

E-participation with social media in Science, Technology and Innovation: Brazilian States Research Support Foundations case

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Abstract

The use of social media has advanced in all social strata with effect on citizen participation in political discussions. In the context of Science, Technology and Innovation (ST&I) policies, bringing citizens closer together is a challenge for scientific and governmental institutions. The Brazilian States Research Support Foundations (RSF) show interest in promoting this approach to legitimize investments in science. Studies on the effects of social media on the relations between science, society and government are scarce. This research analyzed how e-participation, through social media, promotes citizen participation in the ST&I policies and actions of the RSFs. Nine organizations, including at least one Foundation from each Brazilian region, participated in this study. The main contribution of social media was the ability to intensify the interactions between government, researchers and citizens, using an informal and accessible language.

1. Introduction

The advance of dialogue between academia and society is needed for the legitimization and expansion of public investments in ST&I. Making the scientific language attractive to the layman is a challenge for the scientific community. Limiting access to the scientific results also restrain the propagation to citizens the benefits of science. Putting scientific research close to citizens, companies, and the government is imperative to increase the appreciation of scientific activity [1].

The European Commission [2-4] proposes to bring science closer to society with its European Research Area (ERA). The institution allocated € 462.2 million to meet the specific objective: "Science with and for society," in Horizon 2020 [5]. The European Union determines the development of a research and innovation agenda that meets the expectations and demands of citizens and civil society [5].

In the Brazilian context, a plan like Horizon 2020, aiming social participation in science, is still incipient.

However, scientific research public funding agents show interest in reducing the gap between science and society. For instance, the Minas Gerais State Research Support Foundation (FAPEMIG) funds projects for the popularization of ST&I, focusing on the scientific information disclosure to non-expert audiences [6].

However, citizens' participation in science is a challenging process. The reflexive and critical dialogue among government, researchers, and citizens plus the society engagement for the development of ST&I are demanding in the participatory process [7-9]. Actions to promote multilateral communication of the government, citizens active positioning, and the opening of the scientific community to the dialogue with the society are all needed.

E-participation can facilitate the approximation of civil society to ST&I activities to deal with these challenges. E-participation is understood as the use of Information and Communication Technologies (ICTs), mainly the Internet, to promote citizen participation in the agenda-setting and decision-making [10-12]. Also, it contributes to the citizen participation process by providing communication technologies by making information accessible and creating a broader interaction environment [10].

The improvement of the ICTs brought tools for creating and sharing user content, like Youtube, Twitter and Facebook. The so-called social media broaden the channels of dialogue with multiple actors and higher opinions heterogeneity [13], being one of the most used e-participation tools [14]. The communication and speed are increased at a reduced cost, enabling an equitable participation process [15]. The government can place itself where citizens already are communicating [16]. In contrast, the heterogeneity and the volume of opinions make it difficult for information analysis [13,17,18]. Citizens' interest in participation does not always go well as expected [19, 20] and government institutions may not use social media for closer dialogue with citizens [21].

Research associating e-participation to the ST&I policies and actions, in particular, using social media as tools is lacking. Ho et al. [22] point out the need for

research to analyze the relationship between social media, society, and scientific communication. Su et al. [23] indicate that studies on strategies of scientific communication using social media are missing. Facebook use to analyze social media interactions between science and society should be studied [24]. Bolivar and Alcaide-Muñoz [25] also report the importance of more research to understand the social media dimensions and effects in e-participation. Alarabiat, Soares, and Estevez [26] and Vicente and Novo [27] claim for research that addresses the use of social media in e-participation. The lack of studies addressing e-participation in ST&I actions and policies is even more evident outside European and North American. Jia et al. [28] indicate that the use of social media in scientific communication in multiple sociopolitical environments must be investigated. Finally, research that addresses the Brazilian context is scarce, despite it is the fifth most populous country, sixth in area, eighth-largest economy [88], and the fourth leading country in Facebook users [89].

