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Enhancing Stakeholders' Participation: A Semantic, Spatial and Temporal contextualization perspective

Thèse

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RÉSUMÉ

La participation des parties prenantes (PPP) vise à impliquer celles-ci dans les processus de prise de décision concernant des projets affectant leurs communautés. Traditionnellement, les processus de participation des parties prenantes (PPPP) se maintenaient à travers des assemblées et des forums de discussion physiques permettant de rassembler les parties prenantes, de collecter et d'analyser leurs opinions pour aider les décideurs dans leur prise de décision. Ces dernières années, l'évolution des technologies de l'information (TI) et leur prolifération dans la société ont donné lieu au concept émergent de la participation électronique ou la e-Participation. Il s'agit de nouvelles formes de participation basées sur les technologies de l'information tel que les blogs, les plateformes participatives et les réseaux sociaux. La PPP est une notion en constante évolution et a reçu une attention considérable de la part des praticiens et des chercheurs dans différents domaines et disciplines. Cependant, peu de recherches se sont intéressées à la compréhension multidisciplinaire des PPPP et de la valeur que revêtent les données collectées à travers ces PPPP. Cette thèse contribue à la littérature de la PPP en offrant une meilleure compréhension globale du concept de la PP, de ses enjeux multidisciplinaires et de la valeur que revête les données collectées à travers les PPPP. Cette thèse est structurée en deux articles et un chapitre.

Le premier article de cette thèse vise à offrir une meilleure compréhension des enjeux multidisciplinaires auxquels les PPPP font face. À l'appui d'une revue systématique de la littérature analysant 191 articles de recherche, cet article met en exergue que les PPP font face à des enjeux : « administratifs », « éthiques », « politiques », « légaux », « technologiques », « sociaux des parties prenantes », « économiques », « socio-économiques » et « d'efficience et d'efficacité ». De plus, l'article démontre que les PPPP œuvrent à l'intérieur de quatre principales dimensions qui sont « la gouvernance », « l'application », « les parties prenantes » et « la société » et que ces dimensions sont interreliées et sont influencées les unes par les autres. Dans ce contexte, l'évolution vers des PPP qui sont plus efficaces et plus résilientes envers ces enjeux requerrait une prise de conscience de ces dimensions d'enjeux et des efforts de collaboration multidisciplinaire entre la recherche et la pratique.

Le deuxième article se concentre sur l'enjeu spécifique du « contexte de vie des parties prenantes » et rend compte de la manière dont les parties prenantes expriment, de façon implicite ou explicite, leurs contextes de vie dans leurs commentaires de participation. Par une analyse qualitative des données de participation provenant de quatre études de cas dans deux pays différents, cet article identifie un ensemble de patrons, appelés aussi « *patterns* », sémantiques, spatiaux et temporels permettant l'identification du contexte de vie des parties prenantes à partir des données des PPPP. L'identification et la compréhension des patrons que les parties prenantes expriment dans leurs commentaires pour représenter leurs contextes de vie visent à renforcer l'influence des parties prenantes sur les décisions découlant des PPP dans lesquelles ces dernières étaient impliquées. De plus, l'article propose un modèle conceptuel démontrant l'importance pour les décideurs de capturer et d'analyser les patrons sémantique, spatial et temporel dans les données des PPPP afin de favoriser une prise de décision cohérente et réactive aux contextes de vie des parties prenantes. Finalement, l'article souligne le rôle que jouent les technologies de l'information pour l'identification de ces patrons.

Le troisième chapitre offre une meilleure compréhension de l'identification automatique des dimensions sémantique, spatiale et temporelle du contexte de vie des parties prenantes dans les PPP. En se basant sur une analyse théorique, ce chapitre utilise la théorie des affordances et la théorie du réalisme critique pour offrir une conceptualisation des affordances et des fonctionnalités technologiques correspondantes qui sont nécessaires pour l'identification automatique des patterns sémantiques, spatiaux et temporels dans les futures technologies participatives.

Mots clés : participation des parties prenantes, enjeux multidisciplinaires, contextes de vie des parties prenantes, analyse des données, analyse sémantique, analyse spatiale, analyse temporelle, affordances, fonctionnalités TI

ABSTRACT

Stakeholders participation (SP) aims to involve stakeholders in decision-making processes regarding projects affecting their communities. Traditionally, stakeholders' participation processes (SPPs) were maintained through meetings and physical discussion forums to bring together stakeholders and collect their opinions to help decision-makers in taking their decisions. In recent years, the evolution of information technologies (IT) and their proliferation in society have given rise to the emerging concept of electronic participation or e-Participation. These are new forms of participation based on information technologies such as blogs, participatory platforms and social networks. SP is an ever-evolving concept and has received considerable attention from researchers in different fields and disciplines. However, little research has focused on the multidisciplinary understanding of SPPs and the value of the data collected through these SPPs. This thesis contributes to the SPPs literature by offering a better global understanding of the concept of SP, its multidisciplinary issues and the value of the data collected through SPPs. This thesis is structured in two articles and one chapter.

The first article of this thesis aims to provide a better understanding of the multidisciplinary issues that SPPs face. Based on a systematic literature review of 191 research papers, this article aims to review, categorize, and offer a better understanding of the different issues that stakeholders' participation processes (SPPs) can have. This paper has two main contributions. First, it presents a typology of issues that is organized in nine categories: economic, efficiency and effectiveness, ethical, legislative, political, administration, socioeconomic, stakeholders and social, and technology. Second, it proposes a conceptual model of SPPs dimensions of issues. The conceptual model demonstrates that SPPs work within four main dimensions which are "governance", "application", "stakeholders" and "society" and that these dimensions are interrelated and are influenced by each other.

The second article focuses on the specific issue of the "stakeholders' living context identification" and attempts to account for how stakeholders implicitly identify their living contexts in their participation comments. Through a qualitative analysis of participation data from four case studies in two different countries, this article identifies a set of semantic, spatial and temporal patterns allowing the contextualization of data collected through SPPs.

Moreover, a conceptual model for the identification of the living contexts in SPPs data is proposed. This conceptual model emphasizes the importance for decision-makers to capture and understand semantic, spatial and temporal patterns in SPPs data in order to ensure a decision-making that is consistent and responsive to stakeholders' living contexts. Finally, the article highlights the role that information technology plays in identifying these patterns.

The third chapter attempts to provide a better understanding of the automatic identification of the semantic, spatial and temporal dimensions of the living contexts of stakeholders in SPPs. Based on a theoretical analysis, this chapter uses the theory of affordances and the theory of critical realism to offer a conceptualization of affordances and their corresponding information technology functionalities that are necessary for the automatic identification of semantic, spatial and temporal patterns in future participation tools.

Keywords: stakeholders' participation, multidisciplinary issues, stakeholders' living contexts, data analysis, semantic analysis, spatial analysis, temporal analysis, affordances, IT-features

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LISTE OF ABBREVIATIONS AND ACRONYMS

BEPI	Balanced e-Participation Index
CE	Calendar expression
CR	Critical Realism
DMs	Decision-makers
ERP	Enterprise resource planning
GIS	Geographic information system
ICTs	Information and communication technologies
IT	Information technology
PPP	Participation des parties prenantes
PPPP	Processus de participation des parties prenantes
SEM	Sematic pattern
SM	Social media
SNS	Social network system
SPAT	Spatial pattern
SP	Stakeholder participation
SPP	Stakeholder participation process
TEMP	Temporal pattern
VGI	Volunteered geographic information

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Là où il y a une volonté, il y a un chemin. (Vladimir, Ilitch)

La meilleure façon de prédire l'avenir, c'est de le créer. (Peter Drucker)

Un grand merci à vous tous!

PREFACE

In accordance with the standards and requirements of the Faculty of Graduate and Postdoctoral Studies (FESP), this thesis takes the form of an article-based thesis. It combines two chapters in the form of articles and a conventional chapter, each of which written in collaboration with my directors Mr Sehl Mellouli and Ms. Sylvie Daniel.

This thesis presents my work as a Ph.D. student conducted at the department of Organizational Information Systems at the Faculty of Business Administration of Université Laval.

The first and the second papers are already published. In all chapters, I remain the first author and have played the major role in setting up and conducting the research, collecting and analyzing the data, and preparing and writing the papers.

The first paper entitled « *Understanding issues with stakeholders' participation processes: A conceptual model of SPPs' dimensions of issues* » was written in collaboration with my directors Mr Sehl Mellouli and Ms. Sylvie Daniel. The paper was accepted and published by the journal *Government Information Quarterly* in January 2022.

The second paper entitled « *The identification of stakeholders' living contexts in SPPs: A semantic, spatial and temporal model* » was written in collaboration with my directors Mr Sehl Mellouli and Ms. Sylvie Daniel. The paper was accepted and published in the journal *Land* in May 2022.

The third chapter entitled « *Automatic identification of semantic, spatial and temporal patterns in SPPs data: Affordances and IT-features* » was written with my directors Mr Sehl Mellouli and Ms. Sylvie Daniel.

In addition to these three chapters, as part of this thesis, four conference papers were presented and published in the Proceedings of international conferences.

The first conference paper is entitled « *Towards a context-based citizen Participation Approach: A literature review of citizen participation issues and a conceptual model* ». This paper was presented at the *2017 International Conference on theory and Practice of electronic governance* in New Delhi and published in its Proceedings.

The second conference paper in entitled « *The relevance of geovisualization in Citizen Participation Processes* ». This paper was set up and written with a master's student Frédérick Lafrance, and my directors Ms. Sylvie Daniel and Mr Sehl Mellouli. It was presented at *the 2017 Annual conference on digital government research* in New York and published in its Proceedings.

The third conference paper is entitled « Spatial, temporal and semantic contextualization of citizen participation ». This paper was published in the Proceedings of the 2018 *Annual conference on digital government research*.

Finally, the fourth conference paper is entitled « *A qualitative framework for data collection and analysis in Participation processes* ». This paper was presented at the 2019 *International Conference on theory and Practice of electronic governance* in Dubai and published in its Proceedings.

INTRODUCTION

Stakeholders' participation and its main challenges

This thesis falls within the increasing trending domain of stakeholders' participation (SP), where stakeholders expect to have a voice in decision-making processes (Rixon 2010; De Jong et al., 2019; Allen et al., 2020). Over the last decade, SP has been increasingly adopted by both public and private organizations in different domains. This approach is used to strengthen the involvement of stakeholders in decision-making processes about meaningful decisions that will affect their communities. It consists of the practice of consulting and involving stakeholders in the decision-making activities of organizations or institutions responsible for projects and policies development (Bryson et al, 2013). SP is enabled through SP processes (SPPs) that are operationalized through mechanisms instituted to involve stakeholders or their representatives in decision-making activities. SP starts when stakeholders provide an input through these mechanisms to express their opinions (Olphert et al., 2007).

Several researchers and practitioners have mentioned the important added value that SP can bring to both governors and the governed (Martineau-Delisle & Nadeau, 2010; Rixon, 2010; Voinov & Bousquet, 2010). This approach allows the development of a better understanding of communities' problems and needs, while enabling the conception of innovative ideas to handle these problems.

Different terms are used in the literature to refer to "the participation process" such as public involvement, citizen participation, electronic participation, civic engagement or political participation (André et al., 2012). The term "stakeholder" is the broader term used to encompass all types of participants - citizens, communities, representatives, public etc. - in a given participation process. Throughout this thesis, we use the term "stakeholders' participation processes" (SPPs) to refer to any participation process. This term was already used in (Rixon, 2010).

The domain of stakeholders' participation has evolved in last decades. With the emergence of information and communication technologies (ICTs), SP took new forms such as dedicated platforms and social media, which led to the concept of electronic participation (e-participation) (Smith et al., 2009; Boudjelida et al., 2016). It consists of the use of ICTs to make SPPs more inclusive and to facilitate stakeholders' engagement. Even though e-

participation gained much significance as a buzzword, it maintains the same goals of participation in its traditional form, that are increasing the involvement of stakeholders and helping them achieve their communities' objectives.

Although SPPs outstand a great value for communities and organizations, their implementation remains challenging for decision-makers. Scholars noted several issues regarding the implementation of SPPs such as low level of involvement and influence (Coelho et al., 2022), the lack of understanding of stakeholders' living contexts (Bryson et al., 2013b; Janssen & Helbig, 2018), representativeness (Pina et al., 2017) and inclusiveness (Arnstein, 1969; Pflughoeft & Schneider, 2020), power relationships and marginalisation (Hays 2007) and perceptions of costs, benefits and outcomes derived from SPPs (Rowe & Watermeyer, 2018; Skarmeas et al., 2019).

In addition, with the increasing integration of ICTs in SPPs (Porwol et al., 2018), several technology-oriented issues have been raised such as the need to seek the latent talent from the Web, to design optimal crowdsourcing tools and interfaces, to transform the data collected into relevant knowledge, and to better exploit technologies such as geographic information systems (GIS), spatial simulation and visualization tools in SPPs, in order to increase opportunities for coproduction through ICTs (Sanford & Rose, 2007; Measham et al., 2011; Somarakis & Stratigea, 2014; Rowe & Watermeyer, 2018).

