or the novel use of existing platforms (e.g., social networking sites) to engage the public in processes of social innovation, and (2) we only included articles that validated their proposals through use of cases, field studies, controlled experiments, or other research evaluation methods.

Observational studies about the impact of technology in various democratic practices or discussions on the ethical aspects of employing technology to engage citizens were excluded from the review as their analysis, although often rich and thorough, is beyond the scope of our research questions.

2.2.3 Selection Process

Our search resulted in 1,234 unique articles, which we evaluated and selected through the following selection process:

1. We distributed the articles among the first four authors of this paper (from here on reviewers), resulting in approximately 250 articles per reviewer;

2. Each reviewer applied the inclusion and exclusion criteria to the articles, after reading its abstracts, leading to 57 being marked as "relevant";

3. To ensure the quality of our selection process, we cross-validated the result of the previous step. Each reviewer (appraiser) was asked to repeat step 2 on 30 randomly selected articles from the set assigned to another reviewer (appraisee). After cross-validation, an agreement of

98% was found between reviewers. In case of disagreement, appraiser and appraisee met and reached consensus about the final classification;

4. We redistributed the 57 relevant articles among the reviewers, who were asked to read the full text of the papers to confirm the decision taken in step 2. After reading the articles, 29 of them were excluded for not satisfying the selection criteria, particularly, the validation requirement.

From the initial 1,234 papers, we finally selected 28 papers (2.3%) as relevant for this review. Details about the 28 article are presented in Section 2.5.

2.2.4 Data extraction

To extract data from the 28 selected papers, we built a matrix of 16 dimensions. A part from metadata about the papers, i.e., **title**, **authors**, **year of publication**, **publication source** and **type**, the matrix includes dimensions that we identified as relevant to answer our research questions.

To facilitate our study of RQ1, we included the dimension **democratic process** to collect information about the democratic processes that are geared towards the co-creation of solutions for social problems. Aitamurto reports that today ICTs facilitate processes of participatory *policy-making*, *urban planning*, *innovation of services*, and *budgeting* [1]. In these processes, citizens are involved with the aim to create and discover new knowledge, integrate different perspectives to the process, diffuse knowledge and information among citizens, and ensure that policies, plans, services, and public expenditure fit people's need [222].

Alongside these four processes, our analysis of the literature added a fifth, which we named *community engagement*, as it aims at benefiting and empowering local communities by building structures of participatory democracy[6] beyond the established representative institutions [13].

[6]Participatory democracy is a democratic model that envisions the broad participation of citizens in "their self-governance" [179]

Apart from studying which processes are supported by the technologies proposed in the articles, we analyzed who the **actors** of these processes are and how **information flows** between them. The four archetypes of civic technologies introduced by [56] —(1) *citizen-centric and citizen-sourced data*, (2) *citizen-centric and government open data*, (3) *government-centric and citizen-sourced data*, and (4) *government-centric and citizen-developed solution*— were used to identify who interacts with who and how information flows through technological means. Individuals and organizations, e.g., public institutions, companies, NGOs, represent actors of the democratic processes and in these processes the information and knowledge flow can involve only citizens or connect citizens with government.

In citizen-centric archetypes, citizens lead the development of the technology and are the key actors while public agencies play a passive role. Civic technologies in archetype (1) heavily depend on information generated by citizens while technologies in the archetype (2) are built on official information released by public agencies. In government-centric archetypes, the opposite occurs: government invites citizens to provide information, ideas and suggestions (archetype 3) or to implement actual solutions (archetype 4).

Our study of RQ1 also included the understanding of the **technical contribution** of the papers and the **features** of the technology proposed, e.g., mobile application, web-based platform, social network extension. As part of the analysis of RQ1, we also identified the **evaluation method** used to assess the impact of the introduced technology, e.g., real case study, controlled experiment, usability tests; the **location** (country) where the technology was tested; and the **population** to whom the technology is aimed to.

To answer RQ2 we looked at the **role** that civic technologies play to uncover the democratic processes that are under-served. According to [142] technology has served to support four different purposes in democratic processes, (1) *collect citizen's opinion* on relevant topics; (2) support the collective *ideation* of solutions; (3) *facilitate decision-making* processes;

and (4) *educate* citizens on public-interest issues.

While coding our dataset, we encountered two additional elements for our analysis, which characterize how technology fulfill these roles. The first is the **procedures of participation** used to organize and guide citizens towards a more effective participation. These include the Delphi and CoRes methods [55, 123], the inform-consult-empower model [139], argumentation maps [18], the SPI methodology [93], and the mDSS framework [87]. The second element is related to the **strategy used to motivate engagement**. Examples of strategies include motivating engagement through games or leveraging on the location of technology to lower the barriers of participation, e.g., public displays in a public square that is frequently visited by residents of a city.

Finally to answer RQ3, we included in our matrix a dimension to keep a record of the **benefits** discovered after testing the technology. Here, we wanted to understand how the application of the proposed technology has benefited the democracy, e.g., increase participation, influence decision, enhance collaboration. Table 2.2 shows the matrix used to collect information about the papers.

2.3 Results

Our final dataset contains 28 studies that propose ICT tools for engaging the civil society in the deliberation, discussion, collaboration, and creation of solutions for social problems regarding policy-making, urban planning, and public sector innovation.

2.3.1 Summary of selected studies

Articles vary in ripeness, quality of research, and approaches. The research area appears to be quite ripe considering the type of publications found in this review, and assuming that journal papers are often riper that conference articles. A majority of 64% (18 out 28) was published in journals and

Table 2.2: Data extraction dimensions

Dimension	Description	Research Question
Title	Title of the paper	RQ1
Authors	Paper authors	RQ1
Year of publication	Year when paper was published	RQ1
Publication source	Name of journal or conference where the paper was published	RQ1
Publication type	Is the article a journal paper or a conference paper?	RQ1
Democratic process	Process in which the technology was used (e.g., urban planning, policy making, public sector innovation)	RQ1
Role of technology	Role fulfilled by the technology within the process, (e.g., educate citizens, obtain ideas or gather opinions, make decisions)	RQ2
Actors and information flow	Who generate the data and what role play citizens and government (i.e., citizen-centric and citizen-sourced data, citizen-centric and government open data, government-centric and citizen-sourced data, government-centric and citizen-developed solutions	RQ1
Technical contribution	Does the propose a new technology or the novel us of current platforms?	RQ1
Technological features	Main features of the technology proposed in the paper (e.g., mobile application, web-based platform, social network application)	RQ1
Procedure of participation	Mechanisms used to structure participation (e.g., Delphi method, Structured Public Involvement method)	RQ2
Strategy for engagement	Strategy proposed for citizen engagement apart from advertising (e.g., games, situatedness of technology)	RQ2
Target population	Group of people to whom the technology is aimed to (e.g., senior adults, youth, general population)	RQ1.a
Evaluation method	Method used for assessing the technology proposed (e.g., controlled experiment, real case study)	RQ1
Reported benefits	Reported benefits after testing the technology (e.g., increase participation, awareness, adoption)	RQ3
Location	Country where the technology was deployed	RQ1.b

the remaining 10 in conferences.

Figure 2.1 shows that there was not an increasing trend in publications from 2009 to now but the number of studies alternated between peaks and valleys. A noticeable increment in publications can be seen between 2009 and 2010. Then, the number of studies dropped off until 2013 when it increased until reaching the highest peak in 2014. In 2015, the number of publications remained equal to the previous year. Since we conducted the review in the first months of 2016, it can be expected that publications of this year were not yet indexed by the electronic sources.

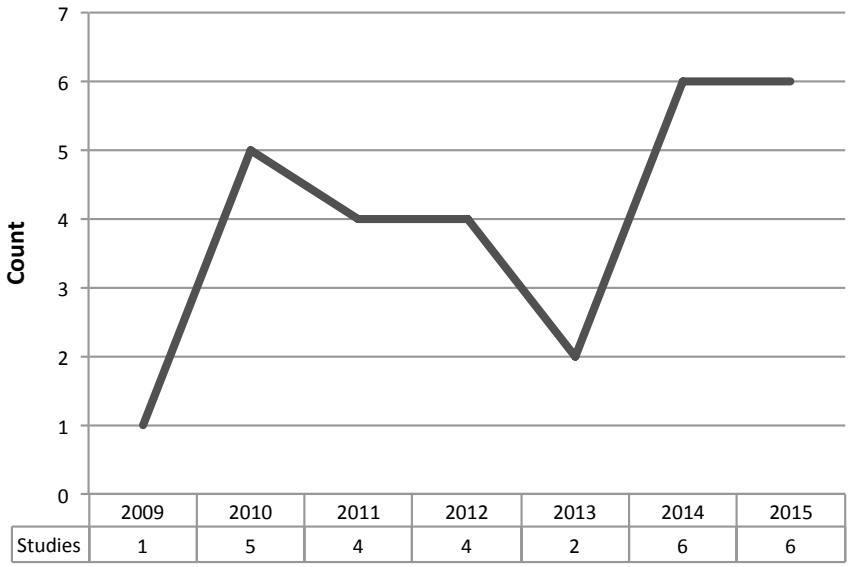

Figure 2.1: Evolution of publications over time

2.3.2 Democratic process, roles, actors, and information flow

Solutions to facilitate urban planning dominated our final dataset: 57% of the studies (16 out of 28) propose technologies that engage citizens in the urban development of their communities. About 14% (4 out 28) of the publications aimed at involving civil society in policy-making. Among the remaining, six articles (21%) proposed approaches to strengthen engagement between community members; and one to support participatory budgeting and one last to facilitate processes of public sector innovation. Gathering people's opinions represents the most typical role, with 43% (12 out of 28) intended to collect feedback from citizens. Technologies to obtain ideas account for 25% and those that are geared towards actually making decisions represent (18%).

Four articles (14%) present technology to help citizens in learning public interest issues. Almost all studies (97%, 27 out of 28) propose civic technologies that depend on data sourced from citizens' creativity, knowledge, opinion, and judgment. Only one article based its approach on official open data. In the majority of studies (64%, 18 out of 28), the implementation and deployment of the tools are led by the civil society, in the remaining

36% of the articles, authors partner with public institution to deploy the solution in real case scenarios.

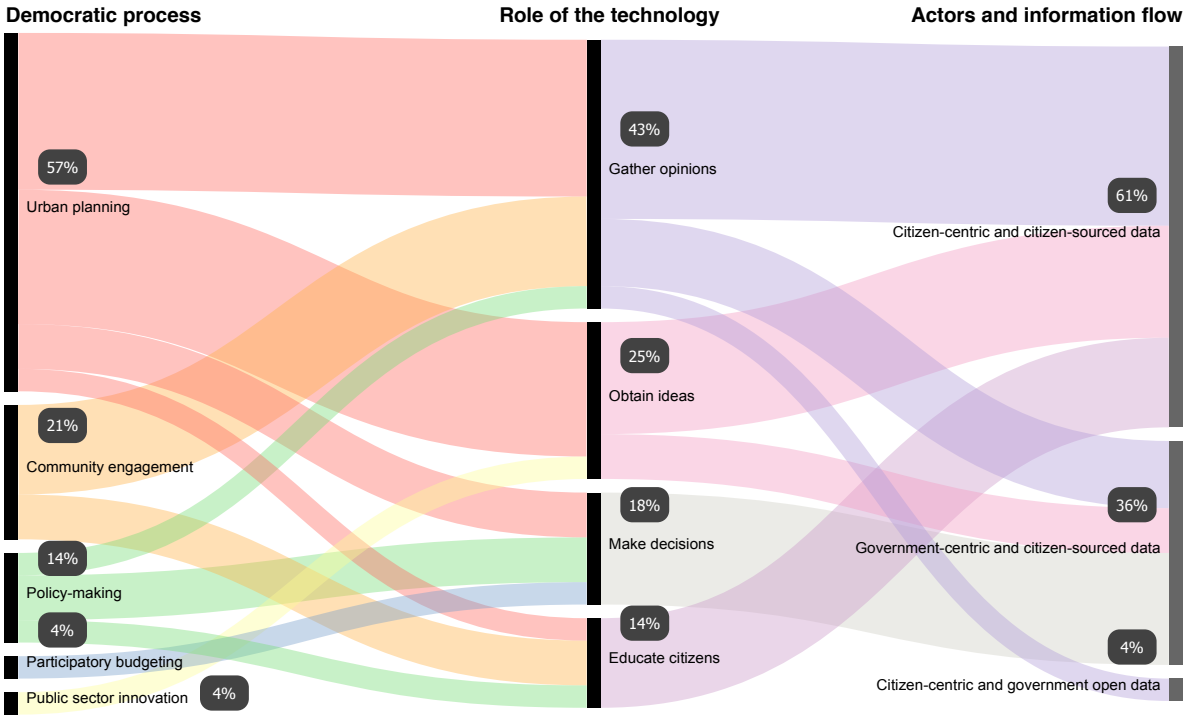

Figure 2.2: Alluvial chart illustrating the relationship between the dimensions of our framework. The percentages indicate the distribution of publications for each dimensions of the framework

Figure 2.2 illustrates the emerging relationships between the dimensions of our frameworks. In the chart, we can see that the technologies used in urban planning processes serve mainly as a means to gather opinions and collect ideas from citizens. Gather feedback is also the primary role fulfilled by technologies that support processes of community engagement. In policy-making and participatory budgeting, civic technologies are employed principally to involve citizens in decision-making, although, in processes of public service innovation they are used to harvest ideas from the public.

Citizens take the lead in the deployment of the majority of solutions that facilitate the collection of opinions and ideas. Figure 2.2 shows also that citizens are the leaders of processes in which technologies are employed

for education purpose. On the other hand, governments play a central role in the implementation of technologies for decision-making. Not all of the actors and information flow archetypes defined in Table 2.2 are present in our dataset. We did not review studies that propose approaches in which government asks citizens to actually implement complete solutions (government-centric and citizen-developed solutions archetype, see Table 2.2).

2.3.3 Technology, strategies of engagement, and procedures of participation

About 57% of studies (16 out of 28) propose web-based civic technologies, as depicted in Figure 2.3. One-third of the proposals use mobile technology (29%, 8 out of 28) and 25% (7 out of 28) of them employ public displays connected to web platforms or standalone systems to elicit situated feedback in urban settings. Approaches build on top of popular social networking sites, like Facebook and Twitter, are proposed in 11% of cases (3 out of 28). Virtual Reality (VR) and Geographic Information Systems (GIS)[7] are functionalities present in six studies (21%). VR is used to allow citizens to access and suggest changes to planning proposals in an interactive three-dimensional visual interface. GIS, for its part, is employed to visualize information in maps and to enable users to provide feedback referring to geographic objects. In 79% (22 out of 28) of the studies, authors present new civic technologies while the remaining articles introduce novel usages of existing ICT solutions.

Almost half of the studies (43%, 12 out of 28) report of having used techniques to engage citizens. In five articles games are used to create entertaining environments where users can be informed, learn and get involved in democratic processes. Four studies leverage on the attractiveness and location of technology to promote civic engagement within planning and

[7]Geographic Information Systems (GIS): system used to report and display spatial and geographical information [220]

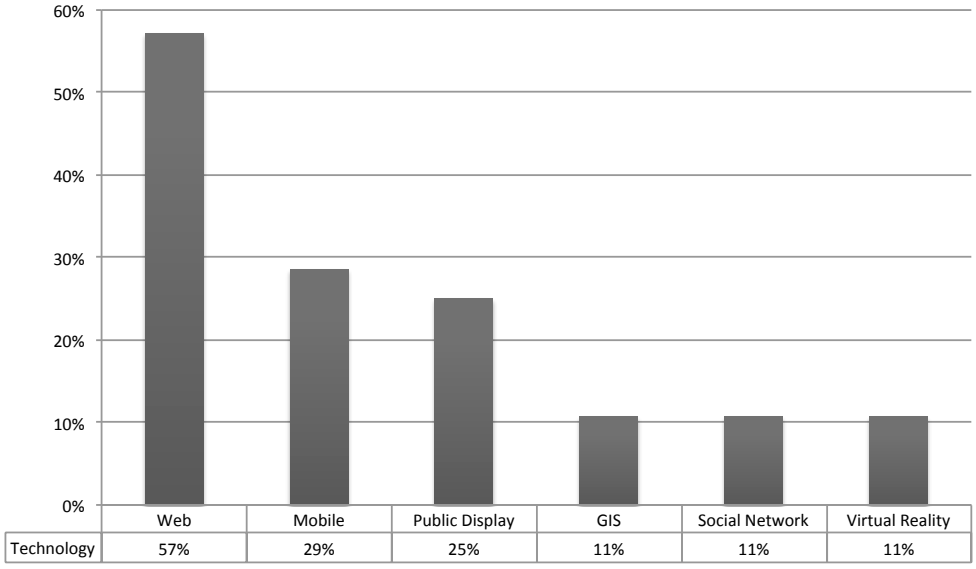

Figure 2.3: Distribution of studies by technology features

ideation processes in urban settings. The use of popular, and well-known technologies, such as mobile phones and general purpose social networking sites (e.g., Facebook, Twitter), is proposed in three studies to lower barrier of entry and give users the opportunity to participate through familiar technologies. Six out of the 28 publications (21%) include in their proposals well-established models to structure participation, such as the Delphi and CoRes methods.

2.3.4 Target population, evaluation methods, and reported benefits

In the majority of cases, the target is the general population (71%, 20 out of 28). Some studies aim at involving specific groups of citizens such as university students or senior adults. Half of the publications (15 out of 28) propose technologies that were tested at a city scale, seven are validated at a community level, and the rest at continent, region, state, and country levels. One-third of the studies (9 out of 28) were conducted in cities and communities of the United States, and eight were done in Australia and Italy, four in each of these countries.

Close to 35% of the approaches (10 out of 28) were tested through real-life case scenarios. In one-third of the cases (28%, 8 out of 28), the author employed field studies on validating their proposals. Focus groups, lab studies, controlled experiments, and usability tests were used in the rest of the publications.

Studies report that the deployment of the civic technology benefited democracy in different ways. One-third increased (8 out of 28) the level of public participation while 11% (3 out of 28) reported of having enhanced community engagement and collaboration. Improvements in citizens' civic skills, i.e., identifying community problems and collaborating on solutions was the benefit reported by 11% of the studies (3 out of 28). About 20% of the articles (5 out of 33) found that the technology proposed increased awareness and interest in public-interest topics. A couple of studies highlighted that their proposals enabled the citizenry to participate directly in decision-making.

Approaches that used games as their motivation strategy reported of having achieved more engagement and of having improved the civic skills of the participants. We also found that structured engagement processes (Delphi method and mDSS framework) have been used to involve citizens in decisions-making and that the application of formal engagement methods, such as argumentation maps and structured public involvement (SPI) methodology, resulted in more public participation. The use of public display has helped to increase the levels of public participation and enhance community engagement. Mobile technologies and social networks have contributed to raising awareness on public-interest topics. Table 2.3 summarizes the information extracted from the selected studies.

2.4 Discussion

Our systematic review identified 1,234 potentially relevant articles of which only 2.3% fit the criteria we had set for this review: to propose a new technology (or the innovative use of an existing one) and to evaluate its impact.

Table 2.3: Selected studies, see Section 2.5 for bibliographic details

Study	Democratic Process	Role of Technology	Actors and Information Flow	Technology	Procedure of Participation	Strategy for Engagement	Evaluation	Reported Benefits
[S1]	Urban planning	Gather opinions	CCGO	Web, public display	None	None	Controlled experiment	Enhanced collaboration
[S2]	Urban planning	Gather opinions	GCCS	GIS	Structured public involvement	None	Controlled experiment	Increased participation
[S3]	Policy-making	Make decisions	GCCS	Web	mDSS framework	None	Real case study	Influenced decisions
[S4]	Community engagement	Gather opinions	CCCS	Web	None	Use it within high-school classes	Real case study	Increased participation
[S5]	Urban planning	Gather opinions	CCCS	Mobile, public display	None	Technology situatedness	Field study	Increased awareness and participation
[S6]	Policy-making	Gather opinions	CCCS	Web	None	None	Real case study	Improved quality of political discussion
[S7]	Community engagement	Gather opinions	CCCS	Web	None	None	Field study	Enhanced community engagement
[S8]	Participatory budgeting	Make decisions	GCCS	Mobile, Web	Delphi method	Use of popular technology (cell phone)	Real case study	Influenced decisions
[S9]	Urban planning	Educate citizens	CCCS	Web	None	Gaming	Real case study	Increased participation
[S10]	Urban planning	Obtain ideas	CCCS	Virtual reality	None	Gaming	Focus group	Engaged young citizens
[S11]	Community engagement	Gather opinions	CCCS	Web, GIS	None	None	Focus group	Do not report

Continued on next page

Table 3 – continued from previous page

Study	Democratic Process	Role of Technology	Actors and Information Flow	Technology	Procedure of Participation	Strategy for Engagement	Evaluation	Reported Benefits
[S12]	Community engagement	Educate citizens	CCCS	Mobile, Social Network	None	Use of familiar technology (Twitter)	Lab study	Increased awareness
[S13]	Urban planning	Gather opinions	GCCS	Public display, Social network	None	Technology situatedness	Field study	Increased participation
[S14]	Urban planning	Make decisions	GCCS	Virtual Reality	CoReS method	None	Usability test	Do not report
[S15]	Urban planning	Make decisions	GCCS	Web	None	None	Real case study	Influeced decisions
[S16]	Policy-making	Educate citizens	CCCS	Web	None	Gaming	Field study	Increased civic skill on young people
[S17]	Urban planning	Obtain ideas	GCCS	Web	None	Gaming	Usability test	Do not report
[S18]	Urban planning	Obtain ideas	CCCS	Web, GIS	Argumentation maps	None	Real case study	Increased participation
[S19]	Policy-making	Make decisions	GCCS	Web	Inform, consult, empower model	None	Field study	Do not report
[S20]	Urban planning	Obtain ideas	CCCS	Web	None	None	Focus group	Do not report
[S21]	Urban planning	Gather opinions	CCCS	Web, public display	None	Technology situatedness	Field study	Enhance comm. engagement
[S22]	Urban planning	Obtain ideas	CCCS	Web, Public display, Social Network	None	Use of familiar technology (SMS, Twitter)	Field study	Involved people that are not civically active
[S23]	Community engagement	Gather opinions	CCCS	Public display	None	Gaming	Real case study	Increased participation
[S24]	Public sector innovation	Obtain ideas	GCCS	Mobile	None	None	Usability test	Do not report
[S25]	Urban planning	Gather opinions	GCCS	Mobile	None	None	Field study	Increased awareness

Continued on next page

Table 3 – continued from previous page

Study	Democratic Process	Role of Technology	Actors and Information Flow	Technology	Procedure of Participation	Strategy for Engagement	Evaluation	Reported Benefits
[S26]	Urban planning	Obtain ideas	CCCS	Virtual Reality	None	None	Focus group	Do not report
[S27]	Community engagement	Educate citizens	CCCS	Mobile	None	None	Real case study	Increased awareness
[S28]	Urban planning	Gather opinions	CCCS	Mobile, Web, Public display	None	Technology situatedness	Real case study	Increased participation

CCCS: Citizen-centric and citizen-sourced data

GCCS: Government-centric and citizen-sourced data

CCGO: Citizen-centric and government open data

GCCD: Government-centric and citizen-developed solution

This suggests academic research in *Civic Technology* is still emerging, leaving ample room for researchers and practitioners to make influential contributions to the field. This is also noticeable in how we see ups and downs in the number of research articles per year (see Figure 2.1). Possibly the last two years, 2014 and 2015, represent the beginning of an increasing long-term trend. In what follows, we discuss the answers to each of our research questions as informed by our findings, presented in the previous section.

2.4.1 RQ1: What technologies are proposed?

The web reigns this academic field, with more than half of the articles proposing web-based technologies (e.g., [S1][S17][S28]). One reason for this might be that the web is the most accessible and cheap technology to develop. Mobiles and public displays come second (e.g., [S5][S8][S21]).

The choice of a base technology is very important for the citizen's engagement and the process facilitation. *Civic technology* is particularly challenging because it justifies itself as the mean for increasing participation while potentially excluding people if it does not consider the capabilities and resources available to all citizens. In democratic processes like participatory budgeting, there is often a concerted effort to reach excluded communities [40] and these often involves reaching out to them where they live. In this sense, we find it interesting that our data shows an emergence of public displays, as these can be placed in selected locations to address specific inequalities in terms of access to technology.

In addition to this, there is still room for *civic technologies* to improve its use of multiple channels of participation. In this regard, only 11% of our dataset used social networks [S12][S13][S22]. It is unclear from these research articles why so few of them used social networking sites considering how pervasive they are today. Exploring and evaluating the benefits of social networking sites to facilitate civic engagement therefore represents an open opportunity for academia that has, in fact, already been lever-

aged in some non-academic instances. Governments and citizens of US, UK, and Canada, for example, used social networking sites, like Facebook, to support asynchronous and ongoing dialogues about neighborhood and community development plans in *urban planning* [67], but they have not designed new platforms on top of these networks or published in computer science literature.

Another interesting point is that there is almost no use of open data in this literature. Repositories that make all kind of public data available are on the rise, promoted by the international *Open Gov Partnership*[8]. Civic Technology in academia might benefit from exploring how to design tools that make effective use of this data to improve the quality of online deliberation.

2.4.2 RQ2: What role do these technologies fulfill in the process?

Before analyzing the specific roles of technology, it is interesting to see how academic research has to pay extensive attention to *urban planning* (e.g., [S1][S9][S17]) and *community engagement* (e.g., [S4][S7][S11]) while almost neglecting others like *participatory budgeting* [S8] and *public service innovation* [S24] (represented by merely one article each). This, apart from indicating opportunities for more academic studies, suggests that either the under represented cases employ already well-established technologies so no new civic technologies are proposed to support them or there is a lack of interest in understanding how technology can be use to facilitate these processes.

While computer science (CS) literature neglects these two processes, there are high profile cases of civic technology for *public service innovation* and *participatory budgeting* in practice. *Public service innovation* is the goal of Challenge.gov[9], a platform developed by the White House during

[8] `http://www.opengovpartnership.org/`
[9] `https://www.challenge.gov`

president Obama's administration [159] with the goal of harnessing the collective intelligence of citizens for solving public administration problems. Similarly, social media tools, like Facebook, Twitter, and Youtube, as well as specially-designed technology, has been used to facilitate participatory budgeting processes in the city of Chicago, USA [1] and the Brazilian region of Rio Grande do Sul [205], among many more examples [40].

A reason for this limited coverage might be that CS literature, incorporating both design and evaluation in these processes, has simply not been published or achieved recognition yet. For example, the Stanford Crowdsourced Democracy Team[10] collaborated with cities like Vallejo and Oakland in California, and Cambridge in Massachusetts, to support voting in their participatory budgeting processes, but there was no reference to these experiments in their publication list at the time of this review[11]. Similarly, a platform designed at the University of California, Berkeley, was used by Vallejo residents to develop proposals, but only a preliminary publication about the platform has been published, with no evaluation [109][12]. Like in this case, evaluation of civic technology within CS literature might still be forthcoming for most cases. In the case of *Policy-making*, CS literature is also limited while practice showcases high profile examples. For example in Finland, citizens used an online platform to submit ideas for reform and improvement of off-road traffic laws [7], and in Iceland, online tools were used for the participatory writing of the country's new constitution [136].

Regarding roles, if we consider gathering opinions and ideas as fundamentally consultative roles, we can see that research has mostly studied *civic technologies* that do not have a deliberative or binding outcome. This represents a risk in terms of practice, as citizens tend to lose interest in processes that do not have a measurable outcome [144]. In accordance, one of the highly deliberative processes, participatory budgeting, is also the least studied[13].

[10] `https://pbstanford.org/`

[11] `http://voxpopuli.stanford.edu/publications/`

[12] `https://vallejopb2016.appcivist.org`

[13] Participatory budgeting often features several phases of proposal development, where volunteer

An open challenge for academia is therefore to explore effective technologies for substantive deliberation, which allows residents to consider the problems facing the cities and to engage in deep and productive deliberations that result in solutions being implemented. This type of processes require partnering with government. Only one-third of the articles included government participation, and all of the articles that proposed technologies to support making decisions were government-centric (e.g., [S15][S19][S25]). Here again, practice is ahead of research. Four thousand citizens of Geraldton-Greenough, Australia, for example, participated in large-scale decision-making about the future of their city through the platform CivicEvolution sponsored by the city government [208].

A future in which technology is the enabler of evidence-based and participatory governance depends on academia partnering more and more with governments to link *civic technologies* to actual outcomes.

Another interesting and encouraging result is that most articles that are citizen-centric rely on citizen-sourced data (e.g., [S9][S16][S20]). This suggests that, even if only for consultative purposes, public administrations are still reluctant to embrace open government practice, and it is citizens who take the lead at promoting opportunities of technology-mediated civic engagement. Future research should explore how this is impacting the life of regular citizens, what new obligations are being created, and how to reward citizens accordingly to maintain their engagement, motivation and empowerment. Moreover, the fact that none of the articles we reviewed supported a government-centric process with citizen-developed solutions represents an interesting design research exploration opportunity. There is a design research opportunity for CS with technologies like FixMyStreet[14], but with the solution side driven by citizens, who themselves come up with ideas and implement them.

A final note has to do with the supported magnitude of these processes.

residents spend several months researching, discussing and deliberating on project proposals, before reaching the final voting phase

[14] `https://www.fixmystreet.com/`

The overwhelming consensus in literature is that, as Buchanan and Tullock put it, "direct democracy becomes too costly in other than very small political units when more than a few isolated issues must be considered" [156]. Our review indicates that *civic technology* might be breaking this consensus as half of the studies (15 out of 28) tested their application at the city scale (e.g., [S8][S10][S23]) and around 20% (6 out 28) did so at an even larger scale (e.g., [S3][S6][S19]). Furthermore, there seems to be a resurgence of the city as the principal space of democratic endeavor, as in ancient Greece.

2.4.3 RQ3: What is the reported benefit of these technologies?

The third and final question is also the hardest to answer, as even when all finally selected studies have validated their proposal through field studies, real case pilots, or controlled experiments, these evaluations vary in quality and consequently the inferred conclusions can be weak. In some cases, studies do not include in their evaluations the target population of the proposed tools. In other cases, they evaluate the users that are not representative; for instance, applications built for senior adults were tested by students [S25] or platforms intended to be used by ordinary citizens were validated by technically skilled students [S17].

The fact that not even 50% (28 out of 57) of the potentially relevant papers included evaluation is a testament to how challenging it is to measure the benefit of *civic technologies*. Academic evaluation is still lacking in this field and represents an opportunity for research and there seems to be a gap with respect to practice, with many important real use cases of civic technology not coming from academia but anchored in the work of practitioners.

We find interesting that several articles that do evaluate their proposals, also explored the pedagogical impact of their proposals, citing benefits such as improved civic skills [S16], enhanced collaboration [S1], improved quality of political discussion [S6], and increased interest in public issues

[S25] [S27]. *Civic technology* can therefore become the channel for learning by doing for future generations of citizens.

2.4.4 Limitations of this review

Civic technology represents an emerging field of research, design and practice. To map and analyze the field in its full extent is beyond the scope of this review, whose main purpose is to present and analyze a systematically constructed dataset of academic research incorporating both design and validation elements. This focus on academic research is the first limitation of our review, which can be complemented by other perspectives [177].

A second limitation is our focus in the computer science discipline and, particularly, in ICTs. Other disciplines like Political and Information Sciences, Industrial Design or Urban Planning might also host research that incorporate both design and validation of technologies for social innovation [188]. The use of digital libraries that index a large set of journals and conference proceedings, however, ameliorates this limitation, as online libraries like ACM and IEEE often include also interdisciplinary collaboration between computer scientists and other disciplines.

A third limitation is our focus on literature indexed by online digital libraries. While this ensures a wide coverage of the field, we might be losing interesting but not widely known contributions that are published in self-indexed venues, often focused on practice more than research. Conferences like the TICTeC (The Impacts of Civic Technology Conference[15]) or CIRN (Community Informatics Research Network[16]) often include among their accepted publications interesting pieces of academic research that have high local impact but low academic recognition.

[15] `http://www.mysociety.org/research/tictec-2016`
[16] `http://cirn.wikispaces.com`

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Chapter 3

Idea Management Communities in the Wild

with Marcos Báez, Carlos Rodríguez, Gregorio Convertino, and Grzegorz Kowalik

3.1 Introduction

Idea Management (IM) has the potential to benefit organizations and businesses by allowing them to discover valuable ideas that can lead to innovations. We have seen in Chapter 1 that a strategic assets in the success of IM initiatives are the contributions of participants to provide valuable ideas and in this context, the larger the community of participants, the more diverse views are likely to appear because more diversity increases the chances of producing valuable ideas.

In this sense, building successful online communities requires an understanding of the people and their needs, as well as setting up the proper technology and policies to match the characteristics of users and purpose of the community. Success then depends as much on proper management as it does on proper support. By gaining a better understanding on how organizations and users make use of IM communities, platforms and systems

can better accommodate their designs to serve these needs and facilitate the management of the overall community.

In this chapter, we explore *how* and by *whom* IM systems are used in practice. We do so first by qualitatively analyzing and classifying IM communities and then by quantitatively analyzing collective and individual behaviors of users. We explore these questions on a dataset of 166 openly available communities in IdeaScale. This part of thesis contributes to the state of the art on IM as follows:

- *Characterization of IM communities on the same platform.* We perform a qualitative analysis of a large set of IM communities that share the same technology platform and derive a set of community archetypes. These archetypes tell us how and by whom IM systems are used.

- *Identification of collective and individual behavior patterns from user actions.* We study four types of user actions (i.e., registering as member, posting ideas, commenting, voting) and identify a set of individual and collective patterns of behaviors.

3.2 IdeaScale: Idea Management System

We focus on IdeaScale[1] as the IMS of interest for this study. IdeaScale is one of today's leading technologies for supporting the execution of IM processes and used by big companies like Microsoft and Xerox and government institutions such as NASA and the White House. Apart from being a popular commercial platform in the market of IM systems, IdeaScale offers publicly accessible data that can be collected for research purposes through dedicated Web APIs[2] — an important facilitator for conducting research on these IM communities.

[1] `https://ideascale.com`

[2] APIs: set of functions through which a system can be programmatically accessed [79]

Figure 3.1: IdeaScale UI. (a) IdeaScale's community website; (b) Idea submission features; (c) Detailed view of an idea, commenting and voting functions

In IdeaScale, ideation initiatives are created by setting up a community website in which organizers describe the goals of the initiatives and define campaigns through which ideas are collected. Figure 3.1 (a) illustrates the main interface of an IdeaScale's community website.

Figure 3.1 (b) shows the empty template used to submit ideas on this website. When submitting an idea, a user, who previously registered as member of the community, provides a title and a description of the idea

and associates the idea to a campaign. Optionally, the user can categorize the idea using tags and attach an image or file to enrich the description.

Users can also comment and assign positive or negative votes to others' ideas and comments. They can also reply to existing comments. Such functionalities enable users to contribute arguments in favor or against an idea or a previous comment. This helps the authors with refining the content and the organizers with selecting and growing the best ideas. Figure 3.1 (c) introduces an example of an idea together with the features to vote and comment.

By default ideas are listed in three forms in IdeaScale, see Figure 3.1 (a). First, in a chronological order where the newest ideas appear first and the oldest occupy the last positions. Then, by popularity where ideas with highest scores —scores are calculated by computing the difference between positive and negative votes– are presented at the top of the list and third by the number of comments gathered by ideas.

3.3 Methods

3.3.1 Research questions

In this research work we address the following research questions:

RQ1. What type of communities emerge in Idea Management Systems? The goal is to understand what types of communities live in IM systems by identifying relevant properties that characterize such communities.

RQ2. What individual and collective behaviors emerge in Idea Management Systems? The goal is to identify common patterns of behavior by looking at how users and communities as a whole participate in the ideation process.

Understanding how communities work in practice can help i) researchers identify potential gaps between current theory and practice, and ii) practitioners design solutions that fit better the needs of users and communities.

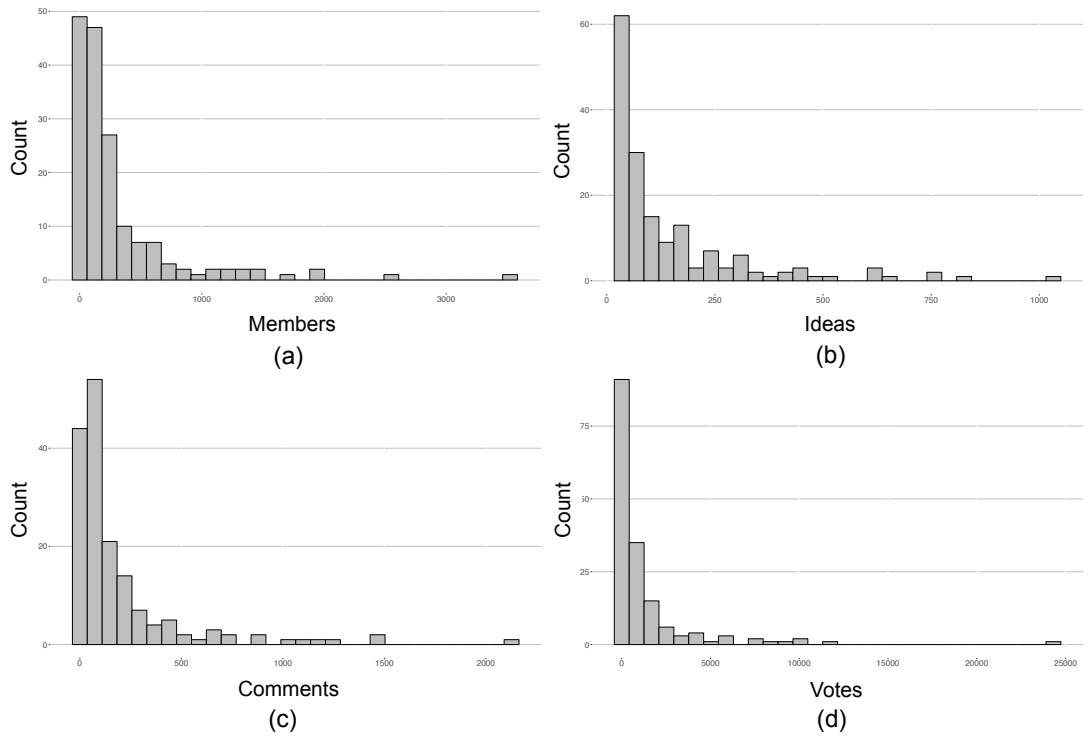


Figure 3.2: Distribution of members (a), ideas (b), comments (c), and votes (d) across the 166 communities

3.3.2 Data

The data set used in this research consists of public-access IdeaScale communities, available as of October 2015. It contains data from 166 communities generated through the main actions supported by the platform (registering as member, submitting ideas, posting comments and voting), which collectively account for 50,187 registered members, 24,403 ideas, 32,592 comments, and 217,933 votes[3]. The number of members, ideas, comments, and votes are distributed across the 166 communities following right skewed distributions, as outlined in Figure 3.2.

[3]Datasets and R scripts of this study are available at `https://github.com/joausaga/collective-behavior-im-communities`

3.3.3 Qualitative analysis of community archetypes

To address **RQ1**, we conducted a qualitative analysis of the 166 communities in our data set. For each community, the content analyzed was the main IM community page and a few of the most prominent (e.g., most voted) ideas. The analysis consisted of the following steps:

Step 1. Two independent coders analyzed a random sample of 20 communities using an open coding method [124, 53]. Then, the coders shared the results and agreed on a common coding scheme of six descriptive dimensions, where each dimension takes one of a bounded set of possible values. For example, when coding a community, the first dimension "Type of organization" could take one of these values: "Business", "Governmental", "NGO" or "Community".

Step 2. Three independent coders (the previous two coders plus a third coder) categorized the 166 communities using the coding scheme described in Table 3.1. The inter-coder agreement was 83%. For each case where there was a disagreement the three coders met and reached consensus on the final categorization.

Step 3. The results of the categorization were then used to cluster the communities based on emerging archetypes, i.e., groups of communities where tuples of values tended to co-occur frequently among the dimensions. Due to insufficient information two of the six dimensions, "Contributor" and "Can act?", were excluded from the analysis (see results below).