This study seeks to fill this lack by analyzing how e-participation, through social media, promotes citizen participation in the ST&I policies and actions of the Brazilian State Foundations of Research Support.

2. Citizens' participation in ST&I policies and actions

Citizen participation in science, according to Irwin [7], Chilvers [8] and Ryan [1], is a concept that comprises democratic and reflexive citizen participation for ST&I development in its many shapes. The participation forms can be deliberative; discussion and policy-making; monitoring and accountability; and participation in scientific processes, using open data and scientific research results.

Research on citizen participation in ST&I policies rises in Europe, mainly in the UK, as a result of discussions on the development of GMOs in the late 1990s. The English society had a strong reaction, which made it possible for citizens to approach the researchers, in order to delimit the related policies. Doubts regarding the GMOs production provided the necessary civic engagement for social participation in decision-making regarding Bioscience [7].

However, criticism of an instrumentalist participation process reinforces the need for learning of a critical and reflexive dialogue [8]. Collective political deliberations depend on rational arguments for its legitimation [9]. The dialogue must take place equally to explore the individual critical capacity. Humbleness in promoting a balanced dialogue enables a collective decision that serves common interests [9].

Chilvers [8] mapped the main actors that mediate science-society interactions in the UK, their roles, and relationships. Despite the significant differences between Brazil and the United Kingdom, this mapping was used as a starting point for questioning citizen participation in Brazilian science. According to Chilvers [8], knowledge mediators, facilitators, catalysts, and intermediaries, constituting organizations to institutionalize the public dialogue field arisen.

A fixed model for public conversation delimited by relation networks emerged, given that the locus of dialogue is in the political and science institutions. In this institutionalized model, public dialogue is only triggered for specific decision-making moments. Besides this fixed model, dialogue associated with public engagement spaces was also identified [7, 8].

3. E-participation with social media

Web technologies advances have enabled communication tools to citizen collaboration. Web 2.0 designates a second generation of web technologies with new designs in online systems development [29]. Developers provided features to enable content creation and sharing, where users can interact in their creations. Web 2.0 applications became platforms where content is exponentially generated and expanded by a collective intelligence [29]. Users that were information consumers become information producers.

In this new web environment, applications like Youtube, Facebook, and Whatsapp abound. These applications, called social media, after citizens and private organizations, are also incorporated by government becoming communication and interaction tools. By using social media, the government can interact with citizens where they already are communicating [16]. Close contact can provide greater citizen satisfaction if the government balances its interests with the citizen's interests [30, 31]. Social media provided a contact channel with citizens in a more informal and personal tone than traditional media. Such government-led communication in social media can increase the government positive activities visibility [32] reinforcing citizen satisfaction.

Social media provide more significant opinion heterogeneity for decision-making. However, this higher data volume and volatility requiring training and specialization of government agents to deal with these new technologies, especially in crisis mode [13,17,18]. Government interaction not always reach expected volume and potential, due to a lack of citizen engagement [19, 20] or government interest [21]. In the context of e-participation, Social media has the potential to amplify e-participation but in some cases does not result in broader citizen participation [19,20].

4. Brazilian States Research Support Foundations - RSFs

In Brazil, research support foundations exist in the national and state. This study will only focus on state government. São Paulo State was the first to establish a foundation in 1960 and Rio Grande do Sul came second in 1964. Rio de Janeiro and Minas Gerais started foundations in 1980 and 1985, respectively. The foundation constitutions grew in the 1990s and currently only one state does not have this institution.

The RSFs were instituted by state government acts delimiting their desired performance. The RSFs are also accredited by the Brazilian Ministry of ST&I [35]. The RSFs seek to foster scientific and technological development by driving and funding scientific projects, human resources training, and transferring research results to the productive sector [6].

The RSFs stand out for their capillarity with presence in all but one of the Brazilian states. This scattering makes possible the execution of national policies acknowledging regional specificities [34]. The National Council for State Research Support Foundations (CONFAP) is responsible for coordinating RSFs common interests [36].