For organizations, SP introduces a new governance model in which stakeholders are part of the decision-making process. This governance model may lead to different political issues since decision-makers might become wary of the process if they feel that their power is being diminished (Bryson et al, 2013). Moreover, organizations need to prepare and to manage SPPs. The success of a SPP depends on how the process itself is managed. To this end, organizations need to have the required resources for the implementation of these processes. Consequently, they might face budget challenges with regards to the reduction of costs that several governments around the World are putting in place (Rowe & Frewer, 2000; Molinari, 2010). In addition, SP brings transparency challenges since stakeholders will talk about issues for which organizations should release data in order to enlighten stakeholders in their participation (Piotrowski &Liao, 2012). Thus, organizations have to ensure that the stakeholders have the right information in order to adequately contribute to the process. For

stakeholders, the success of the SPP requires a high level of involvement; relevant stakeholders should be identified, and the process should be representative of all relevant stakeholders to reflect a real and coherent view of stakeholders' concerns. These stakeholders'-related issues should be managed in the process (Cornwall, 2008; Wakabi & Grönlund, 2015).

Additionally, as stated, organizations need to integrate ICTs in their SPPs to facilitate the involvement of their stakeholders (Porwol et al., 2018). However, ICTs are not always accessible to all relevant stakeholders since some do not have or do not know how to use ICTs (Williams et al., 2013). Thus, organizations are challenged by accessibility and inclusivity issues of their SPPs when using ICTs.

Whether using ICTs or not, SPPs generate data for organizations. This data should be analyzed in a way to bring a benefit to a given decision-making process, whatever its complexity (Burgess-Allen & Owen-Smith, 2010). Hence, organizations have the challenge to ensure that the collected data is appropriately analyzed and understood to help provide decision-makers with the right knowledge for an informed decision-making. If ICTs are used, organizations have the challenge to take full advantage from ICTs' data processing, reporting and communication capabilities (Sanford & Rose 2007).

Research objectives and integration of chapters

The general objective of this research is to offer a better understanding of SPPs within organizations in order to help them capture contextual information in SPPs data. Hence, the main research question addressed in this thesis is:

How to capture the stakeholders' living contexts in stakeholders' participation processes data?

Since our main research question contains two main components: "SPPs" and "stakeholders' living contexts", the sub-research objectives revolve around these two components. By answering the question "how", the objective of this thesis is not to define a process of capturing the living contexts' in SPPs data. Rather, our thesis focuses on building an understanding of: the SPPs in general, the expression of the stakeholders' living contexts in SPPs data, and the role of information technology (IT) in capturing these living contexts.

More precisely, we identify three specific research objectives around which this doctoral work is articulated and that are 1) identify the issues that SPPs faces, 2) conceptualize the living contexts expressed in SPPs data and 3) investigate the role that information technology (IT) plays in expressing the living contexts.
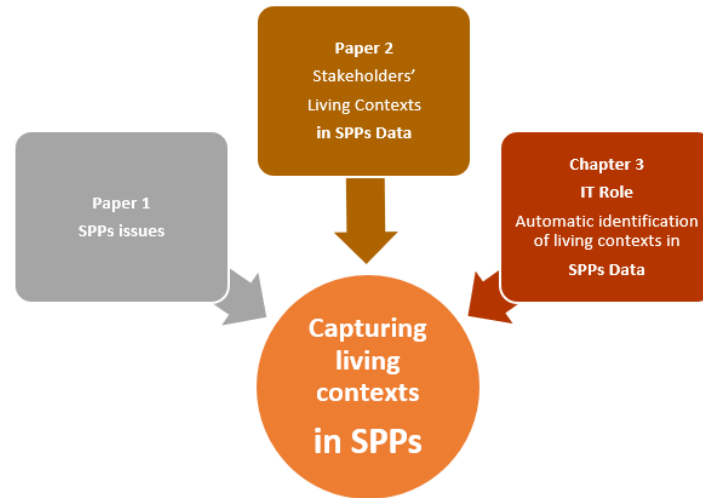
Figure 0.1. Thesis structure

Putting into perspective these different elements and the integration of these research objectives within this thesis led to the use of an analytical framework in which we were able to combine several research approaches to contribute to the literature of SP. This thesis is anchored on an integrative framework that responds in an integrated way to the research objectives of this thesis. It combines:

- Three methodologies: systematic literature review, multiple case studies analysis and theoretical analysis.
- Two levels of analysis: process level and data level
- Two types of SP: solicited and spontaneous
- Two types of SPPs: traditional and online

Hereafter, we briefly introduce the two papers and the chapter of our thesis.

Chapter 1: Understanding the multidisciplinary issues of SPPs implementation

Chapter 1 presents the first study in this thesis. Following a systematic literature review, this chapter identifies and categorizes the multidisciplinary issues that the SPPs face. The

resulting typology of issues comprises nine categories, and the conceptual model of SPPs issues comprises four dimensions that contribute to the understanding of SPPs in organizations.

Chapter 2: The identification of the stakeholders' living context in SPPs data

Although a substantial body of knowledge exists around SP theories and models, we remarked that little is known in SP literature about the value that SPPs data analysis outstands, and specifically about the identification of stakeholders' living contexts from this data. This interpretation led to our second research objective which is related to the stakeholders' living context identification in SPPs data. This objective concerns the way stakeholders express their living contexts in their SPP comments, and the way decision-makers could capture these living contexts to enhance their decision-making processes. Chapter 2 involves a qualitative study of SPPs data, investigating the issue of stakeholders' living contexts identification in SPPs. Based on the analysis of SPPs data from four case studies, this chapter identifies an empirical model of patterns for the stakeholders' living contexts identification in SPPs data. The living context of a stakeholder is defined in literature as "the information about local issues, the topics related to everyday life" and "the information relevant to individual stakeholder" that "directly affect stakeholders' lives" (Bonson et al., 2015). It has to be considered to better respond to stakeholders' requests in a participation process. This chapter offers a better understanding of the value that data generated from the implementation of SPPs could outstand, through the identification of patterns of the stakeholders' living contexts in SPPs data.

Chapter 3: Investigating the role of IT in SPPs data analysis

Chapter 3 investigates the role of IT for the automatic identification of stakeholders' living contexts in SPPs data. Based on a theoretical analysis, this chapter uses the theory of affordances (Volkoff & Strong 2013) and the theory of critical realism (Gibson 1986) to offer a conceptualization of affordances and their corresponding information technology features for the automatic identification of patterns in SPPs data. This chapter provides an understanding about the role of information technology in highlighting patterns in data resulted from the implementation of SPPs.

A brief description of each chapter and its goals is presented in Table 0.1.

Table 0.1. Thesis structure

Theme of each chapter/paper	Sub-research questions	Methods	Data sources	Paper / chapter
Issues of SPPs	*What are the issues that SPPs are facing?*	Systematic literature review	191 scholarly articles	Paper 1
The identification of the living contexts in SPPs data	*How to identify stakeholders' living contexts in SPPs and what patterns do stakeholders use to express these contexts in SP data?*	Qualitative analysis	4 case studies	Paper 2
IT role in the automatic identification of the living contexts in SPPs	*What are the necessary affordances and IT-features for the automatic identification of the stakeholders' living contexts' patterns in SP data?*	Theoretical analysis	4 case studies	Chapter 3

References

A. Marzouki, F. Lafrance, S. Daniel, and S. Mellouli (2017b), "The relevance of geovisualization in citizen participation processes," in Proceedings of the 18th Annual International Conference on Digital Government Research, pp. 397–406, ACM, 2017.

André, P., & Avec la collaboration de P. Martin et G. Lanmafankpotin. (2012). *«Participation citoyenne », dans L. Coté et J.-F. Savard (dir.), Le Dictionnaire* encyclopédique de l'administration publique.

Allen, B., Tamindael, L. E., Bickerton, S. H., & Cho, W. (2020). Does citizen coproduction lead to better urban services in smart cities projects? An empirical study on e-participation in a mobile big data platform. Government Information Quarterly, 37(1), 101412.

Arnstein, S. R. (1969). A ladder of citizen participation. Journal of the American Institute of planners, 35(4), 216-224.

Boudjelida, A., Mellouli, S., & Lee, J. (2016, March). Electronic citizens participation: Systematic review. In Proceedings of the 9th International Conference on Theory and Practice of Electronic Governance (pp. 31-39). ACM

Burgess-Allen, J., & Owen-Smith, V. (2010). Using mind mapping techniques for rapid qualitative data analysis in public participation processes. Health Expectations, 13(4), 406-415

Bryson, J. M., Quick, K. S., Slotterback, C. S., & Crosby, B. C. (2013). Designing public participation processes. Public administration review, 73(1), 23-34.

Coe, A., G. Paquet, and J. Roy, "E-governance and smart communities: a social learning challenge," Social science computer review, vol. 19, no. 1, pp. 80–93, 2001.

Coelho, T. R., Pozzebon, M., & Cunha, M. A. (2022). Citizens influencing public policy-making: Resourcing as source of relational power in e-participation platforms. Information Systems Journal, 32(2), 344-376.

DE JONG, Menno DT, NEULEN, Sharon, et JANSMA, Sikke R. Citizens' intentions to participate in governmental co-creation initiatives: Comparing three co-creation configurations. Government information quarterly, 2019, vol. 36, no 3, p. 490-500.

Gibson, J. (1986). The ecological approach to visual perception. Hove: Psychology Press.

Hays, R. A. (2007). COMMUNITY ACTIVISTS' PERCEPTIONS OF CITIZENSHIP ROLES IN AN URBAN COMMUNITY: A CASE STUDY OF ATTITUDES THAT AFFECT COMMUNITY ENGAGEMENT. Journal of Urban Affairs, 29(4), 401-424.

J. M. Bryson, K. S. Quick, C. S. Slotterback, and B. C. Crosby, "Designing public

participation processes," Public administration review, vol. 73, no. 1, pp. 23–34, 2013.

Janssen, M., & Helbig, N. (2018). Innovating and changing the policy-cycle: Policy makers be prepared!. Government Information Quarterly, 35(4), S99-S105.

Martineau-Delisle, C., & Nadeau, S. (2010). Assessing the effects of public participation processes from the point of view of participants: significance, achievements, and challenges. The forestry chronicle, 86(6), 753-765

Olphert, W., & Damodaran, L. (2007). Citizen participation and engagement in the design of e-government services: The missing link in effective ICT design and delivery. Journal of the Association for Information Systems, 8(9), 27.

Pflughoeft, B. R., & Schneider, I. E. (2020). Social media as E-participation: Can a multiple hierarchy stratification perspective predict public interest?. Government Information Quarterly, 37(1), 101422.

Pina, V., Torres, L., & Royo, S. (2017). Comparing online with offline citizen engagement for climate change: Findings from Austria, Germany and Spain. Government Information Quarterly, 34(1), 26-36.

Porwol, L., Ojo, A., & Breslin, J. G. (2018). Social software infrastructure for e-participation. Government Information Quarterly, 35(4), S88-S98.

Rixon, D. (2010). Stakeholder engagement in public sector agencies: Ascending the rungs of the accountability ladder. International Journal of Public Administration, 33(7), 347-356.

Rowe, G., & Watermeyer, R. P. (2018). Dilemmas of public participation in science policy. Policy Studies, 39(2), 204-221.

Sanford, C., & Rose, J. (2007). Characterizing eParticipation. International Journal of Information Management, 27(6), 406.

Silverman, D. (2013). Doing qualitative research: A practical handbook. Sage.

Skarmeas, D., Leonidou, C. N., Saridakis, C., & Musarra, G. (2019). Pathways to Civic Engagement with Big Social Issues: An Integrated Approach. Journal of Business Ethics, 1-25.

Smith, S., & Dalakiouridou, E. (2009). Contextualising public (e) Participation in the governance of the European Union. European Journal of ePractice, 7, 4-14.

Volkoff, O., & Strong, D. M. (2013). Critical realism and affordances: Theorizing IT-associated organizational change processes. MIS Quarterly, 37(3), 819–834.

Y. Charalabidis, G. Gionis, E. Ferro, and E. Loukis, "Towards a systematic exploitation of web 2.0 and simulation modeling tools in public policy process," in International Conference on Electronic Participation, pp. 1–12, Springer, 2010.
Voinov, A., & Bousquet, F. (2010). Modelling with stakeholders. Environmental Modelling & Software, 25(11), 1268-1281

Volkoff, O., & Strong, D. M. (2013). Critical realism and affordances: Theorizing IT-associated organizational change processes. MIS Quarterly, 37(3), 819–834.

Williams, C. B., Gulati, G. J. J., & Yates, D. J. (2013, June). Predictors of on-line services and e-participation: a cross-national comparison. In *Proceedings of the 14th Annual International Conference on Digital Government Research* (pp. 190-197). ACM.