3.3.4 Quantitative analysis of collective behaviors

In answering **RQ2**, we investigated common patterns around the following four types of actions: *idea submission*, *community member registration*, *comment posting*, and *vote casting*. We assumed that communities behave differently at different stages of their lifecycle. Particularly critical for the success is for example the behavior of the community after it is launched. To mitigate the effect of time and maturity of the community, we limited our analysis to its first year of life.

Table 3.1: Communities coding scheme

Type of organization.
Type of organization running the ideation process.
Business. Profit organizations (e.g., a company).
Governmental. Organizations such as government agencies.
NGO. Non-profit, non-governmental organizations.
Community. Individuals running a community, without conforming a formal organization (e.g., gamers community).
Domain of the organization
Domain in which the community is operating
Technology. Related to software and hardware.
Civic. Organizations seeking civic participation.
Education. Organizations such as universities and schools.
Bureau. Related to the financial, legal, political and military sector.
Leisure. Related to entertainment and hobbies (e.g., tv, games)
Retail, including food & drinks (e.g., shops, restaurants, wineries).
Other. related to other sectors not described above.
Contributor
Participants of the ideation process in relation to the organization
External. People external to the organization (e.g., clients).
Internal. Members of the organization (e.g., employees).
Scope
The location of the target contributors.
Local. A country or local community (e.g., Serrenti county, Italy).
Global. Any country or region of the world.
Purpose
Reason for running the community
Feedback. The purpose is to gather requirements and feedback over a product or service (e.g., suggestions to improve a service).
Innovation. The purpose is to gather ideas for new products and services (e.g., school reforms in a local community).
Coordination. The purpose is to coordinate actions (e.g., for events).
Discussion. The purpose is to discuss (e.g., priest replying to questions about faith).
Can act?
The initiative owner is able to implement the idea and take actions
Yes. The ideation and deliberation are actionable.
No. The ideation and deliberation are *not* actionable.

For each type of action, we performed the following: *i)* the actions performed in the first year were partitioned into quarters; and *ii)* the proportion of actions performed in each quarter in relation to the yearly total was computed. In addition, we computed the relative number of ideas, votes and comments per member to cancel the effect of community size. As a result, for each community we obtained a four feature vector, with one feature per action type. The first feature contained the proportion of member registrations in each quarter, and the remaining three contained the proportion of ideas, votes, and comments by members in each quarter. We used a K-means clustering algorithm [153] to group communities according to the similarity of their feature vectors. We iteratively tested the algorithm with different number of clusters until we were satisfied with the grouping. The satisfaction criteria we used were simplicity and clearness. Next, for each cluster, we drew the evolution of user actions (e.g., member registrations, idea generation) within communities over the first year of life, thus, obtaining a set of patterns that describes the collective behavior of communities within that period. These patterns help us address questions such as when we should expect the majority of member registrations and how user action evolve over time.

3.3.5 Quantitative analysis of individual behaviors

We also analyzed the individual behavior of members to address **RQ2**. To do so, we selected all the actions recorded in the 166 communities that have authors with known registration dates. We found 173,433 action records meeting this criterion.

In this analysis, our aim was to find what the typical "lifetime" of a member in a community is — what their first actions are and how long they remain active. To this end, we computed the percentage of actions performed during the day of registration, the day after, two days after, etc. In addition, we investigated what type of action seemed to motivate people to join a community. By "joining" we refer here to the registration

date of a member and we used the first action of that member after the registration as the "first reason" for joining the community. Finally, we analyzed the individual user behaviors against the archetypes described previously.

3.4 Results: Community Archetypes

In this section we first present the results of our characterization of the online communities according to the coding scheme, and then the emerging community archetypes. These analyses are summarized in Figure 3.3.

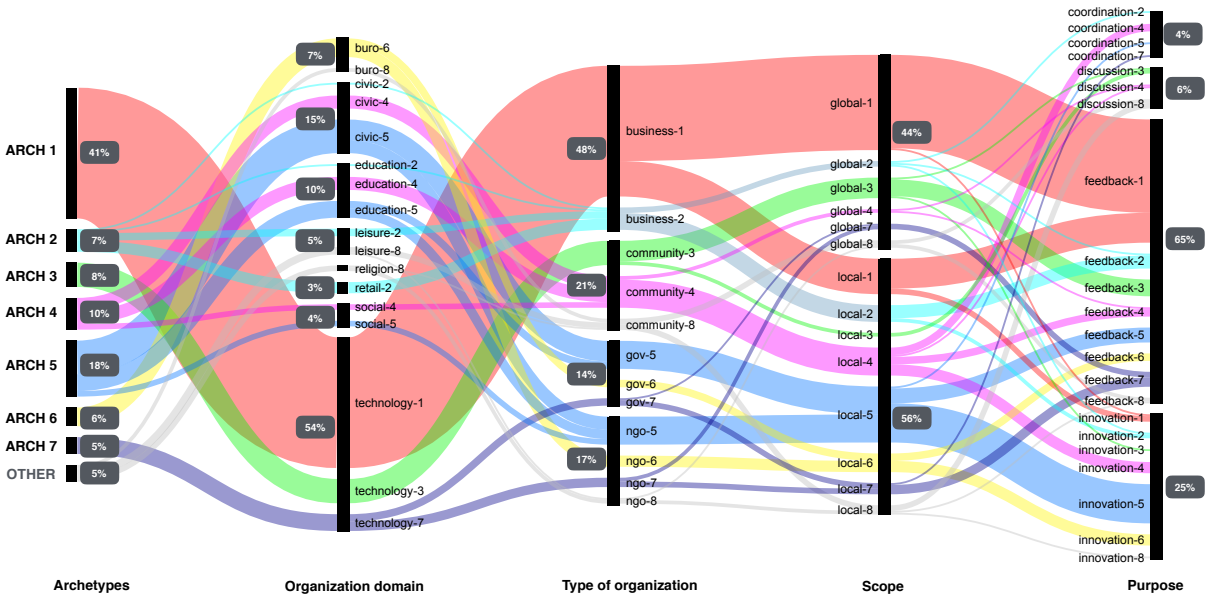


Figure 3.3: Alluvial chart illustrating the emerging community archetypes. The percentage represents the distribution of communities for each dimension of the coding scheme

3.4.1 Communities according to the coding scheme

Exploring each dimension of the coding scheme we have observed the following general trends:

Type of organization. The majority of communities are run by companies (*Business* 48%) followed by self-driven communities (*Community* 21%), i.e., communities without the backing of a formal organiza-

tion. Closely behind we have communities run by non-for-profit / non-governmental organizations (*NGO* 17%), and by governmental organizations (*Governmental* 14%) (see Table 3.1 and Figure 3.3).

Organization domain. Most organizations running the communities are related to the *Technology* domain (54%), followed by *Civic* (15%) and *Education* (10%), with fewer communities from the other domains (see Table 3.1 and Figure 3.3).

Contributor. As we were limited to publicly available communities, most of them involved *External* actors. Since we were not able to reliably determine the type of contributors, this third dimension was excluded from the analysis.

Scope. Both local and global communities were frequent. Communities appear to be somehow equally distributed between local and global audiences. *Local* (57%) communities are the most common, mostly consisting of civic communities, while the *Global* (43%) ones are more technology-oriented focusing on product and services available worldwide (see Table 3.1 and Figure 3.3).

Purpose. The dominant purpose of the communities is collecting *Feedback* (65%) followed by *Innovation* (25%) and to a lesser extent *Discussion* (6%) and *Coordination* (4%) (see Table 3.1 and Figure 3.3). For example, a common case is that of communities focusing on software products where members report bugs and request features (feedback).

Can act?. The capacity of communities to act on the results of the deliberation was difficult to assess. This is partly due to the lack of information on the communities and the misuse of the different phases in the ideation process. For this reason, this dimension was excluded from the analysis.

3.4.2 Communities archetypes

Based on the categorization done using our coding scheme (shown in the previous section), in this section we focus on identifying community archetypes

(see Figure 3.3). We use the descriptive construct of community archetypes to categorize types of IM communities. An archetype is defined as a frequently observed tuple of values along the four coding scheme dimensions.

ARCH 1. Communities run by companies in the technology domain

This archetype was the most frequent in the data set (70). As illustrated on Figure 3.4, communities belonging to this archetype were mostly seeking feedback from users and customers on their technology-related products and services. A representative example is `QuestionPro Feedback`[4], a community where users report on bugs and request features their product.

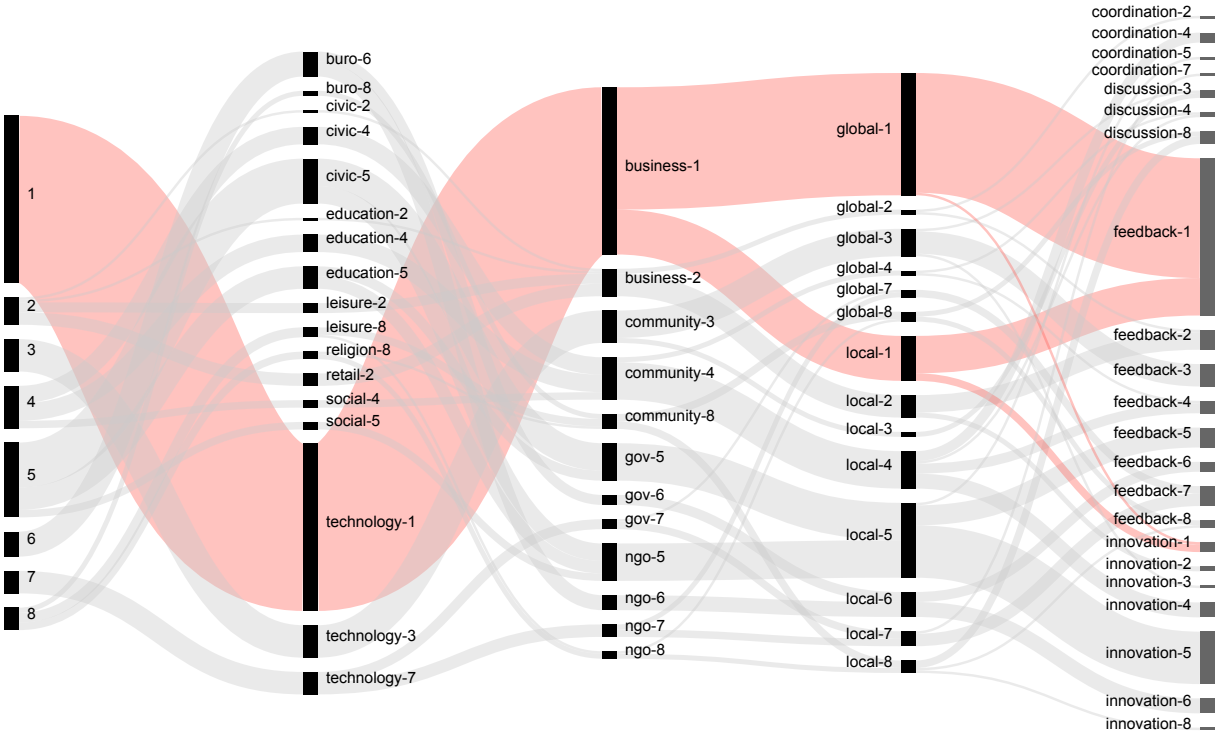


Figure 3.4: Alluvial chart illustrating the characteristics of communities in ARCH 1

ARCH 2. Communities run by companies in other domains

This archetype clusters the remaining communities run by companies (11). The domains of these companies include leisure, retail, food & drinks,

[4]`https://questionpro.ideascale.com`

civic and education. For example, the `The Beerenberg Family Farm`[5] is a community run by a food processing company on its products. Figure 3.5 shows the features of communities belonging to this archetype.

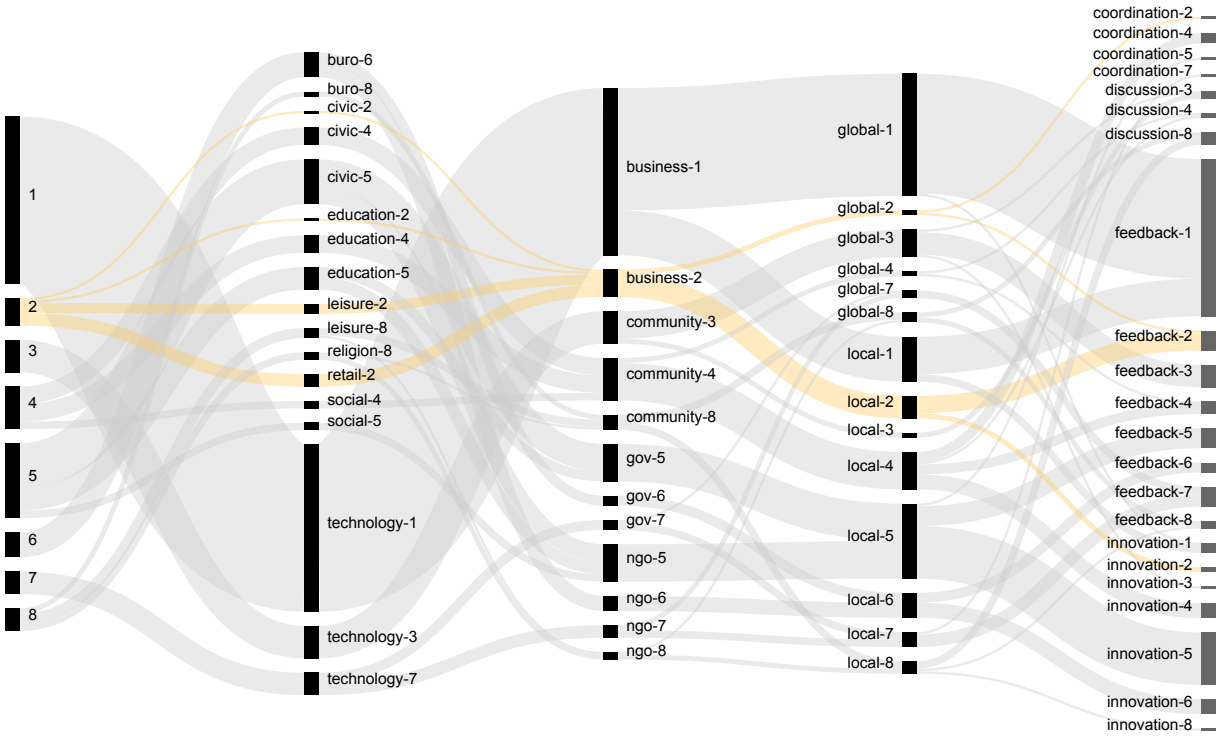


Figure 3.5: Alluvial chart illustrating the characteristics of communities in ARCH 2

ARCH 3. Self-driven communities on the technology domain

This archetype represents communities without the backing of a formal organization, run by its own members, on topics related to technology (13). These communities are similar to communities of practice, a type of communities frequently investigated in previous research [229]. This cluster combines the community-driven nature with the dynamics of software products and services. As in *ARCH 1*, the dominant purpose is feedback, although we also observed a much higher number of cases with a focus on discussion (see Figure 3.6). An example of this cluster is `Vivo Open`

[5] `http://beerenberg.ideascale.com`

`Source`[6], a community on an open source software managed by the community itself.

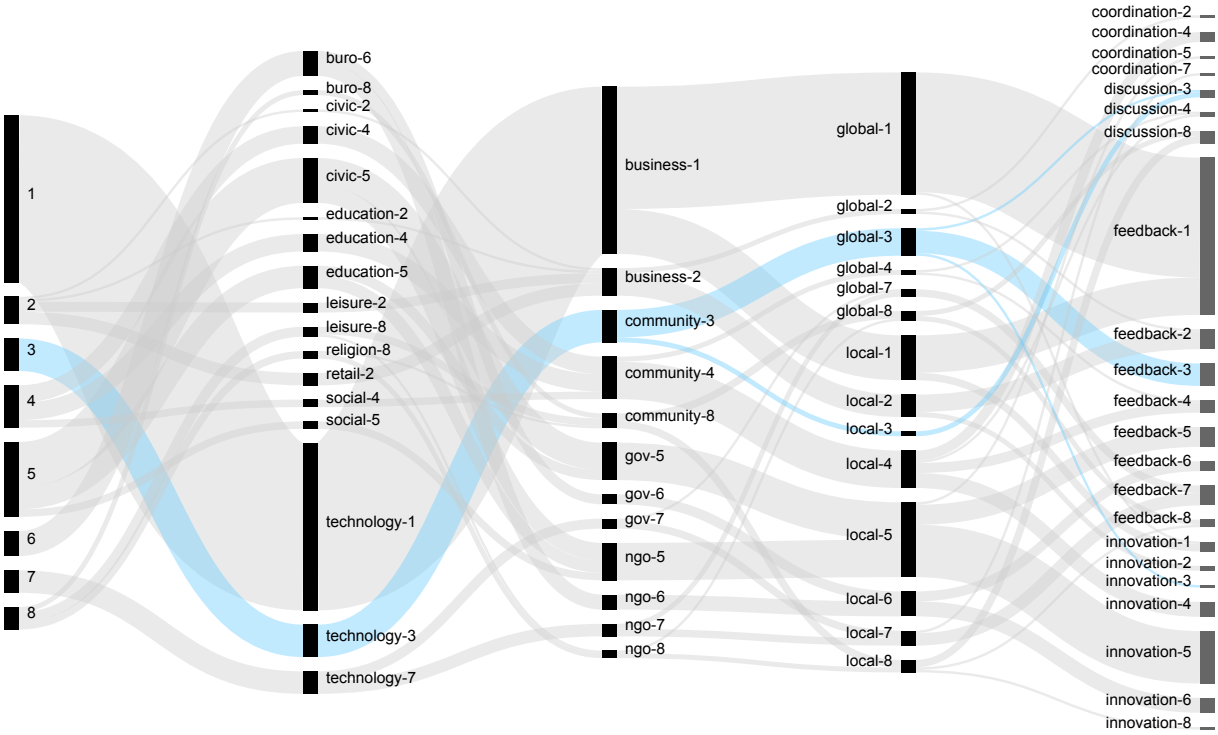


Figure 3.6: Alluvial chart illustrating the characteristics of communities in ARCH 3

ARCH 4. Self-driven communities in civic, education and social domains

This archetype represents communities without the backing of a formal organization, run by its own members and focusing on topics related to their civic life, education and other social themes (16). Figure 3.7 shows that this archetype combines the self-driven nature of the communities, focus on social impact, and local scope. Here, we see innovation as the prominent purpose, followed closely by feedback. An example of this cluster is `Rescatar a Lois`[7], a community run by concerned citizens on how to save a local factory from a crisis.

[6] `http://vivo.ideascale.com/`
[7] `http://rescataralois.ideascale.com/`

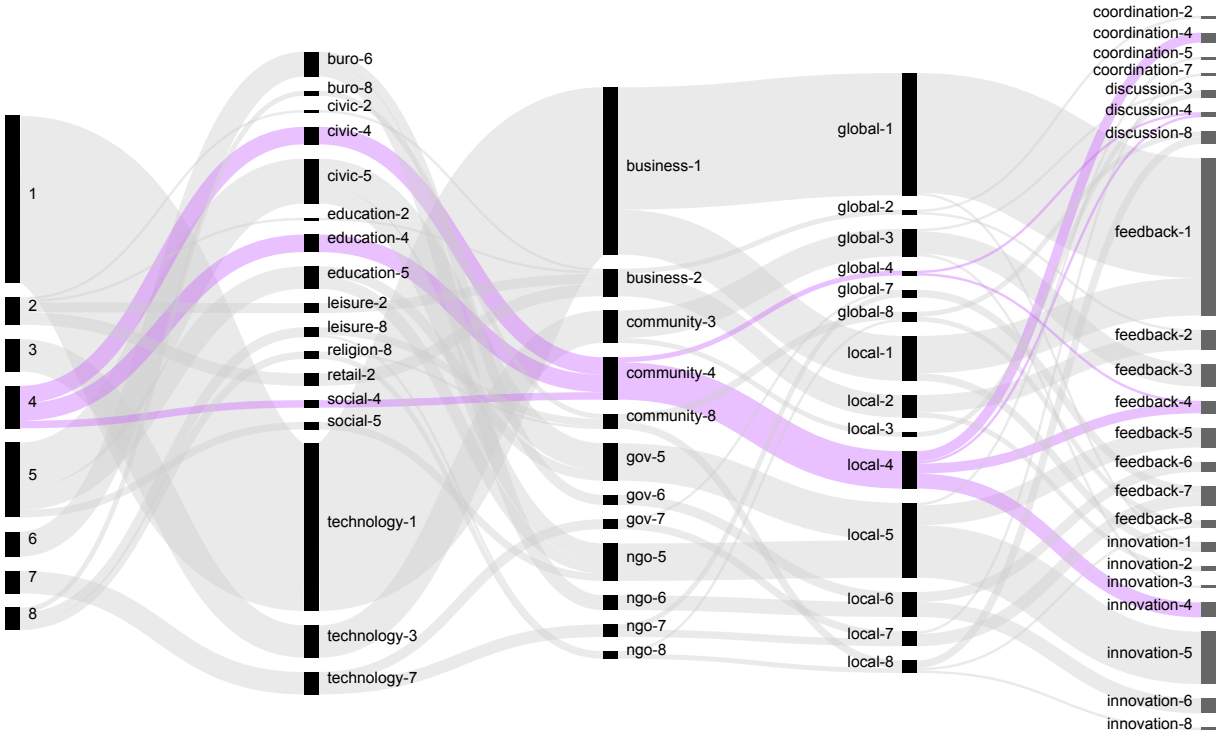


Figure 3.7: Alluvial chart illustrating the characteristics of communities in ARCH 4

ARCH 5. Communities driven by a formal organization focusing on civic, education and social domain

This archetype groups communities run by either governmental or non-profit organizations (Governmental, NGO) on topics that relate to the civic life, education and other social causes (30). This is the second most frequent archetype and it combines the local scope with the presence of governmental or non-profit organization as drivers of the communities (see Figure 3.8). Compared to *ARCH 4*, innovation is by far the most dominant purpose here. An example of this cluster is `HoCoInnovations`[8], a community run by a county on ideas to improve the school system.

[8] `http://hocoinnovations.ideascale.com/`

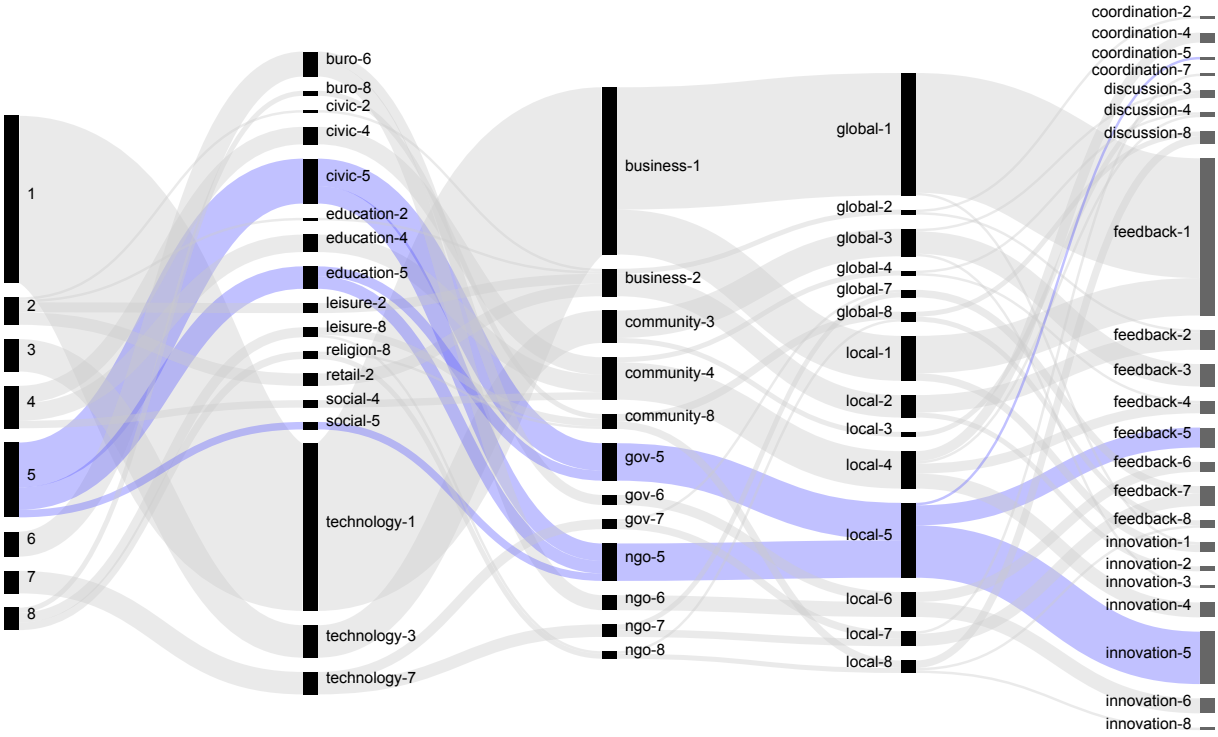


Figure 3.8: Alluvial chart illustrating the characteristics of communities in ARCH 5

ARCH 6. Communities driven by a formal organization in the "Bureau" domain

This archetype groups communities run by either Governmental or NGO organizations on topics that relate to financial, legal, political and military matters (10). These are local communities that tend to have very structured contributions around campaigns. In some cases they have more complex organizational structures: the median number of campaigns per community in this archetype was higher (median = 6) than in the other archetypes (median = 4). An example of such communities is `Martellago Cinque Stelle`[9], a community run by a political party in an Italian town on local programs and actions. Figure 3.9 shows the dimensions that characterize communities in this archetype.

[9] `http://martellago-m5s.ideascale.com`

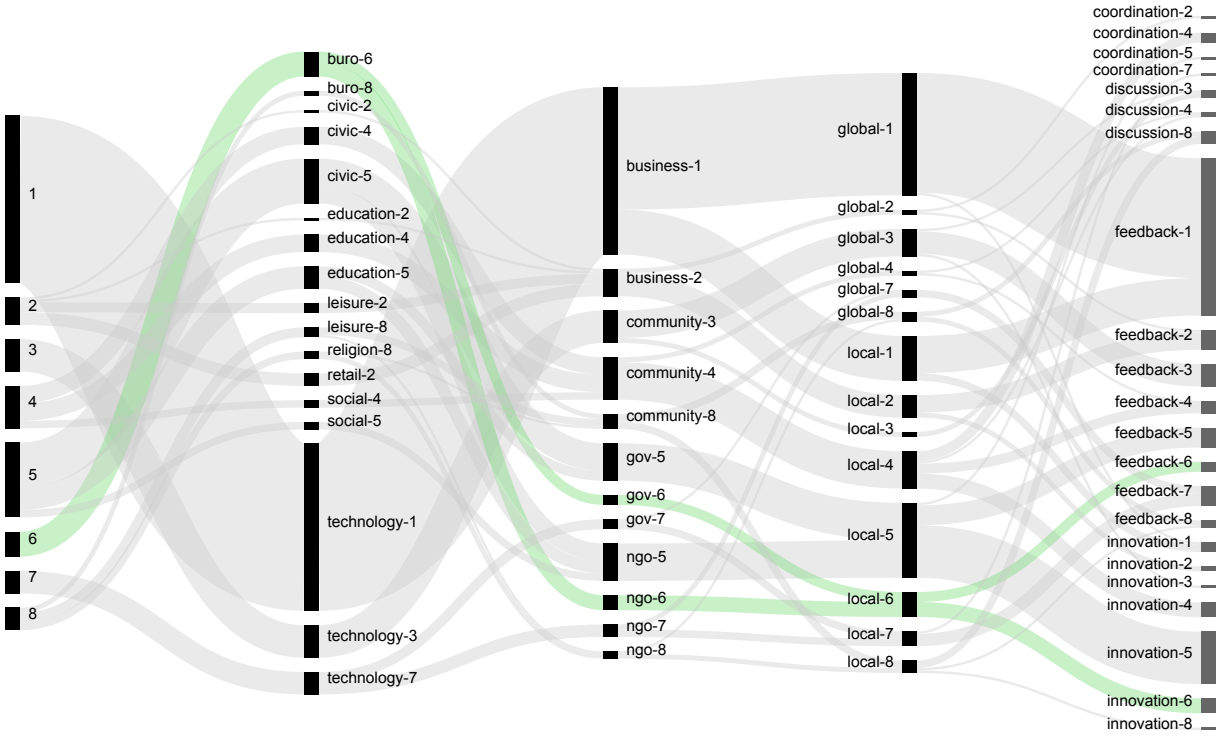


Figure 3.9: Alluvial chart illustrating the characteristics of communities in ARCH 6

ARCH 7. Communities driven by a formal organization in the technology domain

This archetype groups communities run by both governmental and non-profit organizations (gov, ngo) on technology-related areas (9), in contrast to *ARCH 1* and *ARCH 3*, which are run by companies or the communities themselves. However, similar to *ARCH 1*, these communities are predominantly focused on feedback. AS depicted on Figure 3.10, this cluster combines the nature of technology-related products and services, with the dynamics of NGOs and governmental agencies. An example of such communities is `API Developers Forum`[10], a community run by the US Census Bureau on the API for accessing their data.

The above archetypes give us some interesting insights about how and by whom IM systems are used: (i) Communities related to technology largely focus on incremental or corrective feedback; (ii) communities on social

[10] `http://apiforum.ideascale.com/`

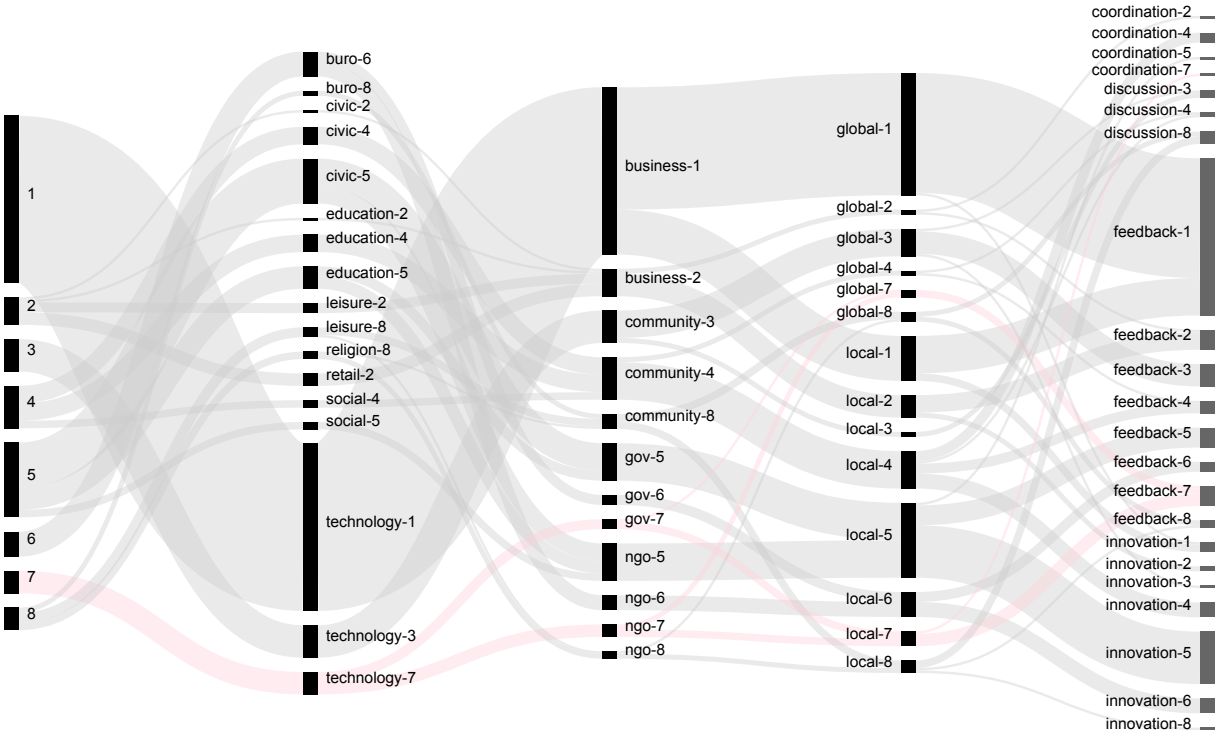


Figure 3.10: Alluvial chart illustrating the characteristics of communities in ARCH 7

themes tend to seek for more innovative ideas; (iii) communities run by its own members tend to incorporate more discussion; (iv) communities run by organizations on "bureau" tend to have more structured campaigns[11].

3.5 Results: Collective Behavior

This part of the chapter focuses on describing how communities act collectively. We found five patterns that shape the development of *member registration*, *idea submission*, *commenting*, and *voting* in communities. Also, we observed that these behavioral patterns are apparently influenced by the intervention of moderators. Finally, we did not observe a clear correlation between behavioral patterns and archetypes, except for voting behaviors.

[11]For more information about the archetypes please refer to the website of study: `https://goo.gl/zONg5U`.

3.5.1 Behavioral Patterns

After applying the k-means algorithm with different number of clusters, we found five behavioral patterns, i.e., trends over 1 year for one of four types of actions (see Figure 3.11).

For most communities (142 out of 166, 85%), the evolution of registrations over the first year of their life follows patterns 1, 3, or 5 (see Table 3.2 for the list of patterns). In **behavioral pattern 1**, which we call *Q1 peak and gradual decent*, 55 (33%) of the communities show to have a burst of registrations during the first three months of the year and then the number of new members gradually decreased or remained somehow constant until the end of the period. Communities that follow **behavioral pattern 3**, which we call *Q1 peak and rapid decent*, (53 out of 166, 32%) show, however, a more prominent peak of registrations during the first quarter. In fact, between 50 and 75% of registrations occurred in that period of time. Then, from the second quarter on, the proportion of registrations falls remaining stable around 25%. **Behavioral pattern 5**, which we call *Q1 peak and super rapid decent*, represents a more extreme case of pattern 3. Here, between 75 and 100% of member registrations happened in the fist quarter. Then the number of member registrations decays drastically and remains very low until the end of the period.

A quite different pattern is followed by 13% of the communities, which corresponds to **behavioral pattern 2**, which we call *Q2 peak and very rapid decent*. Instead of having large proportions of registrations at the beginning, they concentrate their registration activities during the second quarter (from month three to half-year). After that period, the registration of members falls down to quite low levels. Finally, very few communities (4 out of 166, 2%) show peaks of registrations towards the end of the year (**behavioral pattern 4**, which we can call *Q4 latter peak*). This type of behavior could be considered more an outlier than a pattern.

Interestingly, for the rest of the actions, i.e., idea submissions, comment posting, and vote castings, communities follow the same patterns. How-

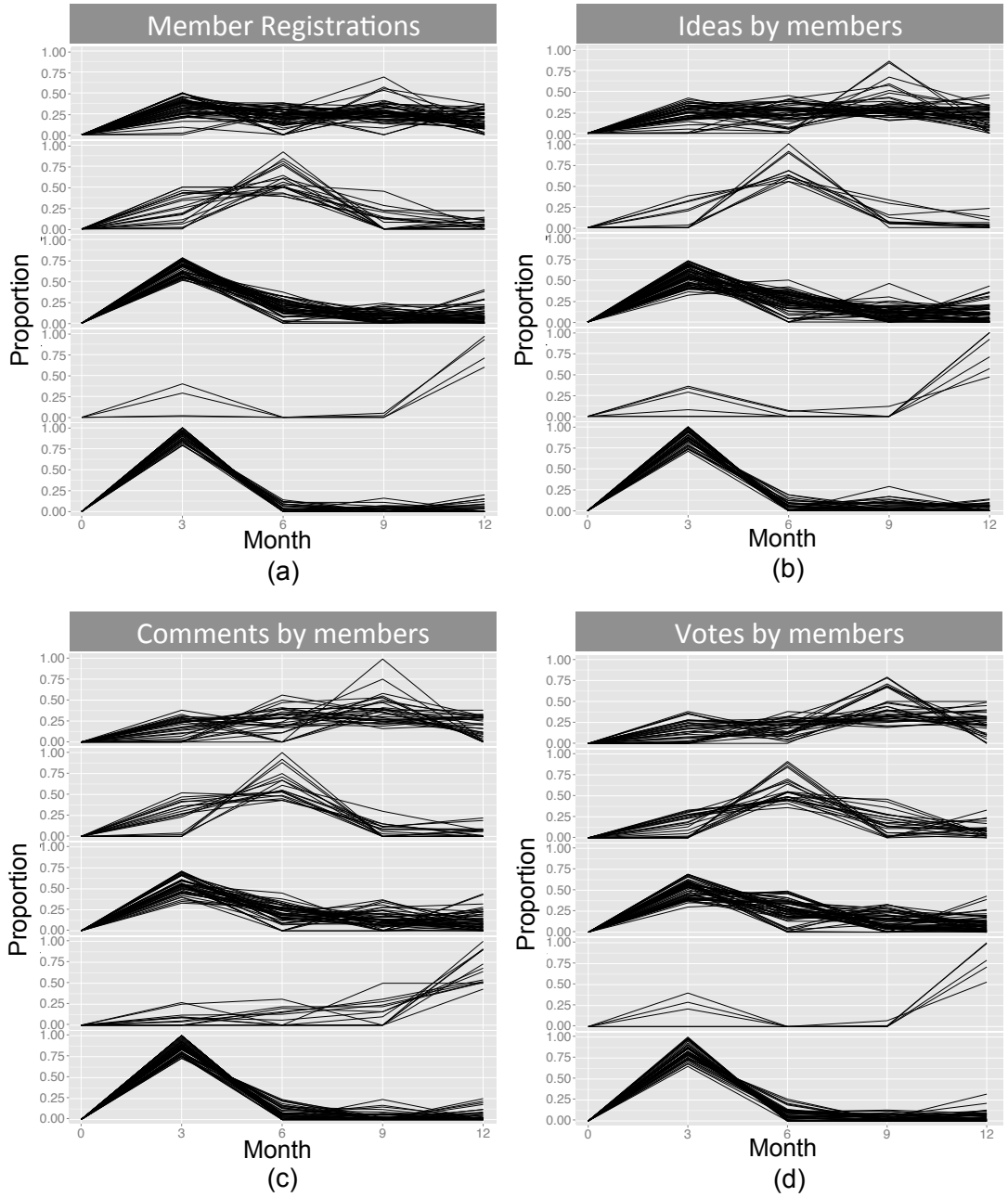
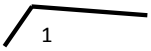
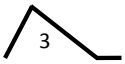
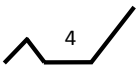
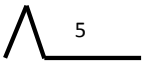


Figure 3.11: Patterns in the evolution of member registrations (a), idea submissions (b), comment posting (c), and vote casting (d) over first year of life, respectively. X-axis indicates the month of the year while Y-axis shows the proportion of the actions done in the different months

ever, the distribution of communities per pattern is different as shown in Table 3.2. Although the distribution of communities in each pattern show

to be different from action to action, a general trend can be seen: patterns 1, 3, and 5 are followed by the majority of the communities. Pattern 2 depicts the behavior of about 6 to 15% of the communities for each action while pattern 4 is rather negligible.

Table 3.2: Number and percentage of communities affected by the patterns for every action

Behavioral Pattern	Action: Member Reg.	Action: Idea Submission	Action: Comment Posting	Action: Vote Casting
 1	55 (33%)	48 (29%)	32 (19%)	34 (20%)
 2	20 (13%)	11 (6%)	18 (11%)	24 (15%)
 3	53 (32%)	61 (37%)	48 (29%)	56 (34%)
 4	4 (2%)	6 (4%)	13 (8%)	5 (3%)
 5	34 (20%)	40 (24%)	55 (33%)	47 (28%)

A general finding is that a main peak is present in each of the patterns. The peak indicates a localized period of predominant activity, which could be explained by external events, such as dissemination events that trigger it. Except for pattern 4, the level of activity decreases after the peak.

One third of communities (55 out of 166) follow the same collective behavior for all of the action types. Such commonality suggests overall attention peaks, where contributions —in all forms might— follow member registration. We will go in depth on these results in the next section.

3.5.2 Influence of moderation in collective behavior

Different factors may influence the collective behavior of communities. We have no information about the external ones, such as promotional events, incentives, or other public events because they are not registered in our data set. Other factors are internal and in particular previous research has shown the benefits of having organizers and moderator interventions on the quality of IM processes [1].

In this analysis, we investigated if there was a relationship between moderator interventions and behavioral patterns, understanding moderator intervention as all submissions (ideas, comments and votes) performed by moderators and organizers of communities. The analysis was limited to actions related to content creation because we assume that the actions by moderators within the communities have little influence on attracting new members.