In the ST&I National System (ST&INS), RSFs are seen as Development Agencies located between the Political Actors and the ST&I Operators, allowing a close relationship with all the actors of the system. The ST&INS group the actors involved in the regulation, resource allocation, and execution of ST&I activities. Political actors discuss and elaborate on the norms and guidelines for the ST&I development activities. ST&I operators must follow the guidelines, programs, and projects to generate innovations, technologies, and scientific advances. The RSFs and other agencies articulate the development of the ST&I programs bridging the strategic guidelines and the implementation of the policies by the operators [35].

The scattering of the State RSFs and their position in the ST&INS provide a strategic opportunity to promote e-participation in the Brazilian ST&I actions and policies. The RSFs network and the proximity with citizens, politicians, and researchers provide a singular capacity to foster the dialectic process between citizens, politicians, and researchers.

5. Methodology

The multiple case study followed a qualitative and descriptive approach in eight RSFs (named from A to H) from all Brazilian regions and members of the CONFAP. The intention was to understand the perception coming from e-participation using social

media related to actions and policies of ST&I from the foundations.

The analysis categories were based on the e-participation framework of Wirtz, Daiser, and Binkowska [37]. This model integrates elements from the Macintosh frameworks [10], Tambouris, Liotas, and Tarabanis [38], Sæbø, Rose, and Flak [11], Phang and Kankanhalli [39], and Macintosh and Whyte [40].

The chosen framework [37] was built on top of the most-cited academic e-participation frameworks [10, 11, 12], offering an integrated view focusing implementation, and interconnecting environmental drivers, organizational goals, and e-participation forms. Additionally, instruments and strategies for using technologies were also crucial due to these studies' emphasis on social media.

In the data collection and analysis, the following categories were considered: targets - e-participation purposes guiding other categories; forms - citizen participation and interaction; strategies - e-participation instruments integration and coordination levels (technologies); instruments - e-participation information systems and components; demand groups - actors in the e-participation initiatives; and e-participation drivers - the environmental drivers that influence the other components.

The communication department managers were selected using a snowball sampling and interviewed due to their social media involvement and close contact with organization members. The data collection was from June to December 2017. The interviews last 45 minutes on average. Content analysis occurred for three months, simultaneous to data collection.

Semi-structured interviews were performed with communication department managers to gather qualitative data focusing on e-participation categories. The transcripts were coded and grouped in a matrix by the organization and e-participation category. The selection, classification, and qualitative analysis of the excerpts followed the Bardin's principles [41], i.e., exhaustiveness, objectiveness, and specificity.

6. Results and Discussion

The following topics show the content analysis of the interviews according to Wirtz, Daiser, and Binkowska [37] categories (targets, forms, strategies, instruments, demanding groups, and drivers).

6.1. E-participation targets

RSFs communication managers perceive that social media is used to improve information disclosure to the public. All investigated institutions share the same perception. Respondents consider that this

improvement comes from the possibility of closer, faster, cheaper, and comprehensive contact with the public. This improvement works as a counterpoint to traditional media such as television, radio, and newspaper, all limited in interactivity. Shares, likes, and comments on Facebook help increase the posts reach and the information dissemination speed.

The improvements indicated by the interviewees correspond to others findings [16, 15, 42], that social media provides greater reach and speed in the information spreading. The managers' perception reinforces Merry's research [15] that social media is an equitable communication channel compared to traditional media due to lower costs.

Another target using social media is related to the ability to improve the relationship with citizens. Organizations A, B, D, E, F, and G has this goal. This improvement comes from promptness responding to citizens demands and keeping closer contact.

The interviewees corroborate the literature [20, 30, 31, 43-49] that points out the possibility of using social media to increase citizens' satisfaction in government. The increase comes from receiving and monitoring citizens' demands by government agents. Social media made easy the contact with citizens.