CHAPTER 1: PAPER 1: Understanding Issues with Stakeholders' Participation Processes: A conceptual model of SPPs' dimensions of issues

RÉSUMÉ

Au cours de la dernière décennie, la participation des parties prenantes a été de plus en plus adoptée par les organisations publiques et privées dans différents domaines. Cette approche est utilisée pour renforcer l'implication des parties prenantes dans les processus décisionnels concernant les décisions significatives qui affecteront leurs communautés. Dans cet article, nous visons à examiner, catégoriser et offrir une meilleure compréhension des différents enjeux que pourraient rencontrer les processus de participation des parties prenantes (PPPP). Pour atteindre cet objectif, une revue systématique de la littérature a été réalisée. Cet article comporte deux sections principales. Tout d'abord, il comprend une typologie des enjeux qui sont classées en neuf catégories: économique, efficience et efficacité, éthique, législative, politique, administrative, socioéconomique, des parties prenantes et sociale, et technologique. Ensuite, il propose un modèle conceptuel des dimensions des enjeux des PPPP. Un scénario réel de l'utilisation du modèle conceptuel est proposé, et des recommandations sont également présentées.

Mots clés : Processus de participation des parties prenantes, e-participation, gouvernance, société, enjeux pluridisciplinaires, typologie des enjeux, modèle conceptuel

ABSTRACT

Over the last decade, expanded participation among stakeholders has been increasingly adopted by both public and private organizations in different domains. This approach is used to strengthen the involvement of stakeholders in decision-making processes about meaningful decisions that will affect their communities. In this paper, we aim to review, categorize, and offer a better understanding of the different issues that could occur in stakeholders' participation processes (SPPs). To meet this aim, a systematic literature review has been conducted. This paper has two main sections. First, it includes a typology of issues that are arranged in nine categories: economic, efficiency and effectiveness, ethical, legislative, political, administration, socioeconomic, stakeholders and social, and technology. Second, it proposes a conceptual model of the dimensions of SPP issues. A real-world scenario of the proposed conceptual model and recommendations are also presented.

Keywords: Stakeholders' participation processes, e-participation, governance, society, multidisciplinary issues, typology of issues, conceptual model

1.1. Introduction

'Public participation,' 'citizen participation,' 'public involvement,' 'community engagement,' 'political participation,' 'citizen engagement,' and 'community involvement' are all terms that have been extensively used in the literature to describe means of involving citizens, members of the public, or different representatives in decision-making processes that affect their cities, communities, or organizations (André et al., 2012). The term "stakeholder" is the broader term used to encompass all types of participants — citizens, communities, representatives, the public, etc. — in a given participation process. Throughout this paper, we use the term "stakeholders' participation process" (SPP) to refer to any participation process. This term was already used in (Rixon, 2010). Several researchers and practitioners have mentioned the important added value that diverse participation can bring to both governors and the governed (Martineau-Delisle & Nadeau, 2010; Rixon, 2010; Voinov & Bousquet, 2010). This approach allows for the development of a more comprehensive understanding of communities' problems and needs, while enabling the conception of innovative ideas to handle these problems.

Stakeholders' engagement in SPPs is one of the driving forces behind the success of participation initiatives. This engagement is intended to open additional avenues of co-production, which could enhance initiatives' social values, affect the quality of life in communities, and consolidate the knowledge and opinions of stakeholders, while empowering them and helping them achieve their common objectives (Fung, 2015). Nowadays, organizations in different domains and with different purposes — e.g., policy making, city planning, environmental assessments, and strategic planning — are adopting SPPs to strengthen "accountability" and to advocate for "fairness" and "justice" in decision-making processes (Aubin & Bornstein, 2012). With the emergence of information and communications technologies (ICTs), participation has been transformed to electronic participation (e-participation). The use of ICTs is intended to simplify the participation process, make it more inclusive, and ensure that stakeholders are involved in a productive and constructive way (Boudjelida et al., 2016).

Although SPPs bring important added value to cities, organizations, and communities, their implementation still faces several challenges and issues (André et al., 2012; Boudjelida et al., 2016). For example, in (Janssen & Helbig, 2018), the authors point to an issue related to the complexity of the process of getting people involved in participatory activities. They note that "developing mechanisms for participatory governance is complex and resource-intensive" (p. 104). Participation is multidisciplinary in nature (Boudjelida et al., 2016; Freschi, Medaglia, & Nørbjerg, 2009; Marzouki et al., 2017a; Royo, Yetano, & Acerete, 2014), and to acknowledge this complexity, it is important to develop a "multi-faceted" understanding of SPPs (Rosener, 1978). Hence, the primary objective of this paper is to review, categorize, and offer a better understanding of the multidisciplinary issues that SPPs face. Moreover, as SPPs might be traditional (e.g., a physical assembly) or electronic (e.g., a social media channel), or involve both, we have considered in this paper SPPs in general (i.e., both traditional and/or electronic means). To meet our objective, we have conducted a systematic review of the literature from the last two decades.

The rest of this paper is organized as follows: We provide in Section 2 details of our systematic review process. Sections 3 and 4 include the results of our review. Section 3 presents the proposed typology of SPP issues, wherein the main categories are defined and emphasized. In Section 4, a conceptual model of the dimensions of SPP issues is presented; here, the categories of SPP issues are aggregated into four dimensions. Section 5 presents a real-word scenario that illustrates the applicability of the proposed conceptual model for planning and assessing SPPs. Sections 6 and 7 include discussion, recommendations, and a conclusion.

1.2. Methodology

The literature review process conducted for this paper is based on the framework of (Templier & Paré, 2015), which includes six major steps:

(1) Formulating the problem: As emphasized in the introduction, scholars have noted various challenges and issues of participation processes. For instance, a common concern about the "representativeness of stakeholders" is confirmed in (Pina, Torres, & Royo, 2017). Moreover, it is argued that "e-participation is still in its infancy, lacking relevant methods and tools in many areas" (Porwol, Ojo, & Breslin, 2018, p. 96) and that "not much knowledge

is available about how e-participation platforms should be governed" (Janssen & Helbig, 2018, p. 104). Hence, the main research question of this paper is as follows: What are the issues that SPPs are facing?

(2) Searching the literature: In accordance with the recommendations in (Templier & Paré, 2015), a literature search strategy was adopted. For this, we used two categories of databases: disciplinary and multidisciplinary. The keywords used in this search were "citizen," "public," "community," "stakeholder," "electronic," "digital," "participation," "e-participation," "engagement," "e-engagement," "involvement," "e-involvement," "deliberation," "e-deliberation," "public," "government," "sector," "agency," "institution," and "process."

To focus the review, we established a set of criteria for selecting the papers, specifically, access to peer-reviewed journals, English papers, and the publication period of 01/2005 to 06/2020. The search results are provided in **Figure 1.1.**

(3) Screening for inclusion: In this step, we aimed to evaluate "the applicability of the studies previously identified and selecting or excluding them" (Templier & Paré, 2015). This included two procedures: (i) removing irrelevant papers by reading the abstracts and then only keeping the most relevant papers; and (ii) removing duplicate papers.

(4) Assessing quality: To assess the quality of papers, we considered the following two criteria: (i) that each paper is relevant to our research objective; and (ii) that each paper is in peer-reviewed journals. **Figure 1.1.** is a flow diagram depicting our literature review search strategy.

(5) Extracting data: The strategy used to extract the data from the articles included two main stages (Templier & Paré, 2015): (i) holistic analysis of each article (abstract, conclusions, and rapid review of the article in its entirety); and (ii) in-depth analysis of the results and findings of each article (results, discussion, and conclusions). Regular brainstorming meetings among the authors were carried out to validate and update the collection of extracted issues. An issue consists of a key concept, finding, or variable that has an impact on the SPP and that is clearly emphasized in a primary study. **Figure 1.2.** describes the process of extracting, analyzing, and synthetizing the data we reviewed.
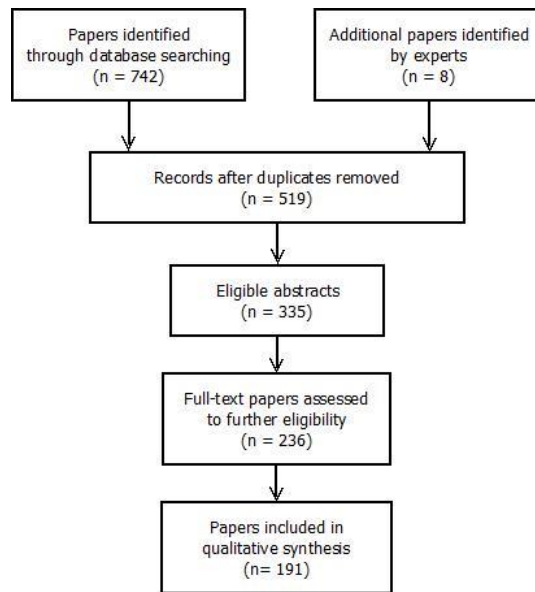
Figure 1.1. Flow diagram of our literature search strategy

According to our analysis, authors have outlined two types of issues: domain-specific and process-specific. Domain-specific issues are those that are related to the topic of the participation process (e.g., environmental, criminal, or nuclear issues). Process-specific issues are related to the process of participation itself (e.g., transparency, consensus-building, or manipulation issues).
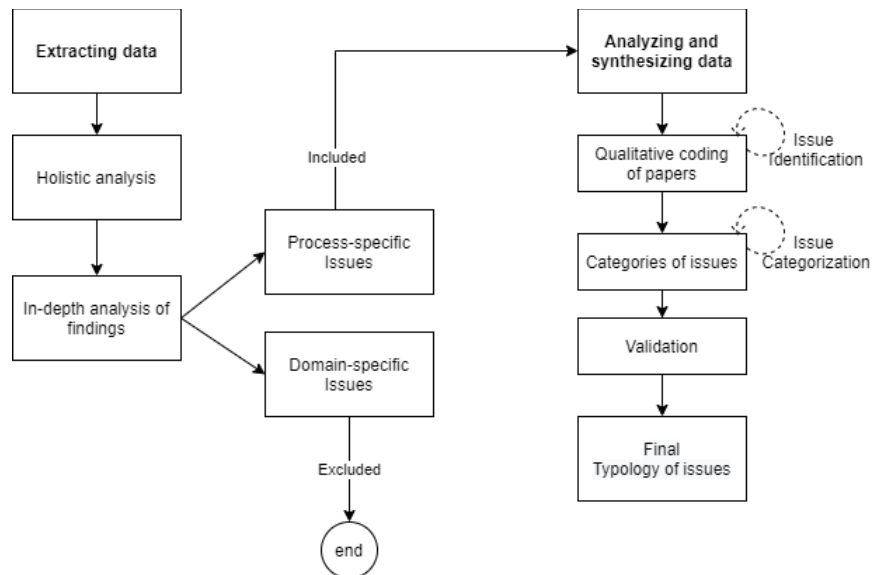
Figure 1.2. The process of extracting, analyzing, and synthetizing the data

Hence, a paper was considered relevant to our research if it identifies at least one process-specific issue. Process-specific issues are those that are valid for any type of SPP, regardless of the policies or projects in question. By following this procedure, 191 final papers were retained based on their relevance to our research objective.

(6) Analyzing and synthesizing data: The process of aggregating, organizing, and summarizing the issues extracted from the primary studies was performed iteratively to assess the meaning and significance of the extracted issues (variables, concepts, findings). More than 240 issues (first-order concepts) were identified in the first analysis and labelled using open coding. These issues were then sub-divided into nine categories (second-order themes: e.g., ethical, administration, technology, etc.). These categories were created based on the terminology used by the authors of the primary studies. We chose specific expressions as our units of analysis to perform the coding; each expression that was related to the SPP issues was added to one of the existing categories as an occurrence. A final validation was approved by the authors to present the complete typology of issues that SPPs face. In the following sections, we present and discuss the results of this study.

1.3. A multidisciplinary typology of issues of SPPs

The analysis of the 191 papers led to the creation of nine major categories of issues that SPPs face: ethical, efficiency and effectiveness, political, stakeholders and social, technology, administration, economic, socioeconomic, and legislative. **Figure 1.3.** shows the typology of issues identified in this literature review. In the following sub-sections, we present, discuss, and provide a definition of each category of issues (detailed tables of categories are provided in Appendix 1.A). We also discuss three to five salient issues for categories with higher number of issues (e.g., ethical and political). For issue categories with four or fewer issues, we emphasize all issues.

1.3.1. Ethical issues

SPPs are associated with various important ethical issues. Ethical issues are related to questions of human morality, namely defining concepts such as good and evil, virtue and vice, and justice and crime. The field of ethics (or moral philosophy) involves systematizing, defending, and recommending concepts of right and wrong behaviors. In this literature review, we have identified 25 ethical issues that SPPs face (see Table 1.A.1, Appendix 1.A).