Interestingly, communities that follow patterns 1 and 3 are at the same time those that show the strongest presence of moderators. On average, moderators intervened 2.5 times (69.71 vs. 27.92 interventions in average) more in communities in which their ideation actions are shaped by patterns 1 and 3 than in communities that follow patterns 2, 4, and 5. Similar numbers were found when studying the participation of moderators in communities where commenting and voting are governed by these patterns.

By splitting interventions into quarters, we observed that periods with high level of activity correspond to quarters of high activity by moderators. For every pattern, significant correlations ($\alpha = 0.05$) were found between interventions and productivity of ideas, comments, and votes (idea submission: Person r=0.89, $p < 0.001$, commenting: Person r=0.55, $p < 0.05$, and voting: Person r=0.73, $p < 0.001$). In light of previous research [6], these results confirm that in our communities a higher number of interventions by moderators is associated with higher activity levels by the community.

3.5.3 Patterns and archetypes

We did not observe associations between behavioral patterns and archetypes, except for the patterns for voting. By conducting Pearson's Chi-squared tests, we found that archetypes are associated with the patterns of behavior for casting votes ($X^2 = 48.52, df = 28, p < 0.01$). That is, some archetypes exhibit distinctive behavioral patterns for voting.

Voting in 66% (44 out of 67) of the communities in ARCH 1 is shaped

by patterns 1 and 3. More than half of the communities in ARCH 4 (9 out of 17) follow pattern 5 when casting votes. Voting follows patterns 3 and 5 in about 75% of communities belonging to ARCH 5. For the rest of the archetypes (2, 3, 6, 7 and 8) the voting action is homogeneously distributed among patterns, as illustrated in Table 3.3.

The nature of voting action —which requires much less effort compared to ideation, commenting, or registering— may explain why groups of archetypes are associated to patterns. It might be that low-effort actions are more easily shaped by common patterns than more time-consuming actions, which may be more influenced by external factors. Further research is needed to better understand the reasons behind this association.

Table 3.3: Distribution of communities archetypes per voting activity patterns

Behavioral Pattern	ARCH 1	ARCH 2	ARCH 3	ARCH 4	ARCH 5	ARCH 6	ARCH 7	ARCH 8
1	19	3	0	4	3	2	3	0
2	9	2	6	0	4	1	1	1
3	25	3	3	3	12	5	2	3
4	0	0	0	1	1	0	2	1
5	14	3	4	9	10	2	1	4

3.6 Results: Individual Behavior

This section contains analyses of community members actions on individual level. We found that most of members perform only one action and that action happens normally during the first day after registration.

3.6.1 Number of actions per member

To study the number of actions per member, we included only active community members (13,619 members, 27%), defining "active" members as those who performed at least one action, i.e., submit idea, cast vote, or post comment.

The majority of community members did just one action of each type (idea, comment, vote). The median of action per member is 1 idea, 1 comment and 2 votes. There is a very small group (10%) of more active members with more than 3 ideas, 4 comments, and 23 votes.

3.6.2 Time of actions

In our analysis of community member actions, we computed the day in which they were performed since author registration. Results are summarized in Table 3.4. A large part of actions was performed sometime between the day of registration or the day after (0 means the registration day, 1 means day after, etc.). About 50% of ideas, 20% of comments, and 40% of votes were submitted in this time window. Probably, patterns of registration, ideas, comments and voting show similar shapes because these actions are performed within a short time window (usually within the first few days). See Figure 3.11.

Table 3.4: Number of days that pass from registration to first action

Percentile	First Idea	First Comment	First Vote
0.1	0	0	0
0.2	0	0	0
0.3	0	3	0
0.4	0	11	1
0.5	1	34	11
0.6	8	82	33
0.7	39	176	90
0.8	140	327	225
0.9	365	551	448
1	2192	2198	2111

Given the above results, next we try to understand in more details which action was the main driver for registration, i.e., which action was firstly performed after the person registered as a member of the community.

Results are shown in Table 3.5. Almost half of community members posted their ideas as the first action after joining the community. Interestingly, the a-priori "hardest" action was the main driver that attracted people to communities (the "easiest" and least time consuming action, voting, was the second one). Previous research has also found that people engage in this kind of initiatives mainly attracted by the possibility to disseminate their ideas [219].

Table 3.5: First actions of users

Action	Number of users	Percentage of users
Idea Submission	6161	46.49%
Vote Casting	4853	36.62%
Comment Posting	2238	16.89%

3.6.3 Users action and archetypes

We also compared users action within each of the discovered archetypes. From Figure 3.12, we can see that there are communities with the majority of actions done within one day (ARCH 2,3,4,8) and those that have more active members during later days (ARCH 1,5,6,7). This is interesting, because ARCH 1,2,5,6,7 are more formal —they are supported by companies or formal organizations— while ARCH 3 and 4 are self-driven. In relation to the latter, we found that communities in ARCH 2 have more active members than 3 and 4 if results are analyzed in the 60-percentile level. It seems that company-driven or official communities have more success in keeping their members active for longer periods of time.

3.7 Discussion

The findings we report in this article reveal aspects of IM systems and communities to date scarcely studied. We expect that these results will help practitioners in the design and instrumentation of their IM initiatives.

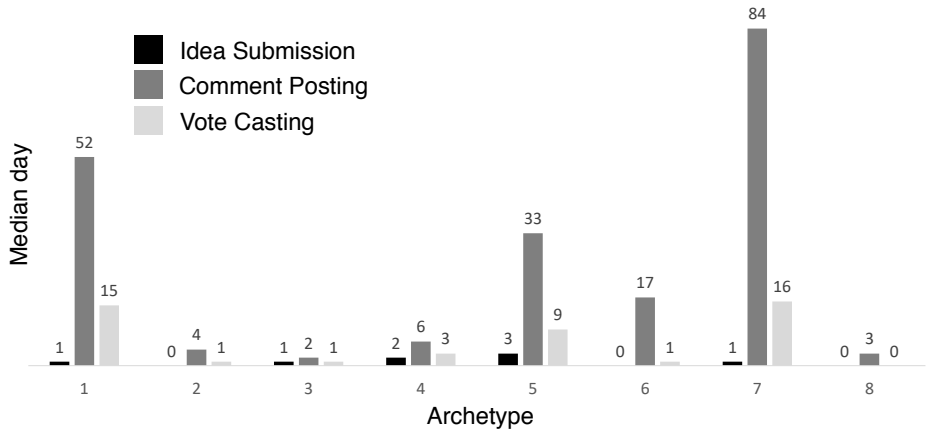


Figure 3.12: Median of days spent by communities in archetypes to perform their actions

3.7.1 Types of communities in IM systems

Most of the IM initiatives found in the platform are dominated by communities in the technology business and those that address civic, education and social issues. On the one hand, the civic communities are usually managed by for-profit organizations that use IdeaScale as a tool for collecting user feedback on their products and services. On the other hand, the education and social communities are either self-driven or driven by a formal organization, and they are characterized by its innovation nature and strong social impact. The rest of the communities have a lower prevalence and they typically relate to other domains such as leisure, food & drinks, military, politics, among other topics.

3.7.2 Collective behavior of communities

Overall, communities follow the same collective behavior pattern for all action types, i.e., for member registration, idea submission, comment posting, and vote casting. From the results that we reported earlier, patterns that show higher activity levels at the beginning of the life of communities prevail. This common behavior [224] might be the effect of the early enthusiasm occurring soon after the lauch of a community or the result of additional external factors such as the promotion of the initiative out-

side the IM platform or the incentive offered by the organizations to the participants. The implication of this behavior is that organizers or moderators who want increase the volume of interactions by members of the community should focus their efforts during this early period of high activity and high rate of member registrations, as opposed to leaving such efforts towards a later time.

Finally, our study on patterns and archetypes indicate that these two are not associated, except for the case of voting patterns. More concretely, the archetypes that include technology business and civic participation communities seem to be correlated with patterns that show high vote casting levels during the early stages of the initiatives.

3.7.3 Individual behavior of community members

Posting ideas seems to be the main reason that drive people to IM. In addition, we found that most postings occur during the same day of registration. In fact, we detected that members experience a quite active period right after registration and then become inactive. However, visible differences between archetypes were also discovered here: Members of communities supported by companies or official institutions remain active for longer periods than members in self-driven IM. We also found that the activity levels for the actions studied in this chapter evolve following similar patterns (notice the similar pattern shapes in Figure 4). This may be explained by the short time that passes between user registration and the actions associated to content creation.

3.7.4 Limitations of the study

The findings we report in this chapter are tightly connected to the platform we chose for our study (IdeaScale), and, of course, they should be interpreted within this context. We are also aware that the study is limited by its descriptive nature and we therefore could not investigate causal effects. The analyses we carried out in this work may also suffer from the

lack of consideration for "lurking" variables, such as unattractive discussion topics, low promotion efforts, incentives, unclear participation rules, and timing of our observation.

Chapter 4

Participants' Motivation Factors and Profile in Crowdsourcing Ideation

with Tanja Aitamurto and Hélène Landemore

4.1 Introduction

In Chapter 3, we have seen that Idea Management is being used by official institutions to crowdsource ideas, perspectives, and opinions from citizens to fuel the innovation of public services, regulations, policies, and laws. For citizens, participating in such initiatives is an avenue to influence the policies that affect their everyday lives. For governments, crowdsourcing is a method for searching knowledge for policies and for engaging citizens.

While there is an increased interest in crowdsourced policymaking [34, 140, 170], there is a lack of knowledge about the profile of the online participants, and what drives their participation [45, 44]. Despite the increasing number of crowdsourcing initiatives in governments, we do not know enough about the crowd's profile, motivation factors, and expectations.

The crowd remains an anonymous, 'masked' entity, which can be problematic because of the potential impact that an undefined crowd can have in influencing the policies that govern us, and also because knowing the

crowd's profile and motivation factors can help governments use crowdsourcing more efficiently. Answering such questions is thus important both for democratic theory and from the point of view of institutional design.

After understanding the type of communities that live inside Idea Management platforms and how they behave collectively, in this chapter we deepen our knowledge of the individuals that take part in IM initiatives by studying the intrinsic and extrinsic factors that motivated their participation. By analyzing data collected from a crowdsourced law reform in Finland, we also study the profile and expectations of these participants. Specifically, we aim in this chapter to answer the following **research questions**:

- What is the demographic profile of the crowd?;
- What motivates the crowd to participate in crowdsourced lawmaking?;
- How do participants expect their contribution to affect the law?

4.2 Crowdsourcing in open policy-making

Crowdsourcing has many definitions, but can be captured by the idea of an open call for anyone to participate in an online task [31, 34, 66, 113] by contributing information, knowledge, or skills. The 'crowd' refers to the group of people who participate in the crowdsourcing initiative online. The crowd can be constructed to emerge from the widest possible constituency (in theory anyone online) or specific subsets (usually national ones in the political context). Participation is either voluntary (uncompensated) or for money (financially incentivized). An instance of voluntary crowdsourcing can be found in crowdsourced journalism [2] or crowdsourcing in crisis management [150]. In paid crowdsourcing, participants are compensated per task, as in microtasking on digital labor market- places such as Amazon's Mechanical Turk [127] or based on performance as in innovation challenges [121].

Governments use crowdsourcing for two primary reasons: for knowledge search to develop stronger policies and for civic engagement [169, 185, 233]. In crowdsourced policymaking, governments ask citizens to contribute to a policymaking process with their ideas, knowledge, and opinions. The crowd input is then synthesized and channeled into policy.

The primary goal of crowdsourcing for knowledge search is to find information that can help the policymakers craft stronger policies, differing from goals in crowdsourced deliberation and argumentation. In online deliberation and argumentation, the goal is to foster constructive deliberation about policy issues [71, 131]. The technologies for online deliberation and argumentation enhance the constructive expression of opinions, whereas in crowdsourcing the goal is to facilitate knowledge search and idea exchanges [119, 150]. However, crowdsourced policymaking can also foster deliberation-even though the process and the medium were not designed for this use [5].

Crowdsourcing, in this way, is an instance of open policy-making, a method that opens up a process traditionally closed to the wider public. A well-known instance of crowdsourced lawmaking took place in Iceland in 2011, when the constitutional council tasked with writing a new constitution crowdsourced ideas from the Icelandic people [136]. Similar initiatives have been conducted for ordinary legislation by the House of Representatives in Brazil [70] and by the White House and various federal agencies in the USA [1].

Crowdsourcing can be used in several stages in policy-making, as depicted in Figure 4.1. Public policymaking follows a cycle with several sequences: (i) problem identification and definition; (ii) data gathering; (iii) developing of proposals and solutions; (iv) consultation; (v) designing and drafting of the policy; (vi) decisions; (vii) implementation; and finally (viii) evaluation [64, 114, 182].

In the cases study in this chapter, crowdsourcing was applied in the evaluation, problem definition, data gathering, option development, and consultation stages of the policy cycle (see highlights in Figure 4.1). In

legislative reforms, the crowd participates in the early stages, but elected representatives —in the Finnish case, the Parliament— make final decisions regarding bills.

Crowdsourcing functions as a tool for participatory democracy, where the goal is to engage citizens in political processes between elections [167, 178], and it is not a method for direct democracy [82]. In direct democracy, the citizens decide about a policy directly, for instance in binding referenda or in participatory budgeting processes in local government [37].

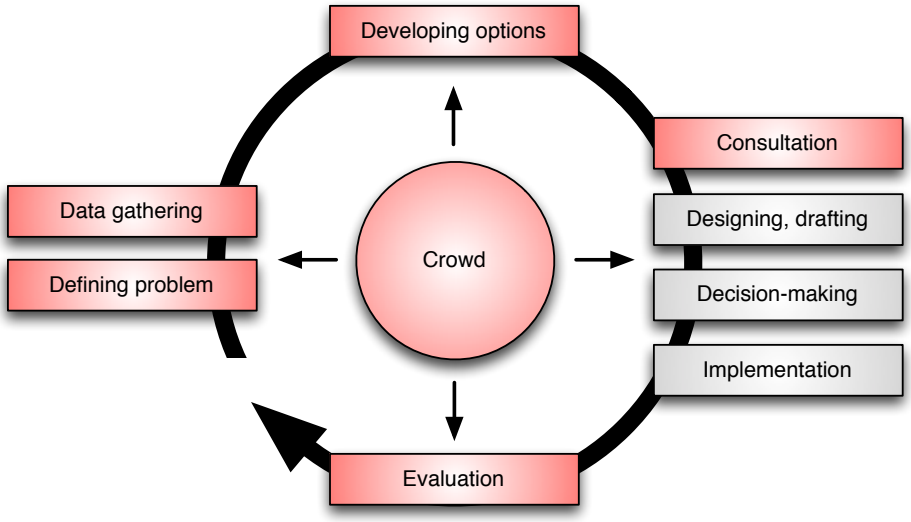


Figure 4.1: Crowdsourcing in policy cycle. The sequences that are highlighted in red refer to the parts of policy cycle that the crowd participated in the crowdsourced law reform, which is examined in this article

To achieve its goals in knowledge search, crowdsourcing does not require statistical representativeness of the participant crowd, although ideally the process should be as inclusive as possible (i.e., should engage as large crowd as possible) to maximize the efficiency of the knowledge search[1] [8]. The crowd's ideas are analyzed and synthesized based on the knowledge value in them, separately as individual inputs. The inputs are often summarized

[1]The desired ideals, however, lead to complications: Due to a lack of effective methods for synthesizing crowdsourced input, large amount of input can be overwhelming, and as a result, the crowd's input can remain unused in policymaking [3]

into larger themes, not by using preference aggregation unlike in crowdsourced deliberation.

The goal is what differentiates crowdsourcing from many other democratic innovations, such as deliberative polls [75] and citizens' assemblies [205], which are typically based on offline group deliberations. These methods aim for detecting public opinion by using the so-called mini-publics approach, using statistically representative (random) samples of citizens. The mini-publics approach aims to replicate the preferences of the larger public whereas crowdsourcing is based on self-selected participant group, and thus is unlikely to be a representative sample of the opinion of the larger population.

The potential useful knowledge also comes from a selection-biased crowd; however, when the input is evaluated based on the usefulness of the proposed solution, the selection bias does not lead to detecting a biased public opinion (opinion about the options that should be considered) but to a set of proposed options (these are some options that could be considered), complemented by other options produced by experts. Therefore, crowdsourcing is more conducive to be used as a knowledge search method in policymaking, rather than a method for measuring the public opinion or crowdvoting during the policy-cycle.

4.2.1 Legislative system in Finland

Let us now look at the Finnish legislative system to understand the role of crowdsourcing in law making. In Finland, the Parliament has legislative power. The Parliament consists of 200 members of Parliament (MPs). The Cabinet has executive power with its 12 ministers, led by the prime minister. The ministers are typically elected members of Parliament, and they lead ministries in subject areas such as justice, education, and finance. Civil servants in the ministries with expertise in the subject matter are assigned by the ministry to write a bill. Civil servants are ministry employees and are hired as bureaucrats for their positions, not elected, unlike

politicians, and their tenure in their positions is not directly tied to the elected representatives, the ministers. The heavy reliance on bureaucrats in law making in the Finnish parliamentary system is often assumed to provide objectivity regarding legislation. However, in the end, the MPs decide about the legislation, and the MPs are bound to political parties.

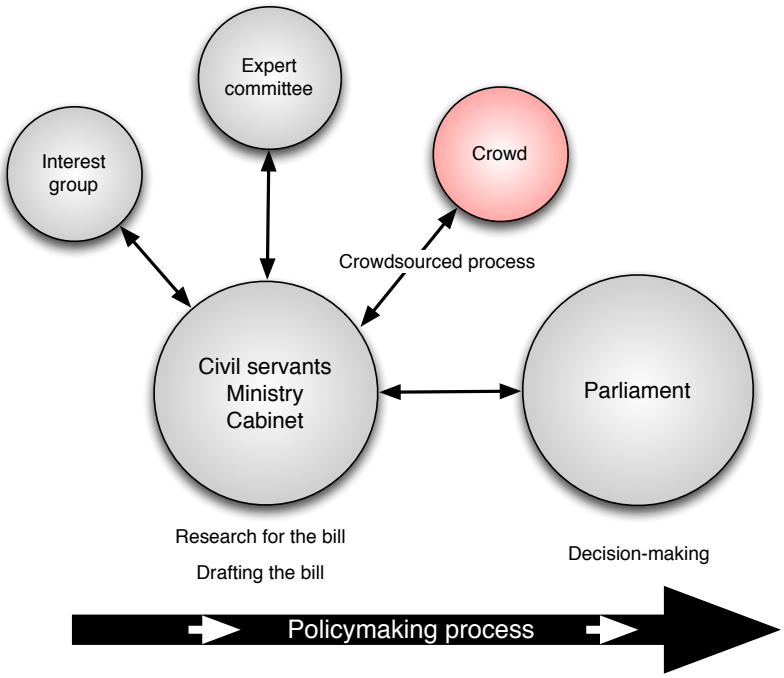


Figure 4.2: Policy-making process and actors' roles

The law-making process and the roles of the actors are illustrated in Figure 4.2. First, civil servants conduct research, and assign consultants to research the subject matter. Then the civil servants write the bill; after the Cabinet has approved it, the bill goes to the Parliament. The Parliament accepts the bill, revises it, rejects it, or lets it expire. In Finland, the Parliament has decision-making power over legislation.

Crowdsourcing brings in citizens' knowledge, which can be used as an additional data point when civil servants prepare the law, as Figure 4.2 illustrates. The arrows in the figure illustrate the interaction between the interest groups, the expert committee, the crowd, the ministry, the Cabi-

net, and the Parliament. These interactions are rarely public. When the research stage in the process is crowdsourced, and the crowd's contributions are visible for anybody online, there is horizontal transparency in the process.

4.3 Intrinsic and extrinsic motivation factors in crowdsourcing

What is a motivation? In this article, we refer to the term 'motivations' as the subjective reasons individuals claim or recognize to be driving their behavior. We thus distinguish motivations from mere incentives, which may –at least partly— cause the action to happen, but may not be endorsed subjectively by the participants as reasons to act. Motivations can differ from incentives in that although incentives may be necessary for people to participate and are often built into controlled experiments aiming at greater participation, such incentives may not be the reason with which people actually justify their participation. For example, monetary incentives are often useful in lowering the cost of participation. That does not mean, however, that citizens engage in democratic processes for the money. Similarly, just because sunnier days can be shown to be correlated with higher voter turnout does not mean that the weather is a motivation for citizens to go out and vote.

With motivations understood in this sense, we then differentiate between extrinsic and intrinsic motivations by using the self-determination theory in social psychology [54, 193]. Intrinsically motivated activity is performed for its own sake, in the pursuit of goals internal to the person's identity and aligned with his or her values, principles, and desires. By contrast, extrinsically motivated activity is oriented toward goals and rewards toward which the self has a more instrumental, external relationship, such as money or other goods [133, 193].

Intrinsic motivations are driven by the human need to be recognized as

competent and self-determined, and they are categorized into enjoyment-based or obligation- or community-based intrinsic motivations [54, 146]. In enjoyment-based intrinsic motivations, the person is motivated by the fun or joy of performing the activity. In obligation- or community-based intrinsically motivated behavior, the individual is driven by the need to follow the norms of a group or a community [54]. Extrinsic motivation, by contrast, is present when an action is taken to achieve a separable outcome [193], which can include financial reward, fame, or reputation.

Because crowdsourced policy-making is based on voluntary contributions, in the following review of motivation factors we focus on unpaid crowdsourcing. Studies on the motivation factors of voluntary (unpaid) crowdsourcing find that the crowd is motivated by both intrinsic and extrinsic motivations. In a crowdsourced film project, the participation was mainly intrinsically motivated: it was a fun way to pass the time; the participants also appreciated the reciprocity of the project-sharing knowledge and skills with others. But they were also moved by extrinsic motivations such as gaining respect and recognition [145]. In another example, the crowd participated in crowdsourced journalism for intrinsic motivations, namely, to contribute to social change and mitigate power and knowledge asymmetries, and peer learning and deliberation [2].

In the crowdsourced citizen science project Galaxy Zoo, participants were intrinsically motivated by the possibility of contributing to science, which is an interest, hobby, or profession that contributors care about [187]. Similarly, Nov, Arazy, and Anderson [167] document that in the stardust@home citizen science project, intrinsic and collective motivations are the most important - namely, the enjoyment gained from the activity and a feeling of identifying with the goals of the project. Similarly, Rotman et al. [191] show that in ecological citizen science projects, citizen volunteers participate out of interest, curiosity, and commitment to conservation. When studying the motivation factors behind participation in a bus stop design challenge, Brabham [30] finds that the extrinsic motivations were to advance one's career and be recognized by peers. To express

oneself and to have fun were the intrinsic motivators[2].

Although crowdsourcing and commons-based peer production (CBPP) [23] differ from large-scale collaboration methods in several ways, they also have much in common, including contributing one's time voluntarily online. CBPP refers to bottom-up online creation, such as Wikipedia writing or open source software production, in which the power and control lie within the commons. In crowdsourcing, instead, it is the crowdsourcer —the organizer of the crowdsourced initiative— who has the control over what is being crowdsourced and how the crowdsourced input is used (see also Pedersen et al. [180], p. 582).

The commonalities between crowdsourcing and CBPP might be reflected in motivation factors, so it is worth examining the motivations in CBPP. Nov [166] found that active Wikipedia contributors are motivated mainly by fun and ideology. 'Ideology' refers to the contributors' beliefs in the need for information to be free and universally available, and 'fun' refers to the enjoyment of contributing. Yang and Lai [232] found that Wikipedians are intrinsically motivated by pursuing an activity —such as sharing knowledge— that meets their inner values and principles [143].

4.4 Off-road Traffic Law Reform

The case studied here is a crowdsourced off-road traffic law reform in Finland. Off-road traffic is motor-powered transportation in nature, mainly with snowmobiles in the winter and all-terrain vehicles (ATVs) in the summer. The Finnish Ministry of the Environment regulates off-road traffic in Finland under a law that came into effect in 1995. There has been pressure to reform the law, one reason being the increased volume of off-road traffic [6]. The Ministry of the Environment and the Committee for the Future in the Finnish Parliament decided to experiment with crowdsourcing as a

[2]Other factors for participation listed by Brabham [30] include low barriers to entry and an appealing, usable website. In our view, such preferred features do not amount to motivations per se and rather qualify as incentives.

participatory method in the lawmaking process.

Crowdsourcing took place in two sequences in the spring of 2013 on an online platform. The process was designed for problem mapping, ideation, knowledge sharing, and information exchange among participants. The participants could propose ideas on the platform, comment, and like or dislike ideas by using a thumbs-up/thumbs-down modality. The crowd-input was visible to the online public. To participate, the users had to register on the site with a verifiable email. They could choose to stay anonymous or use their real names.

The crowd was asked to submit ideas for improving the law in categories defined by government experts and the authors of the paper, who advised the process. These categories included safety, age limits, protecting nature, and regulation of the route establishment process. The prompts for the participants included information about the law and questions for them to answer. The idea crowdsourcing phase resulted into 500 ideas and 4000 comments from more than 700 users. A minority of participants, one-fourth of them (23%), produced most of the ideas. The 10 most active participants submitted almost one-half (46%) of the ideas. The participants' input was evaluated by their peers and international experts (for the evaluation process, see [6]). The results of this evaluation were then handed to the Ministry of the Environment for further processing, which is ongoing[3]. The focus of this chapter is on the idea crowdsourcing sequences, because it was in those two sequences that participants were interviewed and surveyed.

4.5 Methods

Two of the authors participated in the planning of the crowdsourcing process as advisors, thus applying an approach of action research. In action research, the field is not something to be observed; rather, the researcher is

[3]A new government started in the summer of 2015, and it is unclear if and how the new ministries will continue the projects started during the previous government. This uncertainty indicates the vulnerability of open government practices to changes in political power.

active in interacting, producing, and creating the research site [95]. Once the crowdsourcing began, the authors took the role of participant observers [101]. The participation of the researchers helped to build a rapport with the interviewees.

4.5.1 Interviews with key informants

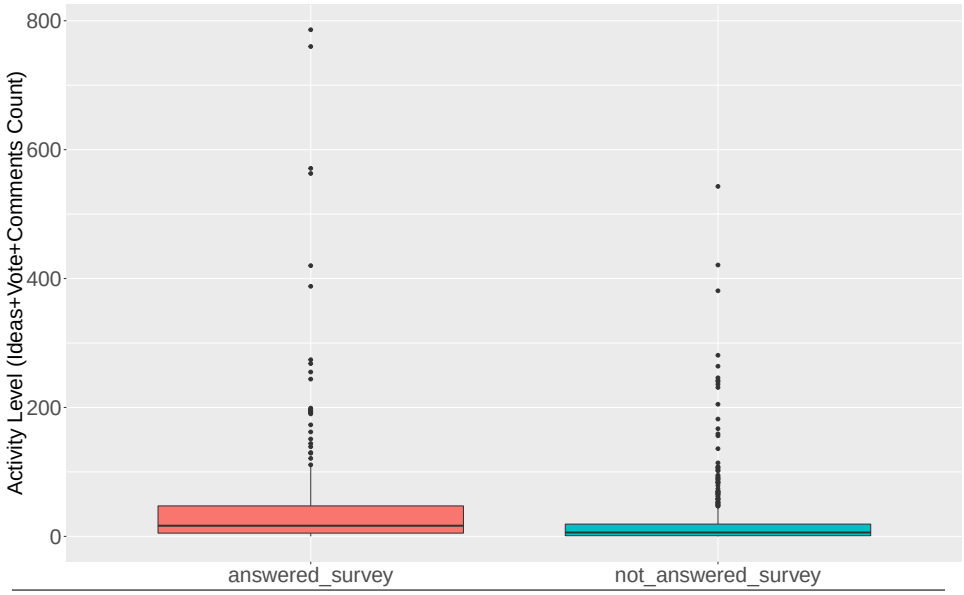
We interviewed 23 people who participated in the crowdsourcing. The interviewees were recruited via emails on the online platform sent to a random sample of participants across activity levels. Those who responded positively to the interview request were participants who had participated in the online exchanges in some manner, the sample thus excluding those who were the most passive. The interviewees' activity level (i.e., several ideas, comments, and votes) varies from very active to low activity —that is, no ideas, just comments and votes.

Nine of the 23 participants were interviewed twice, once early in the process and again after the crowdsourcing was over, totaling to 32 interviews. Seven of the interviewees were females and 16 were males. The average age of the participants was 53 years, ranging from 27 to 69 years. Seven of the 23 interviewees were retired, and the rest were working in various occupations, including individuals in electrical engineering and business and product management, a kindergarten teacher, a lawyer, a wilderness guide, an environmental and land-use expert in municipal government, and a forest expert. The numbers 1-23 in the text identify the interviewees.

4.5.2 Online survey

An online survey examined participants' demographic profiles. The survey link was sent to participants by email. Out of 743 registered users 186 replied, resulting in a 25% response rate. Active participants were over-represented in the survey respondents, as Figure 4.3 illustrates. Six survey responses were removed because of the respondents' outlier activity level.

The survey respondents produced more ideas, comments, and votes than the nonrespondents.



	N	Means Activity	Median Activity
Survey respondents	180	56.54	16.50
Non-survey respondents	557	20.84	6

Figure 4.3 & Table 4.1: Survey respondents' and nonrespondents' activity distribution

4.5.3 Data Analysis

The interview data were analyzed by following Strauss and Corbin's [207] analytical coding system. In the first round, open coding was used, allowing key themes and patterns to emerge from the data and thus guide further analysis [147, 207]. Coding involved dissecting each transcript paragraph by paragraph to identify recurring subcategories and themes. Finally, we applied selective coding to integrate and synthesize the subcategories [207] into the following main categories: impact, civic duty, peer learning, deliberation, and expectations: realism and skepticism.

The survey data were first analyzed for the demographic profiles of the participants. The demographic data were combined with the data on participants' level of activity —ideas, comments, and votes— on the

crowdsourcing platform to detect an association between participants' activity levels and their demographic characteristics. The activity data were preprocessed in the following way: participants who did not answer the survey were removed, six outliers were removed, and the survey data and activity data were merged by taking the email addresses as the common denominator, resulting in a data set of 180 records.

4.6 Results

In this section, we elaborate the findings, starting from extrinsic and intrinsic motivation factors and then moving to the crowd's expectations and profile. The primary motivations for participating in crowdsourced policy-making were having an impact, upholding civic duty, and peer learning and deliberation. Having an impact on an issue of interest for tangible benefit was an extrinsic motivation for the crowd, whereas fulfilling a sense of civic duty, affecting the law for sociotropic reasons, and finding and enjoying opportunities for peer learning and deliberation were intrinsic ones, as Figure 4.4 illustrates.

Figure 4.4 shows the role of the motivation factors in a crowdsourced policy-making process. There are two types of factors: those that drive the crowd to participate in the first place, such as the opportunity to affect the law, and those that are created during the process, such as peer learning and deliberation, and they can motivate the crowd keep on participating in the process. The interactive nature of these factors in relation to the crowdsourced process is illustrated in the double-headed arrows in Figure 4.4.

4.6.1 Affecting the law: extrinsic and intrinsic motivation

The crowd participated in the crowdsourced process because they wanted to affect the law. Affecting the law is an extrinsic motivator to the extent that the participant is seeking an outcome distinct from his or her core

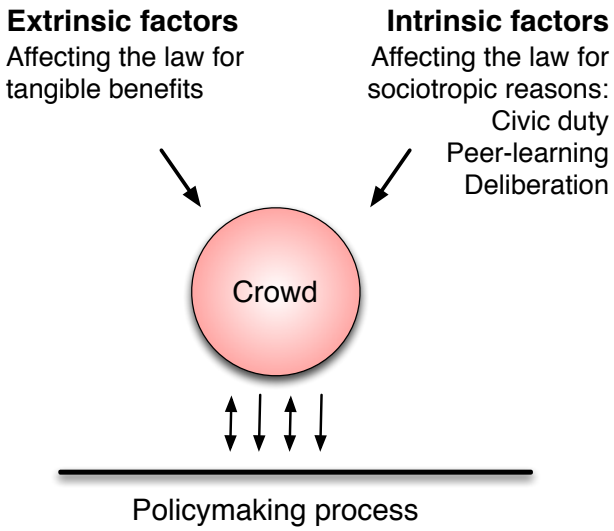


Figure 4.4: Extrinsic and intrinsic motivation factors in crowdsourced policy-making process

values, such as a financial benefit. However, many participants wanted to impact the law for reasons that did not include a direct benefit: for instance, for protecting nature and society at large as altruistic and sociotropic reasons, which are intrinsic motivation factors. Thus, influencing the law can be an extrinsic or an intrinsic factor, depending on the motivator.

The crowd cared about the off-road traffic law because they had an interest in it, grounded in their relationship to off-road traffic. By participating in crowdsourced law-making, the crowd hoped to contribute to resolving an issue important to them, as the fol- lowing interview excerpts depict:

> *"I'm such a nature-lover that I'm getting annoyed by the all-terrain vehicle craze. So I thought maybe I could have an impact on that this way."* (1, online participant, female)

> *"The topic is closely related to my own life. The legislation will have a strong effect on what I do."* (4, online participant, male)

The participants were snowmobile riders for leisure or work, land- and

forest owners, entrepreneurs, or environmentalists, and each group was motivated by a particular goal. The snowmobile riders wanted to have more routes for riding, and professional users of snowmobiles, such as fishermen and reindeer herders, wanted to maintain their special privileges of riding beyond routes designated by existing laws. Landowners were worried about the damage caused to their land by off-road traffic vehicles and wanted to be better compensated for the use of their property. Having the law changed a certain way would often have benefited these participants directly and even financially. In addition, environmentalists were worried about harm to the environment.

When affecting the law is an extrinsic driver, the motivations to participate are instrumental and even self-serving to a degree, bringing the motivations close to what certain rational choice theories claim motivate voting in elections [61]: the maximization of self-interest. Rational choice theory models assume that voters are motivated only by instrumental considerations —the likelihood of being pivotal to the desired outcome (i.e., getting candidate X elected or policy Y implemented)— with very often the added assumption that the outcome is supposed to serve the interest of the voter, narrowly defined as an economic benefit. A rational choice theory model of voting [88] suggests that voters participate when they know they can win —that is, make a difference with their vote. However, the motivations in crowdsourcing are neither purely instrumental, nor when they are instrumental are they necessarily self-serving. Often the participants want to bring the law closer to their ideal of reasonability, sensibility, and justice, as evidenced in the following:

> *"I'm doing this for entirely selfish reasons [laughs]. I happened to have come to the conclusion that I'll do as much as I can to make sure that off-road traffic will be thought through sensibly, at least to the extent that ... it will at least be legal. [...] And of course, I hope that my rights will be properly taken into consideration."* (9, online participant, male)

> *"I'm an active hiker, and I've noticed while spending time outdoors that the off-road traffic, particularly snowmobiles, are really a nuisance. So the fact that I can in some way at least try to influence ... these things, I feel I must try to bring some sense into the discussion."* (12, online participant, male)

Participation is a way to protect their rights (whether theirs specifically or that of other people they care about), such as property rights and associated claims to compensation for the use of their lands or the right to a serene natural environment. Participation is also a means to offer a viewpoint that has not been, in their opinion, properly expressed or represented:

> *"I had the feeling that not all the viewpoints were being taken into account in the drafting of the law, and I had a few viewpoints in my mind that weren't necessarily being taken into account, at least adequately."* (2, online participant, female)

> *"Just based on the legislative proposal, the snowmobilers' point of view was missing —and in particular, when it comes to the needs of someone who rides a snowmobile as a hobby."* (10, online participant, male)

Participants often consider themselves to be representing the opinions or interests of stakeholders that are not otherwise present on the platform, such as people with fewer communication skills or even nature itself. They sometimes consciously claim the role of advocates for other citizens —an endorsement, in other words, of the role of informal representative, stepping up to fix the problems of the existing formal representative institutions:

> *"I unwittingly became involved, persuaded by desperate landowners and citizens, who felt utterly powerless; I had to be their advocate so to speak. The decision-makers had a tyranny over drafting routes, especially in northeastern Savo."* (21, online participant, male)

Several participants had been previously active in the off-road traffic issue. They had very specific and defined ideas about how the law should be changed, as the following excerpt depicts:

> *"We wanted to have an impact on the drafting of the off-road traffic act and on the safety issues, which ATVs generally have. There should be those rules and, of course, this is related to the tractor discussion, too. So, currently, helmets aren't mandatory in tractors, and we've been really trying to bring that forth."* (5, online participant, male)

The crowd also included participants who were professional representatives of interest groups, such as a lawyer from the organization representing professional fishermen and fisheries and a representative of a nature conservation organization, who participated with their real names on the platform. Their organizations perceived crowdsourcing as another avenue to influence the law, and they saw that while in the traditional lawmaking process a small organization can be easily sidelined by larger stakeholder groups, in crowdsourcing, their viewpoint had a better chance of becoming public and being heard. The regular, non-lobbyist participants welcomed the professional lobbyists to the discussion and hoped that the civil servants in the ministry would also interact with them on the platform.

Interestingly, transparency in crowdsourcing revealed a diversity of opinions within some lobbyist groups. For instance, the largest lobbyist organization in the off-road traffic issue, the Central Union of Agricultural Producers and Forest Owners, with about 400,000 members, represents farmers and forest owners. The crowdsourcing process made it publicly visible that neither their members nor the organizational representatives were unified in supporting the stance the organization had taken previously in public about off-road traffic. These divided views became visible on the platform, as seen by a representative from that organization in an interview (22).

4.6.2 Participation as a civic duty: intrinsic motivation

The crowd was also spurred by a strong sense of duty, which was an intrinsic motivation. The sense of civic duty refers to an internalized purpose of the self, engaged in the activity. For the crowd, participation in crowdsourcing was not only a way to influence an issue important to them, but also an action they felt they had to take as citizens. Some participants suggested they would have regretted missing this chance to participate —as if there were something morally reprehensible about inaction:

> *"If there were such an opportunity, and I had done nothing and hadn't shared my own opinions ... afterwards, I would have felt bad."* (1, online participant, female)

The act of participation was seen as valuable for its own sake, or at least necessary to minimizing regret (similar in this to the act of voting in elections according to theories by Ferejohn & Fiorina [74] and perhaps even guilt. After having done their duty, participants felt a sense of accomplishment and relief independent of any actual instrumental impact:

> *"I have actually been thinking about this for some 20 years — that it would be good to have a channel to share my opinions. It could move the opinion forward. And at least you feel relieved when you can share your opinions."* (15, online participant, male)

The participants felt that they should not waste their chance to have an impact on the law. One plausible way to interpret this 'burden' that is alleviated by the act of participation is as a civic duty, which weighs on people's conscience when they fail to act. The civic duty thus identified in this study resembles the motivations attributed to voters in Blais and Young's classic experiment [24] —namely, a sense of moral duty to preserve

democracy[4]. The motivation is similar to obligation- and community-based intrinsic motivation, in which participation is driven by a sense of obligation derived from external social pressures that have been internalized. Instead of being motivated to participate by an external social pressure similar to that which makes people vote in national and local elections because they assume that everybody else votes too (see [228]), participants in crowdsourcing feel an internal pressure to participate. Given that there was very little awareness about the crowdsourcing initiative in Finland, it is unlikely that external social pressure could have been a factor and so we credit the participation to other types of intrinsic motivations.

4.6.3 Peer learning and deliberation: intrinsic motivations

Crowdsourcing provides new educational and learning experiences for the crowd, and these serve as intrinsic factors to participate. The crowd perceived its role to be that of educating other people or redressing their misconceptions by sharing knowledge about the off-road traffic issue, as the following interview excerpt depicts:

> *"I thought the point of departure was not right. They hadn't done the analysis thoroughly enough. The interpretation they made was wrong. How they had justified it, that ... I thought they were untrue statements."* (4, online participant, male)

One motivator was to generate more complete or true knowledge. Participants' intention was not necessarily to change the minds of the dissenters or the people they saw as being incorrect, but to improve the quality of the discussion:

> *"But I also tried to bring some facts into the emotional debates, in my own provocative way, because I know that the topic*

[4]In Blais and Young's experiment, exposure to rational choice models of voting lowered the participation rate of students who voted in the 1993 Canadian federal election. The results suggest that a plausible motivation for voting prior to this exposure was a sense of duty.

