ABSTRACT The recent political, economic, and social situation has given rise to question on the part of citizens regarding their own space for political participation. Social movements in the form of protests are an example of this growing need for society’s participation. One thing that can expand these possibilities is technology. It is correct to affirm that the advancement of smart city and popularization of technology — more specifically, of social media — has established new opportunities to expand these virtual spaces. In line with this scenario, there are several initiatives whose objective is to develop tools that facilitate or promote citizen participation. However, there are still many issues that need to be investigated in order for the use of these tools to be effective. The objective of this work was to propose a tool that facilitates the discussion of societal problems by citizens. In the analysis of the results — obtained through an experiment with users to evaluate the effectiveness of the tool — it could be seen that, although the majority of users agreed that the discussion model and the proposed problem register can contribute to the real solution of the problem, it could also be seen that citizens still lack motivation and engagement — something that needs to be studied and improved.

INDEX TERMS e-Government, e-participation, digital democracy, smart city, social media.

I. INTRODUCTION

For [1], smart cities should use a citizen-centered approach, so participatory technologies become important in this regard. Various technological advances have provided new opportunities for the participation of society in public management. These new possibilities may be considered stimuli for new scenarios in which the space for citizen participation in policy decisions could be discussed and expanded again. One phenomenon to be considered in this context is the popularization of social media and their role in promoting citizenship. For Agarwal et al. [2], among many others, social media platforms have profoundly impacted human behavior and lifestyle.

For example, in Brazil’s recent presidential elections, social media had a considerable influence, as identified in the work of [3], which analyzed information shared on Twitter during the election campaign period. In [4] the authors described a platform that collects and processes tweets to produce metrics related to e-Participation. Resende et al. [5] also verified this impact by analyzing WhatsApp’s shared misinformation about the first round of the 2018 presidential election and the national truck drivers’ strike in Brazil, which showed that social movement, in the form of social media protests, can be considered an example of possibilities for expanding these spaces.

Normally, people directly or indirectly involved in a specific societal problem engage in extensive discussions on social media. Berntzen and Johannessen [6] stated that discussion forums and social media facilitate citizen participation, regardless of time and space. However, it is essential to highlight that the discussions take place in a disorderly manner, without systematization, and often, the parties involved do not seek to reach a practical result that proposes a possible solution to the problem in question. Thus, it is necessary to consider that the momentum requires reflection that would
lead to an improvement in these possibilities so that the potential of these movements can be effectively exploited.

Another important consideration regarding this new modality of organization and action in society is the new mobilization strategies. Araújo et al. [7] stated that society’s activism has taken on new forms, and in this same work, they described web activism (cyber activism) as a set of practices — used in network — aimed at broadening society’s collaboration in defense of specific causes. According to the authors, web activism expands the possibilities of society to pressure the State to modify decisions and implement public policies that meet the needs and demands of these social groups.

Aligned with the above scenario, there are several initiatives aimed at developing tools that facilitate or promote citizen participation. When participation is supported by information and communication technologies, it is known as electronic participation or e-participation [8]. In order for e-participation to be effective, there are still many questions that need to be investigated.

One of the barriers to this type of tool being used is the low engagement of citizens who are not motivated to participate, which can be caused by several factors. Among them, it is possible to cite issues related to social and political aspects; for example, discrediting the engagement of the political sphere, as well as citizens’ lack of interest due to poor political formation. These issues are essential and require a multidisciplinary analysis that goes beyond the computational aspect of this type of tool, and adds complexity to the theme.

Thus, the objective of this work was to analyze the described context and elaborate an artifact that, starting from the organization of the elements that characterize the discussion of societal problems, could improve the existing social and political system, and somehow make the city smarter. For this, we firstly conducted a study of the existing initiatives to identify their strengths and weaknesses, in order to inform the design of the artifact. Subsequently, the computational tool denominated SoPa (Participatory Society) was developed, with the objective of enabling and facilitating the discussion of societal problems. The idealization of this artifact was based on technologies for social media and argument visualization. The use of these technologies is a differential compared to the other tools analyzed.