The most cited are as follows: "**representativeness**," "**trust**," "**transparency**," "**legitimacy**," "**inclusiveness**," "**openness**," and "**conflict of interest**." Several authors have stressed the necessity of investigating ethical considerations and issues in the participation domain (Jao et al., 2015; Porwol, Ojo, & Breslin, 2018). Barriers such as "**representativeness**" remain when small numbers of participants (especially those using ICTs to participate (Pina, Torres, & Royo, 2017)) have greater or unique motivation or interest in a particular topic than the majority of stakeholders, leading to SPPs that are not representative of their communities' diversity of needs and main priorities (Pina, Torres, & Royo, 2017; Alcaide- Muñoz, et al., 2017).
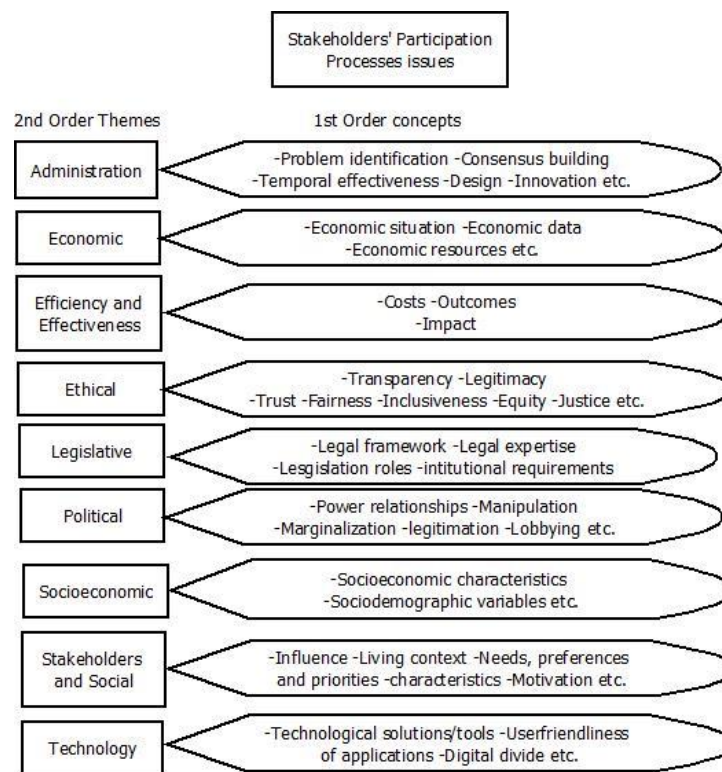
Figure 1.3. A typology of SPP issues organized in nine categories

"**Inclusiveness**" means providing to citizens equal opportunities to participate by removing typical barriers to participation. According to (Pflughoeft & Schneider, 2020), electronic participation has the potential to reduce those barriers and, consequently, allow for participation that is more inclusive. "**Transparency**" concerns how much the provided SPP-related information is accurate, accessible, understandable, complete, timely, and free or low-cost (Piotrowski & Liao, 2012). "**Legitimacy**" is about whether the process is approved by a

majority of the adult population of the community (Molinari, 2010). "**Trust**" comprises stakeholders' evaluations of whether or not authorities and institutions are performing in accordance with the normative expectations held by the public (Lee & Schachter, 2019). Low levels of trust indicate that stakeholders do not perceive that institutions are doing the right thing for them (Lee & Schachter, 2019, p. 406). Stakeholders who do not trust their government would actively resist the state and are therefore "less likely to participate" (Goldfinch, Gauld, & Herbison, 2009, p. 335). The understanding of ethical issues would help both practitioners and scholars moderate and more effectively control methods/measures to make SPPs as ethical as possible.

1.3.2. Efficiency and effectiveness issues

In the context of SPPs, efficiency is defined in (Molinari, 2010) as the ratio between the outputs (or results) of an SPP and the inputs (or resources) that were necessary to support its activities. Effectiveness could be defined as how well the outputs lead to outcomes and impacts that have been set out as the goals of the SPP (Rosener, 1978). Indeed, assessing the effectiveness of SPPs requires a recognition of their complexity (Rosener, 1978). In the review, we identified three categories of efficiency and effectiveness issues as related to SPPs (see Table 1.A.2, Appendix 1.A): "**costs**," "**outcomes**," and "**impacts**." In SPPs, cost-effectiveness is applied in the evaluation framework of (Rowe & Frewer, 2000) to assess whether a participation process is cost-effective or not. In (Molinari, 2010), the authors argue that a sustainable SPP is a process that reduces operational costs or at least keeps them invariant with respect to the "non-participatory" processes it replaces (p. 136). "**Costs**" encompass the money, time, and energy (Robson & Kant, 2007; Shapiro, 2008) needed for the implementation of a given process. Besides monetary resources, there are also human and material resources needed to support the activities of SPPs; these resources have additional costs (Wodschow, Nathan, & Cerutti, 2016). Moreover, the cost of ICT use (Lagos, Coopman, & Tomhave, 2014; Benjamin, 2006) is considered "a small part of the price of effective online engagement" (Epstein, Newhart, & Vernon, 2014). Nevertheless, the authors in (Pina, Torres, & Royo, 2017) note that online participation is better than offline participation with respect to cost.

"**Outcomes**" are the "extended set of assessment criteria against which the success of a participatory approach may be measured" (Videira, Antunes, Santos, & Lobo, 2006, p. 24). According to (Videira, Antunes, Santos, & Lobo, 2006), outcomes encompass such items as "the promotion of learning," "the inclusion of public values and preferences," "the capacity to increase the quality of decisions," and the "potential to foster trust and reduce conflict" among others (see Table, 1.A.2, Appendix 1.A). The major challenge with respect to outcomes is the ability of decision-makers (DMs) to "maintain realistic expectations about outcomes" (Skarmeas, et al., 2019; Rowe & Watermeyer, 2018).

Finally, "**impacts**" refer to the wide range of types of benefits that can be defined and assessed from collected opinions (Martineau-Delisle & Nadeau, 2010; Wahl, 2013). Major challenges include the complexity and slowness of impact assessment (Rowe & Watermeyer, 2018). Evidencing impact — which means speculating on superficial impacts, such as those imagined by stakeholders (Rowe & Watermeyer, 2018)— is a common concern in the participation context. Even so, estimating how much impact opinions could have on policies or projects (Coglianese, Kilmartin, & Mendelson, 2008; Coglianese, Kilmartin, & Mendelson, 2008; 32, Wahl, 2013; Leung, Yu, & Chan, 2013) is not a trivial task.

Indeed, improving the participation process could be a means of amplifying the beneficial impacts and outcomes of SPPs; it is a crucial concern that scholars and practitioners must constantly consider. As such, models and guidelines that lead directly to more effective decisions through the participation process are still needed. Moreover, when it comes to assessing the effectiveness of SPPs, it is important to know the ultimate goal we wish to achieve by involving stakeholders (Rosener, 1978). Without knowing this, the effectiveness of SPPs cannot be assessed. The following are examples of important goal-related questions that organizations need to ask themselves when it comes to implementing SPPs: Are we looking for changes in policy outcomes? / changes in our institutions? / the development of a citizenry with a 'democratic character'? / a more open political process?" / etc. (Rosener, 1978, p. 458).

1.3.3. Political issues

Political issues comprise political factors affecting SPP planning and/or achievement. In the literature review, we identified and aggregated 13 major political issues (see table 1.A.3,

Appendix 1.A). The most cited ones are as follows: "**power relationships**," "**marginalization**," "**manipulation**," and "**legitimation**." "**Marginalization**" refers to the exclusion of voices and social stigmatization (Cunningham & Tiefenbacher, 2008; Lagos, Coopman, & Tomhave, 2014; Thipe, De Souza, & Luwaya, 2015). In this context, the authors argue that "marginalized groups" (Cornwall, 2008) should not be excluded from SPPs and that efforts are needed to stimulate community development through participation "without taking over and tutoring 'the people' to speak to power in 'acceptable' ways" (p. 282). In (Chaney, 2015), the authors contrast "**legitimation**" and "legitimacy." They argue that "legitimacy aims for a public basis of justification and appeals to free public reason, and hence to all citizens viewed as reasonable and rational." In contrast, "legitimation involves communicative actions aimed at managing the public's perception that government actions are effective in promoting their desired ends, whether that is in fact true" (Chaney, 2015, p. 1477). Regarding "**power relationships**" and "**manipulation**," some political elites tend to alter SPPs by dictating and orienting processes to meet their own needs (Hays, 2007). Elites "might become warier of the process if they feel that their power is being diminished" (Bryson et al., 2013b, p. 30). Moreover, it is noted in (Somarakis & Stratigea, 2014) that ICTs have the potential to reinforce current power structures "where adoption and utilization of ICTs in participatory decision-making processes can be seen as a privilege of ICTs-literate groups of society for increasing control over ICTs-illiterate groups" (p. 755).

1.3.4. Stakeholder and social issues

Stakeholder and social issues can be defined as the characteristics, facts, and/or behaviors that stakeholders hold and/or manifest and that have a direct link or impact in an SPP context. In this review, 13 issues related to stakeholders were identified (see Table 1.A.4, Appendix 1.A). Some of these issues are purely social ('needs, preferences, and priorities'; 'characteristics'; 'living context'; 'values, cultures, and ideologies'; 'subjective norms'; and 'social awareness'), while the others ('influence,' 'involvement level,' 'motivation,' 'NIMBYism,' 'reward/tangible benefit,' 'perceptions,' and 'capacities') are inherently linked to SPPs. The most cited ones are "**involvement**"; "**influence**"; "**needs, preferences, and priorities**"; "**living context**"; and "**characteristics**."

In (Videira, Antunes, Santos, & Lobo, 2006), the authors argue that the level of "**involvement**" of stakeholders should match the level of impact/influence sought by policy-

makers. These levels are specifically related to "information," "consultation," "involvement," "collaboration," and "self-determination" (Videira, Antunes, Santos, & Lobo, 2006). By establishing the necessary level of engagement, leaders can more effectively obtain the resources required to meaningfully empower stakeholders, and subordinates can better understand and fulfill their respective roles in the decision-making process (Videira, Antunes, Santos, & Lobo, 2006). Also, the risk of having stakeholders develop an exaggerated perception of their value (Doran & Daniel, 2014; Pina, Torres, & Royo, 2017; Janssen, & Rezaei, 2019) would be mitigated if their roles and level of involvement are clearly defined in the early stages of participation.

A stakeholder's involvement in the participation process does not necessarily mean that their voice will be heard (Cornwall, 2008). One of the main challenges is to measure the degree of "**influence**" that stakeholders have had on the decision-making process.

Stakeholders' heterogeneity in terms of "**needs, preferences, and priorities**" is a crucial social issue in SPPs (Janssen & Helbig, 2018). If this heterogeneity is not incorporated into participation processes, then it would be difficult for stakeholders to get involved and see their community's goals and priorities reached. As argued in (Charalabidis et al., 2010), it is important to consider stakeholders' "**living context**" while implementing participatory processes: "The topics discussed were sometimes distant from people's daily problems and priorities, so that content contributions by non-experts was inhibited" (p. 2). In fact, stakeholders' priorities and needs are embedded within their living context. It is stated in (Bryson et al., 2013b) that "effective public participation processes are grounded in analyzing the context closely." (Bryson et al., 2013b, p. 1–2). Stakeholders' living context could be represented "in… their goals and their intentions, their social context, and their capability of learning and adopting" (Bohman 2014) and should be carefully analyzed in a participatory perspective (Bohman 2014; Ochara & Mawela, 2015; Charalabidis et al., 2010; Tuler & Webler, 2010).

Stakeholders' "**characteristics**" are social issues that encompass several features, including skills, t-knowledge (knowledge about and the ability to operate technologies), background, and self-efficacy, among others (see Appendix 1.A). According to (Janssen & Helbig, 2018), stakeholders' "should have the skills to be involved in policy-making." In (Cegarra-Navarro

et al., 2014), the authors argue that "t-knowledge can potentially improve engagement by helping the user to make his/her personal decision in an increasing range of domains" (p. 660).