Within this context, social media increases the communication and interaction capacity of governmental ST&I agents with society. However, social media alone is not enough to promote social participation.

6.2. E-participation forms

All the investigated organizations are using Facebook and other social media to information diffusion. According to the respondents, the focus is on disclosure of calls for funding and results of funded research. The organizations also seek to show the importance of investment in ST&I for society.

Despite the focus on information disclosure and transparency of funding, a participatory approach of citizens in decision making is still limited. The social media use in the organizations is consistent with several studies [21, 50-68] that point out the use of social media predominantly for the information disclosure limiting the citizens opinions in decisions.

Only organizations F and G indicated public consultation through social media. In organization F, the communication manager emphasized that when using Facebook for public consultation, they not always achieve the expected engagement. On the other hand, in organization G, the public consultation with Facebook obtained a satisfactory engagement. However, the participation of the academic community

prevailed. In both cases, the challenge remains to expand the participation outside academia.

Organization F data corroborates the studies [19, 20, 55, 69] which indicate a passive citizen positioning relating to the government in the social media. However, where actors already have a relationship outside of social media, this is reduced, as observed in Organization G. Organization G matches the data from studies [30, 70, 71] which demonstrate the social media use with higher interaction between citizens and government. In these studies, the interactions were already occurring outside the electronic environment.

Organization F also stands out for initiating a more in-depth analysis of the high influence actors. This analysis consists of the network mapping searching for the most influential institutional pages. Based on this mapping, Organization F exchanges information in social media with those institutions.

Social media mapping in Organization F demonstrates an electronic monitoring action to evaluate and to promote its policies and organizational image. This Organization F behavior is in line with cases addressed in other studies [72, 73] showing the rise of the electronic monitoring to understand citizens' opinions and feelings both useful to assess government image and actions. This approach demonstrates a willingness of the Organization F to increase the synergy with the social media agents.

All institutions demonstrate a willingness to answer the citizen's questions with a few cases of direct involvement that influence institutional decisions. Despite the limited social media use in decision-making, its use led to the expansion of attendance with closer follow-up of citizens' problems.

The social media is also an open environment for claims. The managers of organizations E, F, and G observed posts and comments volume increase asking for solutions when scholarships and grants were delayed. These claims encourage organizations to position themselves to clarify difficulties and present solutions. As exemplified in organization F:

"[...] there are the most delicate questions about this situation, the scholarships delay, we already had two situations that we consider as crisis and Facebook is a gateway to questions and complaints, [...] then we try to answers through a post or information sharing and something we try to work together with our presidency in a strategic way [...]" — Chief of the Social Communication Advisory, Organization F

The delay of the scholarships impelled the students to break with the passive position and provided a bidirectional relationship. This situation has broken the status quo, demonstrating the potential of social media for a more intense and direct relationship between citizens and government agencies. These extreme

situations that put the government as the target of scrutiny were also verified in other studies [72,74-76] and reinforce, together with the organizations cases, the potential of bi-directional use of social media when citizens actively participate in the discussions.

In Organization D, Facebook strengthened the demands for the formulation of a program of funding projects with scientific initiation for high school students. Although it is an isolated situation, this case demonstrates the potential of Facebook to support claims with influence on institutional decisions.

In the interviewees' reports of all the organizations, the use of social media to involve citizens in institutional decisions was not identified as one of the main ways. As observed in the studies by Chen et al. [77] and Mergel [78] the way in which social media is used depends on its alignment with the organization's mission and objectives, the use of social media does not imply an automatic involvement of citizens.

Public interest ST&I information is broadening by social media. Also, this media enables direct and informal dialogue between government agents and citizens to enlighten ST&I issues. However, it has not been able yet to provide a fully collaborative environment for citizens and decision-making entities.

6.3. E-participation strategies

In the perception of the managers, the organizations A, B, C, D, E, F and G adopt the integrated strategy with adequacy of the content and the language for each format of media and public. The timing of publication also varied for each media format. The peculiarities of each media are used in an associated way to meet the communication objectives of the organizations.