SoPa can capture relevant information such as citizens’ opinions about their local environment. This collected information can be used in various ways for decision making by the public sector, as a solution for improving the local environment, the conviviality, and the integration of society.

A case study was conducted to analyze the viability of using SoPa as an alternative for discussion of societal problems. In the analysis, we investigated the perception and behavior of users of the tool, in order to identify solutions for improving engagement in e-participation. Thus, the evaluation enabled the identification of important factors that may impact the motivation of citizens.

This work is structured as follows: section 2 presents a summary of related papers that served as the basis and comparison for this research; section 3 presents the methodology used for the analysis; section 4 presents the proposed artifact (SoPa); section 5 evaluates, analyzes, and discusses the results of the case study; and section 6 presents a discussion on the contributions and the limitations of the study, as well as suggestions for future works.

II. BACKGROUND AND RELATED WORKS

Kuru and Ansell [9] looked at how to develop citizen- and resource-centric smarter cities based on the recent smart city development. According to [10], participation is the heart of the democratic lifestyle. Thomas [11] stated that citizen engagement fosters better decision making that, in turn, favors society. Roberts [12] argued that citizen participation is fundamental to democracy, and although the active role of citizens in government is important, there is still skepticism about its effectiveness. However, for Box [13], there is a belief that citizen involvement in democracy generates (in the citizens) a greater appreciation of administrators. Rifkin and Kangere [14] presented participation as a complex and challenging alternative that improves people’s lives. For Irvin and Stansbury [15], both government and citizens benefit from participation. Santamaria-Philco et al. [16] analyzed current literature in the field of electronic participation through a systematic mapping of the research work carried out in the period 2000-2019.

Although there are many innovations and initiatives that make (to some degree) participation effective, there is still a long way to go to make participation effectively part of the routine of citizens [53]. Fung [17] indicated engagement as being one of the challenges of citizen participation. Even though it may be clear that citizens and government benefit from participation, Bingham et al. [18] stated that engagement in the political sphere is a challenge because, in most contexts, the government either has no motivation or ignores the opinion of society. Arnstein [19] stated that the participation of the governed in government is a fundamental part of democracy. The author defined a typology with eight levels of participation, using rungs as a metaphor. The definitions of the rungs — reaffirmed in [20] — are as follows: (1) Manipulation and (2) Therapy, which represent levels of non-participation; (3) Informing; (4) Consultation and (5) Placation, which advance to “tokenism”, and can be defined as an early defense strategy, in which minor concessions are made to a minority group in order to avoid any accusations of prejudice or discrimination. In this context, “tokenism” can be interpreted as a scenario in which citizens can hear and be heard; however, it cannot yet guarantee that opinions are considered. Rung (6) is Partnership, in which citizens can partner and commit to decisions. The highest rungs are (7) Delegated
Power and (8) Citizen Control, in which citizens gain a more significant influence on decisions and full managerial power.

According to [21], democracy is the form of government in which the people exercise sovereign power. Therefore, metaphorically, it can be said that the progression upward on Arnstein’s rungs represents the achievement of higher levels of democracy since the direct or indirect participation of citizens in government is the basis for a democratic political system. Additionally, the higher the rung, the more necessary the use of technology to enable or facilitate this participation.

The relationship between technology and democracy has been much discussed by many groups, researchers, politicians, citizens, activists, and others. Sampaio [22] and Luchmann [23] stated that political will is essential and that governments should consider technological resources as fundamental elements in their political management and urban development. Additionally, interest from the population in technologies is essential in order to make them beneficial tools for public administration.

The possibility of using technological resources to support democratic practices was conceptually defined as Digital Democracy by [24]. Farias [25] defined Digital Democracy as a way of practicing electronic government, in which the population can interact directly with the public administration, exercising their political rights. Penteado et al. [26] stated that Digital Democracy does not mean a new form of democracy, but rather the use of the Web to consolidate it.

Allan [27] indicated that technology has the power to deconstruct the representative democracy in which we live, making citizens more influential in public management. Landim [28] stated that Digital Democracy is associated with the use of devices, such as computers, mobile phones, applications, and tools, which foster discussions about political and social practices.