1.3.5. Technology issues

We outline from the literature eight major technology issues related to participation (see Table 1.A.5, Appendix 1.A). Among the most cited we note "**the need for technological solutions/tools**," "**the use of GIS and visualization in SPP**," and "**the digital divide**." Regarding "**the need for technological solutions/tools**," we observe an extensive use of different communication channels for SPPs, such as dedicated platforms, blogs, and social media (SM) platforms. The use of these channels has led to two main research problems (Sanford & Rose, 2007): how the data is collected and how the data is analyzed. Furthermore, though technological solutions are increasingly used in SPPs, scholars still emphasize the importance of seeking new technological avenues for enhancing participation (Brabham, 2009; Coglianese, Kilmartin, & Mendelson, 2008; Cunningham & Tiefenbacher, 2008; Castro, 2013a; Howard & Gaborit, 2007; Measham et al., 2011; Somarakis & Stratigea, 2014). Recently, the authors of (Porwol, Ojo, & Breslin, 2018) noted a lack of tools for participation, including "tools for participation request (manual SM advertising instead)" and "specialized tools for the processing and reporting on deliberation data." On the other hand, many authors have recognized and described the relevance of "**geographic information systems (GIS)**," "**spatial simulation**," and "**visualization**" in the participation context (Benjamin, 2006; Brabham, 2009; Cheu, Valdez, Kamatham, & Aldouri, 2011; Howard & Gaborit, 2007; Hunt, Robson, Lemelin, & McIntyre, 2010; Lagos et al., 2014; Lei & Hilton, 2013; Mansourian, Taleai, & Fasihi, 2011; Pieper & Pieper, 2015; Ríos, Benito, & Bastida, 2017; Romero & Keidan, 2017; So, 2014; Somarakis & Stratigea, 2014; Stich & Holland, 2011; Wu, He, & Gong, 2010). The usability of GIS virtual environment tools (Howard & Gaborit 2007; Lei & Hilton, 2013) and visualization platforms (Cheu et al., 2011; Stich & Holland, 2011) in SPPs brings added value since they enhance credibility as well as the comprehension of problems (Hunt et al., 2010). It is noted in (King, Conley, Latimer, & Ferrari, 1989) that visualization is important for effective SPPs because it is a "common language to which all participants technical and non-technical can relate" (Hakimpour, Aleman-Meza, Perry, & Sheth, 2006, p. 38). As (Al-Kodmany, 2000) quotes, "an effective

visualization is the key for communicating ideas and engaging public participation" (p. 222). Spatial simulation and visualization have the power to facilitate communication among different actors involved in the process by promoting mutual understandings and common agreements about basic facts (Rowe & Watermeyer, 2018). Despite this, scholars note that SPPs do not take enough advantage of GIS-based tools (Howard & Gaborit, 2007; Lei & Hilton, 2013; Al-Kodmany, 2000). Also, the authors of (Stich & Holland, 2011) note the lack of standard federal geodata for all areas and the size constraints of a large GML (Geographic markup language) model of a city (Wu et al., 2010). Another technology issue is "**the digital divide**." This is defined as the disparity among stakeholders in the use of ICTs in different spheres of life — that is, those who can and those who cannot use certain digital technologies (Goldfinch, Gauld, & Herbison, 2009). As such, ICTs are not always accessible to all relevant stakeholders since some of them do not have or do not know how to use ICTs (Williams, Gulati, & Yates, 2013). The "**digital divide**," then, means that not all stakeholders are represented. Low levels of internet capacity in rural areas is a notable barrier to some stakeholders' participation (Ju, Liu, & Feng, 2019a).

1.3.6. Administration issues

As in any process, administration efforts are required to enhance the success of SPPs. According to the Cambridge Dictionary,[1] administration refers to "the arrangements and tasks needed to control the operation of a plan or organization." More than 100 issues related to the administration of participation processes are outlined in this research. After aggregation and synthesis, these issues were summarized in 19 groups (see Table 1.A.6, Appendix 1.A). The most cited issues are "**Temporal effectiveness**," "**effective communication**," "**the use of adequate approaches, tools, techniques, and methods**," "**Empowerment, co-learning, and supporting of stakeholders**," and "**Problem, goals, purposes, and proposals identification**." Several aspects related to "**temporal effectiveness**" have been addressed in the literature; these include "time pressure" (Pidgeon et al., 2005), "long timeframes" (Measham et al., 2011), the "time-consuming" nature of a process (Shapiro, 2008), "engagement timing" (the moment at which the stakeholder becomes involved) (Booth & Halseth, 2011; Brabham, 2009; Henningsson et al., 2015; Jami

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[1] https://dictionary.cambridge.org/dictionary/english/administration

& Walsh, 2016; Kahila-Tani, Broberg, Kytt¨a, & Tyger, 2016; Li, Ng, & Skitmore, 2012; Nilsson, Peterson, Holden, & Eckert, 2011; Romero & Keidan, 2017; Rowe & Watermeyer, 2018; Syma Czapanskiy & Manjoo, 2008; Videira et al., 2006; Wahl, 2013; Wodschow et al., 2016). In (Rowe & Watermeyer, 2018), the authors discuss the "timing dilemma" and demonstrate a couple of reasons why the timing of participation poses challenges. One of these reasons is the novelty of the emergent issue, which requires "a coherent characterisation to inform public participants of the key elements/aspects so that they are then able to indulge in relevant debate" (p. 206).

On another vein, scholars note that there is a need for using "**adequate approaches, tools, techniques, and methods**" of engagement "in order for the laymen to understand complex issues and to enable implementation by strengthening the connection between participation and decisions" (Wahl, 2013). Surveys, focus groups, advisory committees, and visioning workshops are all participatory methods that could be used in SPPs. The main challenge for planners and decision-makers is to decide "what the corresponding engagement approach should be" (Bryson et al., 2013a) and how to "engage people in meaningful interactions" (Webler & Tuler, 2006).

Conducting meaningful discussions and negotiating the multiple viewpoints of stakeholders is a challenge, especially when it comes to dealing with a significant level of involvement and/or number of participants. Dispute resolution (Bingham, Nabatchi, & O'Leary, 2005; Booth & Halseth, 2011) and conflict management (Daley, 2008; Syma Czapanskiy & Manjoo, 2008; Veronesi & Keasey, 2015) are key challenges in SPPs. Consensus-building is critical for meeting the objectives of both leaders and subordinates (Martineau-Delisle & Nadeau, 2010). In (Brabham, 2009), the authors mention the concept of "crowdslapping," which consists of resistance from the crowd in SPPs. This may "destabilize communities and may interfere in the problem-solving abilities of a crowd" (p. 257) either via online engagement or in face-to-face meetings and forums. "**Effective communication**" refers to the need for the multidirectional flow of information / two-way flow of communication (Coglianese et al., 2008; Cunningham & Tiefenbacher, 2008; De Santo, 2016; Decker & Bath, 2010; Everatt, Marais& Dube, 2010; Henningsson et al., 2015; Kim & Schachter, 2013; Muluk, Danar, & Rahmawati, 2019), which involves reporting back to communities (Everatt

et al., 2010; Jami & Walsh, 2016) and makes for a better quality of exchange (Martineau-Delisle & Nadeau, 2010). For this, explicit communication of the issues, objectives, and design of SPPs is needed (Uittenbroek, Mees, Hegger, & Driessen, 2019).

1.3.7. Economic issues

In this study, we identify a category of economic issues that scholars have rated as being of high importance to SPPs. Economy is defined as "a social domain that emphasizes the practices, discourses, and material expressions associated with the production, use, and management of resources."[2] As stated in (Daley, 2008; Castro, 2013a), economic issues represent, issues that are related to the global economic parameters of a city or an organisation and that have a direct influence on SPPs.

We have identified four economic issues: "**economic development**," "**transportation and logging issues**," "**the need for additional economic resources for participation**," and "**the need for introducing economic data in SPPs**."

According to (Castro, 2013a; Castro, 2013b), "**transportation difficulties and logging issues**" and overemphasized "**economic development**" lead to "an adverse impact" (Li et al., 2012, p. 52) on SPPs. In (Rios et al., 2017), the authors note that the technology gap among countries with different economic levels (according to an index of "**economic development**") limits stakeholders' opportunities to use ICTs, particularly the internet, for a wide variety of activities, including direct participation. Therefore, it is necessary to procure adequate "economic resources" (Daley, 2008) (including but not limited to ICTs) to enable the adoption and the implementation of effective participation processes. Furthermore, the authors of (Stich & Holland, 2011) consider that there is a "**need for introducing economic data in SPPs**" since doing so allows participants and decision-makers to evaluate and predict the economic and demographic effects of a given policy initiative (p. 64).

1.3.8. Socioeconomic issues

Several socioeconomic issues were highlighted to explain stakeholders' engagement in SPPs. These include income, education level, age, gender, ethnicity, internet penetration, and the

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[2] JAMES, Paul. *Urban sustainability in theory and practice: circles of sustainability*. Routledge, 2014.

demography of participants. We have identified three major socioeconomic issues: "**socioeconomic characteristics**," "**sociodemographic variables**," and "**socioeconomic location**" (see Table 1.A.8, Appendix 1.A). In (Booth & Halseth, 2011), it is argued that "people with enough money" ("**socioeconomic characteristics**") are more likely to participate in SPPs. Furthermore, countries with higher socioeconomic resources ("**socioeconomic variables**") can offer more access to ICTs, meaning they can offer more opportunities for citizens to participate in public issues (Jho & Song, 2015). Finally, the "**socioeconomic location**" (center/periphery) affects the level of stakeholders' engagement. People in urban areas are generally more likely to engage with their local authorities via SM than those in rural areas.

1.3.9. Legislative issues

Legislative issues in SPPs largely consist of the development of an adequate "legal framework" (Catalin, Cherecheș, Cristina, & Țiclau, 2009; Cliquet, Kervarec, Bogaert, Maes, & Queffelec, 2010) that would ensure that SPPs are implemented properly and in adherence to "legislative actions and policies" (Somarakis & Stratigea, 2014). In fact, the "type of legal system" has an influence on participation through the creation "of more or less favourable normative resources that condition the extent to which public participation is understood as a component of legitimate government" (Rios et al., 2017, p. 52). In the review, we identified three major legislative issues: the "**legal framework**," "**institutional requirements**," and "**legal expertise**" (see Table 1.A.9, Appendix 1.A).

In (Allen, Tamindael, Bickerton, & Cho, 2020), the authors highlight that in both examined countries, they observed that "**legal frameworks**" "limit the participatory potential of administrative appeals" (p. 842). They argue that stressing an increase in civil participation in the absence of an institutional system has adverse effects, namely bringing democratic crisis rather than democratic development. Their findings are consistent with the UN's recommendation for transitioning democracies, specifically their assertion in the 'Technical Cooperation Projects on E-Government' that the digitalization of government and the institutionalization of democracies must go hand in hand (Pflughoeft & Schneider, 2020). It is noted that "**institutional requirements**" (e.g., the level of institutionalization of freedom of speech and democracy in political institutions), influence the level of participation (Jho &

Song, 2015). Strong political institutions (those with high levels of institutionalization of freedom and democracy) in a country positively affect the level of e-participation and vice versa. Finally, the access to "**legal expertise**" in SPPs is necessary for groups that lack the means to participate effectively (Abbot, 2020). "By virtue of their expertise and skills, and their positioning as repeat players in SPPs, lawyers can — among other things — advise groups on how best to present their knowledge and maximise influence and, if appropriate, can represent their groups at oral hearings" (Abbot, 2020, p. 285).

1.4. A conceptual model of the dimensions of SPP issues

In Section 3, we grouped SPP issues into nine categories. For this section, we have conducted an analysis with a higher abstraction level (third-level of coding) to present a conceptual model of the dimensions of SPP issues (Urquhart & Fernandez, 2013). Continuing questioning of our typology of issues has led us to two observations: (1) that the nine categories can be grouped into four distinct dimensions of issues (governance, application, stakeholders, and society, as illustrated in **Figure 1.4.**); and
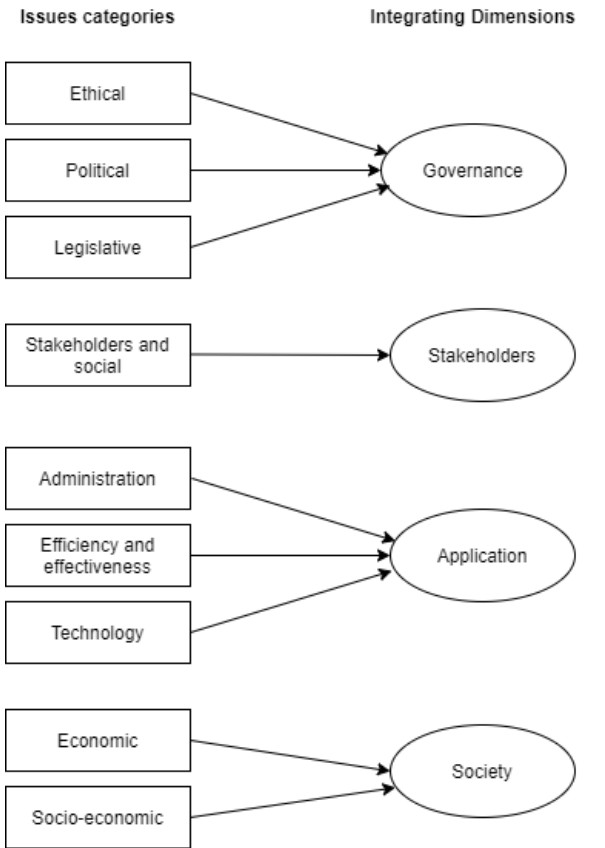
Figure 1.4. Integrating dimensions of SPP issues

(2) that it is misleading in some cases to completely separate categories of issues and, in turn, dimensions of issues. Instead, we have come to understand that two types of influences exist among issues, as illustrated in **Figure 1.5.**: intra-dimensional (within the same dimension) and inter-dimensional (between two different dimensions). Hereafter, we present the four dimensions of issues within which SPPs operate and we illustrate with some examples the applicable influence among and within the dimensions.