> *is such that it's almost impossible to make the opposition change their opinions."* (9, online participant, male)

The participants were worried about false information and extreme opinions, and they wanted the interactions to be based on facts rather than on extreme opinions from 'the propaganda machines,' as they called the extremists. They wanted the interactions to be 'rational,' 'sensible,' and 'serious,' hoping the knowledge they shared on the platform would reach the civil servants and politicians who prepare the law and write legislation:

> *"A civil servant isn't necessary a hobbyist. He observes the issue from the viewpoint of his task and takes a stance on the drafting based on his knowledge. And now that the knowledge is more widely available —from the hobbyist— it has a positive effect. At least I would hope that it has."* (5, online participant, male)

The participants perceived their knowledge of the off-road traffic issue to be different from that of the civil servants, and they saw their knowledge as necessary for developing a good policy. The crowd also perceived inherent value in the transparency: the mere act of sharing their knowledge is a contribution through which the participants hope to affect the public debate and the general opinion by bringing in knowledge they think is true even when they think they are unable to influence the law:

> *"That has been a place where it's been possible to bring the viewpoint from the other side to the attention of the extremes. And to correct the urban legends that have been presented."* (7, online participant, male)

Moreover, by exchanging arguments and reading others' comments, participants were able to learn what others —even opposing groups— thought about their viewpoints. After participating, the participants felt they had learned from others:

> *"There were quite a lot of opinions when I went there, so I was able to get an idea about what people think about it, on both sides. So I felt that I finally understood what people think."* (1, online participant, male)

Peer learning and deliberation were intrinsic motivators in this study; however, they could be extrinsic ones too, if the learning and deliberation had been performed for extrinsic outcomes, such as recruiting supporters for one's interest group in the issue. Such factors, however, did not surface in the data for this study.

4.6.4 Crowd's expectations: a small possibility of 'winning'

The act of participation was an empowering moment, in which the participants perceived crowdsourcing as a more direct way to influence a societal issue than voting:

> *"This is actually the first time in my life that I feel I'm really participating in making democracy and influencing the decision-making in this society. It feels much more real than just voting for some person."* (9, online participant, male)

Even though participants were excited about the novel avenue for influence, they remained acutely aware of their limited possibility to actually have an impact, being realistic and even skeptical about their chances of influencing the law:

> *"The way I see it is that at least I have the chance to say something somewhere, either by writing or talking, and I'm trying to use that opportunity, even though I know that the effect that I may have is rather small, unless some lucky turn speeds the effect up a little."* (2, online participant, female)

The participants perceived their participation as one element in a larger, more complex process in which lobbying groups and other political powers will easily drown out citizens' voices:

> *"The possibility is there, but at the end of the day, it's all ultimately so politicized that ... And then there are the organizations, like MTK [The Central Union of Agricultural Producers and Forest Owners]. They're such strong actors that an idea presented by a mere individual might seem rather lightweight."* (1, online participant, female)

> *"The civil servants will probably end up having a general idea about the direction to go in, and then they will consider comments that fit the framework they have in mind."* (11, online participant, male)

Participants were aware of the nature of policy-making. They anticipated that political authorities would determine how the crowdsourced input would be used. They were also aware of the nature of the Finnish legislative process, in which the Parliament can approve, reject, or revise the bill the government proposes —regardless of the input from the crowdsourcing moment in the law reform. Participants, thus, did not consider their participation as a particularly efficient means of having a direct influence on the law. The crowd members saw themselves as a small cog in a larger legislative system, where the main responsibility remained with official authorities:

> *"It's now up to the authorities. Preparing the legislation and then taking it forward into the political decision-making process and so on. [...] There is a wealth of smart ideas [on the crowdsourcing platform], and above all, the main points have emerged."* (8, online participant, male)

Participants believed that they had done their part in the law reform and that the responsibility to bring about a better law was now in the official decision-makers' hands.

This result has a rather counterintuitive and even paradoxical nature. Despite the participants' skepticism about their ability to influence the law,

they still found reasons to be there and engage constructively. Participants perceived their chances of making a difference as being low, but they still tried. One explanation is that they got enough utility from whatever low expectations they had of making a difference, developing perhaps 'adaptive preferences' [73], whereby their preferences were formed in response to their restricted options, thus saving them from disappointment. Another explanation is that they engaged in 'rationally irrational' behavior, whereby they chose to believe what made them feel good, namely, that they could make a difference even in the face of actual knowledge to the contrary (as per Caplan [39]). The latter interpretation is suggested in some interviews:

> *"The passive action won't help much, whereas I want to believe that if you are being active in your field of interest, you can make a difference."* (16, online participant, male, our emphasis)

The more plausible interpretation of the crowd's behavior, however, contradicts rational choice theory. People participated even though they knew they had little chance of being pivotal agents in the final decision. They were not 'rationally irrational' in the sense that, as per the comment above, wanting to believe is not the same as believing and it is clear that our participants were not delusional. Either way, the participants' hope of having a little or enough influence carried them over the threshold of registering on the platform and spending their time contributing to crowdsourced policy-making.

4.6.5 The participant crowd: male, educated, and working full time

Most of the participants were male (86%) and had formal education, as Figure 4.5 (a) illustrates. Moreover, the majority of participants were middle aged: the largest group was 35-54 years old (46%), and about one-fifth were 55-64 years old (22%) or 26-34 years old (20%), as Figure 4.5 (e) illustrates.

Most of the participants worked full time (65%). About one-third of them were high- ranking officials (27%) and about one-fourth were employees (23%). Entrepreneurs and those in farming or forestry made up 13% (Figure 4.5 (b)). All main geographic areas were represented (Figure 4.5 (c)).

Although the distribution is relatively even between the main geographic areas of Finland, northern Finland is overrepresented in population size. Northern Finland has the smallest number of inhabitants, but represents one of the two largest participant groups. In Northern Finland, snowmobiles can be used during most months of the year and are used for professional fishing and reindeer husbandry. Most participants lived in rural areas (45%) or suburbs (28%), as illustrated in Figure 4.5 (d).

The participants' civic activity level varied. About one-third had written op-eds to newspapers or contacted a member of the Finnish Parliament (Figure 4.6). However, many of the participants had not been that active in the civic realm: most of them had not contacted an elected representative, for instance. Most of the participants (72%) had been active in online forums before, indicating that those who are familiar with online participation are more likely to find more ways to continue participating online, such as in crowdsourced policy-making.

The participant profile in the Finnish Experiment follows, in many ways, the demographic features of the population found to be generally active online. Participants were mostly men, as most Wikipedia contributors [46, 103]. The nature of the issue in the Finnish case on off-road traffic most likely created a stronger bias toward male participants than probably would have existed if the topic had been a more general one, such as a social security or taxation issue. Snowmobile riding is a male-dominated hobby and professions that use off-road traffic vehicles, such as the fishing and reindeer herding industries, are also male-dominated. Nonetheless, although women were the minority in terms of numbers, they were more active as idea producers on the crowdsourcing platform, as illustrated in Figure 4.7. The difference in idea production between genders is statisti-

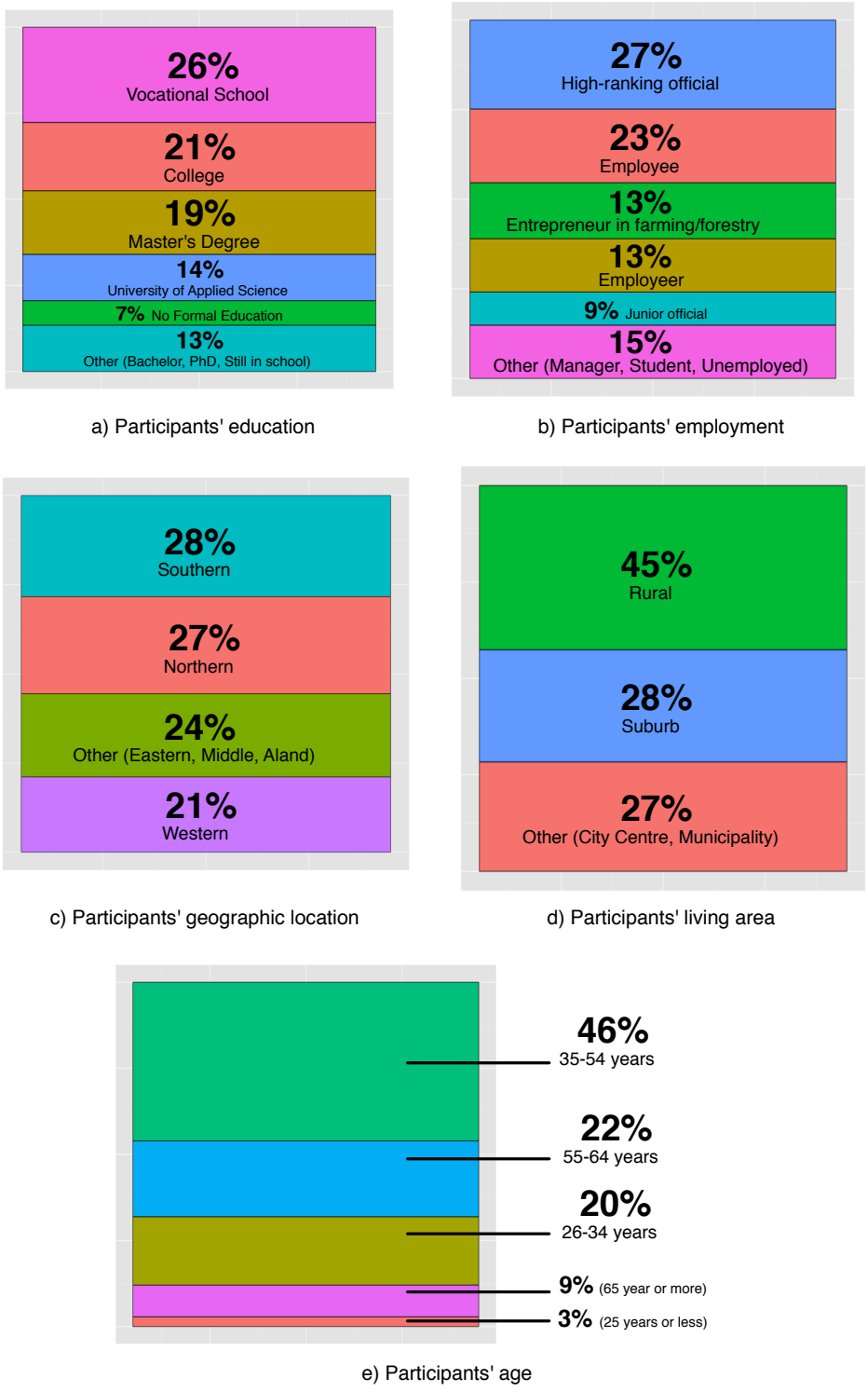


Figure 4.5: Participants' education, employment, geographic location, living area, and age

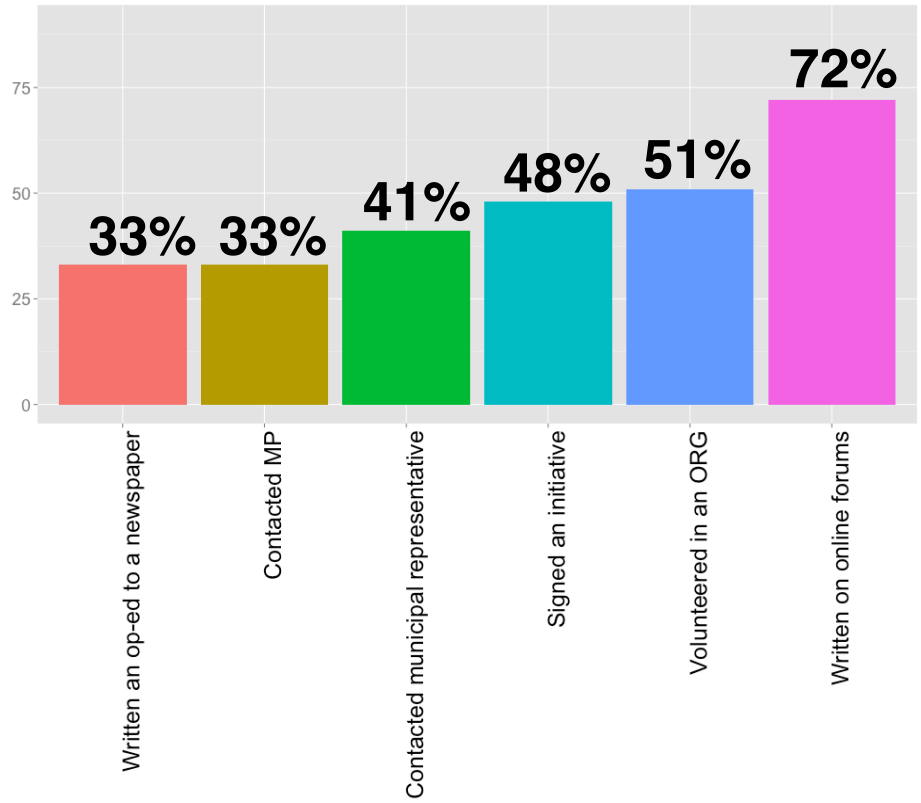
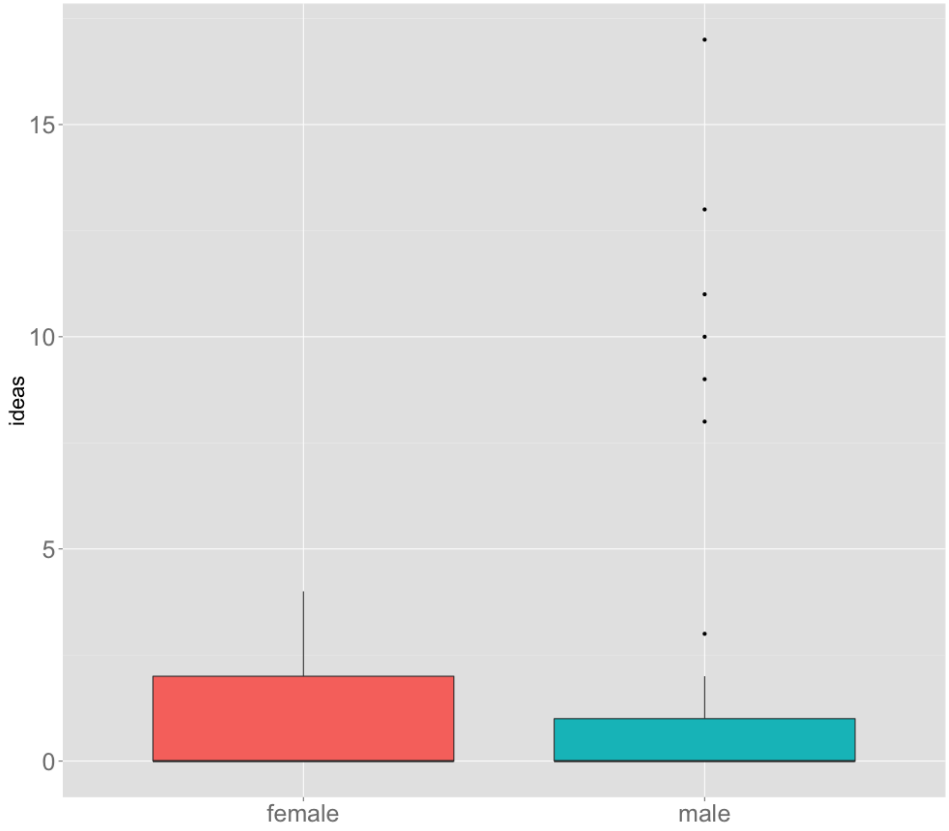


Figure 4.6: Participants' civic activity.

cally significant ($p = 0.012, \alpha = 0.05$). Women's underrepresentation in numbers was thus somewhat compensated by their higher level of activity.

There was no statistically significant association between any other variables and participants' activity in crowdsourcing. For instance, there was no association between activity in civic life and activity in the crowdsourcing process.

The participant crowd was educated and somewhat active in civic life, two characteristics that are predictors of more active Internet use [85], more active participation in online deliberation [10], and more active sharing of content online [104]. The participant crowd thus included the 'usual suspects' in online participation and civic life. The ones already active offline were also active online. However, most participants had not been actively contacting politicians or writing op-eds to newspapers. The crowd



Gender	N	Means
Female	25	1.04
Male	155	0.72

Figure 4.7 & Table 4.2: Participants' activity level by gender

was a mix of both civically active and less active citizens.

4.7 Discussion

This chapter examined the demographic features, motivation factors for participation, and expectations of participants in a crowdsourced lawmaking process we call 'the Finnish Experiment.' The crowd consisted of mainly male, highly educated, full-time working citizens, who shared a strong interest in the off-road traffic issue and had previous experience in expressing themselves on online forums, while they were also a mix of

civically more and less active citizens. Unlike several other types of participatory democracy practices, crowdsourcing can also attract people who are less civically active and may thus provide a new avenue to increase civic participation for those who have not been previously very active —at least among those who already use digital means for participation. This shows a promising aspect of crowdsourcing as a democratic innovation enhancing participatory democracy.

The crowd members had various ranges of expertise: there were regular citizens who enjoyed hiking and thus cared about the off-road traffic issue, and there were also professional influencers, such as lawyers from lobbyist groups. Interestingly, even though women were the minority in numbers, they produced more ideas than the men did. This shows how intensity of activity in online participation can offset sheer numbers and that minorities can shine in online environments.

The motivation factors driving the crowd's participation were seizing the possibility to influence the law, civic duty, and peer learning and deliberation. Willingness to influence the law was both an extrinsic and an intrinsic motivator. To the extent that the participation was driven by the goal to change the law to one's interest, for example, to gain more financial gain, the motivator was extrinsic. When the attempt to affect the law was done for sociotropic reasons (e.g., preserving the nature for future generations), it was an intrinsic motivation. Among the intrinsic factors, civic duty was a powerful motivation, as observed in other forms of political participation such as voting. The act of participation in this case of crowdsourced lawmaking was often seen as a moral obligation and, when performed, a fulfillment of civic duty. Peer learning and deliberation were also intrinsic motivations. These factors are similar to those observed in crowdsourced journalism, citizen science, and on Wikipedia. By contrast, however, the motivators in crowdsourced policy-making otherwise differ from those detected in other realms of crowdsourcing and large-scale online collaboration. Having fun, passing time, enjoying problem-solving, feeling creative, and advancing one's career were not the driving factors of

participation in crowdsourced policy-making. This indicates that participation in the Finnish experiment was experienced as primarily a political act. It was driven by a concern to protect the rights of individuals, groups, or a larger entity, such as nature, and a sense of civic duty. In this respect, crowdsourcing for policy-making differs from the other crowdsourcing initiatives that are often 'less serious' in nature, which emphasize creativity and intellectual stimulation or the practice of one's skills.

Participants in the Finnish Experiment perceived crowdsourcing as a channel for getting their voices heard and for presenting solutions to issues related to off-road traffic. Participation in crowdsourced policy-making is an act of grassroots advocacy, whether to pursue one's own interest or more altruistic goals, such as protecting nature. The crowd saw their participation as a way to attempt to make a difference, enabling them to pursue the change they want to see in the world. It is in part an instrumentally rational act to attempt to achieve a goal —by changing the law— that the participant cares about, similar in this to voting in elections. Participation was thus an empowering moment, providing citizens with the feeling of having a greater societal influence than with voting. Rather surprisingly, at the same time the crowd was also rather skeptical about its potential for influencing the law. The participants understood that policy-making is about consensus and compromises. Their skepticism —or perhaps realism— may also reflect the crowd's disappointment in the political system, in which the lobbyist organizations have excessive power in policy decisions and in which citizens' input is not welcome. The crowd's behavior is somewhat paradoxical: they participate even though they are not sure that they can make a difference. This suggests willingness to try and trust a new mechanism for participation as well as a desire for self-efficacy. It also shows the power of civic duty and other intrinsic motivations, contra certain rational choice theory predictions, and indicates that the crowd's behavior may rely on adaptive preferences or rationally irrational behavior.

The crowd's genuine hope, and ever so light expectation that they can make a difference should pressure policy-makers to use the crowd's input. If

the input is not used, there is a risk that crowdsourced policy-making will increase citizens' skepticism. The crowd experienced and enjoyed learning and deliberating in the process, even though neither the crowdsourcing process nor the medium was designed for such things. These aspects should be reinforced by designing crowdsourced policy-making processes and technologies that support learning and deliberation. The crowdsourcing technology should have as low threshold as possible for participation. The crowd in the Finnish experiment was mainly composed of working people with presumably very limited time to participate in the process. Therefore, the design of the crowdsourcing platform should enable an easy way to find and track the most recent contributions so that users can get involved in the process quickly. Finally, since the crowd wants to have an impact on the law (even as they realize it is unlikely), crowdsourced policy-making initiatives should be publicized in a way that emphasizes not just the possibility of having a say in policy, but the likelihood of making an actual difference. This means that politicians and official organizers need to make credible promises to take seriously the crowd's input and make public commitment that they will give a minimal account of why they chose to ignore that input when and if they ultimately do.

4.7.1 Limitations of the study

This study has several limitations. It is one case study based on a limited sample. The findings are thus not directly generalizable without testing them with larger samples in other countries and contexts, and in other types of process and technology designs. Those can affect on the profile of the participant crowd, and thus the motivation factors. In a very practice-oriented policy the factors that drive participation might be different from those for a policy that has more ideological dimensions, such as laws governing environmental conservancy or criminal laws. The profile of the participants can also affect the motivation factors. It may be that only this demographic group was driven by the motivation factors detected

in this study, and future research must aim for more diverse participant crowds to test the findings of the present study.

Chapter 5

Agora 2.0: Enhancing Civic Participation through a Public Display

with Gianluca Schiavo, Marco Milano, Tooba Nasir, Massimo Zancanaro, and Gregorio Convertino

5.1 Introduction

We have seen in previous chapters how in recent years, the use of Idea Management (IM) platforms where people can share, vote, and comment on ideas, has surged as a way of encouraging a more direct dialogue between the public administrators and the citizens. In addition to IM, large public displays have been used to support social interaction and promote a sense of community engagement in real-world scenarios, where the goal of their application is usually to foster the discussion of themes of interest for the general public or specific communities (e.g. [158, 172, 201, 215, 216]).

As we have mentioned at the end of Chapter 4, these democratic innovations —that is, processes and tools designed to increase and deepen citizen participation in political processes [204]— should foster the con-

struction of civic participation spaces where all sectors of the population are represented, youth and seniors, poor and rich, activists and civically inactive citizens.

This chapter presents one of our tools designed to involve the largest possible sector of society in technology-mediated civic engagement process. Agora 2.0 is a platform composed of two equally relevant features: an online system for proposing, commenting, and voting ideas based on IdeaScale (presented in Section 3.2) and an interactive public display deployed in a public space that is relevant to the community, a public relations office. The aim of the design is to combine the advantages of online and onsite technologies in one platform to grant ease of public access and promote civic participation. The main contributions of this chapter included:

- The design and the development of a civic platform characterized by two entry points: an online website and an onsite interactive public display;

- Findings from a pilot deployment in a university setting and a realistic deployment in a public setting, where the system was used by actual citizens and their public administration.

5.2 Design and Developed of Agora 2.0

Our research approach was inspired by the Interacting Places Framework [158] and encompassed the exploration of three research challenges, namely:

1. Identify the stakeholders involved;

2. Identify and design a suitable instrument for Agora 2.0;

3. Understanding the factors affecting the citizens' usage of Agora 2.0.

5.2.1 Requirement Analysis

As proposed by Alt et al. [12], we decided to ground the requirement analysis of Agora 2.0 in common practices surrounding public notice areas relevant for the civic life (like notice boards, event displays and wall hangers) and on the way in which citizens engage with the public administration. The purpose of this initial research was to inform the design of Agora 2.0, to identify the possible interlocutors and to determine a physical location for the deployment.

The research started off with a field study in the city of Trento where we collected photo logs and interviews to investigate current engagement practices around traditional public displays used for community communication (e.g. in the municipality buildings, city hall, public library and public squares).

Consistently with prior studies [12, 117], our investigation pointed out that areas of public boards are characterized by a strong interplay among the location in which they are deployed, the stakeholders (content viewers and providers) and the information displayed. The local community largely uses public notice boards to post information, advertisements and news (Figure 5.1), but they primary serve as tools for conveying unidirectional information, making it impossible for citizens to give feedback or collaborate.

When examining municipality buildings, we found that the facilities did not provide clear means for citizens to share ideas or discuss matters of public interest. The only means for citizens to give suggestions and provide feedback to their political representatives were suggestion boxes and face-to-face interactions with the staff.

Motivated by this, we investigated more in detail the activities of the public relations office (URP, Ufficio per le Relazioni con il Pubblico) of the City of Trento, Italy. As part of the city's communication service, this office is in charge of improving and simplifying communications between the citizenry and the administrative staff by providing a wide range of services,

Figure 5.1: Two pictures from the introductory field study: notice boards are common informational tools adopted by citizens (left) and newsagent's boards are non-interactive public displays that attract the attention of passers-by (right)

for instance, receiving and handling citizens' complaints and supplying information on municipality activities.

We interviewed the URP staff investigating their role and activities in the relation between the citizens and the municipality. The aim was to understand how Agora 2.0 would fit into the URP staff duties and if it was perceived to be a useful integration to the set of tools available to those very people who have to daily liaise with the public on the behalf of the City Council. The meetings with the URP's staff highlighted the interests and the needs that the administration would like to push forward with the use of Agora 2.0. The public administration appeared interested in giving better channels for citizens to create and respond to survey on relevant topics and allowing the results to be displayed for public discussion but was also keen on making explicit that no further action would be required on their behalf. The administration was also willing to explore new tools that could call for helpful ideas from citizens or collect their opinions regarding specific issues.

On the basis of these requirements, we designed Agora 2.0, a system that allows the public administration staff and the citizenry to post polls

and gather opinions about local issues through questions that are answered online or onsite.

5.2.2 System Design

The results from the field study and the interviews guided the design of the Agora 2.0 platform. The platform extend IdeaScale (see section 3.2), which is a commercial Idea Management software that allows organizations to let their community of employees or customers to propose, rank, discuss, and vote for ideas. Similarly, in a civic setting, citizens and administrators can use this type of platform to post and select ideas as a community.

In order to aid this new form of large-scale civic deliberation, we developed a new prototype for extending the Web-based IdeaScale platform. According to our design, citizens can contribute, comment, and vote for ideas online via the original IdeaScale website. In addition to that, people can vote for the ideas that were posted online, also on the public display. However, the public display does not support posting of new ideas, as new ideas can only be posted online due to technical limitations. Figure 5.2 outlines the system architecture of our platform.

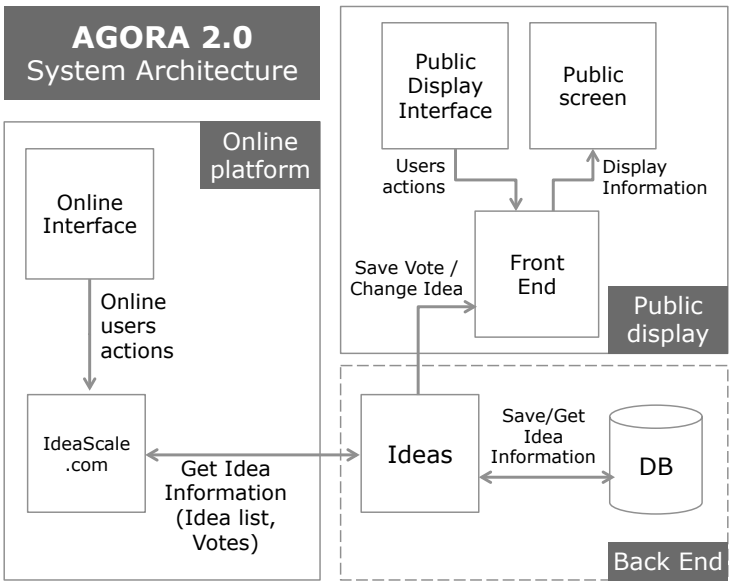


Figure 5.2: The Agora 2.0 system architecture

Interface Layout

In order to design the interface, guidelines for public display interface development were followed [12, 117].

The interface should appear familiar to common public and be consistent through all of its states. The responses of the system should be helpful for the user and the system should be easy enough to use even for people that may not be proficient in use of computers. Since the aim was to allow access to a wide range of population of the city, the system would need to be self-explanatory, in order to support all of the above points. The initial mock-ups of the system were basic and depicted a newsagent board. This design choice was informed by the fact that news agent boards are popular non-interactive public displays that attract the attention of citizens passing by, as revealed by the field work study. These existing boards use a visual style that is common, clear, and minimalist in helping readers to quickly identify the main headlines. The display area was then arranged similarly to a newsagent board and the interface was designed with a big header and large fonts in a way that is visually different from a traditional computer interface. For a situated display, it is also important that the interface is not only attractive to the public, but it presents all relevant information, about the system itself as well as its use, in a concise and clear manner. To address these issues, the instruction on how to vote and a side bar with information about the project were included in the interface (Figure 5.3) in the final design.

Interaction

Previous studies [11, 201] have reflected on the types of interaction employed that would aid in the communication between users and the public display. These works involved the use of either a touchscreen or a mobile device as the input method. Due to technical constraints and feasibility, the use of a touchscreen display was not possible. Although most citizens have a mobile phone, the use of mobile devices as interaction method

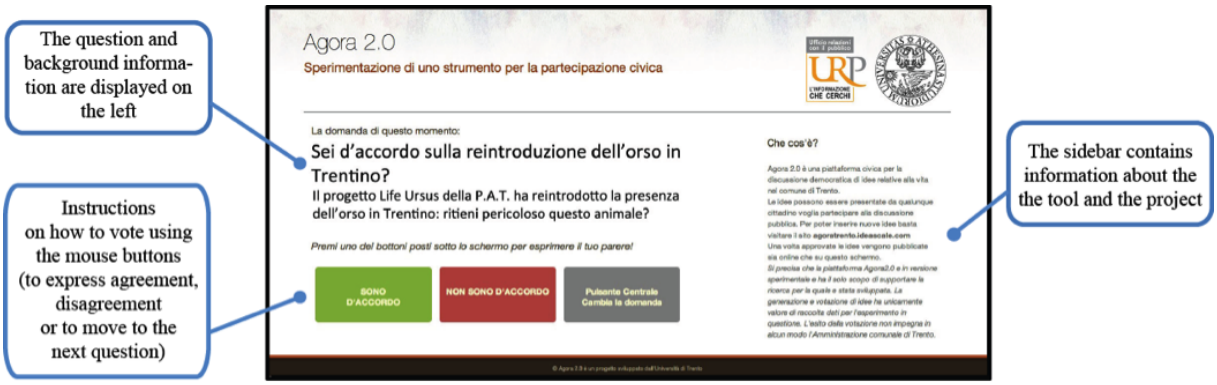


Figure 5.3: The public display interface contained three main sections showing the question, instruction and side information. As input device, a user would use the buttons of a mouse placed next to the screen

was seen as a potential complication in the use of the public display [216], which was going to be used by people from all spheres of life and ages. Thus the idea of using mobile phones for an interaction technique was also eliminated in favor of a more inclusive way of interaction. For easiness of use and of implementation, we decided to make people interact with the public display through buttons of a classical mouse, offering a basic and low-entry barrier method of interaction.

A mouse was then fixed right next to the public screen and the buttons were color coded to match the possible choices on the screen and to make the voting task even easier (see Figure 5.4). The left-most button, colored in green, was assigned to express agreement with the question, the right-most one, colored in red, to indicate disagreement and the middle button was used to skip the question.

Furthermore, in order to discourage manipulations in the voting process, after a vote was cast the system would display a random question out of the set of all the possible questions stored. This strategy, suggested also by research in social data collection [199], was meant to prevent possible manipulations from users, given that respondents could not choose which ideas they will see but, instead, this choice was made randomly at the system level.

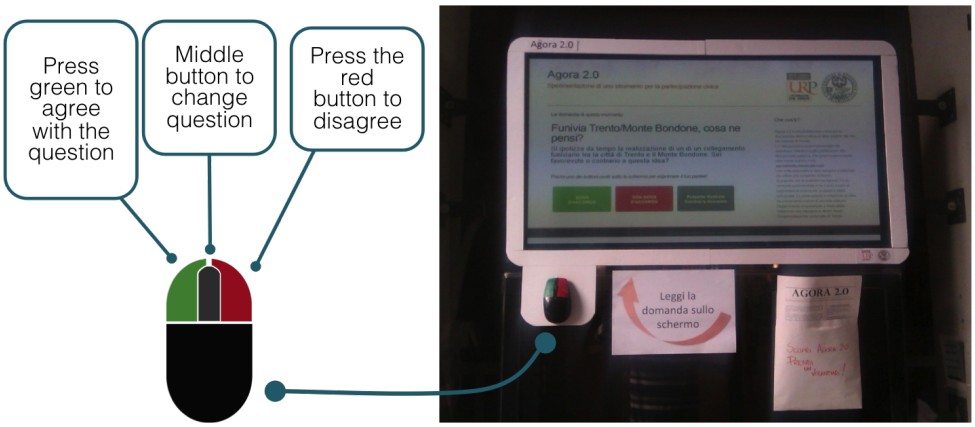


Figure 5.4: Mouse with colored buttons to foster a low-entry barrier method of interaction

5.3 Deployment of Agora 2.0

5.3.1 Pilot Deployment in an University Setting

The development process was informed by a parallel formative evaluation: the public display was deployed for 7 days in the hall of the Department of Computer Science at the University of Trento (Figure 5.5), where the system was used by the university community. The population addressed in this pilot study was mainly composed of university students, faculty and staff. During the pilot study, which was the first occasion to evaluate Agora 2.0, a researcher was regularly present to observe the behavior of individuals around the public display. The researcher assessed the level of involvement directed towards Agora 2.0 using an observation technique, called micro-shadowing [214]. For each passer-by, his level of involvement exhibited was measured by recording if one of these behaviors occurred:

- *Ignore*, if the person completely ignored the display;
- *Glance*, if the person glanced the display in some noticeable way;
- *Stop*, if the person stopped in front of the display to look the content displayed;
- *Vote*, if the person eventually interacted with the system and voted for an idea.

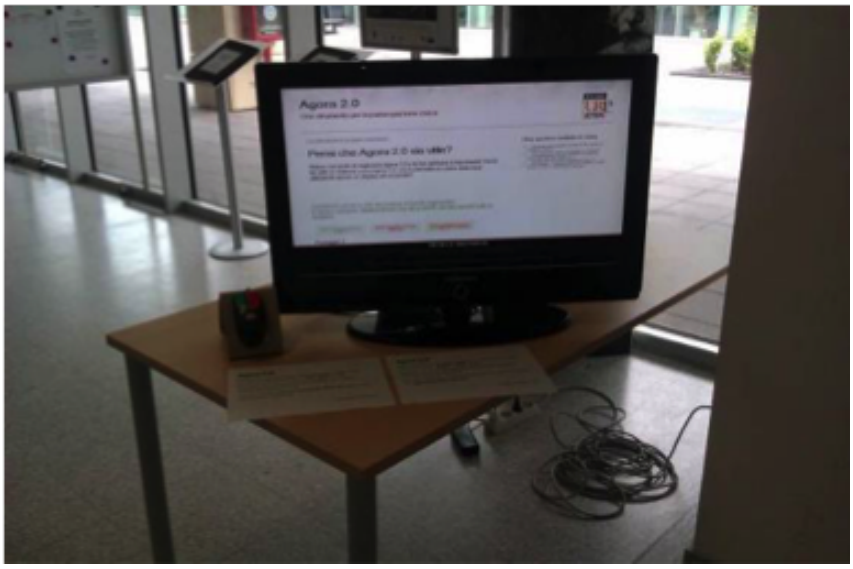


Figure 5.5: A first prototype of the public display of Agora 2.0 during the pilot study at the University of Trento

Results

During the pilot deployment, a total of 2225 people were observed and 100 of them (4%) interacted with the system (see Table 5.1). The observed level of participation is consistent with those reported in other studies [102, 117, 214] and gave an important insight into the degree to which the student community reacted to Agora 2.0 public display.

Table 5.1: Distribution of levels of involvement of 2225 passers-by in response to the public display during the pilot study

Level of involvement				
Ignore	Glance	Stop	Vote	Total
1398	558	169	100	2225
(63%)	(25%)	(8%)	(4%)	

A total of 575 votes were collected through the system. A deeper analysis, which considered the time when the votes were collected, showed that during two different days, when the researcher was not on site, the number of votes were higher (about 50 votes in one single hour), suggesting a

potential misuse of the system.

People who interacted with the display were interviewed in order to gather their comments and opinions on the Agora 2.0 platform, its interface and the interaction technique.

Users' feedback led to following improvements and tweaks to the prototype: adding support for skipping questions and providing background information to the displayed idea.

During the pilot deployment, a total of three users entered the online community and posted six new questions, all related to the student life. Given the limited of the pilot study, the overall participation to the online community was encouraging about the usability and utility of the Agora 2.0 prototype.

The results of the pilot study helped us to plan a longer field deployment of Agora 2.0 in a public space located in the city of Trento's city center.

5.3.2 Field Deployment in a City Setting

A field study was conducted to assess how regular citizens would interact and respond to Agora 2.0. The system was deployed at the foyer (entrance) of the URP office of the City of Trento (see Figure 5.6).

The hardware consisted of a computer connected to the Web, a 47-inch display that was already situated at the venue and was facing the office's surrounding and the mouse used for interacting (see Figure 5.4). Before this study, the screen was rarely used by the office and thus turned off. The foyer consists of a public passage that connects two main city roads as well as gives access to many public offices that have their entrance around this area. Agora 2.0 was made available on weekdays from 9am to 6pm, during the URP office hours, for 20 working days over a full month. Concerning the content of Agora 2.0, we agreed with the URP staff on initially publishing 5 ideas all related to local civic issues and that would be posted both online and onsite. The ideas were phrased as yes or no-answer questions and were presented along with a description of the context of the debated issue.

Figure 5.6: Agora 2.0 at the URP foyer. The left side of the figure shows the screen, the mouse and the leaflets containing information about the project.

The evaluation data included:

- Usage data and system logs both from the public display and the online platform;
- Observations and notes from the field, following an observation reference schema;
- Semi-structured interviews to both users and passive-users (i.e. people who stopped to look at the display but who did not interact). The interviews investigated the demographic of the user, their civic engagement experience and the motivations for interacting (or not) with the system.

Results

In total 290 votes were cast on the public display by approximately 250 users, with an average of 14 votes per day. The five questions received an average of 58 votes and the 'change question' button was pressed quiet often compared to the vote collected (on average 26 times per question). Table 5.2 summarizes the results of the deployment at the URP of Trento.

Table 5.2: Ideas phrased as questions in Agora 2.0 and the votes

Question	Votes	Agree	Disagree	Skip
1. What do you think of the cable-car plans for connecting Trento and Sardagna?				
	58	36 (62%)	22 (38%)	29
2. Do you agree with the reintroduction of brown bears to Trentino region?				
	63	38 (60%)	25 (40%)	31
3. Do you think that shops should remain open on Sunday?				
	51	30 (59%)	21 (41%)	18
4. Are you able to recycle your waste correctly?				
	66	46 (70%)	20 (30%)	24
5. Did you like the topic of the last edition of the Festival of Economics hosted by the City of Trento?				
	54	25 (48%)	27 (52%)	30
Total votes: 290				

During the deployment of Agora 2.0, the URP staff took note of the number of people who physically come to the office, reporting a total of 1074 citizens. This information gave an estimation of the number of citizens who visited the office at the time of the deployment. Field observations indicated that passers-by were mainly middle-age citizens, between 20 and 50 years old, and the distribution of gender was almost equal.

A total of 15 people agreed to be interviewed: 9 of them interacted with Agora 2.0 while the remaining 6 were passive users who devoted attention to the public display but eventually did not interact with it. Four respondents were under 20, four between 21 and 40 and seven were over 40. None of the respondents was vigorously engaged in the political life at the time of the interview nor did they consider themselves very involved in civic participation.

The total number of users who accessed the Agora 2.0's online version (i.e. the online community on IdeaScale) was very small: only two users signed in on the online platform, voting for the ideas present but without posting new ones.