Gomes [29] described five degrees of popular participation provided by the internet, which the author called degrees of Digital Democracy. The closer to one, the less the participation, and the closer to five, the greater the involvement of the population in decision making. Caetano et al. [30] classified resources and initiatives according to each defined degree of participation. Most of the time, e-government initiatives and resources were ranked in the lowest degrees of Digital Democracy.

In the search for related works, tools and initiatives were found that have enabled e-participation to some degree. Table 1 shows some examples.

Although there are already several related tools and initiatives, from the analysis it could be seen that the main challenge indicated by the literature — engagement — has not yet been solved. There are still several aspects to be investigated as factors that could motivate this engagement. Thus, the discussion about the results obtained in the case study of this work may contribute to the literature in relation to the motivation and engagement of citizens.

### III. RESEARCH METHOD

The methodology used in this present work was Design Science Research (DSR), which, according to [39], is the methodology that establishes and enables the conducting of research when the ultimate goal is an artifact or a prescription. The authors also stated that, based on the understanding of the problem, the DSR seeks to build and evaluate artifacts that make it possible to transform situations by improving the state of their conditions.

Hevner and Chatterjee [40] stated that the application of DSR is highly relevant to information systems because it combines the focus on the IT artifact with the high priority given to problem domain relevance. Dresch et al. [39] indicated DSR as being a problem-oriented research methodology that seeks to minimize the gap between theory and practice but does not necessarily seek the optimal solution, instead of seeking a satisfactory solution to the situation.

In DSR, two cycles are defined for research development: the Design cycle, which aims to solve the problem practically; and the Rigor cycle, which aims to define theoretical conjectures that ground the creation of the artifact.

To facilitate the understanding of the main elements of research using DSR, [41] drew up a map Fig. 1 shows the

| Tool                 | Description                                                                 |
|----------------------|-----------------------------------------------------------------------------|
| Open Town Hall       | A tool in online forums for discussion among the population of the municipality associated with the identified problems. The forums are available on government websites, and allow discussions to reach government attention directly [31]. |
| Colab                | Allows citizens to highlight problems and suggest solutions to urban problems [32]. |
| SeeClickFix          | Communication platform for citizens to report non-emergency problems [33]. |
| Civinomics           | A platform that allows citizens to discuss and vote on government proposals [34]. |
| White House Petitions| This tool allows US citizens to petition and collect signatures. If petitions reach 100,000 signatures in 30 days, the White House reviews the petition and returns a response to society [35]. |
| Cities for Life      | A platform that allows the user to enter suggestions for city improvements [36]. |
| MiraMap              | A tool that allows citizens to add problems, points of interest, and information to a city map. It is also possible to check the status of the post according to the alert marker (green, yellow, or red) [37]. |
| Decide Madrid        | A tool of the Madrid city government, which enables the creation of debates and proposals, budget deliberations, and voting [38]. |
FIGURE 1. Map of DSR elements, adapted from Pimentel (2017).

map prepared by Pimentel and adapted to the context of this present work. As shown in the map, the artifact is constructed to try to solve a problem in a given context, from conjectures that direct the elaboration of the artifact. In the map, it can also be seen that the evaluation occurred not only to validate the artifact, but also to investigate if the artifact diminished the identified problem and if there was a contribution to the theoretical conjectures.

In adapting the map to this work, SoPa was idealized as an artifact to converge on the solution of the problem presented: the discussion of societal problems by citizens. The theoretical foundation for the design of SoPa was based on the analysis of other related artifacts, the tools and initiatives identified, and the investigation of computational techniques to define the requirements related to the Design cycle (e.g., social media, information visualization, and argument visualization).

Moreover, this idealization was driven by theoretical conjectures that are grounded in related theories; for example, the Issue-Based Information Systems (IBIS) proposed by [42], in which the objective is to visually represent a discussion; and the theory — affirmed by Card (2003) — that information visualization can facilitate the understanding of information. The map also presents the experiment, which aims to verify if the conjectures are valid and if, in any way, the idealized artifact can contribute to the solution to the problem. In this present work, the experiment was conducted through a case study and evaluated through the application of a questionnaire.