1.4.1. The stakeholder dimension

Stakeholders, which represent all types of participants, play a fundamental role in SPPs. Without stakeholders, there is no SPP. Hence, we consider them an integral dimension in the conceptual model. Assessing whether stakeholders have the necessary skills to be involved in an SPP and determining how to get them involved are, in our view, crucial social issues for stakeholders. Drawing on our analysis, we find that stakeholders and their social issues influence and are influenced by the application, governance, and society dimensions, generating inter-dimensional influences among all dimensions. The justification for this contention follows.
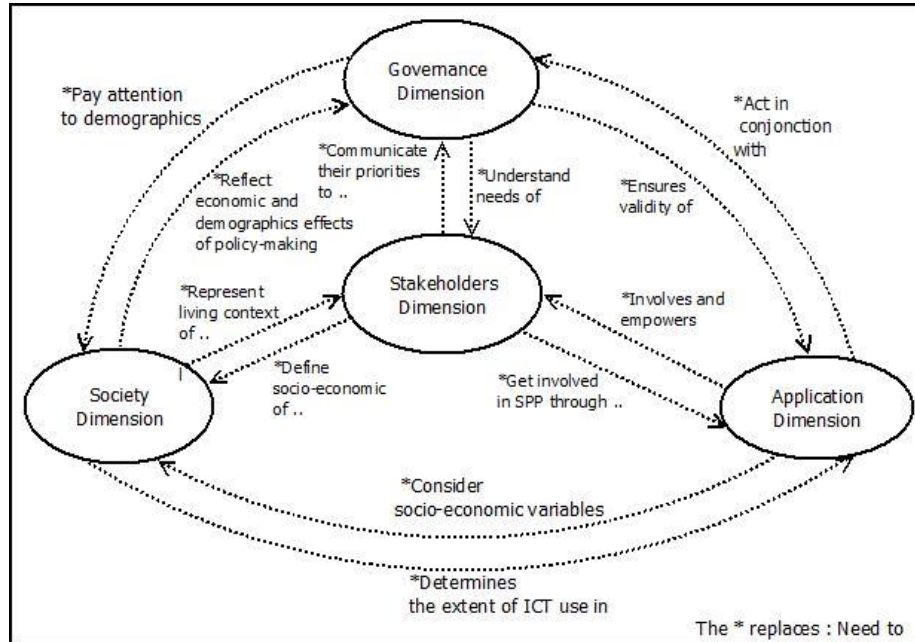
Figure 1.5. A conceptual model of the dimensions of SPP issues

The application dimension encompasses the administration, efficiency and effectiveness, and technology categories of issues. "Participants' self-efficacy beliefs increase their

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participation input and could be influenced by the level and mechanisms of 'empowerment' put in place," as argued in (Schmidthuber, Hilgers, & Rapp, 2019); consequently, if platform managers intend to increase platform content, they are well advised to increase individuals' self-efficacy (e.g., by providing individuals with feedback on how tasks were performed and by offering sufficient socio-emotional support, which increases their feelings of self-efficacy) Moreover, even if stakeholders are willing to be involved in SPPs, they may lack enough time (Aubin & Bornstein, 2012; de Luca, 2014). Leaders of SPPs should take advantage of the characteristics of ICTs, such as asynchrony, adaptability, anonymity, and instantaneity to make SPPs more effective (Brabham, 2009; Coglianese et al., 2008; Howard & Gaborit, 2007; Pieper & Pieper, 2015), while being mindful of issues of representativeness and inclusiveness (Pina, Torres, & Royo, 2017). This brings us to the governance dimension.

The governance dimension encompasses the ethical, political, and legislative categories of issues. Stakeholders have needs and priorities that they wish to communicate and fulfill through their contributions to SPPs. However, stakeholders' involvement in an SPP does not necessarily mean that their voices will be heard (Cornwall, 2008). This means that immediate facilitators and managers of SPPs as well as other governance actors need to comprehend stakeholders' needs and priorities. Indeed, aspects of governance are fundamentally changing through the utilization of new technologies. This, in turn, influences the ways policy-makers create policy, while affecting the power balance between government and the public (Janssen & Helbig, 2018).

The society dimension encompasses the economic and socioeconomic categories of issues. A society is a context where stakeholders are living and where their social issues arise as well as where projects and policies requiring SPPs are implemented. The socioeconomic characteristics that require significant attention in SPPs (Guillamon et al., 2016) are derived from individual stakeholders' social characteristics

1.4.2. The application dimension

The application dimension is related to the planning, implementation, and evaluation of SPPs from an operational perspective. It includes the administration, efficiency and effectiveness, and technology issues. Actions within this dimension are carried out by planners and facilitators and necessitate the involvement of stakeholders. Outcomes, use of multiple

techniques, and internet-based surveys are three issues that arise respectively from the efficiency and effectiveness, administration, and technology categories.

We observe that the application dimension comprises issues related to the society dimension (representing an inter-dimensional connection), as the consideration of economic and socioeconomic features is essential when it comes to implementing participatory initiatives (Guillamon et al., 2016).

1.4.3. The governance dimension

The governance dimension includes the ethical, legislative, and political issues that are inherent to SPPs. This dimension represents issues that are more volatile because many different stakeholders (e.g., elected officials) in this dimension have shorter tenures (Corbett & Mellouli, 2017) than those in the application dimension (e.g., facilitators). Ensuring effective governance of SPPs requires integration among the ethical, legislative, and political aspects and structures within an organization. For example, legislative and ethical decisions are influenced by each other ("legal expertise and fairness"), as emphasized in (Abbot, 2020). Through investigating inter-dimensional links, we stress the necessity of aligning the governance and application dimensions when implementing SPPs to ensure their effectiveness. In fact, e-participation has a higher probability of increasing when institutions and technology work in conjunction (Jho & Song, 2015). For instance, policy-makers must have knowledge of technologies' "(im)possibilities" and limitations and need to know how to integrate technologies into public discourse (Janssen & Helbig, 2018).

Finally, society is the space where actions and policies resulting from governance are tested and take place. Society reflects the results of effective or ineffective governance of SPPs. For example, the use of economic/output models as recommended by (Stich & Holland, 2011) allows for the evaluation and prediction of the economic and demographic effects of a given policy initiative.

1.4.4. The society dimension

The society dimension encompasses economic and socioeconomic issues. We note that the economic and socioeconomic categories influence each other in the SPP context, representing intra-dimensional relationships. Countries with greater socioeconomic resources can offer more access to ICT-generating resources and more open competition in

telecommunication industries (Girish, Williams, & Yates, 2014; Ju, Liu, & Feng, 2019b), all of which enables increased opportunities for citizens to participate in public issues (Jho & Song, 2015). Regarding inter-dimensional relationships, we recognize that there are interactions between the society and application dimensions. For instance, technology use in SPPs could alleviate some socioeconomic issues, such as low incomes. It is argued in (Guillamon et al., 2016) that "citizens with lower incomes may also use some new technologies, such as SM (for instance, Facebook), since they are very popular, cheap, and easy to use." This brings us back to the technology-related recommendation — as suggested by (Guillamon et al., 2016) — that local governments use SM to reach citizens with lower incomes. We acknowledge that additional relationships might exist in the literature, but those noted here are the ones that emerged from our particular study.

1.5. Scenario for use of the conceptual model

In this section, we present a real-word scenario that illustrates the applicability of the proposed conceptual model in planning and assessing SPPs. The SPP we analyzed was carried out for the strategic planning of a public organization in Québec (a public university), Canada between September 2017 and March 2018. The first author was a member of the planning team and closely followed all stages of the SPP. To demonstrate the applicability of the model, we analyze one or two issues for each category.

Based on our conceptual model, decision-makers (DMs) and planners might assess SPPs (post-process) by asking themselves, "what measures could have been taken to ensure that our process considers each category of issues?" Obviously, the goal is not to respond to all of the issues exhaustively, but to consider and ensure that efforts are made and means are made available to address the obstacles. Likewise, at the planning stage (pre-process), the aforementioned key actors might ask a similar question: "What actions might be taken to enable measures that could shield future SPPs from multidisciplinary barriers?"

1.5.1. The governance dimension

One of categories of issues in governance is _ethical_ issues (as depicted in Table 1.A.1, Appendix 1.A). In this context, actors might ask themselves the following: "What measures were taken to ensure that our SPP is ethical?" One issue in the ethical category is **transparency**. In this case study, transparency was ensured by making the information about

the SPP publicly accessible. To this end, a specific web page on the institution's website was created and updated regularly throughout and after the SPP to enable continuous follow-up. Another issue related to the ethical category is **equity**. Regarding this, we note, for example, that when two participants raised their hands at the same time, priority was given to the person who had not yet participated. However, when no participants voluntary raised their hands, a dice was thrown so that participants could be randomly selected.

When examining the *legislative* category under governance, we observe that even though the participation campaign took place with respect and inclusiveness granted to all members, the fact remains that an institutional legal framework for citizens' participation is absent in this institution, so there was no access to legal expertise/professionals. **Legal frameworks** are important for organizing roles and guaranteeing the rights of all stakeholders and for distinguishing them as "consultants" and/or as equal partners around the table (Somarakis & Stratigea, 2014). The presence of both legal professionals and a legal framework would have allowed for the positioning of stakeholders' knowledge within the legal framework and the policy without detracting from the value of their knowledge in influencing planning outcomes (Abbot, 2020).

1.5.2. The application dimension

One of the categories of issues in the application dimension is *technology*. To assess social media (SM) use in our case study, a specific hashtag was created for participation via SM. However, we note that the participation rate on the institution's official SM pages was low. As to why this happened, we note here that a **clear strategy for management of SM channels** might be developed during future SPPs to enhance participation through SM, as recommended in Section 4.

Regarding the *administration* issues, which is also one of the categories in the application dimension, questions arise about **temporal effectiveness**. We note that the time allocated to our team was limited, which significantly increased the workload of everyone involved in managing the process. As data analysts using intelligent algorithms to analyze the collected data (from forums, focus groups, SM, sent documents, etc.), we were in a race against time to complete data transcription, updating, cleaning, and processing. A longer period of time and a larger data analysis team would have made it possible to analyze the data more quickly.

Similarly, regarding *efficiency and effectiveness*, a question could be asked about how to measure the **outcomes** of the process. In our case, the institution applied five monitoring indicators that were grouped according to three major axes: experience, engagement, and excellence. The indicators include several actions. On a periodic basis, dynamic dashboards allowed people from the institution's management, faculties, and services to discuss results and make the necessary adjustments.

1.5.3. The society dimension

The society dimension includes socioeconomic and economic issues. To understand the *socioeconomic* issues, DMs might ask themselves, "what are the **demographics** of targeted stakeholders for this SPP?" or "did the involved stakeholders represent the demographics of targeted stakeholders?" Exploring these questions would help DMs put in place best practices for more effectively targeting their stakeholders. In our case, the University welcomes a large number of international students and professors, so many participants had different background in terms of ethnicity, country of origin, culture, etc. We note that the process was open enough to incorporate the diversity of stakeholders, while allowing all participants — regardless of their origin, ethnicity, gender, or age — to be actively involved in it. For instance, the representative from the elderly community of the public organization in question was very well received and applauded for her remarkable and original contributions in the consultation forums.

With reference to *economic* issues, no **transportation and lodging difficulties** were noted as barriers in this SPP. In fact, the economic profile of Québec City allows easy access to transportation in general. Moreover, the context (academia and its partners) of the SPP as well as the diverse means of facilitating participation made it straightforward to get involved.

1.5.4. The stakeholders' dimension

Finally, to assess stakeholders' issues, DMs might ask themselves, "do targeted stakeholders have the skills to be involved in SPPs?" If not, what measures to empower them should be developed? One way of doing this is by using simulations and games (Janssen & Helbig, 2018). It is important to note that facilitators and decision-makers of SPPs should pay close attention to the specific context in which each SPP occurs (Bryson et al., 2013b). Also, DMs might check if **stakeholders' needs, preferences, priorities,** and **living context** are clearly

expressed by participants through SPPs. If not, stakeholders should be encouraged to actively express their needs (Ianniello, Iacuzzi, Fedele, & Brusati, 2019). In our case, we note that stakeholders referred to relevant lived experiences either within or outside the university to emphasize their living context as well as their needs and priorities. An example is the public transportation facilities that participants requested from the organization. The following year, there was an agreement between the organization and the transport network to offer a preferential rate for members.

In the next section, we review and present some recommendations for both research and practice to address issues within the four dimensions.

1.6. Recommendations for research and practice

The main goal of this research is to provide DMs and researchers with valuable knowledge about SPPs and to assist them in preventing potential risks and increasing the effectiveness of SPPs. **Figure 1.6.** shows a recapitulative view of our research. It encompasses the main actors in the participation stream (stakeholders, decision/policy-makers, and researchers) and shows that adoption and improvement of SPPs revolves around the four proposed dimensions of issues: application, governance, stakeholders, and society.

DMs and scholars may be asking how the conceptual model of SPPs issues can be useful. For DMs, the above-mentioned real-word scenario as well as scholars' recommendations in the literature underline concrete actions to help with implementing and assessing future SPPs. For scholars, both concrete actions and research directions highlighted in the literature emphasize that implementing effective SPPs requires multidisciplinary understanding and collaboration between both practitioners and scholars.