In the case of organizations H and I, those responsible for communication indicate the combined strategy in the use of social media with other media, as they have more difficulties in differentiating content between media. This difficulty is related to the need for skilled personnel in the area of designer for creating and editing images for social media.

The interest of the organizations investigated in the use of differentiated content for social media in complementation to other media follows a closer approach to the integrated use of technologies. The organizations' approach is consistent with the studies [54, 63, 79, 80] which show that the use of more informal language with multimedia resources and information related to daily life favors the attraction of citizens' interest in social media. This way of using social media contributes to the broadening the reach of communication actions.

Social media use lowers the use of expert terms for ST&I information spreading. Organic propagation on

social media compels ST&I entities to tailor communications to non-expert citizens.

6.4. E-participation instruments

According to communication managers, in Organizations C, D, F and G, the use of Facebook is greater than the use of other media, including the site. The freedom to produce content is indicated as one of the reasons for the greater use of Facebook. Even in cases of Organizations A, H and I where the use of the site is greater than other media, Facebook is the second most used media, as indicated by the managers. In organization B the use of Facebook resembles the use of the site. In the perception of the managers, the use of Facebook is part of the routine of communication of the investigated organizations with situations of intense use. In contrast, in the Organization E Facebook is considered only a complement to other media.

Those responsible for the communication indicate that the use of private messages, inbox, on Facebook is a recurring practice. Organizations B, I and H receive more inbox messages than comments in posts. In organization E, the volume of inbox messages and comments are similar, in other organizations the comment number is larger than the inbox message.

It is noteworthy that researches [50, 54, 62-64, 75, 81-85] that quantify Facebook's use of e-participation do not cite the existence of this indicator, the amount of inbox messages, which represents a form of direct interaction between citizens and government. Inbox messages, when used concurrently with comments, have an impact on indicators such as the level of engagement. The verification of this indicator in future research may also be important to gauge the level of transparency and profile of citizens.

In addition to Facebook, 78% of the organizations investigated use Twitter, Instagram or YouTube. Highlight for Instagram, social media with relevant adoption by the organizations. Organization H has had cases where the reach of publications on Instagram was greater than on Facebook.

6.5. E-participation demand groups

In all investigated organizations the researchers and the universities are the focus of their communications. Researchers and universities are partners of the organizations investigated. Researchers act cooperatively with communication managers in crafting content to disseminate research in a format more accessible to citizens.

Considering the reports of those responsible for communication in organizations A, E, F, G and H, state governments maintain a relationship of partners and

encourage the use of social media. Especially in organization G, according to the reports, the state government encourages the use of social media and how to act in social media.

"[...] the government also started to come in strong, with communication and a board of directors focused on networks, social networks, face, Instagram, Twitter, various platforms and stimulating enough that all the institutions adhere [...] we have here many communication seminars, within our communication secretariat, about the metrics, about the answers we should always give, about respecting diverse opinions about the contents we are posting, about behavior in networks, and how people should behave in networks and not just us as our directors." — Communication Coordinator, Organization G

Organizations A, B, D, F, G, I and H maintain relationships as partners of the other research funding agencies and CONFAP. The communication managers of the organization A and B indicate that the organizations seek the development of a collaborative relationship between the RSFs with the use of group in the WhatsApp for an integrated communication among the managers of the organizations investigated.

Private organizations were less emphasized as plaintiffs in reports from Organizations A, B, and H. The focus is on disclosure of funding opportunities for startups. In these cases, the investigated organizations use differentiated methods of disclosure to reach a larger audience of stakeholders, this approach extrapolates the academic public.

In all organizations, the citizens are considered a demand group. However, the relationship with citizens only prevails for the dissemination of information. Except for Organizations F and G that carried out specific actions to obtain greater participation of the citizens. In both cases, in the perception of communication managers, the interest of participation of citizens not linked to the academy was limited.