5.4 Discussion

In this research, the pilot study in the university setting served mainly the purpose of refining the design and preparing the platform for the longer deployment in the city setting. This second study, at the office for public relation of the City of Trento, provided a number of useful insights into how general public would or could use Agora 2.0, given a public space and a large community. While the two deployments had different goals, the findings from the field observations and the interviews made during both studies helped us to identify key factors that influenced the citizens to use or not use Agora 2.0. We discuss them in this section.

5.4.1 Why did People Use Agora 2.0?

The field study highlighted three factors that had influenced citizens' interaction with Agora 2.0.

The interaction method

The people interviewed during the deployment in the city setting were not heavy technology users and preferred other ways (face-to-face or telephone call) to interact with the City's administration rather than online tools. Nevertheless, the large majority of those interviewed found the system easy to use and enjoyable. Consistently with the findings of previous studies [216], a simple interaction method for placing votes was a good entry point that encouraged participation. The interviewed voters agreed that the system was accessible and easy to use, even if they were not used to the interface with a mouse at the bottom of a large screen. From our observations, citizens were never discouraged from voting because of a difficult interaction with the mouse.

The deployment in the city confirmed that the main issues related with interface design of the public display had been addressed: the interface was intuitive and self-explanatory. Respondents agreed that the infor-

mation was presented in a clear and concise manner, resulting in a good readability. Moreover, the interface layout and text sizing were effective in guiding users' attention to rapidly parse the content on the screen, i.e. the content of the idea displayed and the instructions to interact with the system and vote. Users appreciated the possibility to find information about the project in the display and in the leaflets, for later reading.

About the voting behavior, we observed that citizens tended to vote for more than one question, continuing to vote as long as a new question would appear on the screen.

Differently from the pilot deployment, misuse was not a problem observed during the city deployment. The strategy adopted to discourage users who wanted to vote multiple times a specific question proved successful. The field observations suggested that nor children neither adults interacted with the display just for fun: the physical location of the screen, the URP office, and the presence of other adults were effective in preventing misuse of the device by children, for example, who could have played with it.

Voting in Groups

We found that many people approached the display in groups of 2-4 people (about one-third of total observed interactions). Before starting to interact with the display, they would usually talk to each other about the topics presented (see Figure 5.7). Since only one person could interact with the system at a time, we observed that the members of the group tended to rotate and take the role of voter in turn. Interestingly, whenever a group approached the display, almost all the members interacted with Agora 2.0 and took the voter role. This group behavior, named role rotation, has been observed in studies of the interaction with public displays [17] and it gains a particular importance in the context of civic participation. Whenever a group discussed on how to vote to a particular question, role rotation tended to occur so that all the members were given the opportunity to

interact. The group members would then vote either on behalf of the group or for themselves.

Figure 5.7: A user (left) and a group of users (right) interacting with Agora 2.0

Specifically, the most frequent interaction pattern observed was the following: one member of a group would read the topic to the other members, a short discussion within the group would follow along with the decision on agreeing or not, and eventually one member would interact with the display to submit the vote. Usually, the group would continue to talk about the topics after the members submitted their vote.

Interest to the topic

Among the citizens interviewed, people who voted reported that they were motivated mainly because they were attracted by the topic of the question displayed (N=6). If the passers-by noticed the display, then they would approach the screen, read the questions and submit the vote(s). Less frequently, people approached the displays just because they were attracted by the technology (N=2) or because they were guided by the notice boards (N=1).

Analyzing the votes collected (see Table 5.2), we found that for four out of five polls the citizens mainly agreed with the questions (questions 1, 2,

3 and 4), while for one poll the number of agreement and disagreement votes were roughly equivalent (question 5).

Overall, positive votes were slightly higher than negative ones, suggesting a tendency of the users to agree with the question displayed. A similar trend was observed in a prior study [216]. This could be the result of different phenomena: the systematic tendency for citizens or study participants to please the asker (in this case the public administration), tendency to agree to any statement (acquiescence bias), and social desirability. These are known biases in psychometrics [94]. This finding suggests that systems such as Agora 2.0 could be used to measure (and account for) this type of bias using control questions: e.g. using positive and negative variants of the questions. Another key factor that could have contributed to the pro-agreement bias is that some people implicitly "voted with their feet": i.e., those who disagreed with the question simply skipped the question or ignored the system rather than giving an explicit negative vote. This type could be measured by comparing the level of participation across different questions. Interestingly, the questions with the highest number of negative responses (questions 2 and 5) were also characterized by the highest occurrences of skipping (31 and 30 times, Table 5.2). Conversely, the question about recycling (question 4) collected the highest number of votes (N=66), the highest percentage of positive votes (70%) and it was skipped less frequently (24 times, Table 5.2). The higher total number of votes suggests that the population of users considers the topic more interesting.

Therefore, these findings support the idea that while collecting votes (onsite and online) in the long term, Agora 2.0 could also be instrumented to build a profile of the biases and interests that is specific to a given community.

5.4.2 Why People did Not Use Agora 2.0?

From the field notes and interviews with non-users (N=6), we identified some key factors that may have led some people to not use (or stop using)

the system.

Location

The location provided both advantages and disadvantages to the field study. Agora 2.0 was deployed in a place that was really at the heart of the civic life, especially considering the proximity to the main local office that acts as the primary link between citizens and the city administration. For the people who noticed Agora 2.0 and understood its purpose, it was natural to find such tool in that location.

A major drawback was the vicinity with other offices related to the local administration, like the city's tourist office, that attracted people who were not interested to the questions presented via Agora 2.0. A second disadvantage lied in the position of the display. The display used for Agora 2.0 was not fully visible from outside the foyer and thus the potentially number of users might have been reduced. Moreover, the protection glass placed in front of the display caused a glare under strong light conditions, making difficult to see the content displayed. These issues were not observed in the pilot evaluation since the system was deployed in an indoor area mainly frequented by students.

The location had thus an impact in the two deployments not only by its relevance to the community but also by its physical characteristics.

Disinterest and Voter Fatigue

Some of the users who noticed Agora 2.0 were not interested in the questions displayed and thus did not vote (N=3). This happened mainly with people who were not citizens, such as tourists or non-local students.

Differently from the previous point, in this case users have noticed the display and subsequently found no interest in the topic.

Other citizens preferred not to vote because they did not believe that the administration would take their vote into serious consideration (N=3). As reported by Tailor et al. [216], providing a real-time feedback (i.e.

immediately display the results after each vote is cast) might affect the system's credibility encouraging participation and willingness to respond.

In our investigation, none of the people interviewed raised concerned about the lack of a real-time feedback but they however had expectations of a concrete commitment from the public administration. The fact that Agora 2.0 was deployed close to the city administration offices might have lowered concerns about an immediate feedback while raising expectation on a concrete response by the administration. In order to prevent voter fatigue, the administration should consider short-term actions on the basis of the poll results and should state in advance what actions they might take.

Low Participation by Online Users

The online participation was lower than expected and did not allow us to compare the usage of the online version of Agora 2.0 to the public display-based version. Such a low participation may be related to resistance to e-voting [173], low Internet literacy or simply low awareness of the online website.

It may also suggest that civic participation can be supported more easily in the public space while an online tool would require more time to be advertised and a more efficient promotion campaign both online and onsite. In fact, the online platform, based on IdeaScale proprietary software, was mainly promoted through leaflets made available at the public display's location and through a Facebook Page connected to local blogs and websites related to the Trento's city life.

The low participation via the online website was also the result of additional constraints that must be managed when deploying a system in a civic setting. These include the legal constraints that regulate non-for-profit collaborations between a local government, such as a city administration, and a private firm. Moreover, there are internal legal obligations of the public relation office (the URP office) to monitor any onsite and online activity in-

volving their official endorsement. While receiving excellent support from a city and a firm, we learned that these constraints call for more work for better addressing the legal aspects.

5.4.3 Final Remarks

We designed Agora 2.0, an online and onsite platform running an idea management system, to empower both citizens that privilege remote interaction via the Internet and those who prefer face-to-face interactions when engaging with local government administrators. We presented the insights about the advantages and pitfalls of an Agora 2.0-like system for e-government and civic participation that we gathered from a pilot and a field study evaluations.

The interactive public display seemed a promising interface for including a broader portion of the citizens population that might otherwise be left out from civic discussions. Overall, our study found that a public display deployed in a location central to the local political life of a city, can play a valid role in enhancing civic participation. The content of the topics and the type of interaction offered to citizens, have proven to be two critical factors that must be taken into account in designing a participatory tool like Agora 2.0. Our findings highlight the importance to choose topics relevant to the local community and to provide an easy way to interact with the voting system. Adopting a question format for addressing civic issues and providing a simple and engaging method for interacting with the system have therefore proven to be successful in promoting public involvement with Agora 2.0. The findings of the study confirm that factors as credibility, design and location of voting systems have an impact on the use of these technologies [216]. Furthermore, the deployment of Agora 2.0 and the field observations have demonstrated that a public display can consistently support the interaction of groups of individuals and trigger in-situ group discussions about local civic issues.

Our initial goal was to merge online and onsite civic engagement activi-

ties by integrating online and onsite technologies in one platform. However, we did not observe the expected synergy between the uses of the onsite public display and the online community platform. Since the latter was not active enough, we cannot draw any conclusion regarding this aspect of our research, as this subject will be a focus point of our future studies to explore the differences between the online site and the onsite tool interaction.

The deployment of Agora 2.0 in a real-world scenario through a public display-based system proved an exceptionally valuable opportunity to work along with a public administration office and offered both parties useful insights for future collaborations. The Trento's URP office appreciated the positive outcomes of the study for what concerned on-situ citizens' engagement via an interactive public display and expressed their interest in continuing the collaboration with us in the near future.

The comparison between the pilot and the field evaluation led to some insights about the effects that the two different settings, the university and the city public office, had on the results. The differences in the communities and in the physical locations affected the adoption of Agora 2.0: in the university setting, we observed greater levels of adoption for both the display and the online community compared to the city deployment. The age and technology literacy of the student community were likely facilitators of the greater adoption of the web site. The location of the public display, the high-traffic area, favored its use.

In addition to the properties of the community and the system's physical location, the topic of the questions was another key factor in determining whether the citizens would interact or not with the system. Questions with an interesting topic can in fact motivate passers-by to interact with Agora 2.0. Giving to the citizen the possibility to post their own ideas could result in a larger number of potential interesting topics in the system. In a future deployment of Agora 2.0, we plan to explore if citizens would respond equally to questions provided by the public administration or by other citizens or peers, investigating differences in participation and voting

patterns.

Chapter 6

Idea Management in Social Network

with Florian Daniel, Fabio Casati, and Luca Cernuzzi

6.1 Introduction

As we have mentioned in Chapters 1 and 3, contributions of participants to provide valuable ideas are key in the successful of Idea Management (IM) initiatives because the larger the community of participants the more chances exist to the emergence of diverse views; more diversity increases the chances of producing valuable ideas. However, as we also already mentioned in Chapter 1, previous research reported that engaging large number of people in online communities is not an easy endeavor [130]. Low rates of participation not only threaten the survival of the innovation communities but also reduce the chances of IM organizers to discover promising ideas, novel opinions and innovative knowledge that can potentially contribute to achieve better outcomes. A low turnout can be even worse in cases of IM for civic engagement, like the Icelandic case, since it may undermine the value of the outcome and discredit the entire process.

Recognizing the difficulty of attracting people to contribute in communities that support IM initiatives and understanding that most organiza-

tions from different sectors (business, non-for-profit, governmental) have been striving to grow active communities in Facebook [227, 176, 157], in this chapter, we introduce an approach that helps organizations to conduct IM in Facebook, enabling them to harvest ideas from their already established Facebook communities. By bringing IM closer to Facebook, the goal is to increase the chances of enlarging the pool of contributors and thus the diversity of perspectives and value of ideas. We define a method that allows carrying out IM tasks (i.e., innovation problem submission, idea suggestion, voting, commenting, moderation, and content processing) through Facebook features. The proposal was tested through two independent studies looking to i) understand its effectiveness in helping organizations to capture valuable ideas from their Facebook communities; ii) discover the suitability of Facebook's features to instrument IM; iii) learn if conducting IM in Facebook actually helps to increase participation.

6.2 Features of Idea Management Systems

A study conducted by Hrastinski et al. [115] on state of the art technologies to support IM showed that IM systems share among them a common set of features. Most of the reviewed tools show to possess features for problem submission, i.e., functionalities that allow organizations to formulate problems and define campaigns through which ideas are collected to address problems. The investigation also found that as part of the problem definition, IM systems allows the creation of ideation categories, which are areas or aspects of the problem that organizers want to focus the discussions on.

A rather common set of characteristics present in the majority of IM systems are features to submit ideas as the way to propose solutions to the problems. The submission can be done within the predefined categories or openly. In addition, IM systems usually offer, according to Hrastinski et al., evaluation functionalities to assess the quality of ideas and solutions through structure feedback mechanisms, like voting (e.g., like/dislike, agree/disagree) and by using more flexible methods such as

text-based comments. The research highlighted that comments represent also opportunities for collaboration among users who used them to share topic-related knowledge.

Synthesizing the stream of information generated during idea campaigns is one of the most serious challenges in IM. In fact, Hrastinski et al. confirms that most IM systems today are equipped with tools that help organizers to handle, process, and synthesize the information generated during idea campaigns. Although not reported by the study, we found that more and more IM systems are equipped today with tools to moderate discussions, e.g., content flagging, abuse and duplicate reporting; IdeaScale (see 3.2) and Crowdicity (`http://www.crowdicity.com`) are representative examples.

6.3 Facebook

Apart from its popularity (it has more than one billion active users as December 2015[1]), Facebook provides a series of features that can be exploited to instrument IM tasks. The following does not pretend to be an exhaustive guide to Facebook but a brief presentation of features that we consider relevant for IM.

A recent report from the company mentions that today more than 50 millions small businesses are using Facebook to communicate with their customers and to establish and strengthen relationship with them[2]. Normally, organizations mark presence in Facebook through institutional profiles, so called Facebook pages. From these spaces, page managers can make use of Facebook's input features to generate opportunities of communication by creating multimedia entries known as posts, i.e., textual publications enriched with images, emoticons, videos, and links to external resources.

Posts within Facebook represent the main form of content contribution.

[1] `http://newsroom.fb.com/company-info`
[2] `http://on.fb.me/1YX0l42`

Users report brief personal status messages through posts, upload photos and videos via posts, or write messages to their friends' news feed by using posts. They constitute also the central unit of participation as textual comments and replies to posts are the main means of interaction among users. By commenting posts and by replying to comments participants collaborate with each other providing text-based unstructured feedback on others' contributions.

Structured and non-verbal feedback can also be given in Facebook through the thumb-up button enclosed into posts. The 'like' button is commonly used to agree with someone else's publication, either comment or personal post (at the moment this work was conducted the like button was the only possible form of providing structured feedback to posts).

Pages can label their posts with actionable hashtags —clickable words or unspaced phrased preceded by the hash character '#'—. This, apart from giving context to the post and helping to indicate the audience that the post is part of a larger conversation, facilitates the localization of the content. By clicking on hash tags or by asking the search engine to look for hashtags, people can easily discover all posts labeled with the interested hashtag and access to the entire conversation.

Managers may need to intervene in conversations originated within their pages. For such situations, Facebook offers tools to moderate discussions. Inappropriate messages can be excluded from the conversation by hiding comments or by marking them as spam. Authors of spam or inappropriate messages can be blocked preventing further participation. In addition, managers can take less extreme actions and cajole participants for compliance by directly commenting their messages through the reply-to-comment feature.

6.4 Idea Management in Facebook

We define a method that allows carrying out IM tasks through Facebook functionalities. A discussion of the rationales that guided our proposal is

presented in the remainder of the section.

Facebook pages represent a promising tool for organizations to engage their already established communities of members/customers in IM initiatives. From there, page managers can leverage Facebook's multimedia input features to formulate innovation problems. By including images, videos, and links to external resources, page managers are able to create rich and almost limitless[3] posts that call for solutions to problems. We propose therefore to carry out the *problem submission* capabilities of IM systems by creating Facebook posts that seek to involve Facebook communities in idea campaigns (from now, idea campaign posts).

In the realm of Facebook pages, conversations and discussions unfold through comments attached to posts published by the page managers. Posts keep the "history" of their own comment threads. This, apart from allowing people to engage in asynchronous conversations (they can join and leave whenever it is more convenient to them), represents a reliable alternative to structure and host idea campaigns. *Idea submission* functionality of IM systems can thus be instrumented by requesting participants to submit proposed solutions by placing comments to idea campaign posts.

Facebook's "like" offers a straightforward and effortless mechanism to instrument the *evaluation* of ideas. Participants can therefore express their agreement with the ideas by liking the comments that contain them. The *collaboration* capabilities of IM systems can be implemented through the reply-to-comment feature of Facebook that allows users to directly reply to a comment.

Participation to IM initiatives may need to be moderated and guided toward the goal of the initiative. Critics, complaints, spam, cheats, and low quality contributions are miss behaviors that commonly appear in online communities and can undermine the entire IM initiative [130]. *Moderation* of IM can be achieved in Facebook by the features of blocking, content hiding, and reply-to-comment.

[3]Sixty-three thousand characters limit the textual contents in Facebook:
`http://mashable.com/2012/01/04/facebook-character-limit`

Table 6.1: Mapping of IM features to Facebook features

IM Feature	Facebook Proposition
1. Problem submission	Define problem through multimedia input features. Place the definition into a post published by the organization Facebook page and labeled with hashtags that identify the campaign launched to collect proposed solutions (idea campaign posts, from now)
2. Idea submission	Place comments to idea campaign posts
3. Idea evaluation	Like and reply to comments that contain ideas
4. Collaboration	Reply to comments that contain ideas
5. Moderation	Hide inappropriate comments, block bad behaved participants
6. Processing and Synthesizing	Search posts labeled with the campaign hash tags

Fully instrument IM high-profile methods for content *synthesizing and processing* with Facebook features will be challenging, however, we understand that the combined use of hashtags, to label idea campaign posts, and search engine, to access the labeled information of the campaigns, can facilitate these tasks. Table 6.1 summarizes our proposal to map IM features to Facebook functionalities.

Figure 6.1 presents the method in action. The innovation problem is submitted via a multimedia post created to launch the idea campaign (1). The post, written in Spanish, contains a short text call to action at the top: "*Respondé a la consigna usando el hashtag [...]*" (Answer the question with the hashtag [...]). Below the introductory text, an image with more details about the campaign is presented. In particular, the image tells the actual question to be answered "*Si pudieras diseñar nuestra casa, ¿cómo sería?*" (If you could design our house, how would it be?), mentions the rewards for participation "*Sortearemos dos entradas para la cena TABOR*

entre todos los participantes" (We will raffle among the participants two tickets for the dinner of TABOR), and explains the mechanisms of participation, i.e., submit ideas by commenting the post, cast votes by liking the comments that contain ideas, place opinions on others' ideas by replying to the comments.

After the campaign launching, the flow turns to the organization's Facebook community (Movimiento Peregrino in this case) who can learn about the campaign through their news feed. From then and until the end of the campaign, they can submit ides by commenting to the campaign post (2). Also, they can contribute by using the like functionality to agree with the comments that contain ideas (3, 4). Page managers can take part in the discussion by, for example, replying the participants thanking for their contributions (5). People can get engaged in the campaign not only by liking the proposal but also by participating in thread comments (6).

6.5 Experiments

Our main goal is to evaluate the effectiveness of the method to help organizations in approaching their Facebook communities and capturing valuable ideas that can lead to innovations. We also aim at understanding to which extent Facebook is suitable to instrument IM tasks. In addition, we want to learn whether bringing IM to Facebook increases participation in relation to known rates.

6.5.1 Method

To study the effectiveness of the method to capture valuable ideas, we partnered with two organizations, which were interested in gathering ideas from their Facebook communities. The method was explained to each organization and they were asked to employ it for i) submitting campaigns to collect ideas; ii) instructing their communities on how to contribute; iii) moderating participation; and iv) processing the content generated during

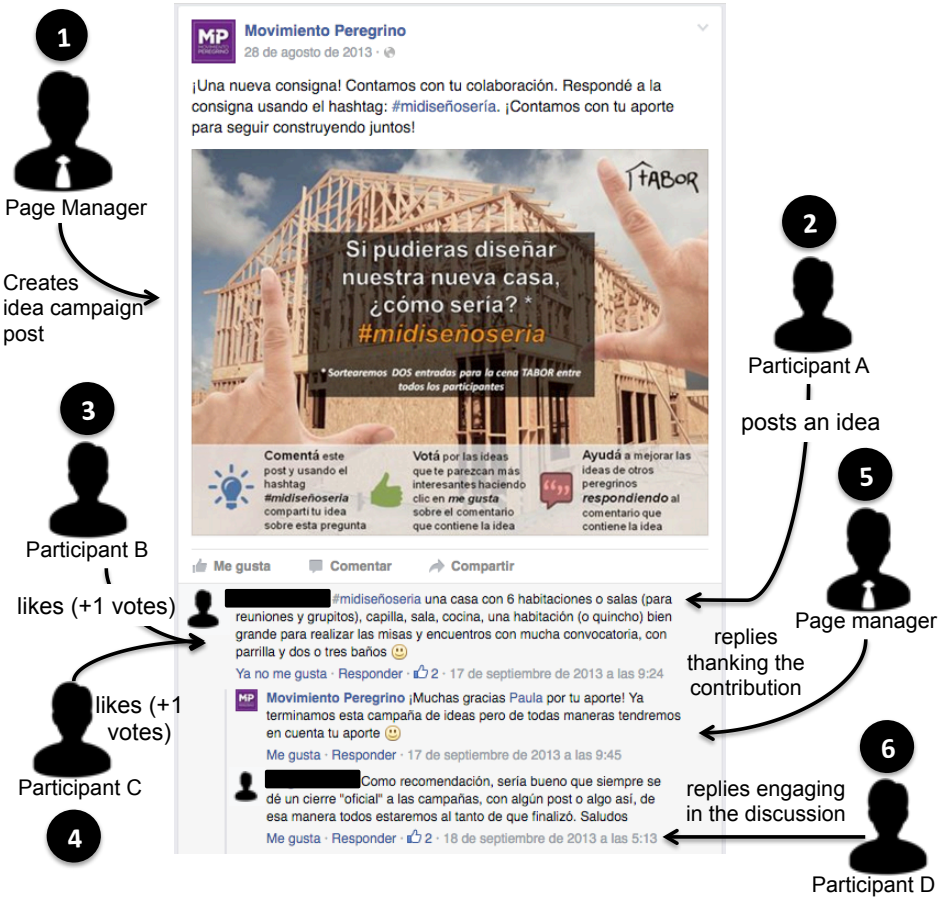


Figure 6.1: Mapping method in action

the campaigns. At the end of the campaigns, we contacted the organizers asking about the quality of the proposals and if some of them are going to be considered for implementation.

To evaluate the suitability of Facebook's features to instrument IM tasks, participants, moderators, and organizers involved in the campaigns were surveyed. A survey was sent to the participants inquiring about the suitability of the proposed method to submit ideas, follow the discussion and digest the information generated during the campaign, and vote on the proposals. In addition, an evaluation on the overall experience was required. The answers were measured on Likert scale ratings [138]. Each question of the survey included also a text-entry form that allowed participants to provide free feedback. We also contacted the moderators of the campaigns asking them to assess the suitability of the method to pro-

mote and moderate idea campaigns, and follow the discussion. Campaign organizers were surveyed as well to know their impressions of the method to process, synthesize and evaluate the content generated during the campaigns. Surveys composed of a mix of open-ended and rating scale questions were also used in the latter cases to understand the experience of the moderators and organizers.

6.5.2 Organizations and Idea Campaigns

Idea campaigns were conducted with two organizations from different sectors: Indigo, a company that owns a pizza restaurant, and Movimiento Peregrino, a small non-for-profit association of about 400 active members that works on the personal development of young people. Table 6.2 summarizes the two campaigns.

Indigo approached its customers in Facebook asking them ideas for a new pizza flavor that they wanted to include in the menu. The campaign lasted for four days and was released through a post that called for pizza flavor ideas. Once a day, the campaign was promoted by re-publishing the campaign post. By contributing with ideas for pizza flavors, the participants entered in a raffle for a free dinner for four persons.

Table 6.2: Case studies conducted to evaluate the proposal

Campaign	Organizer	Length	Reward
New Pizza Flavor	Restaurant	4 days	Free-dinner for 4 people
New Establishment	Non-for-profit organization	12 days	Two tickets for annual dinner

Movimiento Peregrino involved its members in Facebook into a discussion about the interior accommodations and the exterior design of its new headquarter. The initiative lasted for 12 days and the contributors (idea and comment authors and voters) participated in a raffle for two free tickets for the annual dinner of the association. The campaign post was re-published six times during campaign by the page managers. The page

fans, also, helped to promote the initiatives by sharing the campaign post within their Facebook contacts.

6.6 Evaluation and Results

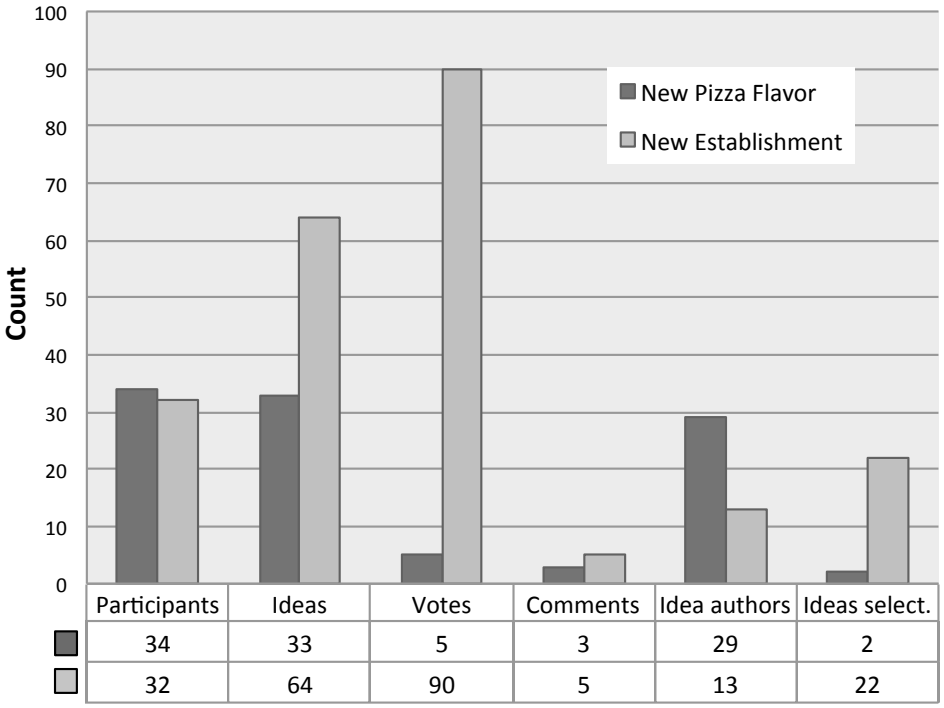
6.6.1 Effectiveness and Participation

Out of the 5,540 fans of Indigo's Facebook page, 34 contributed to the campaign by sharing ideas through comments placed on the campaign posts and by liking the campaign post's comments. The small percentage of participation (0.01%, 34 out of 5,540) found is consistent with previous cases of IM [8].

Thirty-three different flavors of pizzas were proposed; two flavors received two votes (likes), and other three ideas got one like each. The rest of the proposals were not voted. Out of the 34 contributors, 85% of them (29 of 34) submitted ideas, while the remaining liked the proposed flavors. Two contributors submitted 20% of the ideas (6 out of 33), the rest contributed with a single idea. The counter-intuitive relation between voting and content creation (15% vs. 85%) —counter-intuitive because we expected voting to surpass content creation since it requires much less effort— may had been due to the fact that only idea author could win the free dinner.

Page managers intervened three times during the campaign, in all cases to thank the participants for their contributions. Zero incidents were reported during the campaigns, i.e., no complaints against the campaign or restaurant, no spams, and none off-topic comments. Through a posterior communication with Indigo's owners, we learned that two of the proposed flavors ended up in the menu of the restaurant.

About 2% of the Movimiento Peregrino's Facebook fans contributed to the campaign (32 out of 1,554). Also in this case the contribution ratio is aligned with previous research regarding contribution in online social systems [112].



	Participants	Ideas	Votes	Comments	Idea authors	Ideas select.
■	34	33	5	3	29	2
□	32	64	90	5	13	22

Figure 6.2: Results of the idea campaigns

Campaign contributors posted 64 ideas and cast 90 votes. Almost 60% participated by voting (19 out of 32), while the remaining contributed with ideas. The distribution of contributions follows a power-law pattern. A small number of "super contributors" dominated the participation. About 60% of the ideas were posted by four people (39 out of 64) while more than 40% of the votes were cast by five contributors.

Although similar incentives were offered in both campaigns to encourage participation, the higher productivity of the participants in the latter case is prominent. Here, almost two ideas were submitted by each contributor. This high productivity could be associated to the strong tie already existing between the organization and the contributors [130].

Page managers took active part on the discussion by providing encouraging feedback to the contributors. A couple of weeks after the end of the campaign, we were notified by the organizers that out of the 64 ideas submitted during the campaign, 22 of them were under study to be included

as part of the design plan of the new establishment. Figure 6.2 outlines the main results of the case studies.

6.6.2 Suitability

Participants, moderators and organizers of the two idea campaigns were surveyed through questionnaires that mixed open-ended and rating scale questions. A 5 points scale was employed in the closed-ended questions and for the analysis we consider answers 1 and 2 as negatives, 3 as neutrals, and 4 and 5 as positives.

Participants Feedback. Out of the 66 total participants (counting both campaigns), 28 replied the survey (about 40% of response rate). Figure 6.3 shows the feedback from the participants regarding their experience. All questions were answered positively. About 68% assessed Facebook features as suitable for expressing ideas, however, a couple of the participants raised a red flag in relation to the nominative characteristic of Facebook pointing out that:

> *"the fact of having to use real names in Facebook may affect participation since in some situations people feel uncomfortable to share opinions using their identity."*

The issue of using real identity to expose ideas and opinions in online communities is inline with previous similar cases [219].

Similarly, three-fourth of the respondents evaluated positively the features of Facebook for following the discussion, i.e., go through the proposals and read them. However, the dissatisfied participants highlighted the difficulties to digest long texts in Facebook emphasizing that people usually ignore extensive publications:

> *"the problem get worse when using Facebook through mobile devices,"* commented one of the participants.

The inclusion of tools to filter, sort, search, and distinguish content will help according to them.

The least approved feature was the use of the like button to assess the ideas. Although being assessed positively by 50% of the respondents, it was especially questioned for its unreliability to capture the real value of ideas. In this sense, the unhappy participants pointed out that it was hard to differentiate whether the person really agreed with the content or just wanted to socially conform with her friends or liked the author of the idea. They suggested the implementation of more sophisticate methods, which range from the use of rating systems to the employment of other reactions additional to like, e.g., "*I love it!*", "*It's fair*", "*I despise the idea*" (similar to what was recently implemented by Facebook to extend the structural feedback on posts[4]). Along this line, a participant claimed that the like feature

> *"gives a partial overview of people's opinion, since it reflects only the number of people that agree with the idea, but not the number of people that disagree with it."*

The participant therefore suggested the inclusion of a functionality to vote down ideas, such as a dislike button.

Despite the noted drawbacks, the vast majority of the participants (22 out of 28, 78%) showed to be satisfied with their experience of using Facebook to take part in idea campaigns. In addition to the analytic results, the positive textual feedback received demonstrates the acceptance of the proposal.

> "*It is more entertaining to provide feedback and give opinions through Facebook than via other means,*" expressed one the participants,

while another mentioned that she loved to *"dream together about our future*

[4] `http://newsroom.fb.com/news/2016/02/reactions-now-available-globally`

establishment." Interestingly, a respondent agreed with our vision about the potential of Facebook for idea campaigns

> *"today people spend more time in social networks than in others more formal online communities, so we should be present (and get information from) where the target people are."*

Other participants however expressed their concern about negative aspects of the initiatives. From pure administrative mistakes, such as

> *"more participation could have been achieved if the organizers explained better the goal of the campaign, and when and how the ideas will be used"*

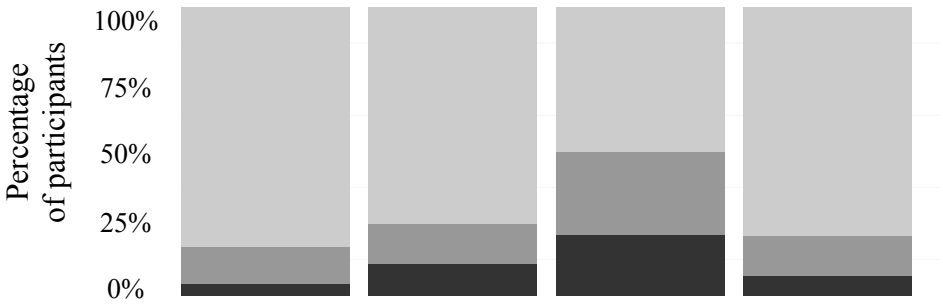
to more behavioral complains like

> *"people should had been more careful when proposing ideas, there were participants that submitted up to 18 ideas in a single comment, which transformed the experience into something overly cumbersome."*

Moderators Feedback. We also surveyed the moderators of the Movimiento Peregrino's campaign (Indigo's campaign moderators did not reply) asking them to assess the suitability of Facebook to promote and moderate idea campaigns, and follow the discussion. It was found that the toughest task was the promotion of the campaign;

> *"the hardest part came when we had to promote and keep the campaign at the top of the potential participants' timelines because every post created to advertise the campaign divided the ideas instead of centralizing everything in a single place."*

Due to large amount of content generated in Facebook, moderators were forced to continuously promote the campaign. The strategy followed was the re-publication of the campaign post, however, this action ended up



	Facebook features are suitable for expressing ideas	Facebook features are suitable for exploring and reading ideas	The like feature of Facebook is suitable for voting on ideas	Overall satisfaction with the experience
Positive	19	21	14	22
Neutral	3	4	8	4
Negative	1	3	6	2
Mean	4.130	3.892	3.5	4
Median	4	4	3.5	4

Figure 6.3: Survey results of participants' experience

splitting the campaign information in various posts making the posterior analysis complex and overwhelming.

Facebook's notification system was evaluated as very useful to follow the participants' actions during the campaign. Moderators mentioned that the awareness features allowed to be immediately notified of changes in the campaign post and also lead to increase communication with the participants and among them. Similarly, the reply-to-comment feature was evaluated as a suitable feature for interacting with participants. Sorting and filtering functionalities were identified to be needed in order to ease moderation actions.

Organizers Feedback. The campaign organizers were contacted to know their impressions of Facebook as a tool to organize, digest and evaluate the content generated during the campaign. Only organizers of the Movimiento Peregrino's campaign replied. For them, Facebook posts were found to be suitable as a container of the ideas generated during cam-

paigns. In addition, they highlighted the usefulness of hashtags to localize campaign posts. As pointed out by the organizers, the most remarkable limitation of Facebook as platform for supporting idea campaigns is the absolute absence of features for synthesizing and processing the information generated. Even simple tasks, such as getting basic statistics about the campaign (e.g., number of participants, number of votes, number of distinct ideas, most popular ideas, most voted comments)

> *"were extremely irritant and time consuming because they had to be done manually after reading all the ideas."*

Harvesting the disorganized and redundant corpus of information

> *"can be a chaos in campaigns with higher participation,"* manifested the organizers.

6.7 Discussion

This study contributes to the state of the art with an analysis of how social networks like Facebook can be used to conduct idea management campaigns (without using dedicated IM software). The goal was to understand how much of the typical IM features can be mimicked, how well, and which are instead the weaknesses of the approach.

In our experiences, Facebook was found to be an effective means to conduct IM. Both organizations, Indigo and Movimiento Peregrino, were actually able to craft a request for ideas, reach their already established Facebook communities of customers/members and get valuable ideas to fuel their innovation initiatives.

While Facebook may help to reach wider audiences of potential participants, large participation rate is not always guaranteed. In our experiences, the number of contributors is low and levels of participation did not differ much from previous findings [112]. This unveils that engaging large number of participants requires more than simply bringing IM closer to

Facebook communities. In this sense, studying the motives that drive people to participate in online communities represents a promising future step in understanding how to encourage contribution [148].

Despite the promising results in the potential of Facebook to elicit and harvest ideas, we learned that the standard features of Facebook are not sufficient to properly instrument all IM activities. We saw that some activities can be covered better than others and that some functionalities (e.g., voting, content processing) need to be improved or extended to become more suitable. In the following, we discuss in details the pros and cons of Facebook features and propose alternatives to overcome the discovered limitations.

The way Facebook supports conversations by threading comments to a post in a single, flat and chronological hierarchy (there is also the possibility to alter the default order and order comments by number of replies) seemed to be appropriate to host campaigns for soliciting ideas and opinions. To ensure a correct outcome, moderators must request participants to post not more than one idea per comment. The notification tools of Facebook appeared to be useful to follow the discussion, engage participants in conversations and interact with them. The employment of hashtags was found to be a convenient method to label idea campaign posts. Facebook tools to hide comments and block users were highlighted to be valuable at the moment of moderating discussions.

6.7.1 Drawbacks and Potential Solutions

Promoting the campaigns was difficult. Instead of re-republishing campaign posts that end up splitting the content, organizers may decide to create independent promotional posts that drive traffic to a unique post that holds all the campaign ideas. Alternatively, they can use paid Facebook ads to promote their campaigns.

Facebook provides a variety of opportunities to express ideas and opinions, yet we discovered that these may also come with its own issues. For

example, as it was reported by the participants, long texts are difficult to grasp in Facebook, especially when accessing Facebook through mobile devices. Moderators should encourage participants to be synthetic and brief when expressing their ideas.

The use of real identity represents another constraint discovered during the study. The participants mentioned that in some situations they may feel uncomfortable to share opinions using their real names. Facebook applications can be a valuable ally to comply with the request of allowing anonymous participation. For instance, action links (e.g., post anonymously)[5] can be added to posts. Whenever the participant clicks on the action link of a post she can be redirected to an external web form that allows her to write an anonymous message and the application can take and publish it as a comment to the post.

Organizers struggled to prune, summarize and evaluate the ideas and opinions suggested by the participants. Even if the combination of Facebook search and the use of hashtags facilitated gathering all the pieces of information, they found it hard to make sense of people's contributions. Posts were analyzed manually and ideas extracted one by one. Similarly, understanding the participants' preferences required manually counting the number of likes of each comment and reply. The implementation of Facebook applications that connect the stream of Facebook pages with external tools can be a potential solution to extend the limited functionalities of Facebook to process and synthesize idea campaigns. The end-user oriented spreadsheet-based approach presented in [120] looks promising for collecting information distributed in different Facebook posts. The proposal introduced by Baez et al. [18] to facilitate the organization, classification, evaluation and selection of ideas appears to be an interesting option to efficiently cope with the amount of information generated during IM.

The like feature was discovered to be limited to assess ideas. The reactions (Love, Haha, Yay, Wow, Sad, and Angry), recently introduced by

[5] `https://developers.facebook.com/docs/sharing/opengraph/using-actions`

Facebook to allow users express a broader range of emotional feedback on posts, represent a valid example of how the like feature can be improved to provide more precise ways to assess ideas.

6.7.2 Limitations of the study

As for the limitations of this study, first it studies two cases based on limited samples. The findings are thus not directly generalizable without testing them with larger samples and additional types of IM campaigns, which can affect the attitudes, practices, and behaviors of participants. It is worth noticing that it was not the goal of this study to achieve statistical significance of results yet.

Comparative analyses are required to better understand the strength and limitations of Facebook to instrument IM. In this sense, campaigns with identical settings can be launched in both, IM platform and Facebook. The results can be used to learn similarities and differences in the quantity and quality of ideas, productivity of participants, impact of the proposals (i.e., how many of the ideas were selected for implementation), level of participation (i.e., which proportion of the Facebook community or of the users registered in the IM platform ended up posting ideas, authoring comments, or casting votes).

Findings about the suitability of Facebook's features need to be studied more extensively. One way is to run studies in which the effects of the discovered critical points (rewards, promotion, reporting, voting) are controlled. Another alternative is to repeat the studies but with the current status of the platform and see if the updated version of the limited features, e.g., like, are found to be more suitable to carry out IM tasks.