IV. SoPa—PARTICIPATORY SOCIETY

For the idealization of SoPa, the strengths and weaknesses identified in the analysis of 17 related tools were considered. The analysis was presented in the work of [43] and contributed to the definition of features and attributes that should be considered when building the application.

After formalizing the main idea that guided the construction of SoPa, it was necessary to evolve the representation of this understanding. For [44], at the project stage, any representation of an idea is a prototype. Thus, in order to help understand the functionalities and interface generation, prototypes were created that evolved as the proposal matured, using online tools that enable the creation of a user interface in the form of non-functional drawings. At this early stage, the first prototype of the tool (which was still called WeCollaborate) was proposed by [45].

A. FEATURES

Two modules and their objectives were defined as follows:
- **SoPa-Citizenship**: to facilitate the discussion of societal problems and to open a channel in which citizens can give their opinion.
- **SoPa-Vis**: to facilitate, through the visualization of information, the analysis of information and the creation of knowledge from this analysis.

In the SoPa-Citizenship module, anyone can register in the tool. When registering, users must inform the city where they live, and they can add specialties to their profile. The city is the selection criterion used to list the problems presented to the user. A specialty represents the areas of knowledge or practice in which the citizen fits; for example, environment, health, public management, etc. These specialties can contribute to the discussion by providing more credibility to the information added by the user.

Also in this module, users can enter city problems to be discussed. Any registered user can enter problems. The problems you enter can be associated with one or more categories; for example, sanitation and housing. The user can also insert problem-related media (e.g., an image).

One important module functionality is the similarity analysis of the problem inserted with other problems already existing in the tool. This analysis is performed automatically by the tool and returns a similarity index. Similar problems are presented to the user, who must decide whether to create a new problem or remain within the discussion about an existing problem. The degree of similarity is calculated using the Sorensen-Dice coefficient. The importance of this functionality reflects the concentration of citizens discussing a particular problem. Aggregating the correlated information is essential so that there are no parallel discussions on the same subject.

When a user accesses SoPa, they are presented with a page (shown in Fig. 2) that lists the problems already existing in the tool. In the page header, there are four search options available: **My Problems**, which filters the problems entered by the logged-in user; **My City**, which filters out problems pertaining to the city for which the user registered; **Other Locations**, which allows users to search for problems from other cities; and **Categories**, which lets you filter out problems that are being displayed by category. Also on this page, users can give a like to problems they find interesting and click on “see more” to see the problem they are interested in discussing.

If the user clicks on “see more”, the page will be directed to the discussion session, and the user may interact with it in several ways:
- Insert comments about the problem
- Propose one or more solutions to the problem discussed
- Comment on other users’ solution proposals, arguing for or against
- Express a reaction by indicating whether or not you like the information given by other users

User interactions in the discussion of the problem generate information that is systematically represented to facilitate understanding. The visualization created based on the IBIS argumentation system model [46] can be seen in more detail in Fig. 3.

During the discussion period, the problem may be solved. In this case, the user who entered the problem may report that the problem has been resolved. The inserted solution may or may not be related to a proposal made during the discussion.

The SoPa-Vis module was defined to address the need for reuse of previous information generated from visualization techniques. According to [47], information visualization seeks to transform a raw data set into a graphic and interactive representation, thus facilitating the process of understanding. Card [48] stated that the promise of information visualization is to accelerate understanding and action in a world with an increasing volume of information. In a context in which users have difficulty choosing the best visualization representation technique, Ribeiro [49] proposed a classification-based technique recommendation mechanism that can aid the automatic generation of visualizations in the tool.

These theories grounded the SoPa-Vis module proposal and were considered in the definition of functionalities. The requirements defined for this module are intended to let users do the following:
- Visualize demographic census data of cities (e.g., population size, population pyramid, etc.) that may help support the discussion raised.
- Analyze data generated by the tool in the SoPa-Citizenship module (e.g., the number of problems per category).
• Associate problems with online portal data sets and, from this association, automatically generate information visualization.
• Visualize problems in a map, using geolocation libraries.
• Define filters (e.g., periodicity) for data representation.
• Export graphical representations (generated in image and iframe format) and an HTML tag that points to the tool to allow the page to be reused in other applications.
• Create, save, export, and share dashboards.