In the academic context, considering the interviewees' reports, students who receive scholarships to carry out research activities are the largest public in terms of the volume of citizens served. Being the most active public in social media. According to reports from interviews in Organizations E, F and G, the presence of students was exemplified in the claims regarding the delay of scholarships with significant growth in the volume of comments and posts on Facebook.

Within this paper' scope, social media magnifies the communication of ST&I themes to society. However, ST&I agencies still have academics as the main demandants. This paper could not identify entities [8] acting as facilitators, catalysts or intermediaries for the social participation in science.

The absence of this type of actor reinforces the limitations for e-participation in the ST&I policies.

6.6 E-participation drivers

The statements of the communication managers interviewed show that all the organizations investigated seek transparency in the publication of financing notices and use social media to broaden the scope of disclosure. It should be noted that publication of the edicts is a legal requirement, however, the use of social media indicates the recognition of the importance of this channel for transparency in communication. One of the main objectives is to increase the number of participants in the edicts. In addition to the initial disclosure, the information that generates doubt is clarified directly on Facebook.

The use of social media in organizations to increase the transparency and dissemination of the edicts reinforces the researches [49, 57, 86, 87] that demonstrate that social media promote and facilitate the availability and access to government information. This provision favors social control and citizen participation in government actions. Citizens, when they feel benefited, are encouraged to request, more and more, information for government agencies.

Those responsible for the communication of organizations A, B, E, F, G, H and I also seek to demonstrate the research financed in a more understandable format for the population. Videos and interviews with researchers are used to facilitate this understanding. Managers are concerned to demonstrate that public investments in research generate a return to society. As stated, for example, by the head of communication of the organization I:

"[...] we have to show to society what we are doing even because today we live in crisis, for example, we have budget cuts at federal level and in some states. So we see that there are people missing here in society as a whole to see the importance that science has. So for example you're on Facebook and you find ways that people see that science is the fruit of what they're paying for tax. [...] This money is applied to make that knowledge, and that knowledge will turn improvement into people's lives." — Head Of Social Communication, Organization I

Social media can contribute to the increase of transparency in ST&I public investments. These investments need legitimization, which should lead to an increment of social media use focusing outside academia.

As observed in the reports, the organizations investigated seek, with the dissemination of information, to strengthen the legitimacy of investments in ST&I. However, the focus is limited to

the dissemination of information. The legitimization of a more incisive participation of the citizens was little observed. The legitimization approach without direct citizen participation has also been identified in the European Union [1]. Ryan [1] points out that in the European case the role of citizens is mainly limited to the assessment of the responsibility of decision makers. Another difficulty lies in the incipient development of scientific literacy for citizens' engagement in science.

The organizations investigated demonstrate the focus on the science development for the society, which is a positive thing, however, organizations seem to be missing the opportunity of developing science with society as indicated by Horizon 2020. The direct citizens' participation in the scientific development can contribute to expand the public investments in science and technology so desired by the organizations.

7. Conclusion

Although only one organization has mentioned the involvement, the targets where the citizen is considered a passive agent have already accomplished. That is what Macintosh [10] has indicated as e-enabling. Possibly, this is related to concerns on improving information provision and strengthen public trust.

Focus on strengthening public trust may indicate that the use of e-participation began with incidental initiatives. The presence on Facebook may show that organizations in this study are going where the majority of citizens are. This movement is relevant to be able to answer citizens' doubts and to meet their demands. Perhaps these organizations have been compelled to use social media, given its strength to the public in Brazil.

It is interesting to note that there are organizations in the study with integrated strategies. Even if the RSFs started with isolated initiatives, they had to evolve to avoid posting on social media the same content from traditional channels. Social media have a strong influence on other channels. Although academia is the largest public, the lay people are also targeted using language with non-expert terms in social media. Thus, the transparency and accountability drivers reinforce that the researched organizations have felt the society's demand for the popularization of science.