Lastly, it was the first time both organizations ran an idea campaign within their Facebook communities. This required organizers to intimately get familiar with Facebook, which took time. For instance, the reply-to-comment feature was disabled during the first days of Movimiento Peregrino's campaign so comments could not be collected when the campaign

was having peaks of participation. Also, in Indigo's case moderators did not actively follow the campaigns and participants did not receive feedback for their contributions. We know from previous research that commitment depends on direct feedback [15].

Chapter 7

On the (in)effectiveness of the Share/Tweet button

with Carlos Rodríguez, Florian Daniel, Fabio Casati, and Luca Cernuzzi

7.1 Introduction

The study presented in Chapter 6 demonstrates the effectiveness of social networking sites, like Facebook, as means to obtain valuable ideas that can lead to innovations. However, through the same study, we have also discovered that Facebook features are not enough to properly instrument all Idea Management (IM) activities. We have seen that processing and synthesizing the content generated during idea campaigns are daunting tasks. It is required then to extended Facebook's technical capabilities by, for example, introducing new conventions, updating the existing features, or connecting with external tools (e.g., IM systems) that can help to overcome the identified limitations.

Attempts to integrate IM with social networking sites have been already performed, however, little is known so far about the effectiveness of these integration approaches. In this chapter, we present a study that investigates the effectiveness of the Share/Tweet button featured by most

modern Web sites, including IM platforms, to increase participation and productivity in IM initiatives. We articulate our research question into the following hypotheses:

- H1: Sharing/tweeting about civic participation initiatives in Facebook/Twitter increases the number of people registered as members of the initiatives;
- H2-H4: A higher sharing/tweeting activity per member leads to higher productivity of ideas (H2) / votes (H3) / comments (H4) per member.

We test the hypotheses by analyzing data about 53 publicly accessible civic participation initiatives from IdeaScale and report on our findings, also discussing open issues and alternative ways of accessing social network communities more effectively.

7.2 Dataset

Our dataset consists of public-access innovation initiatives on IdeaScale (see Section 3.2), active as of March 2014. Organizers of IdeaScale initiatives define, as part of the setup process, a list of categories or campaigns inside which the community of participants can post their ideas. An idea is composed of a title and a description. Members of the community can comment and assign positive/negative valuations (votes) to others' ideas; also they can share the ideas within their social networks.

The dataset contains 73 idea management initiatives oriented to civic participation, of which 10 do not enable the Share and Tweet buttons —key elements for our study. Of the remaining 63, we excluded other 10, because of their outlier numbers of members, ideas, votes, comments, shares or tweets.

The vast majority of the initiatives, 42 out of the 53 (79%), engage citizens in discussions on topics of public interest. Almost half of the initiatives are sponsored by public institutions, such as the Helsinki Public Transportation Office, the United States Patent and Trademark Office, or the

Redmond City Government. The goal is to harvest ideas from citizens on how public services and infrastructures (e.g., public transportation, downtown parks) or processes (e.g., patent/trademark application process) can be improved. The rest of the initiatives are organized by civic organizations (Imagine Central Arkansas, CambiAnzio, Public Works Agency), political associations (Manhattan Young Democrats, Politica Oltre, Cinque Stelle Movement), or supported by ad-hoc communities of citizens that gather together to exchange ideas on how their cities' services (garbage collection, connectivity, libraries, parks) can be improved. The remaining 21% of the initiatives (11) are carried out by political and civic organizations that seek to involve their members in discussions about in-house topics. In the following, we refer to these two clusters as to the Public and In-house clusters.

Together, all initiatives in our dataset account for 5,288 members and register 2,659 ideas —of which 55 are tagged as implemented or in progress of implementation— 22,332 votes, and 3,855 comments. At the moment we collected the data, the initiatives and their ideas were promoted in total 1,825 times in Facebook and 483 times in Twitter using the Share and Tweet buttons, respectively. Also, 49% (26) of the initiatives showed to be actively running, while 51% (27) did not show activity in the last 6 months before March 2014. The biggest and most significant group of initiatives (the Public cluster) report 4,137 members and record 2,195 ideas —54 marked as implemented or in process of the implementation— 18,426 votes, 3,519 comments, 1,411 and 411 Facebook and Twitter shares, respectively. (the source code of the crawler, datasets and R scripts of this study are available at http://github.com/joausaga/ims-sn- study).

7.3 Enrollment of members

We start our analysis to answer hypothesis H1 by scatterplotting the shares/tweets count versus the members count for the 53 initiatives, see Figure 7.1 and Figure 7.2. For an effective visualization, we also plot a

Loess non-parametric regression curve [6] that fits the data points with a 95% confidence interval. It is immediately evident that the initiatives with higher sharing/tweeting activity are not necessarily those with the larger numbers of members.

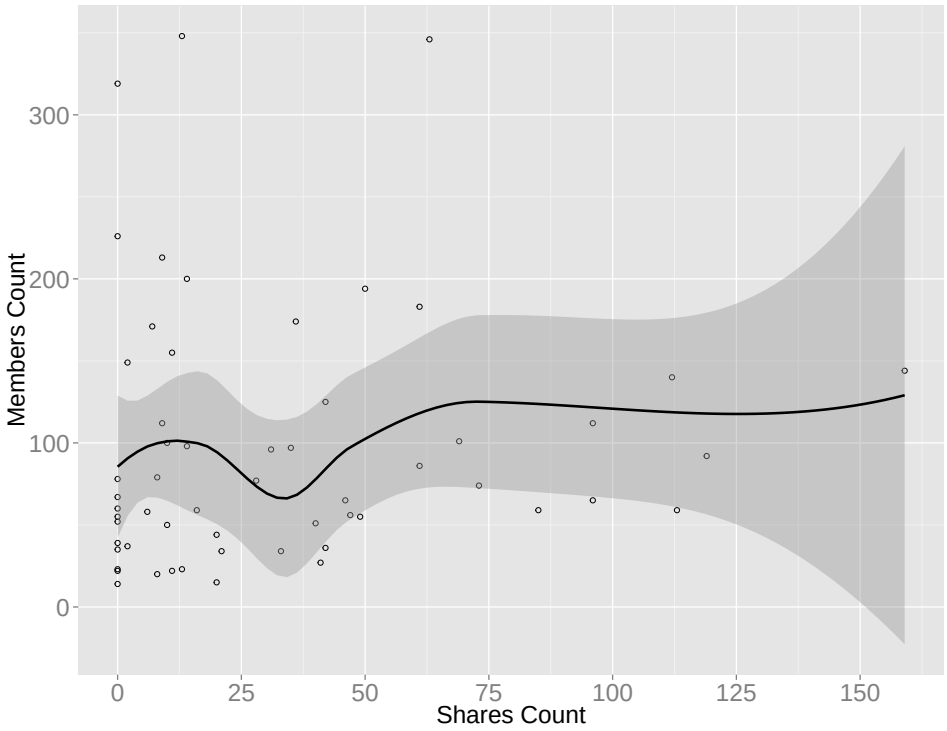


Figure 7.1: Correlation analysis of the number of shares and the number of members of 53 IM initiatives. A larger number of shares does not lead to a larger number of members

A pair-wise correlation analysis shows very low correlation (0.12 for members-shares and 0.05 for members-tweets), which unveils that, in general, increments in the number of shares/tweets only unlikely affect positively the number of members. The situation does not change if we split the analysis by the identified clusters: 0.17 and -0.38 for members-shares and 0.17 and -0.34 for members-tweets in the Public and the In-house cluster, respectively. This, however, provides only a static picture of the data.

In order to obtain also insight into the dynamics of the IM ecosystem and to understand whether shares/tweets help increase participants over time or whether increments are more due to the simple passing of time, we

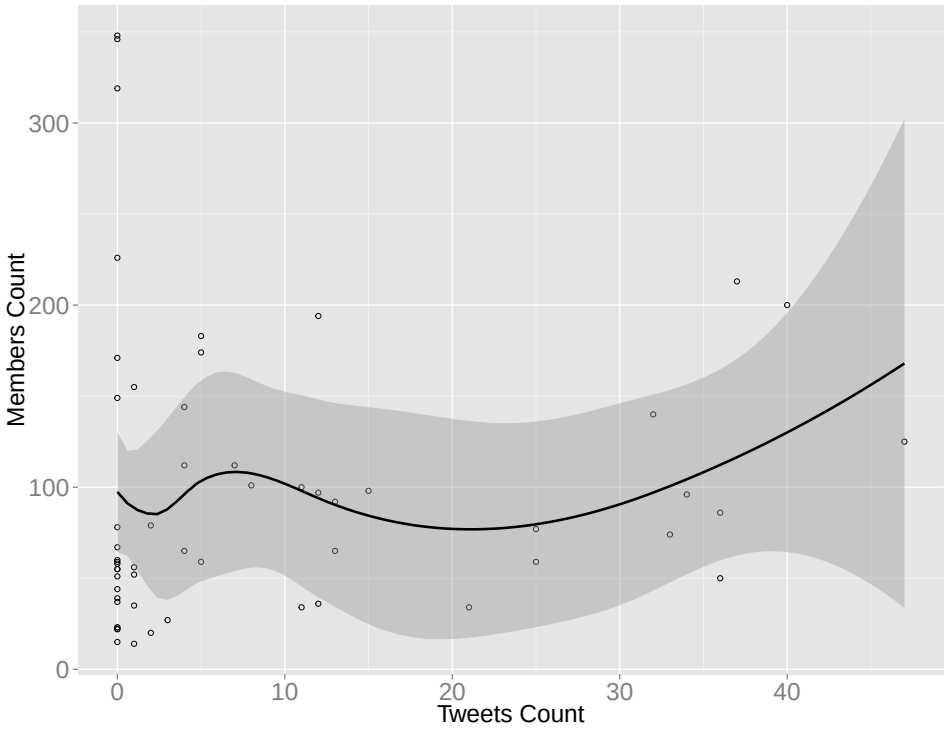


Figure 7.2: Correlation analysis of the number of tweets and the number of members of 53 IM initiatives. Also here a larger number of tweets does not lead to a larger number of members

designed a longitudinal analysis for the 26 initiatives of the whole dataset that were effectively active at the time of our observation. Once a week from March to May 2014 (14 weeks), we recorded the number of members, shares and tweets for these initiatives. Figure 7.3 depicts the identified evolution. The number of members grew over the 14 weeks of the study, passing from about 2,233 to more than 2,305 at the end of the study. Shares and tweets reported only slight increments, together with long periods of stability. The number of tweets increased by 2 (from 343 to 345) from week 2 to 4 and remained constant for the rest of the period. The number of shares grew from week 2 to 3 and stayed unaltered until week 11, when it increased again above 1,060 shares at the end of the study (starting from 1,055).

At this point, it appears to be clearer that increments in the number of shares/tweets are only marginally related with increments in the num-

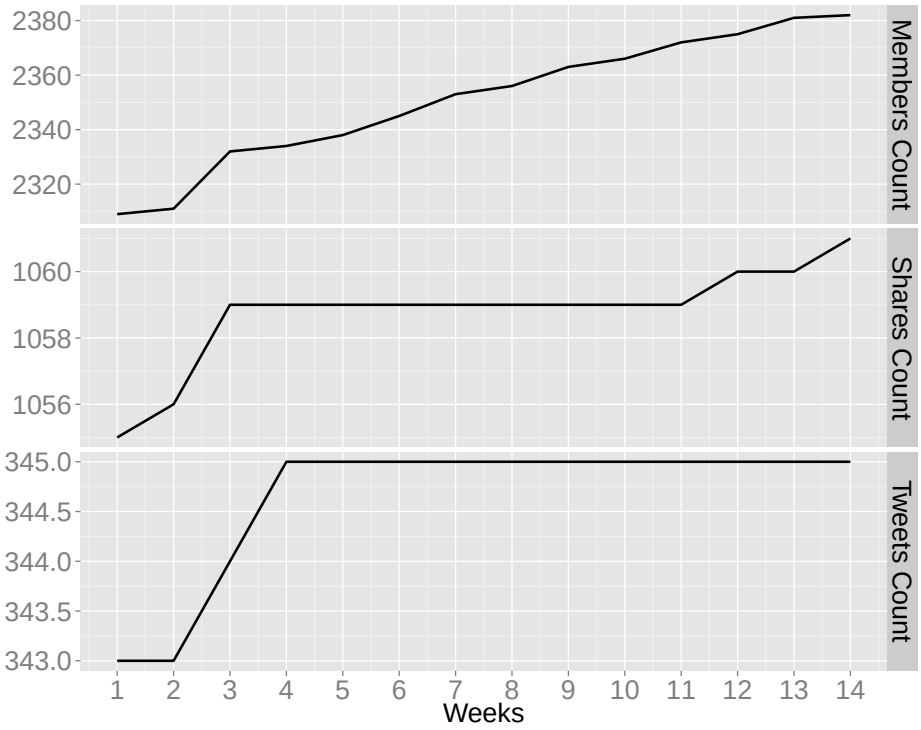


Figure 7.3: Evolution of shares, tweets and members over 14 weeks for 26 active initiatives. Members grow faster than shares and tweets

ber of members. To quantify the real influence of shares/tweets and the initiatives' lifetime, i.e., elapsed time between the start of the longitudinal study and the end of it (in our case 14 weeks), on attracting members, we calculate for the 26 active initiatives the difference in members, shares, and tweets between the beginning and the end of the observation period and conduct multiple regression analyses. Specifically, the relative impact of shares/tweets against lifetime is measured by two different regression analyses, one including shares and lifetime as independent variables and another considering tweets and lifetime as the regression coefficients. In both cases, the variance of members (M) appears to be well explained by the combination of these variables. Shares (S) and lifetime (L) account for 98% (F(2,11)= 289.6, $p-value < 0.05$, M=-0.001 + 3.17 ($p-value < 0.05$) S + 0.035 ($p - value < 0.01$) of the variance in members, while tweets (T) and lifetime have an impact of 99% (F(2,11)= 4269, $p - value < 0.05$,

M=-0.030 + 6.59 ($p - value < 0.01$) T + 0.036 ($p - value < 0.01$) L). A comparison of the relative importance of the variables unveils that it is lifetime that explains the largest amount of the variance compared to Facebook shares and tweets (62% and 67%, respectively). A finer-grained regression analysis limited only to the initiatives that showed social activity during the period of observation (all part of the Public cluster) reports a similar trend, i.e., about 65% of the member variation is explained by the initiatives' lifetime.

The evidence collected via both the correlation analysis and the regression analysis does not provide enough arguments to accept hypothesis H1 that sharing/tweeting increases the number of members of idea management initiatives.

7.4 Ideation Productivity

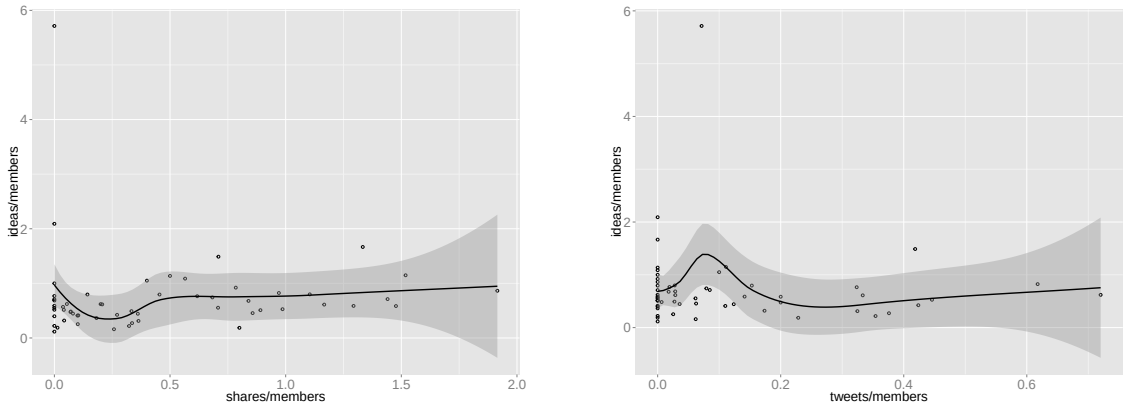
Next, we study whether the social networking activity of members impacts the amount of ideas, votes and comments produced by the initiatives.

A factor that may affect the production of ideas, votes and comments is, of course, the number of members of the initiatives: intuition tells that the more participants an initiative has, the more ideas, comments and votes we can expect. Suitable correlation analyses on these variables confirm that the number of members is indeed significantly and positively correlated with the number of ideas (r=0.64, $p - value < 0.05$), votes (r=0.67, $p - value < 0.05$) and comments (r=0.43, $p - value < 0.05$).

In order to diminish the bias introduced by the number of members in the study of the impact of sharing/tweeting, we proceed our analysis with the relative numbers of ideas, votes and comments per member (productivity per member). That is, we measure whether the ratios of shares/tweets over members influences the productivity of ideas, votes, and comments of the initiatives and study hypotheses H2-H4.

The scatterplots in Figure 7.4 reveal that many Facebook shares or tweets per member do not necessarily lead to higher productivity. In-

terestingly, the most productive initiatives seem to have scarce tweeting activity per member, while for the Facebook shares per member each plot has its own dynamic. Figure 7.4 shows that most initiatives have only small values of shares/tweets per member, highlighting that the productivity of ideas is almost not related with the sharing/tweeting. As for the votes, Figure 7.5 (a) shows a slight increase in the productivity for share ratios between 0.5 and 1.5. It appears that the number of shares per members affects the productivity of votes when at least one share is generated every two members. As for the comments, the left plot of Figure 7.6 seems to indicate that the ratio of shares over members positively contributes to the productivity of comments as soon as the members produce at least one share in average.

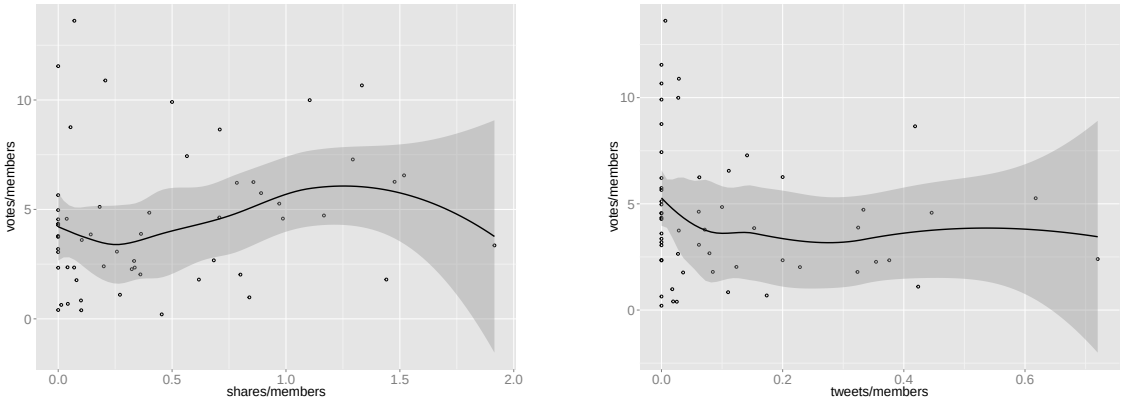


(a) Shares per member vs. ideas per member **(b)** Tweets per member vs. ideas per member

Figure 7.4: Correlation of productivity of ideas per members and the average of member's social networking activity (share/tweets per member)

We also analyze the correlation on these variables. The number of shares per member is only slightly correlated with the number of ideas (r=0.03, p-value=0.84), votes (r=0.20, p-value=0.15), and comments per member (r=0.24, p-value=0.08). Also the number of tweets per member has a low dependence on the number of ideas (r=-0.05, p-value=0.74), votes (r=-0.13, p-value=0.35), and comments (r=-0.18, p- value=0.21) per member. These numbers confirm analytically what was anticipated intuitively by the plots in Figure 3: the productivity of ideas, votes and comments seems

to be independent of the sharing and tweeting activity of the initiatives' members.



(a) Shares per member vs. votes per member **(b)** Tweets per member vs. votes per member

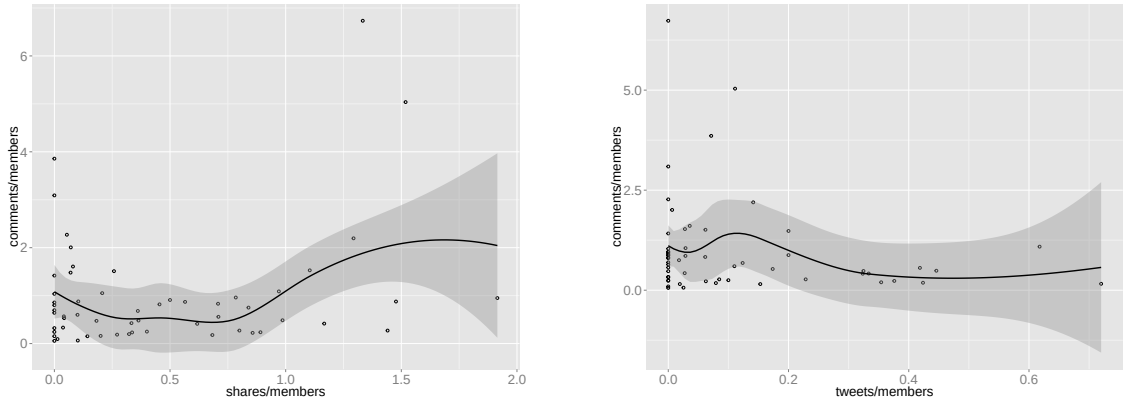
Figure 7.5: Correlation of productivity of votes per members and the average of member's social networking activity (share/tweets per member)

Similar low correlations also hold for the Public and In-house clusters individually. An interesting exception can be identified for the In-house cluster, where sharing on Facebook has a positive influence on the number of ideas per member (r=0.68, p-value=0.02). This correlation is likely explained by the tighter relationship that binds the members of an organization: they know each other, and many of them are also friends on Facebook. This is fundamentally different from the general audience targeted by the Public cluster.

In summary, we thus *accept hypothesis H2 for the In-house cluster limited to Facebook shares and idea productivity*, while we *reject hypotheses H2-H4 for the Public cluster in general and the other combinations studied for the In-house cluster.*

7.5 Ideation inside social network

Given the above results, next we try to understand in more detail what happens when information about IM initiatives is promoted inside social



(a) Shares per member vs. comments per member

(b) Tweets per member vs. comments per member

Figure 7.6: Correlation of productivity of comments per members and the average of member's social networking activity (share/tweets per member)

networks using the Tweet button and whether social networks are suitable at all for IM. We limit our analysis to Twitter, as that the majority of its content is publicly accessible (99% according to Mashable's social media expert Kurt Wagner: `http://mashable.com/2013/08/13/topsy-opens-twitter-data`). This is different from Facebook, which posts are strongly regulated by privacy policies and generally not publicly accessible.

Usually, the Tweet button is equipped with a default message that prefills the Compose box of tweets. Since the goal of tweeting is to drive traffic to an initiative's website, this default message typically contains the URL of the website, among other properties. We can use this URL as identifier: using the REST API of Twitter and the service Topsy (`http://topsy.com`), we searched for the URLs of the initiatives' websites as well as for the URLs of their ideas (in IdeaScale every idea is accessible through a dedicated URL). We collected in total 723 tweets of which 265 are about initiatives and ideas posted via the Tweet button, whereas the remaining 458 tweets were posted using other means, such as Twitter's Web client, smartphone app or other external clients, such as Buffer, TweetAdder or Hootsuite. The vast majority of tweets (81%) was published by the mem-

bers; if we match the tweets' handlers with the username of moderators and administrators or with the name of the initiatives, it can be seen that the remaining 19% of the tweets were authored by the organizers of the initiatives.

A manual inspection of a sample of the collected tweets unveiled that members use Twitter for generating awareness (in line with its use in general), as the following example shows: *"We want to hear your ideas! #transformrockford"* (@TransformRkfd) and *"Do you have an idea for Huntsville? Join the discussion at Imagine Huntsville http://www.imaginehuntsville.com"* (@HSVevents). However, here Twitter serves for two specific purposes: (i) to promote ideas and fuel the discussion; and (ii) to cast votes for ideas. An instance of these purposes can be found in the following tweet that promotes an idea and requests voting actions from followers: *"This is awesome, guys. Pls RT & Vote for the game Myopia in the @WhiteHouse Initiative Games For Impact http://gamesforimpact.ideascale.com/a/dtd/MYOPIA-An- intergenerational-collective-action-game-series"* (@jesserker). Through this analysis, it was discovered that moderators' tweets target similar goals: create awareness, promote interesting ideas, cast votes for ideas, and, in addition, publicly thank members for their contributions.

The effectiveness of the Tweet button can be gauged by comparing the reactions its tweets raised against the reactions triggered by the tweets coming from others sources (reactions are measured by summing up the number of retweets, replies and favorites). The data we collected show that tweets generated with the Tweet button produced in average about three times fewer reactions: tweets posted using the Tweet button triggered in average 0.39 reactions, while tweets published through other means raised in average 1.30 reactions. Moreover, with a 95% of confidence ($p - value < 0.05$) we can say that the average number of reactions triggered via Twitter's Web client and other clients is higher by two to three times (0.70 to 1.12). The maximum number of reactions triggered by tweets posted through the Tweet button is seven, whereas tweets published using other Twitter

clients received from three to even about 30 reactions. Repeating the same analysis for moderators/administrators and members individually, does not reveal any difference among the two types of participants.

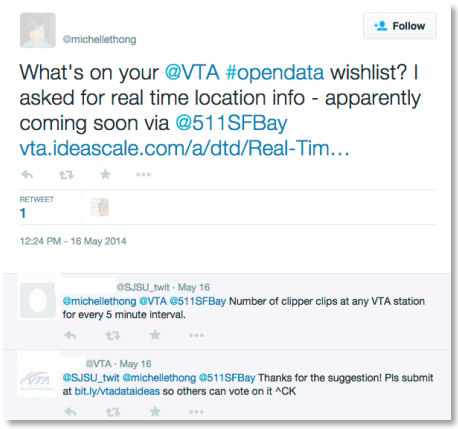
Our intuition is that the difficulty to catch attention with the Tweet button may be the fruit of its generic and impersonal nature (default text only). In contrast, tweets posted through other means are usually written manually and contain personal comments, emotions, excitement or similar —all characteristics automatically generated tweets do not have.

For instance, in Figure 7.7 we present a couple of interesting tweets worth noting. Figure 7.7 (a) introduces a sample of messages exchanged between the followers of @scarpon (moderator of the initiative City of Redmond) about improving the public services of Redmond, Washington (USA). The long discussion produced 36 tweets from 20 different participants and generated valuable content, which very likely was however not transported back to IdeaScale and, hence, lost. Figure 7.7 (b), in fact, captures a case where a Twitter user contributed to the initiative called "VTA," triggering the answer *"Thanks for the suggestion! Pls submit at http://vta.ideascale.com so others can vote on it"* (@VTA). The suggestion was considered just as valuable as suggestions generated within the "official" platform. However, unless the moderator moves the content of the tweet to IdeaScale or the person who posted it takes the time to do so, the contribution, runs the risk of getting lost. Losing this kind of feedback could be a huge loss. It suffices to recall that the Icelandic citizens employed Facebook, Twitter, YouTube and Flickr to reform their national constitution [136].

7.6 Discussion

The findings we report on in this article somewhat surprisingly reveal that the Share/Tweet buttons are, in general, not effective in helping IM platforms to increase participation or productivity. However, they may work in situations where the members are already connected through online so-

(a) Discussion about initiative "City of Redmond"



(b) Suggestion posted by @SJSU_Twitt within the context of the initiative "VTA"

Figure 7.7: Two examples of manually written tweets with an excerpt of the value-adding reactions they triggered

cial relationships, such as the case of the initiatives in the In-house cluster. It is evident that social networks have a huge potential as incubators of ideas and proposals, yet, current techniques fail to leverage on it properly. In fact, even if triggered by Facebook shares or tweets, people inside social networks apparently are not willing to go to and register for another platform, not allowing IM initiatives to track and value their ideas and feedback.

We are aware that these findings are specific to the context of idea management for civic participation and limited by the observational nature of the study (e.g., we could not test reactions to artificial stimuli). Also, the study may suffer from "lurking" variables, such as unattractive discussion topics, non- committed organizers or moderators, unclear participation

rules, timing of our observation (we could not study the startup phase of new initiatives). However, the study provides an analytical picture of a domain that has strong commonalities with other contexts that aim to attract people from social networks to their own platform, application or initiative (e.g., advertisement or entertainment).

The challenge seems to be how to harvest the ideas and feedback people leave inside social networks. This is an engineering problem that, first and foremost, requires understanding and leveraging existing social network usage conventions. In the specific context of IM, we identify three levels of intrusiveness of possible engineering approaches:

- *Use of existing conventions*: this approach aims to identify ideation initiatives inside social networks, e.g., conversations among people, and to harvest ideas and feedback without however touching the social networks themselves. An example is sentiment analysis [149];
- *Introduction of new conventions*: this approach aims to establish ideation-specific conventions, e.g., dedicated hashtags and conversation rules, to trigger ideation initiatives and to facilitate harvesting results. An example is the initiative MyIdea4CA, which was launched by the former governor Schwarzenegger to encourage citizens of California to post ideas for the state on Twitter with the hashtag #myidea4ca [48];
- *Change of conventions*: this approach aims to introduce new features and conventions into social networks, e.g., via functional extensions thereof. An example is supporting the crowdsourcing of tasks inside social networks, as for example proposed by Bozzon et al. [28].

Which of these approaches or combination thereof performs best still needs to be studied. As hinted at by the findings of our study, their departure from the naive Share/Tweet buttons is however a promising step forward that goes far beyond the domain of IM for civic participation.

Chapter 8

Integrating Online Idea Management for Civic Engagement with Social Network Sites[1]

with Florian Daniel, Luca Cernuzzi, and Fabio Casati

8.1 Introduction

The goal of this thesis is to understand how technology can be used to involve diverse sectors of the population into IM processes for civic participation. In Chapter 5, we present the results of an approach that combines onsite access (via a digital display in public spaces) with online access (via a web application) to foster citizens' participation in addressing local problems. One of the main insights of this experiment is that taking the right instruments to where people actually are —both offline and online— is crucial to achieving participation.

In this chapter, we propose an approach that integrates an IMS with Facebook, one of today's most popular virtual spaces of participation[2],

[1]Chapter based on an article that is pending for publication

[2]A recent report from Pew Research Center shows that 80% of online American users have present in Facebook and 76% of them visit the site on their daily basis. For more details about the study, please

enabling people to participate in IM using ordinary tools and without having to step outside their daily habits. Our approach includes a model to integrate features of an IMS with standard features of Facebook and a algorithm that synchronizes content between the IMS and Facebook so users can access to the same information regardless of the platform they decide to use.

Apart from their popularity, Facebook has demonstrated to be valuable tools as spaces to foster dialogue among citizens serving as a platform for political expression and discussions on public interest issues [99]. Activists have found them useful for advocating changes [225] while governments have employed SNS for engaging the citizenship in online deliberation and planning processes [67]. By integrating IMS with Facebook, we reduce the participation barrier increasing our chances of having large and possibly diverse groups of participants [84, 116, 118, 135, 231], who can produce useful ideas to innovate policies and public services [26, 121, 132, 154, 212]. With our proposal, we reach people "where they are" avoiding them the need to leave online spaces they usually inhabit (e.g., Facebook) to be committed to separate places (e.g., IMS). Our proposal also allows people to take part in IM by using familiar and daily basis technologies.

We evaluated our approach in the "wild" through a real case of IM for civic engagement looking to understand whether it helps to increase the number of participants and contributions (i.e., ideas, comments, votes). We also verified if the approach favored an increment in diversity in the group of participants.

8.2 Approach

In this chapter, we study the effects of conducting an ideation campaign not only inside IdeaScale but also inside Facebook. The challenge of the study is understanding how to map the typical IM features of IdeaScale

refer to `http://www.pewinternet.org/2016/11/11/social-media-update-2016`

(e.g., asking for ideas, collecting responses, up- and down-voting ideas) to the features provided by Facebook to its users to maintain online their social relationships (e.g., posting status updates, commenting on posts of friends, participating in interest groups). Given this mapping, the technical challenge is understanding how to seamlessly synchronize IdeaScale with Facebook so that the users of the former get access to and can comment and vote on the ideas provided by the users of the latter, and viceversa, possibly in (near) realtime. Ideally, both types of users should be enabled to perform the same types of actions via the platform they prefer; ensuring they both participate under the same conditions and have access to the same information.

The intuition is that enabling users of Facebook to participate in ideation campaigns, without having to create an own account on IdeaScale and to get familiar with the IdeaScale interface and conventions, it should be possible to attract more people to a campaign and to harvest more and perhaps more diverse ideas and comments – to the benefit of the campaign as a whole. The underlying observation is that there are simply many more people in Facebook than in IdeaScale. The general research question is thus whether this intuition holds and, if yes, how well.

One important observation is that in our work we do not aim to implement applications or plug-ins that extend Facebook's capabilities nor do we want to develop ad-hoc solutions on top of Facebook. Instead, we aim to identify mappings, techniques and conventions that allow us to replicate IdeaScale features (e.g., commenting an idea) using native Facebook features (e.g., commenting a post). Instead of extending the expressive power of Facebook we thus rather aim to leverage on the innate analogies between the two platforms.

We consider the case of IdeaScale[3] as e-democracy platform used, among others, by government agencies, civic organizations, and political parties to harvest ideas from citizens and [200, 198]. In IdeaScale, users can propose

[3] `https://ideascale.com`

ideas on a discussion topic, comment, and like or dislike ideas by using a thumbs-up/thumbs-down modality. For screenshots about the platform and a more detailed explanation of IdeaScale's features, please refer to Chapter 3.

Also, we chose Facebook as the social network service provider, which apart from its popularity[4] provides a series of features that can be useful to empower IdeaScale. One of them are the groups, which have been highlighted by [67] as important spaces of communication, sharing, and interaction in the context of civic participation in deliberation and public planning processes. A group can be created by any Facebook user, who has to enter a name and add members. A group creator has also to configure the privacy properties of the group, i.e., set the group as i) open where all content is publicly visible; ii) closed where anyone in Facebook can find the group, see who is in it but only members can access the content; or iii) secret where only members of the group can see the group, who is in it, and read the content. After the creation, the user who started the group become its administrator. In groups, posts produced by members are presented in a chronological order, except pinned posts, which are marked by the administrators to appear always at the top of the list. Our approach leverages also on Facebook's posts, comments, hashtags, and likes, whose functionalities are described in Chapter 6.

8.2.1 IdeaScale-Facebook Mapping

Figure 8.1 illustrates our mapping proposal. Facebook groups seem to be the most natural feature to represent IdeaScale communities, not only because they have already been employed for civic purposes, but also because they represent the space most commonly taken up by shared interest communities to exchange opinions, discuss ideas, and share experiences. For the purpose of this work, we define a *Facebook group* as a tuple

[4]It has more than one billion active users as for December 2015: `http://newsroom.fb.com/company-info`

$fg = \langle name, url \rangle$, where *name* is the name of the group, and *url* is the URL of the group in Facebook. On the other hand, an *IdeaScale community* is defined as a tuple $ic = \langle name, url \rangle$, where *name* and *url* are the name and URL (inside IdeaScale) of the community, respectively.

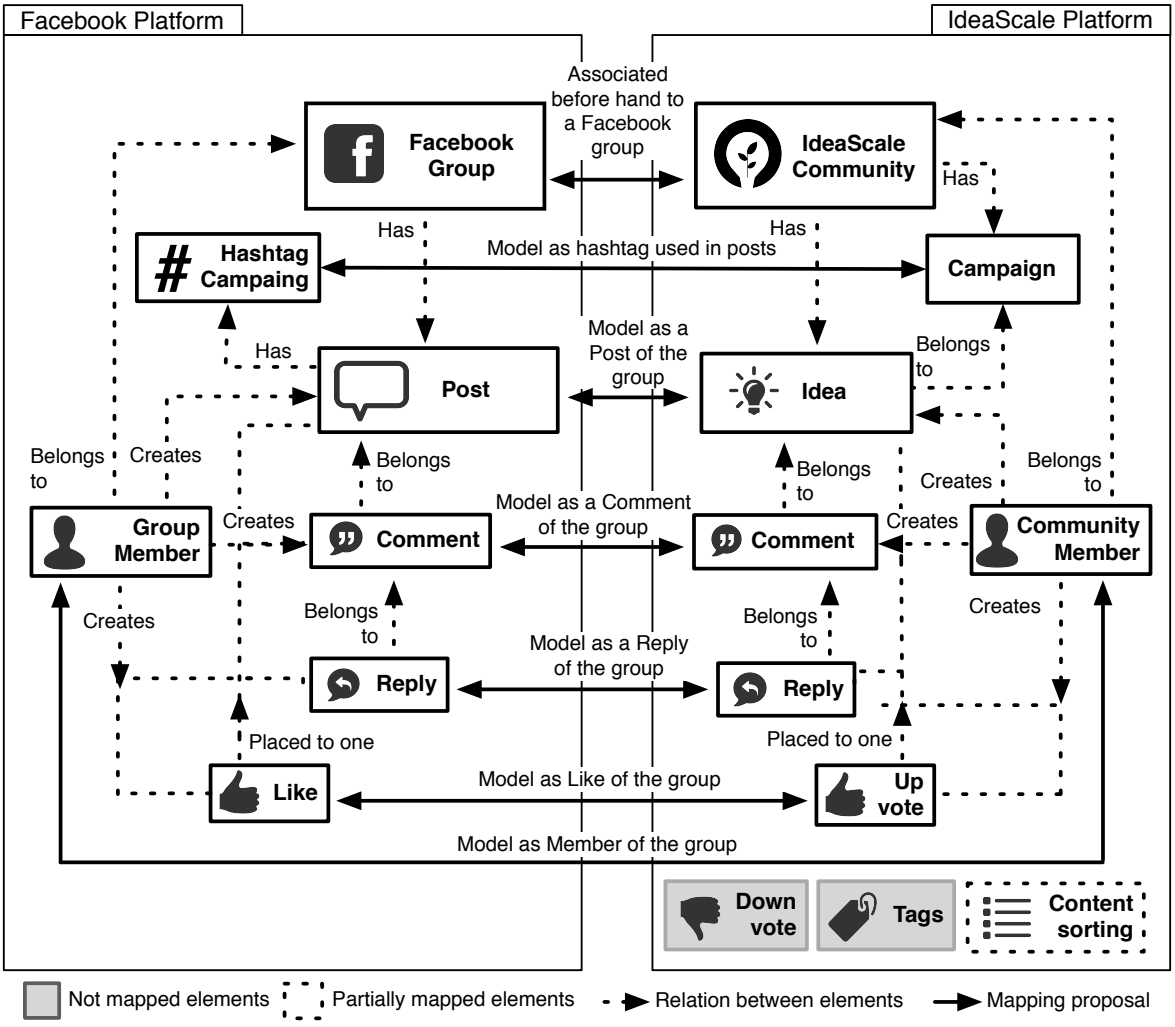


Figure 8.1: Conceptual model mapping features of IdeaScale to features Facebook

In Facebook, hashtags are commonly used to attach content to existing corpora of information. We thus consider them a promising tool to allow Facebook users to indicate which campaign their posts belong to. We define a *campaign hashtag* (i.e., hashtags in Facebook recognized as pertaining to a campaign) *cht* as a tuple $\langle name, fg \rangle$ with *name* being the

name of *cht* (i.e., the name of the tag without the character '#') and fg being the identifier of the Facebook group we want to associate with an IdeaScale community *ic*. Here, we represent a *campaign* with the tuple $ca = \langle name, ic \rangle$, where *name* is the name of the campaign in IdeaScale, and *ic* is the identifier of the community the campaign belongs to.

Posts published inside groups associated with communities are used to model IdeaScale ideas. Given an idea in IdeaScale, posts can be filled with the title and description of the idea and a hashtag representing the campaign under which the idea was submitted. The other way around, given a Facebook post with a campaign hashtag, an idea can be posted in the respective IdeaScale campaign with a default title (posts in Facebook do not have own titles) and the text of the post as the body.

Accordingly, we define a *Facebook post* as a tuple $po = \langle text, url, ht, type \rangle$ with *text* being the description of the idea associated with the post, *url* being the URL used to access the post, *ht* being the hashtag of the campaign the idea belongs to, and $type \in \{'original', 'mirror'\}$ being an indicator of whether the post was published by a Facebook user or imported from IdeaScale. In turn, we define an *IdeaScale idea ie* by the tuple $\langle title, desc, url, ca, type \rangle$, where *title* and *desc* are the title and description of the idea, respectively, *url* is the URL of the idea, *ca* is the identifier of the campaign the idea belongs to, and $type \in \{'original', 'mirror'\}$ indicates if the idea was originally created by an IdeaScale user or posted to mirror a Facebook post. As a convention, we associate each campaign with only one hashtag in order to facilitate the mapping of ideas submitted via Facebook to IdeaScale campaigns. At the end of the section, we explain how we propose to map the elements of *po* to the elements of *ie*.