In the following paragraphs, we detail some practical and research recommendations for each dimension of issues. Due to space limitations, only selected recommendations for each category are provided in this section.
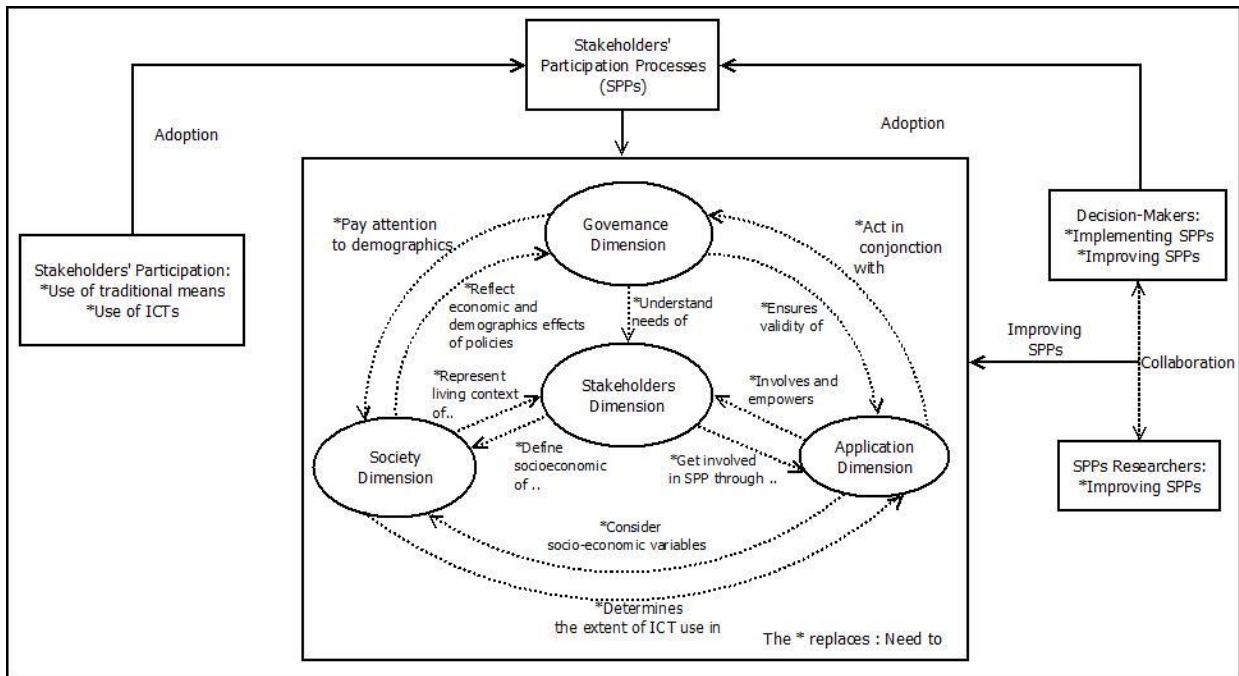
Figure 1.6. A recapitulative view of the dimensions of SPP issues, including key actors

Beginning with the *stakeholders dimension*, we present two recommendations:

1) Who are the stakeholders? What needs do they have? Can the participation system fulfill these needs? (Toots, 2019). In fact, DMs should know their stakeholders and their social issues. There is a need to understand their living context and to focus on topics of interest and significance to local stakeholders (Bonson, Royo, & Ratkai, 2015). Scholars recommend regularly analyzing the context to align the system with changes in the context" (Toots, 2019, p. 557).

2) From the research perspective, even though several scholars refer to the relevance of "stakeholders' living context" (or "contextualization") (Brabham, 2009; Gauvin, Abelson, Giacomini, Eyles, & Lavis, 2010; Henningsson et al., 2015; Hunt et al., 2010; Jami & Walsh, 2016; Martineau-Delisle & Nadeau, 2010; Neshkova, 2014; O'Meara, Tsofa, Molyneux, Goodman, & McKenzie, 2011; Syma Czapanskiy & Manjoo, 2008) in SPPs, this concept is poorly defined in literature. As argued by the authors of (Bonson, Royo, & Ratkai, 2015), the efforts of DMs may be more effective if they ensure that their proposals are relevant to their living context — that is, "focused around topics of interest and significance to local citizens" rather than being of broader organizational interest or marketing-related (Bonson, Royo, &

Ratkai, 2015, p. 60). Further research should investigate and provide a better understanding of context and contextualization regarding participation (Bonson, Royo, & Ratkai, 2015).

Regarding the **application dimension**, DMs and facilitators face issues of *efficiency and effectiveness*, technology use, and administration of SPPs. Accordingly, we offer three recommendations:

1) Regarding *efficiency and effectiveness*, two relevant questions that DMs could ask themselves during the planning phase of an SPP are as follows: "What are the outcome-related goals of the process?" (Pidgeon et al., 2005; Webler & Tuler, 2006) and "how can progress/outcomes be measured in the near term?" (O'Meara et al., 2011; Pirannejad et al., 2019; Janssen, & Rezaei, 2019). First, DMs should maintain realistic expectations about the process and its potential outcomes (Ianniello, Iacuzzi, Fedele, & Brusati, 2019). Metrics can be tailored to quantify the specific changes that the community desires, and progress can be measured year by year, as the set-aside funds are spent (Janssen, & Rezaei, 2019).

2) Using *technology* in an appropriate manner in SPPs requires the implementation of various strategies. Specifically, DMs should implement strategies for SM engagement (Corbett & Mellouli, 2017), participation through additional digital channels (e.g., blogs, forums, etc.), and management (Sandoval-Almazan & Gil-Garcia, 2012). In addition, there is a need to more regularly use GIS-based tools (e.g., visualization tools) since they serve an important role in e-participation as "argument tools" (Doran & Daniel, 2014).

3) For researchers, tools and instruments should be developed from a problem-oriented perspective. This means that a particular problem is the focus and is not developed from a technology-driven perspective (Janssen & Helbig, 2018). Moreover, knowledge about how e-participation platforms should be governed and how they should operate in ecosystems with many stakeholders should be developed (Janssen & Helbig, 2018). Further research would be welcome to "investigate whether there is an optimal point within the policy making process to begin public involvement, which factors are determinative in this respect and whether this varies over policy areas and countries" (De Vries, 2007).

Regarding the *governance dimension*, we outline three recommendations:

1) A key priority is to coordinate actions around ethical, political, and legislative issues of SPPs. To enhance *equity*, SPP designers should consider what is behind stakeholders' choices, focusing first on understanding the problem setting (Naranjo-Zolotov, Oliveira, Casteleyn, & Irani, 2019).

2) Joint efforts should take place to secure *political* support for participation systems, but in such a way that it does not manipulate stakeholders (Toots, 2019), and to prevent ICTs from reinforcing current power structures in the participation context (Somarakis & Stratigea, 2014).

3) For researchers, examination of *ethical* issues is becoming a priority (Jao et al., 2015; Porwol, Ojo, & Breslin, 2018). Future work will require deeper investigation into ethical aspects of e-participation, specifically political campaigns and intentional political propaganda, privacy issues for citizens, and "seed users' influence on social media" (Porwol, Ojo, & Breslin, 2018). Moreover, new indexes could be developed to more extensively cover the political aspects of e-participation initiatives to further refine the Balanced e-Participation Index (BEPI) and related constructs as well as to yield better performance (Pirannejad et al., 2019).

Regarding the *society dimension*, we present two recommendations:

1) For planners who seek to further develop their use of SM as an e-participation tool, the authors of (Pflughoeft & Schneider, 2020) recommend to "pay attention to *demographics* of targeted stakeholders" and to the *economic* situation/data. *Socioeconomic*/demographic variables should be considered in SPPs so that adequate motivational measures can be developed and delivered and so that lodging facilities can be provided to encourage people with low interest in involvement to expand their capacity and willingness to take part in SPPs (Wodschow, Nathan and Cerutti, 2016; Vicente and Novo, 2014; Pflughoeft and Schneider, 2020; Cowie, 2017). For larger municipalities, scholars recommend greater use of SM applications to favour immediate communication between DMs and citizens and to reduce agency costs (Guillamon et al., 2016).

2) From a research perspective, further studies are encouraged "to classify countries based on related *economic variables* such as countries' income level, gross domestic product (GDP), and gross national income (GNI) in order to explore how the economic factors might affect the e-participation initiatives in each category of the countries" (Pirannejad et al., 2019).

Conclusion

This paper represents an attempt to contribute to the development of SPPs from both practical and theoretical perspectives. The typology of SPP issues and the conceptual model of dimensions presented here offer a multidisciplinary understanding of SPPs.

To the best of our knowledge, no prior researchers have attempted to develop such a multidisciplinary understanding of issues regarding participation processes. In our attempt to provide a multidisciplinary global view of participation processes, our typology of issues and our conceptual model are broadly integrative.

We have demonstrated the importance of each dimension to conducting SPPs and that there are still many research avenues to be explored. This study confirms the complex multidisciplinary nature of the participation field.

From a theoretical perspective, we believe that the conceptual model proposed in this paper represents a valuable foundation on which researchers in the participation field could base the development of new approaches and models for participation processes. As argued in (Freschi et al., 2009; Roche, Nabian, Kloeckl, & Ratti, 2012), interdisciplinary or transdisciplinary studies are needed to enhance participation processes in practice. With our study now serving as a baseline, we hope that future contributions will combine considerations of the application, governance, stakeholders, and society dimensions of issues to develop more informed and interdisciplinary participation approaches and guidelines.

In addition to the aforementioned contributions of this paper, there are limitations that need to be considered and that open avenues for future research. First, the findings of this paper are based purely on peer-reviewed academic literature. As participation is inherently about practice, useful future research could be based on grey literature to complement the knowledge of SPP issues from practitioners' perspectives. Indeed, including grey literature

could "*broaden the scope to more relevant studies*" (Mahood, Van Eerd, & Irvin, 2014), so it is useful to validate the results of academic, peer-reviewed studies to providing a more complete understanding of available knowledge and evidence (Benzies, Premji, Hayden, & Serrett, 2006; Mahood et al., 2014).

Second, we demonstrated the usefulness of this model on a single case study. It should be applied to more case studies to further show its usefulness and relevance.

Additionally, we have presented in this paper a limited set of recommendations to remedy issues presented in the conceptual model. We believe that both researchers and practitioners still need more actionable recommendations to better assess the conceptual model. Again, practitioners' real-word experiences as documented in grey literature could also be combined with this peer-reviewed study to advance the knowledge it provides. In a future paper, we will extend the impact of our research by providing a "portrait for action" that will aggregate recommendations with concrete actions for both practice and research.

References

Alcaide-Mũnoz, L., Rodríguez-Bolívar, M. P., Cobo, M. J., & Herrera-Viedma, E. (2017). Analysing the scientific evolution of e-government using a science mapping approach. *Government Information Quarterly, 34*(3), 545–555.

Al-Kodmany, K. (2000). Public participation: Technology and democracy. *Journal of Architectural Education, 53*(4), 220–228.

Al-Kodmany, K. (2001). Visualization tools and methods for participatory planning and design. *Journal of Urban Technology, 8*(2), 1–37, 10.1080/1063073012007971.

Allen, B., Tamindael, L. E., Bickerton, S. H., & Cho, W. (2020). Does citizen coproduction lead to better urban services in smart cities projects? An empirical study on e-participation in a mobile big data platform. *Government Information Quarterly, 37*(1), Article 101412.

André, P., & Avec la collaboration de P. Martin et G. Lanmafankpotin. (2012). *«Participation citoyenne », dans L. Coté et J.-F. Savard (dir.), Le Dictionnaire encyclopédique de l'administration publique*.

Aubin, R., & Bornstein, L. (2012). Montreal's municipal guidelines for participation and public hearings: Assessing context, process and outcomes. *Canadian Journal of Urban Research, 21*(1), 106–131.

Benjamin, S. M. (2006). Evaluating e-rulemaking: Public participation and political institutions. *Duke Law Journal*, 893–941.

Benzies, K. M., Premji, S., Hayden, K. A., & Serrett, K. (2006). State-of-the-evidence reviews: Advantages and challenges of including grey literature. *Worldviews on Evidence-Based Nursing, 3*(2), 55–61.

Bingham, L. B., Nabatchi, T., & O'Leary, R. (2005). The new governance: Practices and processes for stakeholder and citizen participation in the work of government. *Public Administration Review, 65*(5), 547–558.

Bohman, S. (2014, September). Information technology in eParticipation research: A word frequency analysis. In *International Conference on Electronic Participation* (pp. 78–89). Berlin Heidelberg: Springer.

Bonson, E., Royo, S., & Ratkai, M. (2015). Citizens' engagement on local governments' Facebook sites. An empirical analysis: The impact of different media and content types in Western Europe. *Government information quarterly, 32*(1), 52–62.

Booth, A., & Halseth, G. (2011). Why the public thinks natural resources public participation processes fail: A case study of British Columbia communities. *Land Use Policy, 28*(4), 898–906.