Given the results, the social media central contribution, especially Facebook, to citizen participation in ST&I is the ability to intensify relationships and involvement among researchers, citizens, and government, using informal and understandable language. Social media push information holders to make the content accessible to increase their publications engagement and reach.

In the surveyed cases, organizations' longing to broaden the social media reach led to interaction between RSFs communication advisors and researchers to make research results accessible to the citizens. The public, when receiving information and interacting with organizations, found in social media an open and direct communication channel. The institution's involvement with citizens in social media has not necessarily led to a citizens' influence on institutional decisions. However, when this influence occurred, social media contributed to intensify and accelerate the participatory process.

The organizations of this study mainly disseminate information in social media as an e-participation form. That is linked to the organization's target of improving the information disclosure to their public. In that context, social media use is consolidated. However, the influential citizen's involvement in the actions and policies is at an early stage.

Despite this initial stage, social media contributed to citizen participation and involvement, even in environments where social participation is not considered the main purpose. That was observed in the cases of the complaints about the delay in the scholarships in Organizations E, F, and G. In Organization D, there were requests of research financing to high school students. Although these are isolated cases, those events demonstrate the potential of social media to contribute to social participation in ST&I actions and policies.

This research also highlights an interconnection among drivers, objectives, and e-participation forms. Environmental drivers influence the organizations' goals influencing the e-participation forms and their tools. In the empirical cases, the demand for public investments transparency and legitimization directly influenced the determination of organizations' focus on the ST&I information spreading.

Some of the organizations in this study have a restricted view of the social media participatory process potential to promote the ST&I investments legitimization. Organizations disseminate the scientific research results to strengthen the legitimacy of ST&I investments. However, citizens only become aware of what is science and its benefits at the end of the process. This contact form limits the engagement of citizens, researchers, and political agents. Citizens' participation from the beginning, for instance, in the ST&I policies development, can strengthen the legitimacy of policies and, consequently, increase resource availability for this purpose.

However, adequate participation involves the understanding of the ST&I themes, and a citizen's continuous learning is needed. Students engaged in scientific activities can serve as facilitators of that

learning. Students are the largest public attended by the RSFs and have a significant presence in social media.

Most of the citizens not reached by research dissemination live in the boundaries of society and are affected by the digital divide. The RSFs can work with students to broaden the reach of its actions and to promote engagement in ST&I activities. Researched students can act as facilitators in the participatory process on ST&I topics, mainly because they are probably closer to laypeople than the RSFs are.

The Research Support State Foundations can assume the role of financing agents and organizers of this dialogue between science and society, favored by its regional distribution in the Brazilian case. The Foundations can perform citizen consultation campaigns with the support of the students. For instance, competitions where students, researchers, and universities should demonstrate the importance of research in society's daily life, through videos, images, and memes in social media. The competition could be linked to a citizens' consultation about the next calls for funding. Throughout the campaign, students support by researchers would be instructed to answer the citizens' doubts about their research areas.

Some actions described in the study promoted e-participation in ST&I with interaction among citizen, researchers, and government. Social media positively influenced social participation in some organizations. However, the benefits rely on the organizations' goals and environmental drivers towards e-participation. The development of environmental drivers that promotes ST&I citizen participation is needed to mature e-participation. E-participation can bring societies like Brazil closer to science, opening space for discussions of the most significant issues to be addressed. Those discussions could lead to a participatory budget aligning societal demands and science funding.

This research is limited to the scope of surveyed organizations. Future research should investigate the interaction between researchers and citizens in social media. For instance, whether researchers are interested in bringing citizens closer to ST&I actions and policies. Another research direction is to assess the citizens' knowledge in the ST&I actions and policies. Also, one can evaluate the commitment of research institutions and government agencies to promote citizen participation in ST&I policies using social media. Studies to explore and understand the researchers and students' potential as facilitators of a participatory citizens' process in ST&I actions and policies supported by social media. Finally, further research on environmental drivers that promote citizen participation in ST&I is needed.

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