Besides the two modules described, a need was identified for specific functionalities of a user profile, which have some function associated with public management, in order to:
• Allow public queries to be created and, if necessary, choose a specific audience.
• Allow open channels of communication with specific users for a better understanding of a solution proposal, for example.

V. EVALUATION AND DISCUSSION
An evaluation was performed to identify evidence that SoPa is suitable for solving the problem considered. This evidence was expected to support the theoretical conjectures considered.

To identify minor improvements and validate functionality, an initial assessment was conducted in the city of Itajubá — a city with 96,869 inhabitants located in the southern state of Minas Gerais, Brazil. A citizen participation workshop was organized with members of the NGO Transparency Itajubá and a city councilor. The NGO is a non-profit association of the city, for defending the interests of citizens through the development and defense of citizenship and ensuring transparency in all actions of the public authorities.

Six people over the age of 40 who participated in the workshop were introduced to SoPa and instructed to use the tool. Some difficulties in the interaction with features, as well as places for possible improvements were observed. Participants also asked some questions that indicated the need for adjustments. Improvements and adjustments identified in the workshop were considered to make the first version available.

In order to analyze SoPa in a real context, the approach used involved conducting an experiment with end-users. The data collection method was the questionnaire. The questions were elaborated in such a way that data were collected about the profile and the user’s perception regarding the functionalities of the tool so that the utility of the tool could be inferred from the perspective of these users.

In the initial period of the experiment, the tool was advertised through social media and by email. In an attempt to
broaden the scope of the tool, promotional material was developed and then used on Facebook.

Additionally, we tried the strategy of Growth Hacking in order to understand if this could really contribute to solving challenges related to engaging in e-participation initiatives. Siqueira [50] conducted a case study in which a proposed framework for operationalizing Growth Hacking was applied to the social media SoPa. The case study considerably impacted the level of engagement in social media, increasing the total number of registered users by 274.7%.

The time for data collection was approximately 1 year, from 15 February 2018 to 30 January 2019. In this period, 646 participants registered, and of these, 115 answered the questionnaire.

Besides the questionnaire responses, data related to the use of the tool were analyzed and captured through [51]. There were 1000 active sessions in the tool during the evaluation period, and the average session lasted approximately 7 minutes. The analysis tool also indicated that SoPa obtained 47.19% rejection — rejection of the tool by the user was considered to be when the session had no interaction and a duration of 0 seconds.

In the questionnaire there were five questions that investigated the user’s profile. Another important fact is that the answers to some questions were defined based on the five-point Likert scale. There was also space for the participant to post comments.

In the analysis of the results, for the questions answered with the five-point Likert scale, the two positive extremes (4 and 5) were considered to be an agreement with the statement of the question. The two negative extremes (1 and 2) were treated as a disagreement with the statement. Thus, in order to measure agreement and disagreement, the sum of the respective extremes was calculated.

Regarding the profile, the boxplot graph (see Fig. 4) shows that users’ ages ranged from 26 to 45 years, and the average age range was approximately 30 years. The graph also shows that there were some outliers over the age of 45.

The registered users were from 330 different cities and, as shown in Fig. 5, the three cities with the largest number of users were the following: Itajubá, MG; Rio de Janeiro, RJ; and Sao Paulo, SP. The concentration of users in the city of Itajubá was due to the dissemination of the tool in the city discussion groups on Facebook, as well as directing the publications driven on social media.

Although only 34.7% of users stated that they participate in some type of association or non-governmental organization that aims to improve life in society, 89.5% of participants (20% + 69.5%) stated that they had some interest in discussions about societal problems, as can be seen in Fig. 6, which indicates that the participant population really represents potential users.

Additionally, only 24.3% stated that their work is somehow associated with questions involving societal problems, 49.5% stated that it is indirectly associated, and 26% stated that it is not associated.