The mapping of comments and replies is straightforward since both IdeaScale and Facebook offer identical features. We represent a *comment* on a Facebook group associated with a community as a tuple $cm = \langle id, text, post \rangle$ with *id* being the unique identifier of the comment in Facebook, *text* being the text of the comment, and *post* being the identifier of the post that received the comment. *Replies re* are represented

with a similar tuple $re = \langle id, text, comment \rangle$. Analogously, the tuple $co = \langle id, text, idea \rangle$ models *IdeaScale comments*, where id is the identifier given to the comment by IdeaScale, $text$ is the text of the comment, and $idea$ identifies the idea that received the comment. A similar tuple defines *IdeaScale replies*: $rp = \langle id, text, comment \rangle$. In IdeaScale and Facebook, a comment is an opinion placed to an idea and post, respectively, and given by any user; even the author of the idea or post can comment on its own publication. A reply, for its part, is a view given to a comment and published also by any user, including the creator of the idea/post or comment.

Modeling IdeaScale votes on Facebook is not as direct, as Facebook does not provide features to assess content negatively. Since we aim to employ only existing Facebook features, it is not possible to model down-votes without touching the platform (at the time this work was conducted, Facebook reactions were not available yet[5]). We thus propose to model only IdeaScale up-votes using Facebook's like feature.

A *Facebook like* can be represented as a tuple $lf = \langle id, targetid, twinid \rangle$ with id being the identifier of the like, $targetid$ being the identifier of the target (post, comment, reply) that received the like, and $twinid$ being the identifier of the up-vote that mirrors lf in IdeaScale. In IdeaScale, we define a *positive vote* as a tuple $uv = \langle id, targetid, twinid \rangle$, where id is a unique identifier, $targetid$ is the identifier of the target, and $twinid$ is the identifier of the Facebook like associated to uv.

We model members of IdeaScale communities as members of Facebook groups. The tuple $fu = \langle email, role, fg \rangle$ is employed to represent a *member of a Facebook group* with $email$ being the email of the user (also used as identifier), $role \in \{'admin', 'member'\}$ being the role of the user in the group, and fg being the identifier of the group the user participates in. In turn, an *IdeaScale community member* is defined as a tuple $iu = \langle email, role, ic \rangle$, where $email$ is the email address used by the user

[5] `http://newsroom.fb.com/news/2016/02/reactions-now-available-globally`

in IdeaScale (again, used also as identifier), $role \in \{'admin', 'member'\}$ determining whether iu is a member or administrator of the community, and ic being the identifier of the community the user belongs to.

Given an IdeaScale community ic and a Facebook group fg, we say that ic *is mapped to* fg (the mapping is symmetric, and we write $ic \leftrightarrow fg$) if and only if:

- $\forall\ ic \leftrightarrow fg$: $ic.name = fg.name$
- $\forall\ ca \leftrightarrow cht$: $ca.name = cht.name$
- $\forall\ ie \leftrightarrow po$: if ($ie.type =' original'$ and $po.type =' mirror'$): $po.text =$ concatenation of $ie.title$, $ie.desc$ and $ht.name$; else if ($po.type =' original'$ and $ie.type =' mirror'$): $ie.desc = po.text$ and $ie.title =$ first 64 characters of $po.text$ (titles in IdeaScale are limited to 64 characters)
- $\forall\ co \leftrightarrow cm$: $co.text = cm.text$
- $\forall\ rp \leftrightarrow re$: $rp.text = re.text$
- $\forall\ uv \leftrightarrow lf$: $uv.twinid = lf.id$ and $lf.twinid = uv.id$

If it happens that a person is member of both ic and fg then $iu \leftrightarrow fu$: $iu.ic = ic.url$, $fu.fg = fg.url$, and $iu.email = fu.email$. The capabilities of IdeaScale to sort content (by date time, by number of votes, by number of comments) can only be modeled partially in Facebook because it only allows one to order posts by date, i.e., most recent posts first. Without extending Facebook, this behavior cannot be adjusted.

8.3 The System

Our system is composed of four modules and interfacing with IdeaScale and Facebook. Figure 8.2 shows on the sides the platforms IdeaScale and

Facebook providing, through Web APIs[6], services to our system. The modules **Social Network Connector** and **Ideation Platform Connector** support the communication logic with the APIs of IdeaScale and Facebook, respectively.

The module **Synchronization Launcher** is in charge of launching synchronization tasks. Every certain time (5 minutes by default), it requests Social Network Connector and Ideation Platform Connector for the most recent content (e.g., ideas, comments, replies) of a given Facebook group and IdeaScale community. After receiving the information from Social Network Connector and Ideation Platform Connector, it passes the information to Content Synchronizer. At the request of Content Synchronizer, it asks the third party connectors for the creation, modification, or elimination of posts/ideas, comments, replies, and likes/upvotes.

The synchronization between platforms is carried out by the module **Content Synchronizer** by following the steps described in Algorithm 1. It also administers a database of records that used to map elements of IdeaScale platform (e.g., campaigns, ideas, comments) to features of Facebook. More details about the mapping records are given next. To detect inconsistencies between platforms, it checks whether the same number of ideas/posts, comments, and replies exists in both the community of IdeaScale and the Facebook group. Besides, the module ensures that mapped instances of ideas, comments, and replies share the same textual information. If inconsistencies are detected, the module fixes them by following Algorithm 1. The module content synchronizer was also equipped with automatic functionalities to take care of possible failure in the use of our system and to encourage participation from Facebook. If a post is created inside the group and does not contain hashtag or the hashtag is not one of the campaign hashtags, the system automatically places a comment to the post noticing this situation. When a user, who is not already participating from Facebook, put an idea or comment on IdeaScale, the system sends

[6]Web APIs: set of functions through which a platform can be programmatically accessed through the web [79]

an email motivating the participants to use our system so the new content can be visible by the people on Facebook.

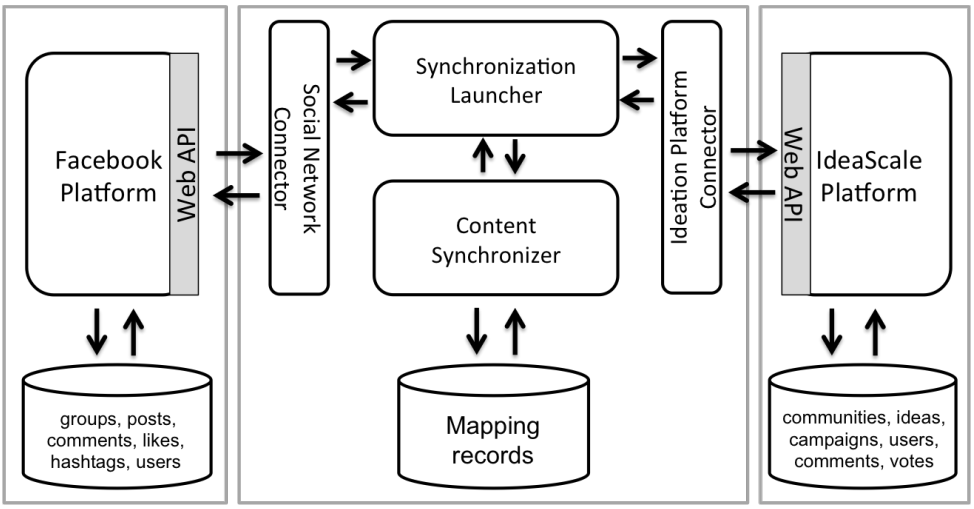


Figure 8.2: Architecture of the system

We adapted the initial design due to constraints in the API of Facebook and IdeaScale. Facebook does not allow third party applications to post on behalf of users unless users give explicit writing permissions. Consequently, ideas, comments, or replies generated in IdeaScale are replicated on Facebook if and only if the authors of these content are: i) registered in both Facebook and IdeaScale with the same email address; ii) members of the group associated with the community where these content were created and; iii) grant permission to our system to write on their behalf inside the group. In the other direction, IdeaScale does not allow to use the API to posting on behalf of users. Thus, we employed a generic author to publish content created on Facebook acknowledging the original author in the description of ideas or in the text of comments, as it is shown in Figure 8.3. We could not map positive votes with likes as we initially proposed. Because in IdeaScale users are allowed to vote on content only once, we could not use our generic user to mirror as votes the likes posted on Facebook. Therefore, likes were not replicated into IdeaScale. In the other way, mirroring votes as likes can only happen if voters are also members of the Facebook group. Understanding that we cannot assume that every partic-

ipant in IdeaScale will be a member of the Facebook group (neither user of Facebook), we decided not to mirror votes as likes but to include the number of positive votes as part of the text of posts. Last, APIs of IdeaScale do not support editing functions then our system is not equipped with features to take care of modifications in the textual of ideas, comments, and replies created to replicate content generated on Facebook. Deleting and publishing again could be a workaround; however, this will cause the loss of the thread of comments and replies that were posted to the modified content. Figure 8.3 shows the system in action through two examples. It is highlighted how we replicate the content.

Our current system uses a MySQL database as the repository of content and records and Django[7] as the development framework. The modules are written in Python programming language. The libraries Facebook SDK[8] and IdeaScaly[9] (written by the authors of this paper as part of the implementation work) are used to interact with the APIs of Facebook and IdeaScale, respectively. Celery[10], a Python-based asynchronous task executor, is employed to automatically launch synchronization tasks[11].

Apart from allowing to access identical information from either IdeaScale or Facebook by replicating content back and forth between these platforms, the system provides the tools to enable Facebook users to take part in ideation processes using only features of Facebook.

8.3.1 Mapping records

A key ingredient in our implementation is the set of records used to implement the mapping between the elements of IdeaScale platform presented previously (e.g., campaigns, ideas, comments) and the features of Facebook described before (e.g., posts, comments, hashtags). The records are

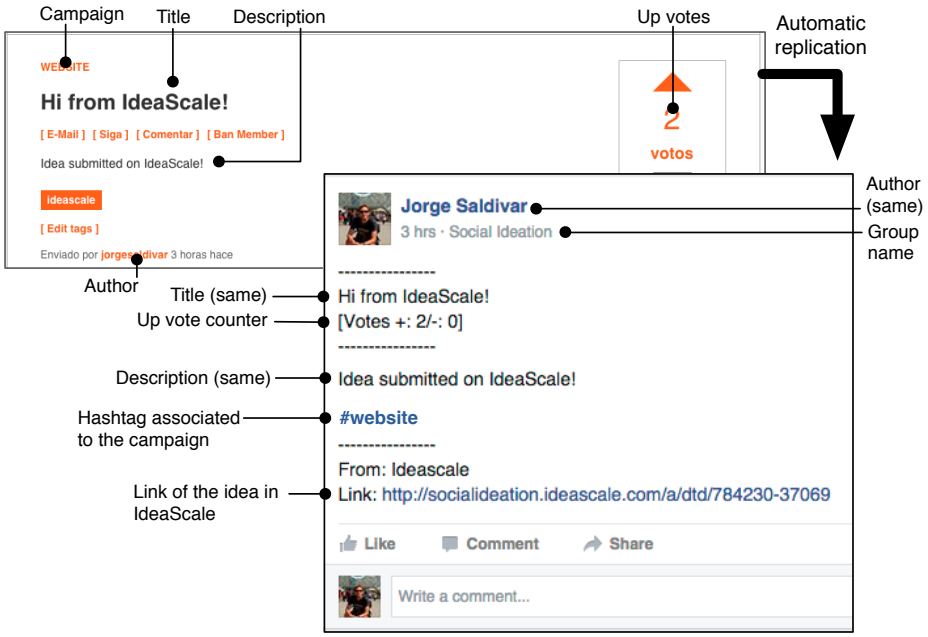
[7] `https://www.djangoproject.com`

[8] `https://github.com/pythonforfacebook/facebook-sdk`

[9] `https://github.com/joausaga/ideascaly`

[10] `http://www.celeryproject.org`

[11] The source code of the system can be accessed here `https://github.com/joausaga/social-ideation`



(a) Idea submitted in IdeaScale and replicated in Facebook

(b) Post published in Facebook and replicated in IdeaScale

Figure 8.3: The system in action. (a) Idea submitted in IdeaScale and automatically replicated in Facebook, (b) Post published in Facebook and automatically mirrored in IdeaScale. It is indicated the details of the content that are replicated.

saved in tables of the database controlled by the module *Content Synchronizer*. We define the record **Ideation Initiative (II)** to keep the association between instances of IdeaScale communities to concrete cases of Facebook groups. The pairing between campaigns and hashtags is registered in the record **Campaign Hashtag (CH)**. Our system saves the mapping between ideas and posts in the record **Idea Post (IP)**, it also registers the mapping between IdeaScale comments and Facebook comments in the record **Comments (C)**. Similarly, the association between replies in both platforms is kept in the record **Replies (R)**. The record **User (U)** is used to store the mapping between members of associated IdeaScale communities and Facebook groups. Figure 8.4 shows the records with their corresponding properties.

Ideation Initiative (II)

Record_i ID	Community_i URL	Group_i URL
Record_j ID	Community_j URL	Group_j URL
…	…	…

Campaign Hashtag (CH)

Record_i ID	Campaign_i Name	Hashtag_i Name
Record_j ID	Campaign_j Name	Hashtag_j Name
…	…	…

Idea Post (IP)

Record_i ID	Idea_i URL	Post_i URL
Record_j ID	Idea_j URL	Post_j URL
…	…	…

Comments (C)

Record_i ID	IdeaScale Comment_i ID	Facebook Comment_i ID
Record_j ID	IdeaScale Comment_j ID	Facebook Comment_j ID
…	…	…

Reply (R)

Record_i ID	IdeaScale Reply_i Email	Facebook Reply_i Email
Record_j ID	IdeaScale Reply_j Email	Facebook Reply_j Email
…	…	…

User (U)

Record_i ID	IdeaScale Email_i ID	Facebook Email_i ID
Record_j ID	IdeaScale Email_j ID	Facebook Email_j ID
…	…	…

Figure 8.4: Mapping records with their corresponding properties

The records play a fundamental role in facilitating the task of having synchronized the content of IdeaScale and Facebook. Next, we explain the

algorithm used to carry out the synchronization.

8.3.2 Synchronization Algorithms

We implement custom synchronization algorithms to handle change propagation. Let's say we want to synchronize the ideas posted on the Facebook group fg_i. A pseudocode of the algorithm is outlined in Algorithm 1. First, the algorithm consults the records **Ideation Initiative (II)** looking for the IdeaScale community associated to fg_i, say ic_i (line 1). Then, it asks for the list of posts published in fg_i (line 2). Later, for each post pos_i it checks whether the post is equipped with a campaign hashtag and if the post has not been replicated in IdeaScale yet (line 4). If the previous conditions are met, it saves the post into a record of the type po, say po_i (line 5). After that, it queries **Campaign Hashtag (CH)** records to obtain the campaign hashtag ht_i of the post, e.g., ca_i (line 6-7). Then, it gets, by consulting **User (U)** records, information of the IdeaScale user associated with the author of the post, say iu_i (line 8). It publishes, later, an idea, say ie_i, on behalf of iu_i in the community ic_i with $po_i.text$ as description, the first 64 characters of $po_i.text$ as the title (titles in IdeaScale are limited to 64 characters), and within the campaign ca_i (line 9). A record **Idea Post (IP)** is created next to preserve the association between po_i and ie_i (line 10). If the post pos_i has already been mirrored, the algorithm updated the idea linked to pos_i if any change in the content of the post is detected (line 12-13).

The synchronization finishes with a double loop that checks that still exist all posts registered in IP records as originally published on Facebook (posts created to mirror ideas are not considered here). If a post associated with an IP record cannot be found in the recently obtained list of posts, we assume that the post has been eliminated and thus its counterpart in IdeaScale together with the mapping record should be deleted to keep the system consistent (lines 15-23). The steps followed by the system to replicate ideas in the other direction, from IdeaScale to Facebook, are alike.

Similar algorithms are also used to synchronize comment, replies, and likes.

Algorithm 1: Synchronization of ideas posted on Facebook

Input: Facebook group fg_i

```
1  ic_i = query II records and get the IdeaScale community associated with fg_i;
2  posts = get posts from the Facebook group fb_i;
3  foreach post pos_i in posts do
4      if pos_i has campaign hashtag and hasn't been mirrored yet then
5          po_i = save pos_i;
6          ht_i = get hashtag of po_i;
7          ca_i = query CH records and get campaign associated with ht_i;
8          iu_i = query U records and get IdeaScale user associated with pos_i author;
9          ie_i = mirror po_i by posting on behalf of iu_i an idea within the campaign ca_i;
10         create IP record to register the association between ie_i and po_i;
11     else
12         if content of pos_i has changed then
13             update the idea that mirrors pos_i;
14 ips = get IP records where the type of posts (po) is equal to 'original';
15 foreach record ip_j in ips do
16     exists =false;
17     foreach post pos_i in posts do
18         if the url of pos_i is equal to ip_j.pourl then
19             exists =true;
20             exit loop;
21     if not exists then
22         delete the idea (ip_j.ieurl) published to mirror the eliminated post ip_j.pourl;
23         delete ip_j;
```

The synchronization algorithm together with the mapping records represents our effort towards the goal of enabling users of Facebook and IdeaScale to access the same information. Apart from allowing to access identical information from either IdeaScale or Facebook by replicating content back and forth between these platforms, the system provides the tools to enable Facebook users to take part in ideation processes using only features of Facebook.

8.4 Real Case Study: Innovation in the Public Sector

The system was tested in the "wild" through a real case process of innovation in the public sector, so-called *Voz y voto* (Voice and vote). Our primary goal was to evaluate whether lowering the participation barrier by introducing a familiar tool, such as Facebook, helps to boost participation and increase diversity in the group of participants. In particular, we addressed the following research questions:

- **RQ1. Does our integration proposal help to increase diversity in the group of participants regarding demographic profile (age, gender, district of residence, occupation, level of education), computer skills, and civic commitment with society?** The goal was to identify whether Facebook aided to reach diverse sectors of the population;
- **RQ2. Does our integration proposal help to increase the number of people registered as participants of *Voz y voto*?** The goal was to understand if the presence of a well-known tool like Facebook, as an additional channel of participation, encouraged the people to take part in the initiative;
- **RQ3. Does our integration proposal help to increase contributions (i.e., ideas, comments, votes)?** The goal was to analyze the effect of Facebook in the generation of content, if the possibility to post ideas or place comments through familiar technology stimulated the participants to produce more content;

Finally, we aimed to know the strength and limitations of our proposal.

8.4.1 Case Profile

We partnered a local political party (*Partido Patria Querida*, Dear Homeland Party in English) to conduct the study in a real case scenario during electoral period of the 2015 municipal election, which was celebrated on

November 15. They were running to occupy seats in the municipal council of the city of Asuncion (Paraguay) and were interested in launching an initiative to involve citizens in the ideation of solutions and innovations for the city's public services.

The initiative ran for 13 weeks, from October to December 2015. Six themes were choose by the political party (from here, the organizer) to guide the discussions, namely garbage and recycling, infrastructure, urban resilience, city markets, sustainable urban mobility, and municipal administration.

The community of IdeaScale `https://vozyvoto.ideascale.com` was employed as the main ideation space (see Figure 3.1) and the Facebook group Voz y voto[12] as an alternative channel of participation. The community in IdeaScale was publicly open, anyone could access the content but people had to register to submit ideas, post comments, or cast votes. In Facebook, the group was publicly accessible to any person registered on this social network.

Before the initiative began, the authors of this article collaborate in the study by setting up the technological tools and advising the organizers on best practices to manage the initiative, i.e., define precisely the goals and discussion topics, participate actively in the discussions by giving feedback, commenting, and thanking for contributions, and ensure that the process leads to concrete actions afterwards [1]. During the initiative, the authors provided technical support, took the role of observers (we did not take part on the discussions), surveyed the participants, and reached out to acquaintance, friends, family, colleagues through e-mail to encourage people to participate and spread the word. At the end, we synthesized the ideas and comments and reported the results to the organizer.

Members of the political party participated as moderators in the discussions. They also led the media outreach efforts by advertising the initiative through newspaper articles, social media, and radio shows[13].

[12] `https://www.facebook.com/groups/1655519178027107`

[13] For example, ABC Color - October 10, 2015 (in spanish) `http://www.abc.com.py/`

8.4.2 Study Design

The study was conducted through a procedure that mixed various methods and instruments to collect data, i.e., two online surveys (pre and post experience), interviews with participants, the log that records user activity on IdeaScale and the database of our platform.

Procedure

As a way to measure the impact of Facebook in the participation and contribution, we decided to publish the possibility to participate through Facebook not during launching the initiative but just at the beginning of the third week. Figure 8.5 illustrates the procedure followed to conduct the study.

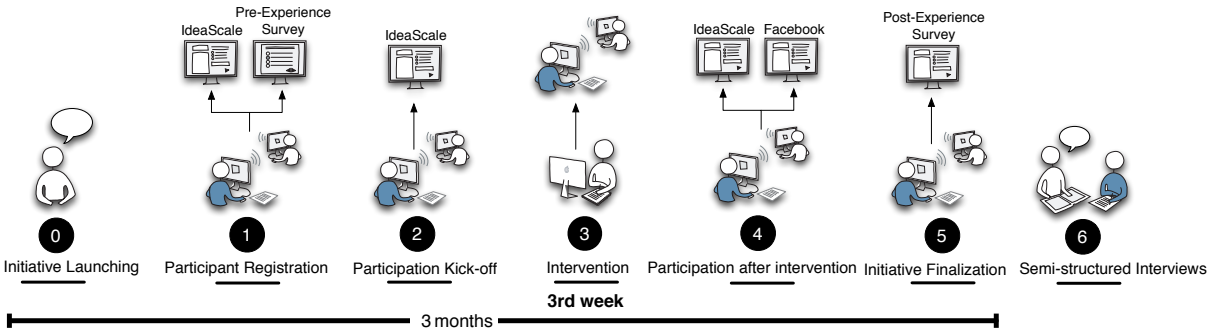


Figure 8.5: Procedure followed in the study

The initiative was launched and promoted by the organizer (0). The participants were not explicitly recruited so as they learned about the initiative signed up into IdeaScale and filled in the pre-experience survey (1). After registration, participants started contributing to the process by submitting ideas, posting comments and casting votes on IdeaScale (2) — the participants were given no training or elaborate instructions but only a brief guide on the site of IdeaScale community.

At the beginning of week 3, we did our intervention and notified the participants by e-mail that they could submit ideas, comments, and votes

edicion-impresa/politica/pq-crea-web-para-dialogar-con-la-gente-1415741.html

also via Facebook. They were instructed to go to a web page (see Figure 8.6) to learning how to do it (3). After Facebook were being introduced, participants took part on the initiative by creating content (ideas, comment, votes) via IdeaScale and Facebook (4). By the end of the initiative, participants were asked to complete the post-experience survey (5) and then follow-up interviews were conducted with 10 of the participants to complement the information collected through the surveys and to deepen our understanding about the experience, strength and limitations of our proposal (6).

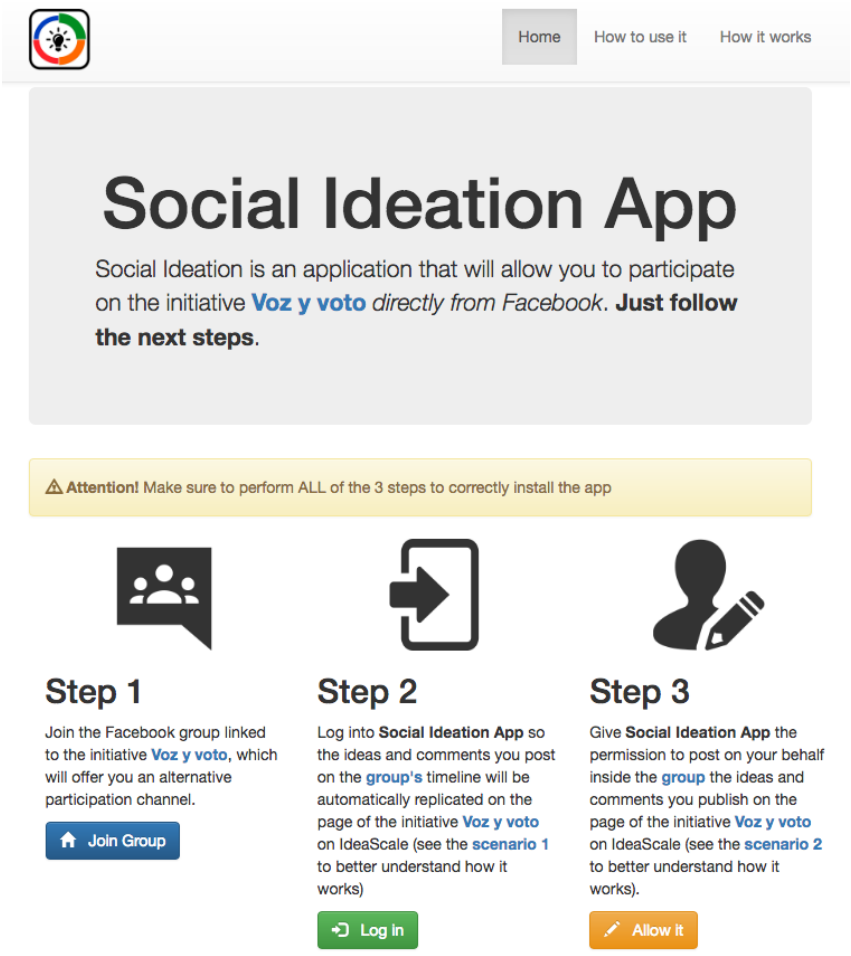


Figure 8.6: Website with instructions on how to participate from Facebook. Social Ideation App is the name we gave to our system.

Online Surveys

After the participants signed up into IdeaScale or joined the Facebook group, they were invited by e-mail to fill in a pre-experience survey. As part of the registration form in IdeaScale, they were asked three basic and not mandatory demographic questions, age, gender, and district of residence. With this, we wanted to ensure having the information needed to answer **RQ1**. The pre-experience survey had three sets of questions. The first set inquired about the participants' demographic profile, such as age, gender, district of residence, occupation, education. In the second part, the participants were asked about their online civic activity, e.g., sign online petitions, express political opinions in social media or forums, write blogs about public-interest issues. Through a 7-point scale, we checked the frequency that the participants perform these activities (1-never, 7-very often). The participants' ability with computer and the time they spend on the Internet were also inquired in this part of the survey to complement the information about their online activity. The last set of questions queried about the participants' civic activities in society, like voting in elections, volunteering in NGOs, leading social campaigns, participating in protests. Also here we measured how often they performed these activities through a 7-point scale, (1-never, 7-very often).

At the end of initiative, the participants were invited to complete a post-experience survey with the goal of understanding the strengths and limitations of our proposal. The survey was composed of two parts. The first asked for an overall self-evaluation of the experience through a 7-point scale (1-insufficient, 7-excellent) and the second consisted of a text-free entry where respondents were requested to provide feedback about their experience in general and with the platforms.

Follow-up Interviews

To complement the information collected through the surveys, semi-structured interviews were conducted with 10 participants. To ensure of not missing

any valuable perspectives, we chose participants from different ages, occupations, gender, and place of residence. We also considered in the selection the participants' level of participation and platforms used. The participants were recruited by e-mail and on a voluntary basis (no payment involved). The interviews followed similar questions to the ones carried out in surveys, with additional focus on questions about appropriateness of Facebook and IdeaScale's features to post ideas, comments, and votes. Two pilot tests were run with colleagues to obtain feedback about questions and understand the potential length of the sessions. The sessions lasted on average 40 minutes and were recorded in audio. Table 8.1 presents an overview of the participants' profiles. We use the codes PI1 to PI10 to identify the interviewees.

	Demographic			Occupation				Previous engagement			Civic activity in last years			
Interviewee code	Age	Gender	Residence district	Full-time employee	Entrepreneur	College student	Univ. professor	Forum	Maling list	Social media	Voter	Volunteer NGO	Electoral represen.	Political activist
PI1	54	f	4		x		x	x			x	x		
PI2	46	m	abroad	x						x	x		x	x
PI3	23	f	5	x							x	x		
PI4	36	m	3	x							x		x	x
PI5	50	f	2	x						x	x	x		
PI6	21	m	abroad			x					x	x		
PI7	28	m	5	x							x	x	x	
PI8	60	m	3		x						x		x	x
PI9	26	m	4	x							x			
PI10	66	m	2		x		x	x	x		x	x		
Frequency				6	3	1	2	2	1	1	10	6	4	3

Table 8.1: Overview of the interviewees' profiles. The city of Asuncion is divided into six residence districts, abroad means that the person live outside Paraguay

Video calls were conducted in two occasions to interview participants PI2 and PI6 who lived outside Paraguay (Spain and United States, respectively); with the rest of the interviewees face-to-face encounters were scheduled. Three of the interviewees were female and seven were male, ranging from 21 to 66 years, see Table 8.1. The average age was 41 years.

Apart from the interviewees who lived abroad, the rest lived in four out of the six districts of Asuncion.

Six of interviewees were full-time employees while one was still in college (PI6). PI1 and PI10 were architects, university professors and owners of building companies. PI8 was a politician from the party that organized the initiative and also owns a business company. PI5 was working in a government agency. The remaining full-time employees worked for private companies including financial, commercial, design and marketing, and agribusiness ventures.

For most of the interviewees it was their first time using technology to participate in discussions about public-interest issues. All interviewees voted in local and national elections in the last five years, most of them (6 out of 10) volunteered in NGO. PI2, PI4, PI7, and PI8 worked as electoral representatives in elections and some of them activated also in a political party in previous years, as shown in Table 8.1.

Activity Logs

The platform IdeaScale registers in log files the activities of the participants. By consulting these logs, we accessed to the date and time of registration activities as well as to details about the ideas, comments, and votes created by the participants (e.g., author, creation date time, description, title). In a similar manner, we prepared our system to record the activities that occurred in both platforms. By using the mapping records presented before, it maintains information about the ideas, posts, comments, replies, votes, likes generated in IdeaScale and Facebook, and of the users that participate in the initiative. We used this information to answer **RQ2** and **RQ3**. Other than the activity logs, we employed the analytics service of Google[14] to track information about visitors of *Voz y voto's* IdeaScale community. We understood that this information could provide additional and complementary input, such as session duration or

[14]https://analytics.google.com

device used, to answer our research questions.

8.5 Results

The results of the study are presented next. We, first, present the findings of the participants' profile **(RQ1)**. Then, we introduce insights about the participation and contributions in both platforms **(RQ2 and RQ3)**. We close the section by reporting an overall evaluation of the participants' experience.

8.5.1 Participant Profile

Through the registration form of IdeaScale and the pre-experience survey, we collected information about age, gender, and district of residence of 122 participants (about 80% of the 154 total participants). Table 8.2 summarizes this information.

Gender and age: Young male and female. Gender was equally distributed among the participants, 51% were women while 49% men. Interestingly, the gender distribution, in this case, follows the national trend, which according to latest official information male population represents 50.4% of Paraguay's society while female occupies the remaining 49.6% [160]. The population of the participants was eminently young. About 63% of the participants (77 out of 122) were between 25 and 34 years of age, and 86% (104 of 122) of them were under 45 years of age, as illustrated in Table 8.2. The result appears to be strongly conditioned by the characteristic of the general population, which is living a historical phenomenon so-called demographic bonus where 75% of its members are between 0 and 39 years of age[15].

Location of residence: Most expensive neighborhoods. Districts 3, 4, and 5 of the city monopolized the discussion, as shown in Table

[15]Bono demográfico tiene que ser aprovechado mediante inversiones (in spanish): `http://www.5dias.com.py/33359-bono-demogrfico-tiene-que-ser-aprovechado-mediante-inversiones` Accessed: 04-09-2016

Descriptor	Values	Percentage
Gender	Male	49%
	Female	51%
Age	Less than 18 years old	1%
	18-24 years old	11%
	25-34 years old	63%
	35-44 years old	11%
	45-54 years old	8%
	55-64 years old	4%
	More than 64 years old	2%
Residence district	(1) La Encarnación	3%
	(2) Catedral	6%
	(3) San Roque	25%
	(4) La Recoleta	33%
	(5) Santísima Trinidad	22%
	(6) Zeballos Cué	2%
	Abroad	8%
	Outside Asunción	1%

Table 8.2: Gender, age, and residence district of the participants (N=122)

8.2. About 80% of the participants reported living in these districts, which allocates the most expensive neighborhoods[16]. Asuncion is a highly segregated city. Typically, the middle and upper-class population live away from the Paraguay River, which borders the city, while most of the low-income and poor people settle in marshlands, nearby the river (districts 1, 2, and 6 the least representative districts in our sample). It can be inferred, therefore, that the initiative attracted mainly participants belonged to middle and upper social classes setting aside citizens living in the river zone. Political and economic factors (little identification with the candi-

[16]El valor por cada metro cuadrado en los distintos barrios de Asunción (in spanish): `http://www.5dias.com.py/35067-el-valor-por-cada-metro-cuadrado-en-los-distintos-barrios-de-asuncion` Accessed: 05-09-2016

date and party, digital divide) might have contributed to this situation. A kind of interesting finding is the important presence of Paraguayans living abroad. About 8% of the participants (10 out of 122) reported that lived outside the country, see Table 8.2. Although the initiative failed to involve people from different parts of the city, it served as an opportunity for people residing in foreign countries to collaborate with their ideas and proposals in shaping the future of their city.

Descriptor	Values	Percentage
Level of education	High-school	100%
	Post-graduated	50%
	College	35%
	Still in school	15%
Occupation	Full-time employee	45%
	Entrepreneur	34%
	Student	12%
	Part-time employee	5%
	Unemployed	4%
Computer ability	Advanced	57%
	Medium	35%
	Basic	8%
Hours per day in the Internet	Less than 1	18%
	Between 1 and 3	22%
	Between 3 and 5	26%
	Between 5 and 10	19%
	More than 10	16%

Table 8.3: Education, occupation, and computer ability of the participants (N=74)

Education and occupation: Well educated and full-time professionals. About half of the participants that filled in the pre-experience survey (48%, 74 out of 154). All survey respondents concluded their high-school studies, 35% of them received college-level education, and half mentioned that earned a postgraduate degree (Master, Ph.D., short-term spe-

cializations), see Table 8.3. Contrary to age and gender, the distribution, in this case, does not correspond to the general level of education in Paraguay where less than 10% of high-school graduated pursuit college studies [42]. Almost half of the respondents (45%, 33 out 74) reported being full-time employed. Of the remainder, 34% (25 out of 74) declared to be involved in entrepreneurship activities, see Table 8.3.

Technical ability: Computer skilled. The majority of the participants (61%) mentioned that pass between 3 to 10 hours a day on the Internet and perceived themselves as technically savvy, see Table 8.3. This result may be explained by the time they spent on the Internet. In fact, a further analysis demonstrated the existence of a positive and significant correlation between participants' computer ability and online time (r=0.48, $p - value < 0.01$). Even when the participants reported to be technically skilled and spend extended periods a day on the Internet, they showed not to be very active in generating civic content online. Through a scale of 1 to 7 (1=never, 7=always), they reported of not commenting in online forums (median=2.5) neither posting in digital newspapers discussion sections (median=2). They expressed that rarely sign online petitions (median=2) and never write blogs (median=1). Sharing personal opinions about political topics on social networks was found to be the most frequent activity, although still below the average 4 (median=3).

Civic activity: Infrequent voters. The initiative attracted citizens that were not used to cast votes in elections but reported to be involved in other activities in society. About 45% (33 of 74) had not voted in local or national elections within the past five years, which is less than the percentage of voters in Paraguay's last presidential election where 68% of the eligible population cast votes. Half of the participants (49%, 36 of 74) mentioned that had volunteered in non-for-profit organizations in the last years. Besides, 15% (11 out of 74) expressed that had participated in town halls and public hearings and 8% (6 out of 74) activated in politics in the past years, as it is shown in Figure 8.7.

No evidence of engaging diversity. We split the set of the partici-

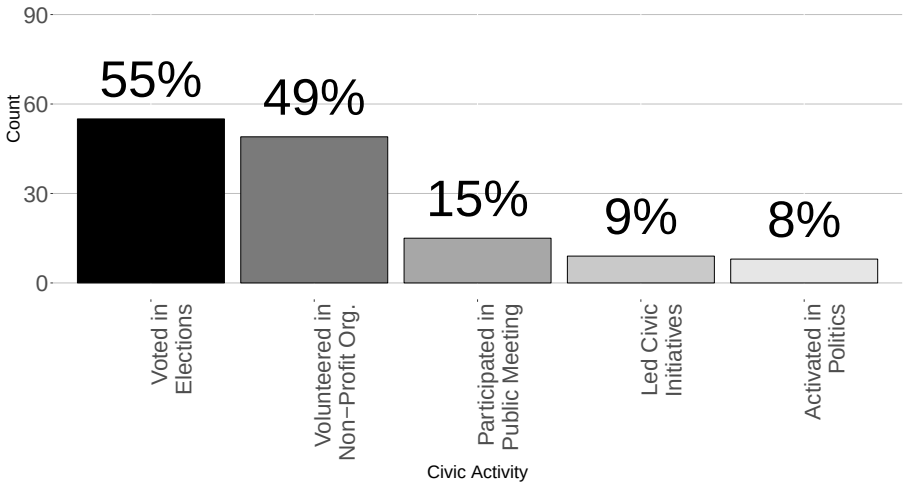


Figure 8.7: Participants' civic activity in the last five years (N=74)

pants in three groups depending on the platform they used to take part in the initiative, i.e., only IdeaScale, only Facebook, both platforms. Later, Pearson's Chi-square and ANOVA tests [138] were conducted to check if the groups' profiles vary significantly. Differences were measured in term of age, gender, district of residence, education, occupation, computer ability, time on the Internet, online and offline civic activity. No significant differences (significant level: 0.05) were found, confirming that the inclusion of Facebook did not bring more diversity to the group of participants.

8.5.2 Enrolling of participants

During the 13 weeks of the initiative (from October to December 2015) 154 people participated. Almost half of them (47%, 72 out of 154) took part from IdeaScale, 30% (46) via Facebook, and 23% (36) used both platforms.

The vast majority of registrations in IdeaScale occurred during the first four weeks (91%, 98 out of 108). Similarly, almost all Facebook group entries (93%, 76 out of 82) happened within the first two weeks after we sent the notification email. About 40% (13 out of 36) of the people that participated in both platforms never contributed again via IdeaScale after

joined the group; they used Facebook to follow the discussion and take part in it. It appears that Facebook represented a more convenient means than IdeaScale for more than one-third of the participants that tried both platforms. The appropriateness of Facebook to post political opinions and participate in civic discussions was remarked by interviewees PI2 and PI5. They tried both platforms but preferred Facebook because of familiarity and its easy-to-use tools to comment, share and like content.