In order to find any relationships between user profile data and the outcome of the questions, an analysis was performed using the R language. The analysis considered the Pearson correlation coefficient, which can assume values between 1 and -1, with 1 being a perfect positive correlation between the two variables and -1 a perfect negative correlation. No correlations with a coefficient greater than 0.3 were found for profile data relationships. According to [52], when the coefficient varies between 0 and 0.3, the correlation may be considered to be negligible. Therefore, statistically, no significant relationships were found between user profile data and other questions.

Also regarding the profile of the participants, in the graph presented in Fig. 7 it can be seen that, although some social media (e.g., Facebook, Instagram, and Twitter) do not have as a main objective the provision of an environment for the discussion of societal problems, these networks have a significant number of users who use them for this purpose, which suggests the need to establish mechanisms that favor the possible use of these spaces as a mobilization tool.

In social networks, for example, this discussion space is ample, with the user subject to any type of content. Despite there being discussions about societal problems in these spaces, and even groups created for this purpose, the dialogue is not qualified; therefore, any interaction occurs through comments or reactions. This lack of categorization or systematization of interactions can make it difficult to understand the discussion and reuse the data later.
When the participants were asked if it became clear that the purpose of the SoPa tool is to map and discuss societal problems (as opposed to a portal for complaints), 88.7% of respondents said yes.

In Fig. 8, it can be seen that 83.4% (58.2% + 25.2%) of the participants agreed that the tool can guide the discussions in an organized manner. This organization can be considered to be an alternative, which indicates the systematization of the discussion and may, in some way, provide adequacy in this discussion space. This statement can be reinforced by the result presented in Fig. 9, in which only 1.7% of participants disagreed, to some extent, that the tool can facilitate discussion.

It is natural to associate the result presented in Fig. 9 with the result presented in Fig. 10, because it is expected that the number of participants who agreed to some extent with these statements, which may suggest coherence in this association.

Fig. 11 shows that 80% (51.3% + 28.7%) of participants agreed that discussing problems in the tool can put pressure on local government. Also, 85.2% (61.7% + 23.4%) stated that the consensus established may intervene in the decision, as shown in Fig. 12.

Fig. 13 presents the results showing a significant agreement of 92.1% (69.5% + 22.6%) among the participants, regarding the statement that the opinions about the proposed solutions can encourage discussion about the problem.
Analyzing the data generated by the users when using the tool, it was possible to identify that, of the 115 users considered in the analysis, 52 did not perform any activity in the tool beyond the initial registration. This data may indicate that the activities were concentrated in only one group and that some of the users may have assumed the role of a viewer of the discussions.

The result — shown in the graph in Fig. 14 — shows that 76.5% (46.9% + 29.5%) of participants felt free to give their opinion on the solution proposals of other users. However, by comparing this data with the number of comments and the number of reactions, it was possible to identify that most prefer communication through nonverbal language, using emojis. Therefore, this result suggests the need to analyze other resources that could stimulate more active participation through virtual writing.

The reasons that justify the non-participation of users were investigated, and the results are shown in Fig. 15. Of the 62 participants (53.9%) who said they did not interact with the tool, 12 (19.3%) indicated that they did not know of any problem in the city that could be discussed in the tool. Also, at least eight participants stated they could not identify how to interact in the tool. This result suggests that it is necessary to reevaluate the interface defined for these features. For a more detailed conclusion regarding this aspect, a more detailed assessment of usability is required.

For the alternative “others”, some users commented that they did not add any problems because they did not have images to represent them. Additionally, some participants reported issues with graphic interface rendering on mobile devices and in some browsers, which highlights the need for an interface that is appropriate for different devices and platforms. Thus, it can be stated that the use of a version for mobile devices may — besides presenting a more pleasant experience for some users — broaden the possibilities of a
user to add features, such as photos, videos, and geolocation, that facilitate the understanding of the problem.

As shown in the graph in Fig. 16, only 1.7% of users said they could not understand the figure with the discussion visually represented.

This result suggests that the strategy for visualization of the argument was accepted by the participants. In order to evaluate its usefulness, users were asked if they agree that the visualization of the discussion could help in perceiving which solution proposal most pleases most users. The results of this question are shown in Fig. 17 — 89.5% (65.2% + 24.3%) of the participants agreed to some extent with the statement.