> *"Everyone knows how to use it [Facebook] (PI5)"*

> *"It [Facebook] is popular, proper and adequate for political discussions, and almost everyone likes it and is familiar with its functionality (PI2)"*

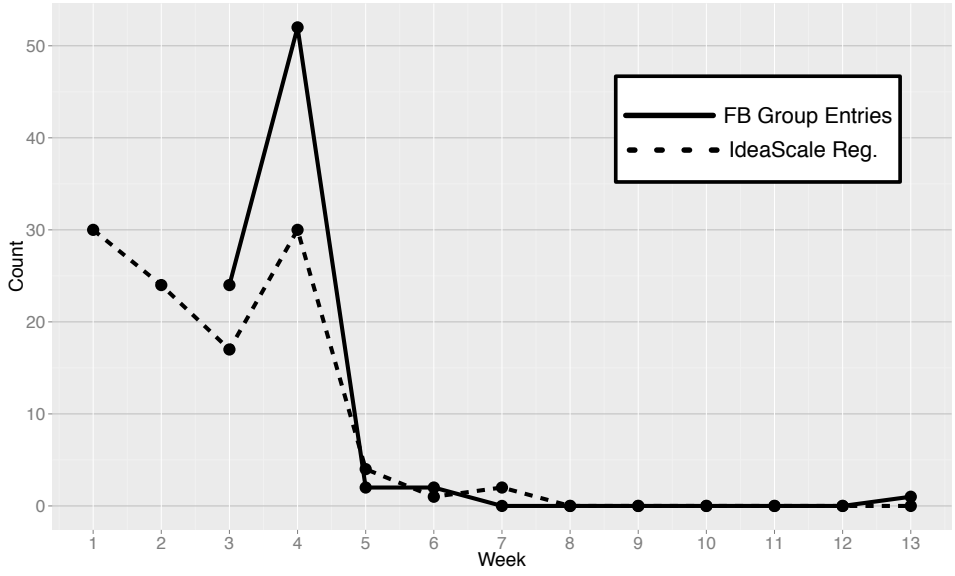


Figure 8.8: Evolution of IdeaScale registrations and Facebook group entries over time

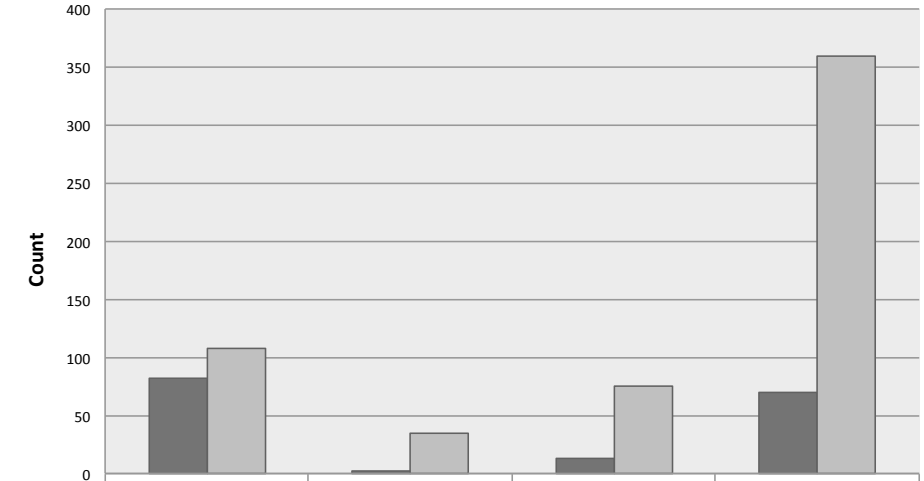
As depicted in Figure 8.8, the burst of registrations in both platforms heavily overlaps. It could happen that the group of newcomers helped to spread the word among their Facebook friends, who decided then to sign up into IdeaScale. It is well known the power of social networks, such as Facebook, to spread information [210, 21, 98]. We found, in fact, that

one-third of IdeaScale registers happened on the same day we communicated the possibility to participate through Facebook. Moreover, almost a quarter (23%) of the registrations in IdeaScale that happened after the introduction of Facebook were of people that first joined the group and then signed up into IdeaScale. Limitations in Facebook's privacy policies disallowed us to obtain the friends' list of the group members to further examine their influence in the registrations. However, intuition tells us that very likely Facebook helped to boost registrations in IdeaScale. Along this line, interviewees PI4 and PI7 remarked the power of Facebook to easily reach out large groups of people and to keep the participants updated about progress of initiatives like *Voz y voto*.

Almost all of the new visitors to IdeaScale that came from week six hereafter just observed the discussion without registering into the platform; then, this late burst of newcomers did not bring any benefit to the discussion. One interpretation of this phenomenon is that these latecomers came to visit the initiative website mainly driven by curiosity and without any real intention to participate. However, this could also happen because of limitations in the platform to engage not only latecomers but also very busy visitors — about 80% of the participants in our case reported to be full-time employees or entrepreneurs. Another interpretation might be that the amount of content (ideas, comments) generated early in the process could overwhelm these visitors making hard and time consuming to find the right way to contribute. Furthermore, it might happened that since the most of the obvious and popular ideas were already proposed latecomers might considered that there were nothing else to add and decided not to registered.

Most of the traffic to IdeaScale came from computers (70.6%), which is somehow expected considering the convenience of computers to write down ideas and express comments [219]. This result aligns with the opinion of PI4 who expressed that computers are a much more appropriate means to write down long texts and opinions. Of the remaining visits, 28.4% were conducted through mobile phones and 1% via tablets. Considering the

general trend of the Paraguayan social media usage[17], we can guess that the participants probably use mobile devices to connect to Facebook.



	Participants	Ideas	Comments	Votes
Facebook	82	2	13	70
IdeaScale	108	34	75	359

Figure 8.9: Participation and contribution in the study

8.5.3 Participation and Contributions

In total, 36 ideas, 88 comments, and 429 votes (summing up votes in IdeaScale and likes in Facebook) were posted through both platforms. Figure 8.9 illustrates the distribution of content between platforms. Almost one idea every three participants was produced in general. About three votes were casted by each participant and one comment every two contributors was generated. Ideas gathered in average 2.3 comments (standard dev=2.3) and 10 votes (standard dev=6.5) in IdeaScale. The submission of ideas and comments was mainly the task of IdeaScale users. Here, interviewees identified a series of positive aspects about IdeaScale. PI1, PI3, PI4 and PI9 liked its simple, straightforward, and easy to learn features. They also remarked the user-friendliness of the platform to follow discussions

[17]Ramírez, G. Estadísticas 2016 de redes sociales en Paraguay (in spanish): `https://medium.com/@analogica/estad%C3%ADsticas-2016-de-redes-sociales-en-paraguay-4bf3facf101`

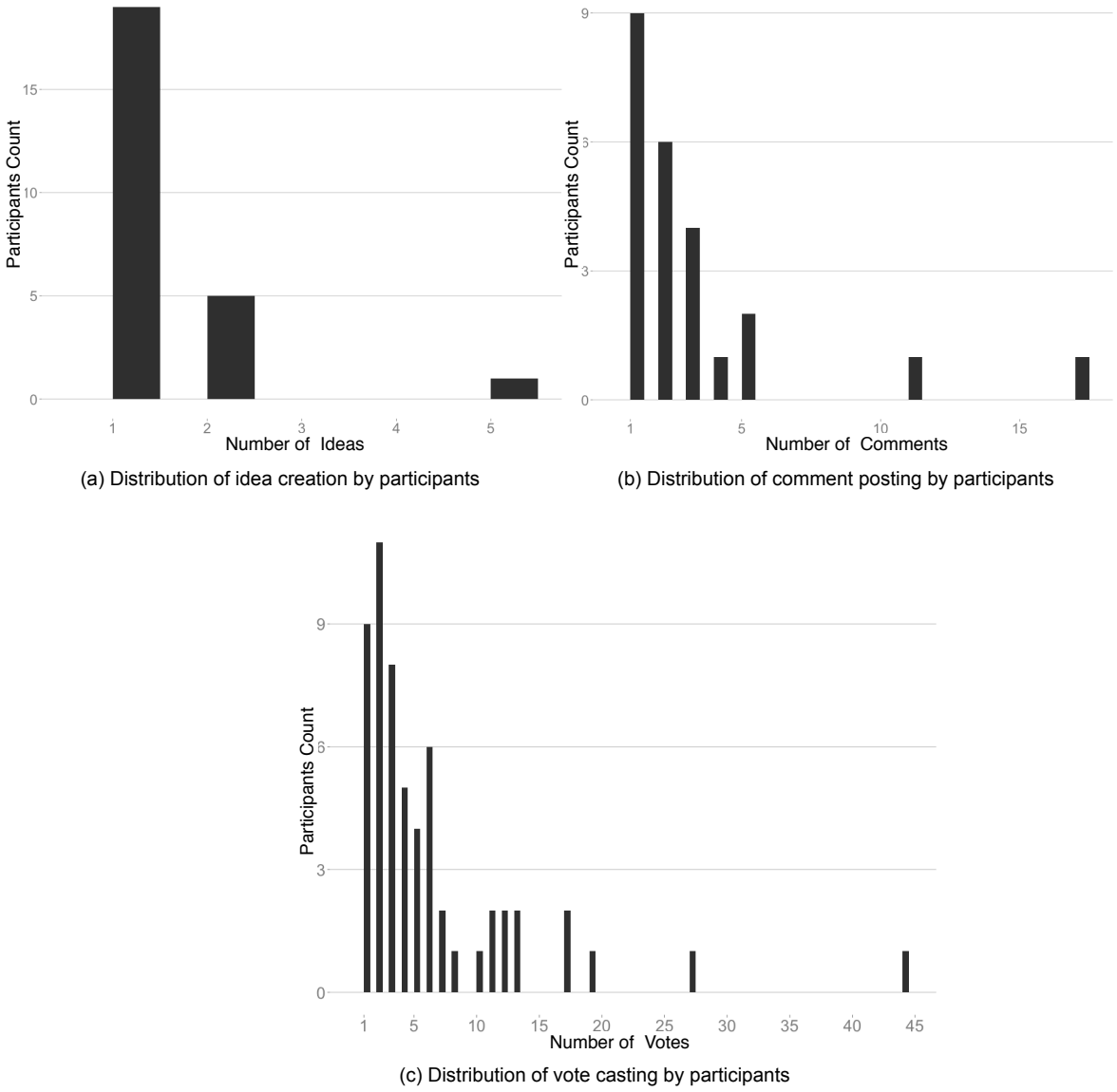
and vote on proposals. Also, the gaming system used to persuade participation was highlighted as useful and fun. Interviewees PI3, PI5 and PI6 identified also some drawbacks regarding the platform. All requested for a more attractive and colorful visual design of the user interface. The same demand was made by one of the survey respondents who told us that explored IdeaScale but did not find it appealing and decided not to participate. In addition, PI3 recommended to include functionalities that allow the participants to know at a glance the status of the initiative, e.g., trends in ideas, ranking of best/favorite/hot ideas, the percentage of ideas that received comments/votes, etc.

Participation inequality. About half of the participants only observed what happened during the initiative, they did not create ideas, comments, or votes. Through the interviews, we discovered some reasons that may explain this result. PI5 remarked that not all the public-interest issues were covered within the pre-defined campaigns, requesting the possibility to add additional discussion categories.

> *"It was missing, for instance, a category to discuss environment and contamination (PI5)"*

PI5 also commented that the description of some campaigns were not informative, so found hard to understand the purpose of them. Besides, PI2, PI4, PI7, and PI10 saw some lack of interventions on behalf of the organizer. They remarked that for example, not all ideas received feedback, which might discourage idea authors to keep participating. Organizers providing feedback or responding to ideas could give the participants the impression that their contributions are valuable and motivate them to keep posting [219].

Not only most of the participants observed the evolution of the initiative but also the generation of content was dominated by a small fraction of "super-participants," as it is typical in platforms based on user-generated content such as IdeaScale and Facebook [92, 8]. In fact, 44% of the ideas in IdeaScale (15 out of 34) were submitted by two participants. Similarly,



(a) Distribution of idea creation by participants

(b) Distribution of comment posting by participants

(c) Distribution of vote casting by participants

Figure 8.10: Distribution of content creation by participants in IdeaScale

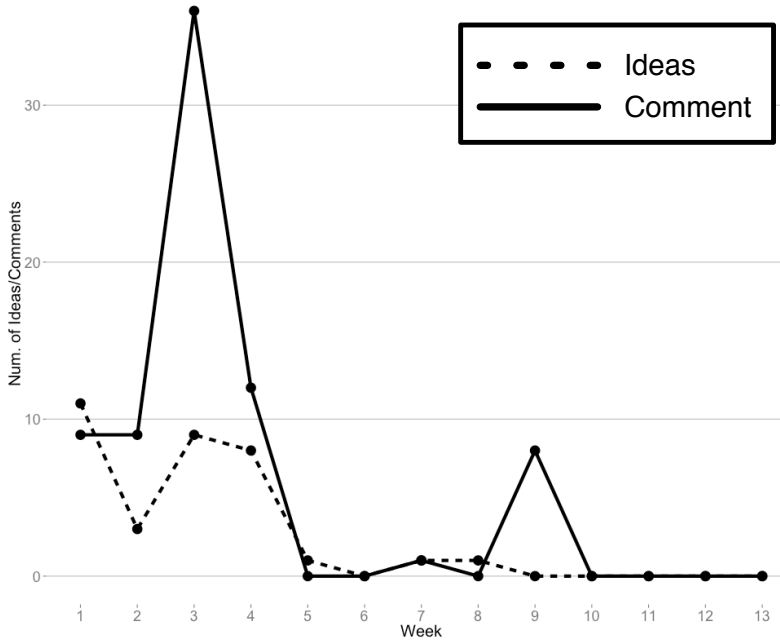
the distribution of comment posting and vote casting follow power-law patterns, i.e., most of the comments and votes were produced by the minority as illustrated in Figure 8.10.

Peaks of activity. The level of the participants' activity changed over time. The first weeks were the most active periods for content creation in both platforms. These peaks indicate localized periods of predominant

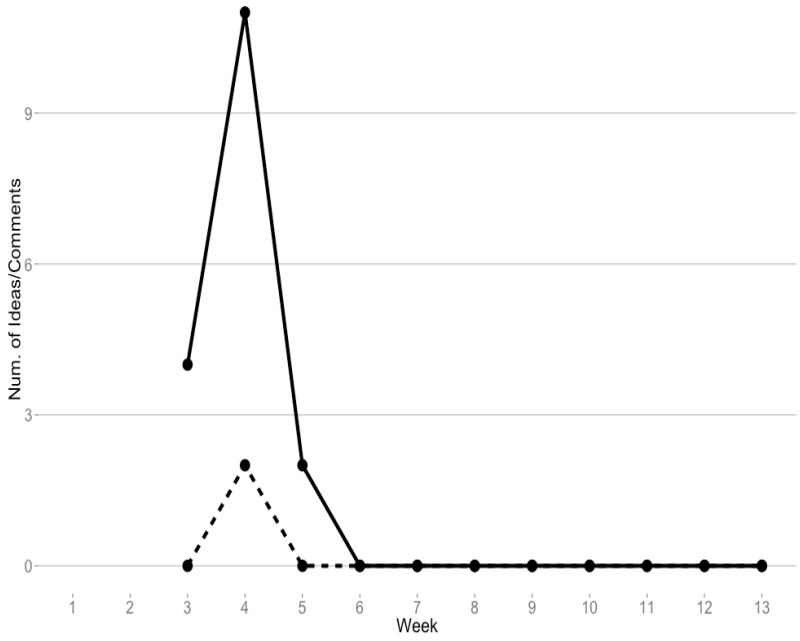
activity, which could be explained by external events, such as dissemination events that trigger it. Figure 8.11 demonstrates the presence of peaks in the activity level and how they occurred in both platforms early in the initiative, corresponding with the time of most advertising activity. Saturation in content production was also reported in previous similar experience [81, 195]. In Facebook, the peaks of idea and comment creation overlap and correspond to the period of most group entries, however, in IdeaScale saturation points occurred before the moment of highest registration activity, indicating that a large portion of ideas and comments were produced by the group of early birds, probably the "super-participants." As happened with registrations, after saturation points the activity decreased until reaching of low levels, this might be because as time goes by the most common ideas and opinions were already posted, and the participants avoided replicating the same content. The slight increment of comments visible on week 9 in Figure 8.11 (a) was related to interventions of members of the political party, who, in passing the election (November 15th) posted comments on the participants' ideas.

Anonymous participation. Although most of the participants used their real identity to contribute to the initiative, the disclosure of one's identity was an issue raised by some of them. One of the survey respondents explained that did not take part in the initiative from Facebook because he did not want to be associated with the political party that organizes it and that preferred to contribute from IdeaScale because there he could create a nickname and participated anonymously. Han et al. reported also concerns with the non-existent anonymity when posting opinions about public-interest topics [100]. Interviewees presented different positions regarding this issue.

> *"At the expense of loosing quality in the content generated, expressing opinions anonymously can make the people feel more comfortable because their opinions will not be associated to their real identities (PI7)"*



(a) Evolution of idea and comment posting over time in IdeaScale



(b) Evolution of idea and comment posting over time in Facebook

Figure 8.11: Evolution of idea and comment creation over time

PI4 agreed with PI7 and added that indeed anonymity gives some freedom to express opinions but at the same it favors inadequate behaviors, like insults, aggression, etc. On the other hand, PI2, PI3 and PI4 expressed that they do not have any problem to use their real identity to express opinions in social media. Along this line, PI6 indicated that anonymity may impact negatively in the credibility of the initiative. Previous research reinforced this idea by pointing out the importance of making participants of online civic engagement initiatives responsible for their input by encouraging them to their real identity [41].

Impact of Facebook. The Facebook participants took part in the initiative mainly as observers. The low use of Facebook to post ideas could be due to problems of communication. On the one hand, the notification email was not read by the participants, PI1 and PI4 confirmed that they overlooked it. On the other hand, we failed in communicating how to participate from Facebook. In this sense, we saw participants having difficulties in following the instructions presented on the website of the system (see Figure 8.6). Also, we found that participants had problems to post ideas from Facebook. Either they submitted ideas without hashtags, or they tried to contribute by publishing posts outside the group but as personal status on their news feed. The difficulties to understand how the approach worked was corroborated by PI6 who expressed that got confused about the presence of two channels of participation.

Some participants raised a flag about the length of contributions and the suitability of Facebook to digest long texts. PI2 warned that in Facebook participants should be precise and concise when expressing themselves because long texts are usually ignored there. Along this line, PI3 mentioned that did not participate through Facebook because found hard to digest the long text of the ideas with her smartphone. She suggested, instead, using Twitter because it would force the participants to be more concise when expressing ideas.

8.5.4 Process Outcome: A garbage recycling plan pilot

The idea of building bicycle paths across Asuncion was the most popular with a total of 27 votes. Suggestions for better infrastructure (e.g., streets and sidewalks, public spaces, neighborhoods) and proposals for new plans, projects, and policies to improve the urban traffic saturated the discussion. More than half of the ideas (22 out of 34, 65%) targeted these two themes. Also, infrastructure and traffic regulations were also the issues with most unique contributors, 17 and 13 participants, respectively, posted ideas and placed opinions related to these themes —in average 10 people contributed per theme. Clearly, there was a demand for better infrastructure and more efficient traffic. Even when infrastructure and regulations issues concentrate the majority of the suggestions, the two most voted ideas were related to sustainable mobility and garbage recycling efforts. Moreover, the idea to implement a city-wide garbage recycling plan was the proposal that gained widespread attention among the participants. It received 8 comments from 7 different persons when in average the ideas were discussed only by 2 persons.

For the organizers, the most innovative idea was the proposal for promoting processes of participatory budgeting in communities and neighborhoods of the city (the idea received 16 votes and was commented three times). However, they recognized that successfully implementing the idea will be challenging because of the number of political interests that can be affected by the inclusion of the citizens into the decision-making process. Apart from this idea, three other suggestions were selected for further study, namely creating chains of *Lapachos* (a typical Paraguayan tree species) across the city, building bicycle paths, and implementing garbage recycling plan. As the outcome of the initiative, the organizers launched in some neighborhoods of the city a pilot plan of garbage classification and recycling. Thank to the initiative, citizens of Asuncion had the possibility of impacting directly and through concrete ideas in shaping the future of their city.

8.5.5 Overall evaluation of the experience

About 40% of the participants replied the post-experience survey (59 out of 154) and in general, the respondents evaluated the experience as positive. In a 7-point scale (1 = insufficient, 7 = excellent), the experience received a median score of 5 (mean = 5.08, sd = 1.49). Through a t-test analysis [138], we found the average score significantly larger than the mean 4 of the scale (t = 5.59, df = 58, $p - value < 0.01$).

Supportive and encouraging feedback was received through the free-text entry of the post-experience survey. The participants expressed their concern about the future of the ideas. They hoped the organizers would be committed to the initiative and take actions to push the ideas further *"voice and vote is a good starting point, hope [the organizers] follow up the viable proposals," "excellent initiative, hope the ideas become real"* (they completed the survey before the recycling plan was launched). Previous research reported that citizens want to spend time on discussions that will affect their living situation [6]. Some of the survey respondents also asked for a second and longer round of the initiative *"the experience was interesting, it may be worthwhile to open second round to discuss and evaluate a filtered set of the most valuable ideas."* Interviewees also assessed the initiative positively, highlighting the following positive aspects. For instance, PI7 mentioned that the initiative served as a way to keep the citizenship actively engaged in the public life between electoral periods. PI3 expresses that loved the initiative because she had the opportunity to express ideas that were always in her mind but never had the chance neither the space to expose them. Similarly, PI4 mentioned that finally could find a space through which being heard. The best aspect according to PI2, PI6 and PI9 was that the initiative was conducted on the Internet facilitating the participation.

> *"The Internet gives me the chance to contribute to my country even living abroad (PI2)"*

Interviewees made some recommendations for future initiatives. Regarding technology, PI1 mentioned that future initiatives should exploit more the advantages of mobile technologies offering the possibility to contribute through instant messages apps or to enrich the description of the ideas with photos or videos. About the organization of the initiative, PI4 suggested that organizers should think about giving some rewards to motivate contributions. PI9 stressed the necessity to partner political actors who can implement the proposals. Along this line, PI3 recommended promoting the initiative by explicitly stating that contributions will have an impact on the participants' life.

8.6 Discussion

By integrating Facebook with IdeaScale, we aim at broadening and increasing the number and diversity of people participating in civic engagement processes for public sector innovation. We also wanted to increment contributions. In what follows, we discuss the answers to each of our research questions as informed by our findings, presented in the previous section. The lessons we learned about the strengths and limitations of our proposal are introduced at the end of the section.

8.6.1 Research Questions

R1: Increase diversity. People that were attracted by the initiative consisted of equally distributed men and women, mostly young, wealthy, well-educated, technology-savvy, and mainly Internet content consumers, not frequent voters but moderately active in society. The profile is aligned with previous experience in other Latin American countries like Brazil [205]. It differs, however, from the characteristics of people that took part in initiatives alike but conducted in socially and culturally diverse contexts such as Finland where participation is dominated by senior retired and well-educated males [7]. No evidence was found that the inclusion of

Facebook fostered diversity in the group of participants. The organizer party, whose followers are known to belonging to a high social class, might have strongly influenced the profile of the participants. Also, because the initiative was run within an electoral period, citizens not identified with the political party could preferred not to participate to avoid being identified with the party. In fact, one of the survey responders explained that did not participate from Facebook because did not want to be considered by his contacts as a supported of the party that organized the initiative.

R2: Increase the number of participants. We found that Facebook helped to attract more people to the initiative. It seems that the group newcomers spread the world with their friends who at the same time show off in IdeaScale and became members of the community of *Voz y voto*. In fact, about 25% of IdeaScale registrations corresponded to people that first joined the Facebook group. Along this line, we saw that an important proportion of the participants that tried both platforms found Facebook a more convenient than IdeaScale to contribute and follow the updates of the initiative. One-third of these people did not return to IdeaScale after joining the group on Facebook. Some of the qualitative results reinforce the potential of Facebook as a tool to increase participation in civic engagement processes. In this sense, the interviewee PI7 perceived the integration with Facebook as an opportunity to reach large groups of people that are already discussing about politics and public-interest issues.

R3: Increase contributions. Even when the introduction of Facebook in the middle of the process fostered increments in registrations, we found that it did not boost contributions. A reason for this might be that when we notified about the possibility to participate from Facebook most obvious ideas were already posted. In addition, communication problems could have discourage participants to contribute from Facebook. Indeed, interviewees and survey respondents recognized that they failed to notice the email through which the possibility to participate from Facebook was notified (e.g., PI1, PI4). Also, other interviewees expressed that did not understand how to participate from Facebook (e.g., PI6). Corrective ac-

tions could have been taken if we were aware of these situations earlier. We could, for example, use other means of communication (e.g., sms or whatsapp) or improve the instructions. The disclosure of one's real identity in giving political point of views could have been influenced this result. The use of real identity to express political opinions on Facebook was a concern raised by some of the participants. Facebook applications can be a valuable to allow anonymous participation. For instance, action links (e.g., post anonymously)[18] can be added to posts. Whenever the participant clicks on the action link, she can be redirected to an external web form that allows her to write anonymous messages. Later, the application takes the messages and publish them as comments to the posts.

Another cause might be related to local technology practices. In Paraguay, most of the social network traffic is generated from smartphones, which according to previous research are not appropriate devices for extended text digestion and composition [234]. As stated by [86], the selection of a civic technology should be context specific; ICT-enabled citizen engagement initiatives have to be implemented taking careful consideration of the local, social, cultural, political, and economic context of the target population. In contexts like Paraguay, then, particular attention should be paid in designing platforms optimized to work with mobile technologies. Here, addressing usability aspects such as connectivity, small screen size, display resolution, and data entry methods appears to be mandatory. In the design of user interfaces, techniques like responsive design[19] seem to be mandatory to satisfy the demand of either desktop and mobile/tablet users.

8.6.2 Strengths and drawbacks of the proposal

In general, the proposal was positively welcomed by the participants, who highlighted the popularity, familiarity, and easy to use features of Face-

[18] `https://developers.facebook.com/docs/sharing/opengraph/using-actions`

[19] Which One: Responsive Design, Device Experiences, or RESS? `http://www.lukew.com/ff/entry.asp?1509`

book. Along this line, PI2 remarked that Facebook offers several easy-to-use tools to facilitate participation, such as commenting, sharing, and liking. Besides, PI4 saw Facebook as promising to keep the participants updated about the news of the process. Interviewee PI5, who tried both IdeaScale and Facebook, mentioned that found Facebook easier than IdeaScale, *"everyone knows how to use it"* (PI5). Also, PI5 mentioned that having to learn a new technology would represent a strong barrier to participation, specially for the occasional participants. She continued explaining that, for example, it is very unlikely that someone will register into the new platform and learn how to use it, just to cast a vote. No interviewee neither survey respondent has complained about the way content was mirrored (e.g., use the first 64-characters of posts as the title of ideas, add vote counter as part of the post text) and no one seemed to miss the features that we could not mimic (e.g., voting).

We also discovered limitations in our proposal. We found that some of the participants had problems following the steps required to participate from Facebook (see Figure 8.6). We saw participants having difficulties to publish ideas. Some of them posted on their news feed and not inside the group. One of the two participants that posted idea from Facebook forgot to include the campaign hashtag; he edited the post adding the hashtag after the group moderator noticed the situation. Some interviewees remarked the difficulties to digest long texts in Facebook, highlighting that people should be precise and concise when expressing if they want to be heard. PI3 reported that found hard to digest the long text of the ideas posted in the Facebook group. She said that Twitter might be more appropriate because it would force the participants to be more concise when expressing ideas and comments. Along this line, PI10 and PI7 also suggested using more restricted text entries to force people to be more concise and facilitate the reading of ideas and comments.

8.6.3 Social Impact of Voz y voto

Voz y voto brought various benefits to the society. In the first place, it allowed the political party not only in understanding the citizens' concerns about Asuncion but also in discovering value ideas that can inform future public policies, such as the recycling plan that is being piloted in some neighborhoods of the city. Second, it served as an opportunity for people living abroad to contribute to the future of their city, and third, the initiative gave most of the participants a chance for the first time to voice their ideas and proposals directly to political authorities.

It is worth noticing the attractiveness of digital means to engage people that do not participate in democracy through more formal and conventional mechanism, like voting. In times of democratic recession when political participation and voting turnout is decreasing everywhere [59], interestingly, the initiative could engage people that are not active in democracy and usually do not participate in elections.

8.6.4 Limitations of this study

The results of this study cannot be generalized without testing the approach in other similar cases. We discovered that the introduction of Facebook in the middle of the process influenced the increment of IdeaScale registrations, however, and because of constraints in Facebook's privacy policies, we could not check if, in fact, the group's newcomers motivated their friends to become members of *Voz y voto* community in IdeaScale. The suitability of Facebook's features to create and publish ideas has to be tested in processes with other configurations and where the platform is available for the participants from the beginning giving them the possibility to choose the preferred means of participation. Also, we should conduct other evaluations in which the instructions on how to contribute from Facebook were better communicated to the participants. Moreover, we found that the presence of two channels of participation generated confusion among the participants and it was not clear enough whether Face-

book was included to complement IdeaScale or to replace it. We could not increase the diversity in the group of participants. But, more research is needed to test the approach in other contexts, with initiatives supported by different organizations, and in discussions of diverse topics to be conclusive about this point.

Chapter 9

Conclusion

This thesis addresses the problem of increasing the inclusion of different parts of the society in the online communities that support Idea Management (IM) for civic engagement. We hypothesized, based on previous research (e.g., [84, 116, 118]), that bringing large numbers of people to IM increases the possibility of having a diverse pool of participants, who has, for different reasons (e.g, access to different point of views, consider diverse experiences and knowledge, tap on various heuristics, draw on a broad range of skills), the potential to produce better solutions [121, 154, 174]. We saw, however, that having a large number of people participating in online communities is not an easy endeavor; it requires adapting the underline technology to the characteristic of the users and the application domain. Our proposal is to integrate Idea Management Systems (IMS) to people's daily basis physical and virtual spaces (e.g., squares, city halls, social networking sites like Facebook or Twitter) strengthening and facilitating participation. In this chapter, we summarize the contributions, discuss the findings, present the limitations of our studies, and introduce possible directions for future work.

9.1 Summary of Contributions

The contribution of this thesis is a study of how to bring IMS for civic engagement with popular physical and virtual spaces of participation. In

our study, we discovered the potential of public displays and social networking sites to lower participation barriers and engage citizens. We then proposed two approaches that integrate IMS with social networking sites and the city's physical spaces. The specific contributions of the work are

- **C1:** An extensive and systematic literature review on technologies proposed to support the participation of citizens in the ideation of solutions for social problems and innovation for public services;
- **C2:** A set of archetypes that define the characteristics of communities that support online IM processes;
- A group of patterns that shape the collective and individual behavior of members of IM communities;
- **C3:** Empirical evidence about the profile of the participants and the factors that motivate them to get involved in civic engagement IM processes;
- **C4:** A prototype implementation of a platform that integrates an IMS with public displays;
- **C5:** Empirical insights about the ineffectiveness of today's integration practices between IMS and social networking sites to increase contribution and the number of members in IM communities;
- **C6:** Findings that demonstrate the strengths and limitations of Facebook as platform to carry out IM activities (e.g., submit ideas, post comments, cast votes, content processing and synthesizing);
- **C7:** A prototype implementation of a system that integrates an IMS with Facebook.

9.2 Lessons Learned

From the presented studies we learned the following lessons.

- *More quantity does not always mean more diversity.* In the evaluation of prototype that integrates an IMS with Facebook, we could increase the number of participants however we were not able to include in the group of participants diverse sectors of the society. Beside the various factors that might have influenced this results (e.g., timing, political party that organized the initiative, wrong communication strategy to reach out the different sector of the population), we learned that increasing diversity in the group of participants requires understanding not only the technical practices but also the motivation factors as well as the social and cultural characteristics of the different targeted population.

- *Taking IMS through public displays to the heart of city life helps to grant ease of public access and promotes inclusive processes.* The use of civic technologies like IMS is particularly challenging because they justify themselves as means for increasing participation while potentially excluding people if it does not consider the capabilities and resources available to all citizens. We discovered that extending IMS through public displays located at places at the center of civic life (e.g., town halls, government offices, central squares) facilitates the inclusion of a broader portion of the population that might otherwise be left out from public discussions.

- *IM processes for civic engagement should be binding.* Although we found that learning and deliberation are strong factors that drive participation in IM, people engage mainly attracted by the possibility to influence the outcome of the process. Deliberating on the issue as well as learning about it and others' viewpoints are socially motivated factors that involve interaction with other participants. Citizens experienced and enjoyed learning and deliberating, even though neither the IM processes nor the medium were designed for such things. However, we saw that the desire to be social or to learn are instrumental in reaching the primary goal of influencing the outcome of the process.

Organizers should, therefore, do their best effort to take contributions into consideration. Otherwise, citizens can lose interest to participate more actively and thus decreasing citizens' engagement because they feel that their voices are not heard.

- *IM processes should be organized in sequences.* Most of activities in IM communities occur at the beginning of their lifetime. Overall, IM communities follow clear collective behavior patterns that show in general higher activity levels at the beginning of the life of communities (first three months) and then a decrease in the level of activity. This phenomenon indicates that participants lose interest in the process after certain time. IM should, therefore, be designed for a limited length. Having several sequences of IM process and changing the prompt can also help in activating the crowd to participate.

- *IM represents a promising means to engage those less civically active.* We discovered that both in Finland and in Paraguay, IM attracted citizens that are not very active civically in society. This demonstrates a promising aspect of IM as a participatory democracy method and provides a new avenue to increase civic participation for those who have not been previously very active —at least among those who already use digital means for participation.

- *Facebook showed to be an effective tool to elicit and harvest ideas yet its features to process and synthesize content are limited.* Facebook provides a variety of opportunities to express ideas and opinions. IM organizers should therefore exploit it as a front end tool to reach their already established Facebook communities and get valuable ideas to fuel their innovation initiatives. Particularly, we found that Facebook's hashtags and its features to support conversations by threading comments to a post in a single, flat and chronological hierarchy are appropriate to harvest ideas and opinions. However, we saw that it lacks more appropriate features to synthesize and process the information

generated during IM processes.

- *Current practices of integration between IMS and social networks fail to exploit the potential of social networks as incubator of ideas.* The common Share/Tweet buttons —today's primary mechanism of integration between IMS and social networks— do not help IMS to increase participation nor contributions. We studied the effectiveness of this practice discovering that these buttons are, in general, not effective in helping IMS to increase participation or productivity. Although social networks have an enormous potential as incubators of ideas and proposals, current techniques fail to leverage on it properly. In fact, even if triggered by Facebook shares or tweets, people inside social networks apparently are not willing to go to IMS and register for another platform, not allowing IM to track and value their ideas and feedback.

- *A novel integration between IMS and Facebook helps in bringing more people to IM.* Facebook contributed to bring more people to the IM. We found that very likely about 25% of the people registered into the IMS were participants that learned about the IM process through Facebook. One-third of the people that were using the IMS did not return to it after starting their participation via Facebook. Familiarity and convenience were among the top reasons given by the people that chose Facebook as their participation means.

9.3 Limitations

The results reported in this thesis are limited by the following reasons.

- Our qualitative studies on the collective and individual behavior of IM communities are tightly connected to the platform we chose for our study (IdeaScale). The results then should be interpreted within

this context. We are also aware that the study is limited by its descriptive nature and therefore could not investigate causal effects. The analyses we carried out in this work may also suffer from the lack of consideration for "lurking" variables, such as unattractive discussion topics, low promotion efforts, incentives, unclear participation rules, and timing of our observation.

- The findings of the ineffectiveness of Share/Tweet button are specific to the context of IM for civic participation, limited by the platform of study (IdeaScale) and by the observational nature of the study (e.g., we could not test reactions to artificial stimuli). As in the case of the behavior study in this analysis, we did not also consider the lurking variables mentioned above.

- Our results about motivation factors cannot be generalized without testing them with larger samples in other countries and contexts, and in other types of process and technology designs. Those can affect the profile of the participant crowd, and thus the motivation factors.

- Even when our system that integrates IMS with public displays showed to be promising in engaging sectors of the population that would not otherwise participate, it had been tested through a single field study. The system should be evaluated in other settings that allow us to deeply understand not only the strengths and limitations of our proposal, but also learn the conditions for its successful implementation.

- Our analysis of the Facebook's technical affordance to carry out IM tasks is based on two cases of limited samples. The findings cannot be conclusive without testing them with additional types of IM processes, which can affect the attitudes, practices, and behaviors of participants. Comparative analyses are required to better understand the strength and limitations of Facebook to instrument IM. Also, the suitability of Facebook's features need to be studied more extensively.

- The proposed platform to connect IMS with Facebook has been tested through a study that introduced it in the middle of an IM process, as a way to verify the effect of the intervention in the process. Also, it has been evaluated in an IM process executed by a particular organization during an electoral period. The results should then be interpreted in the light of this very specific context. More research is then needed to evaluate the platform in processes with other configurations and where the platform is available for the participants from the beginning giving them the possibility to choose the preferred means of participation.

9.4 Future Work

In the future, we plan to test our approaches in other processes of innovation in the public sector. As part of a research project on technologies for civic engagement, we are working with the Minister of Education of Paraguay, with the City Hall of Asuncion, Paraguay, and with a civic organization to conduct experiences of public sector innovation. In the first case, the goal is to invite the citizens to propose ideas on how the Paraguayan education can be improved. Collect feedback and ideas from the citizenry to influence Asuncion's urban development plans is the objective of the city administration, while the civic organization seeks to promote a space for the collective construction of policies and laws.

Embedding civic engagement platforms into popular city locations and integrating them with familiar tools, such as social networking sites, resolve one side of the problem of engaging large parts of the population in participatory practices mediated by technology. On the other side, civic technologies still face the challenge of synthesizing and analyzing the large amount of contributions (e.g., ideas and comments) that are generated by citizens during IM. A research direction we have already started working on and we plan to pursue in future is to explore the use of Machine Learning (ML) algorithms and Natural Language Processing (NLP) techniques to facilitate the analysis, process, and synthesizing of the textual

and unstructured information generated by IM participants. In an ongoing collaboration with colleagues from Stanford University, UC Berkeley, and Fundación Democracia y Desarrollo (Chile), we have experimented with NLP and ML to facilitate, accelerate, and increase the efficiency of synthesizing and processing citizen contributions through automation [4]. The findings of this preliminary research show that NLP and ML are indeed useful in the analysis of citizen contributions, but much work remains to be done to develop algorithms to process the kinds of unstructured data of varying format typical of IM civic participation.

In our future research, we intend to examine motivation factors in other IM processes run in other countries and context, such as Paraguay, which possesses totally different social, cultural, and political circumstances. We plan also to formulate hypotheses based our findings, and test those hypotheses in larger studies. The methods could include A/B testing, by which motivation factors can be embedded into features on the technical design of the platform and their impact tested on one-half of the users. In A/B-testing, a half of the users, the A group, are shown a design appealing to a certain motivation factor, whereas the other half, the B group, is shown another feature appealing to another motivational factor. Assuming that there will be access to several in-the-wild IM processes, future research should identify what key factors in the process affect motivation factors, and how the factors may change over time during the process. Our research agenda might include also qualitative research approaches to examine the motivation factors in greater depth, with interviews and digital ethnographic methods. Finally, we want to study and assess the motivations of the more passive participants in the processes —as well as those who choose not to participate at all— as surely the reasons for passivity are as enlightening as the reasons for active participation.

As we learned from the studies conducted in this thesis, people come to IM attracted by the possibility to interact and deliberate with others about the discussion topic. We have seen that, indeed, deliberation happens on IMS; however, it remains unclear what the quality of the deliberation is.

This matters because IM could, potentially, scale up to masses, unlike many other participatory practices, such as citizen juries and deliberative polls, that serve only a small-scale participation. But if the quality of deliberation is low, scaling up is not meaningful. Another research direction, in which we have done already some preliminary work and contributions and in which we will continue in the future, is to develop techniques to improve the quality of deliberation. In this regard, we have worked in applying Discourse Quality Index (DQI), the most used method in analyzing deliberative quality, to examine the quality of deliberation in two IM processes for policymaking [9]. Next, we plan to develop approaches that can help the participants to improve their contributions during deliberation by, for example, automatically recommending them to provide more justifications for their arguments and prompt for storytelling for real-world examples in narratives.

We studied the behavior of IM communities by looking at nearly 200 communities that live in the same IMS (IdeaScale). In the future, we plan to analyze IM communities existing in other IMS with the goal of understanding the influence of the technological means in the individual and collective behavior of the community members. Some of the questions we hope to address include, but not limited to, do the communities behave similarly regardless of the IMS? Are the emerging practices of members alike despite the underline IMS? Which are the differences? We have already started this work by collecting information from IM processes conducted by large and well-known companies including Starbucks, Dell, and Adobe, which ended up with a dataset of 51,500 ideas, 9,000 users, and 268,000 comments. With the results of the latter study at hand, we plan to derive a set of evidence-based actionable guidelines that accommodate to IM systems and the diversity of communities that live in them.

In the same study, we found that in general communities showed to concentrated the majority of their activity during the first months. An interesting question for future work that emerged from this finding is the early identification of the point when the activity levels transition from an

increasing phase to a decreasing one. In addition, we can investigate and understand what conditions may delay or speed up such phase transition, and how we can use such new knowledge to provide recommendations to organizers and moderators so that they can take corrective actions.

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