Regarding user satisfaction, it was investigated whether the visual features of the tool provided a pleasant experience. While some participants indicated issues with certain browsers and mobile devices, 76.5% (51.3% + 25.2%) of respondents said the tool provided a pleasant experience, as shown in Fig. 18.

Also regarding user satisfaction, in the graph of Fig. 19 it can be seen that 83.4% (59.1% + 24.3%) of the participants stated that they would continue using the tool and would recommend it to a friend.

This result can be compared with the number of users who accessed the tool more than once. As shown in Fig. 20, only 17.4% of users returned to use the tool. Regarding this aspect, the need to use resources that broaden the user’s perception regarding the progress of the discussions can be considered. This can be done through notifications; for example, an email sent to the user when other users interact with the given problem.

Additionally, it should be more rigorously investigated whether non-reuse is due to an inappropriate resource or lack of interest in the subject. Due to it being a social network that is not directed at entertainment, and participation is totally voluntary, questions such as this should be analyzed in order to identify which computing resources are more or less appropriate, and also to design approaches to motivation that go beyond the technical issue.
VI. FINAL CONSIDERATIONS

In the scenario in which technological advances are changing society’s capacity for political participation, this paper sought to analyze the context of e-participation by considering current technological resources, in order to propose an artifact that could improve the existing system.

Initially, a study was conducted to identify the main elements and mechanisms needed to support the construction of a solution to the problem presented: the discussion of societal problems by citizens.

During this stage, the mapping and analysis of existing tools and initiatives were performed, which enabled the identification of strengths and weaknesses, thereby contributing to the definition of the basic requirements for the elaboration of the artifact. These initial studies let us recognize the potential of social networks as an alternative, for promoting a space for debate and the visualization of argumentation as a strategy to represent this discussion in a systematized way, thus facilitating understanding.

One of the contributions of this work is the results presented, obtained through the case study conducted in SoPa, which can help to understand the motivational aspects that may influence the engagement of citizens and the implementation of citizen participation.

The artifact produced can also be considered to be a contribution. SoPa can be defined as an alternative, for solutions in a concrete reality that is the citizens’ discussion of societal problems. A deep understanding of these problems was necessary in order to define the requirements for SoPa’s development process.

Additionally, there are several possibilities for using the data generated by SoPa to improve the local environment and social conviviality. One example is the use of the data generated in the tool to identify the satisfaction or dissatisfaction with the neighborhood where the users live. This information could assist in future decision making regarding investment in urban infrastructure.

One evolutionary aspect would be the implementation of new features. Improvements were identified in the evaluation; for example, allowing any citizen—even those not registered—to view the problems and discussions. Another example is the need to organize the comment and proposal insertion fields in the discussion of the problem so that the interaction possibilities are clear to the user.

Another important feature identified for improving the quality of the discussion is the addition of information, such as links and documents, about problems entered by other users. The idea would be to allow the user to insert complementary information on the discussion page, using external resources to support the argumentation.

Additionally, with a more detailed study using data mining techniques, the analysis and classification of user-profiles could be performed, which would allow the automatic creation of discussion groups from the data entered in the tool and the identification of possible patterns that could be relevant to mobilize new users.

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MELISE PAULA graduated in computer science from the Federal University of Juiz de Fora, in 1997, and the master’s and Ph.D. degrees in computer engineering from COPPE, Federal University of Rio de Janeiro, in 2001 and 2006, respectively. She is currently an Associate Professor of computer science with the Federal University of Itajubá. Her research interests include databases, e-government, public participation, open data, information visualization, knowledge management, and negotiation.

JANO DE SOUZA (Member, IEEE) graduated in mechanical engineering from the Federal University of Rio de Janeiro, in 1974, the master’s degree in computer science from COPPE, Federal University of Rio de Janeiro, in 1978, and the Ph.D. degree in information systems from the University of East Anglia, in 1986. He was with Sabbatical leave at CERN, from 1989 to 1993 (three months a year). His researches and teaches in computer science, focusing on the following subjects such as databases, knowledge management, social networks, CSCW, autonomic computing, and negotiation support systems.