Boudjelida, A., Mellouli, S., & Lee, J. (2016, March). Electronic citizens participation: Systematic review. In *Proceedings of the 9th international conference on theory and practice of electronic governance* (pp. 31–39). ACM.

Brabham, D. C. (2009). Crowdsourcing the public participation process for planning projects. *Planning Theory, 8*(3), 242–262.

Bryson, J. M., Quick, K. S., Slotterback, C. S., & Crosby, B. C. (2013a). Designing public participation processes. *Public Administration Review, 73*(1), 23–34.

Bryson, J. M., Quick, K. S., Slotterback, C. S., & Crosby, B. C. (2013b). Designing public participation processes. *Public Administration Review, 73*(1), 23–34.

Cascetta, E., Cartenì, A., Pagliara, F., & Montanino, M. (2015). A new look at planning and designing transportation systems: A decision-making model based on cognitive rationality, stakeholder engagement and quantitative methods. *Transport Policy, 38*, 27–39.

Castro, C. M. D. (2013a). Public hearings as a tool to improve participation in regulatory policies: Case study of the National Agency of electric energy. *Revista de administraç̃ao Pública, 47*(5), 1069–1087.

Castro, C. M. D. (2013b). Public hearings as a tool to improve participation in regulatory policies: Case study of the National Agency of Electric Energy. *Revista de administraç̃ao Pública, 47*(5), 1069–1087.

Catalin, B. A. B. A., Cherecheș, R., Cristina, M. O. R. A., & Țiclˇau, T. (2009). Public participation in public policy process–case study in seven counties from North- Western region of Romania. *Transylvanian Review of Administrative Sciences, 5*(26), 5–13.

Cegarra-Navarro, J. G., Garcia-Perez, A., & Moreno-Cegarra, J. L. (2014). Technology knowledge and governance: Empowering citizen engagement and participation. *Government Information Quarterly, 31*(4), 660–668.

Chaney, P. (2015). Exploring the pathologies of one-party-dominance on third sector public policy engagement in liberal democracies: Evidence from meso-government in the UK. *Voluntas: International Journal of Voluntary and Nonprofit Organizations, 26* (4), 1460–1484.

Charalabidis, Y., Gionis, G., Ferro, E., & Loukis, E. (2010). Towards a systematic exploitation of web 2.0 and simulation modeling tools in public policy process. In *Electronic participation* (pp. 1–12). Springer.

Cheu, R., Valdez, M., Kamatham, S., & Aldouri, R. (2011). Public preferences on the use of visualization in the public involvement process in transportation planning. *Transportation Research Record: Journal of the Transportation Research Board, 2245*, 17–26.

Cliquet, A., Kervarec, F., Bogaert, D., Maes, F., & Queffelec, B. (2010). Legitimacy issues in public participation in coastal decision making processes: Case studies from Belgium and France. *Ocean & Coastal Management, 53*(12), 760–768.

Coglianese, C., Kilmartin, H., & Mendelson, E. (2008). *Transparency and public participation in the rulemaking process: A nonpartisan presidential transition task force report*. University of Pennsylvania Law School. July.

Corbett, J., & Mellouli, S. (2017). Winning the SDG battle in cities: How an integrated information ecosystem can contribute to the achievement of the 2030 sustainable development goals. *Information Systems Journal, 27*(4), 427–461.

Cornwall, A. (2008). Unpacking 'participation': Models, meanings and practices. *Community Development Journal, 43*(3), 269–283.

Cunningham, C. A., & Tiefenbacher, J. P. (2008). Evaluating the effectiveness of public participation efforts by environmental agencies: Repermitting a smelter in El Paso, Texas, USA. *Environment and Planning C: Government and Policy, 26*(4), 841–856.

Daley, D. M. (2008). Public participation and environmental policy: What factors shape state agency's public participation provisions? *Review of Policy Research, 25*(1), 21–35.

De Santo, E. M. (2016). Assessing public "participation" in environmental decision-making: Lessons learned from the UK Marine Conservation Zone (MCZ) site selection process. *Marine Policy, 64*, 91–101.

De Vries, M. S. (2007). Public participation in policy processes: Towards a research agenda. *Administratie si Management Public, 8*, 144.

Decker, S. E., & Bath, A. J. (2010). Public versus expert opinions regarding public involvement processes used in resource and wildlife management. *Conservation Letters, 3*(6), 425–434.

Doran, M. A., & Daniel, S. (2014). Geomatics and Smart City: A transversal contribution to the Smart City development. *Information Polity, 19*(1,2), 57–72.

Epstein, D., Newhart, M., & Vernon, R. (2014). Not by technology alone: The "analog" aspects of online public engagement in policymaking. *Government Information Quarterly, 31*(2), 337–344.

Everatt, D., Marais, H., & Dube, N. (2010). Participation… for what purpose? Analysing the depth and quality of public participation in the integrated development planning process in Gauteng. *Politikon, 37*(2–3), 223–249.

Freschi, A. C., Medaglia, R., & Nørbjerg, J. (2009, September). A tale of six countries: eParticipation research from an administration and political perspective. In *International conference on electronic participation* (pp. 36–45). Berlin Heidelberg: Springer.

Fung, A. (2015). Putting the public back into governance: The challenges of citizen participation and its future. *Public Administration Review, 75*(4), 513–522.

Gauvin, F. P., Abelson, J., Giacomini, M., Eyles, J., & Lavis, J. N. (2010). "It all depends": Conceptualizing public involvement in the context of health technology assessment agencies. *Social Science & Medicine, 70*(10), 1518–1526.

Girish, J., Williams, C. B., & Yates, D. J. (2014). Predictors of on-line services and e-participation: A cross-national comparison. *Government Information Quarterly, 31*(4), 526–533.

Gjersoe, N. L., & Hood, B. (2013). Changing children's understanding of the brain: A longitudinal study of the Royal Institution Christmas Lectures as a measure of public engagement. *PLoS One, 8*(11), Article e80928.

Goldfinch, S., Gauld, R., & Herbison, P. (2009). The participation divide? Political participation, trust in government, and e-government in Australia and New Zealand. *Australian Journal of Public Administration, 68*(3), 333–350.

Guillamon, M. D., Ríos, A. M., Gesuele, B., & Metallo, C. (2016). Factors influencing social media use in local governments: The case of Italy and Spain. *Government Information Quarterly, 33*(3), 460–471.

Hakimpour, F., Aleman-Meza, B., Perry, M., & Sheth, A. P. (2006). *Data processing in space, time, and semantics dimensions*.

Hays, R. A. (2007). Community activists'perceptions of citizenship roles in an urban community: A case study of attitudes that affect community engagement. *Journal of Urban Affairs, 29*(4), 401–424.

Henningsson, M., Blicharska, M., Antonson, H., Mikusiński, G., Göransson, G., Angelstam, P., & Jönsson, S. (2015). Perceived landscape values and public participation in a road-planning process–a case study in Sweden. *Journal of Environmental Planning and Management, 58*(4), 631–653.

Howard, T. L., & Gaborit, N. (2007). Using virtual environment technology to improve public participation in urban planning process. *Journal of Urban Planning and Development, 133*(4), 233–241.

Hunt, L. M., Robson, M., Lemelin, R. H., & McIntyre, N. (2010). Exploring the acceptability of spatial simulation models of outdoor recreation for use by participants in public participation processes. *Leisure Sciences, 32*(3), 222–239.

Ianniello, M., Iacuzzi, S., Fedele, P., & Brusati, L. (2019). Obstacles and solutions on the ladder of citizen participation: A systematic review. *Public Management Review, 21* (1), 21–46.

Jami, A. A., & Walsh, P. R. (2016). Wind power deployment: The role of public participation in the decision-making process in Ontario, Canada. *Sustainability, 8*(8), 713.

Janssen, M., & Helbig, N. (2018). Innovating and changing the policy-cycle: Policy-makers be prepared! *Government Information Quarterly, 35*(4), S99–S105.

Jao, I., Kombe, F., Mwalukore, S., Bull, S., Parker, M., Kamuya, D., & Marsh, V. (2015). Involving research stakeholders in developing policy on sharing public health research data in Kenya: Views on fair process for informed consent, access oversight, and community engagement. *Journal of Empirical Research on Human Research Ethics, 10*(3), 264–277.

Jho, W., & Song, K. J. (2015). Institutional and technological determinants of civil e-participation: Solo or duet? *Government Information Quarterly, 32*(4), 488–495.

Ju, J., Liu, L., & Feng, Y. (2019a). Design of an O2O citizen participation ecosystem for sustainable governance. *Information Systems Frontiers, 21*(3), 605–620.

Ju, J., Liu, L., & Feng, Y. (2019b). Public and private value in citizen participation in E-governance: Evidence from a government-sponsored green commuting platform. *Government Information Quarterly, 36*(4), Article 101400.

Kahila-Tani, M., Broberg, A., Kytẗa, M., & Tyger, T. (2016). Let the citizens map—Public participation GIS as a planning support system in the Helsinki master plan process. *Planning Practice & Research, 31*(2), 195–214.

Kim, S., & Schachter, H. L. (2013). Citizen participation in the budget process and local government accountability: Case studies of organizational learning from the United States and South Korea. *Public Performance & Management Review, 36*(3), 456–471.

King, S., Conley, M., Latimer, B., & Ferrari, D. (1989). *Co-design: A process of design participation*. Van Nostrand Reinhold Company.

Lagos, T. G., Coopman, T. M., & Tomhave, J. (2014). "Parallel poleis": Towards a theoretical framework of the modern public sphere, civic engagement and the structural advantages of the internet to foster and maintain parallel socio-political institutions. *New Media & Society, 16*(3), 398–414.

Lee, Y., & Schachter, H. L. (2019). Exploring the relationship between trust in government and citizen participation. *International Journal of Public Administration, 42*(5), 405–416.

Lei, L., & Hilton, B. (2013). A spatially intelligent public participation system for the environmental impact assessment process. *ISPRS International Journal of Geo-Information, 2*(2), 480–506.

Leung, M. Y., Yu, J., & Chan, Y. S. (2013). Focus group study to explore critical factors of public engagement process for mega development projects. *Journal of Construction Engineering and Management, 140*(3), 04013061.

Li, T. H., Ng, S. T., & Skitmore, M. (2012). Public participation in infrastructure and construction projects in China: From an EIA-based to a whole-cycle process. *Habitat International, 36*(1), 47–56.

De Luca, S. (2014). Public engagement in strategic transportation planning: An analytic hierarchy process based approach. *Transport Policy, 33*, 110–124.

Mahood, Q., Van Eerd, D., & Irvin, E. (2014). Searching for grey literature for systematic reviews: Challenges and benefits. *Research Synthesis Methods, 5*(3), 221–234.

Mansourian, A., Taleai, M., & Fasihi, A. (2011). A web-based spatial decision support system to enhance public participation in urban planning processes. *Journal of Spatial Science, 56*(2), 269–282.

Martineau-Delisle, C., & Nadeau, S. (2010). Assessing the effects of public participation processes from the point of view of participants: Significance, achievements, and challenges. *The Forestry Chronicle, 86*(6), 753–765.

Marzouki, A. (2017). Towards a context-based citizen participation approach : A literature review of citizen participation issues and a conceptual framework. In *10th International Conference on Theory and Practice of Electronic Governance (ICEGOV)* (Forthcoming, 7–9 Mars 2017).

Measham, T. G., Brake, L., Robinson, C. J., Larson, S., Richards, C., & Smith, T. F. (2011). NRM engagement between remote dryland communities and government agencies: Success factors from Australia. *Journal of Arid Environments, 75*(10), 968–973.

Molinari, F. (2010, August). On sustainable eParticipation. In *International Conference on Electronic Participation* (pp. 126–139). Berlin Heidelberg: Springer.

Muluk, M. R. K., Danar, O. R., & Rahmawati, L. (2019). Community participation and development planning in local government level: A study on the formulation of Batu City medium-term development plan. *Bisnis & Birokrasi Journal, 26*(3).

Naranjo-Zolotov, M., Oliveira, T., Casteleyn, S., & Irani, Z. (2019). Continuous usage of e-participation: The role of the sense of virtual community. *Government Information Quarterly, 36*(3), 536–545.

Neshkova, M. I. (2014). Does agency autonomy foster public participation? *Public Administration Review, 74*(1), 64–74.

Nilsson, B., Peterson, B., Holden, G., & Eckert, C. (2011). Design Med Omtanke: Participation and sustainability in the design of public sector buildings. *Design Studies, 32*(3), 235–254.

Ochara, N. M., & Mawela, T. (2015). Enabling social sustainability of e-participation through mobile technology. *Information Technology for Development, 21*(2), 205–228.

O'Meara, W. P., Tsofa, B., Molyneux, S., Goodman, C., & McKenzie, F. E. (2011). Community and facility-level engagement in planning and budgeting for the government health sector–A district perspective from Kenya. *Health Policy, 99*(3), 234–243.

Pflughoeft, B. R., & Schneider, I. E. (2020). Social media as E-participation: Can a multiple hierarchy stratification perspective predict public interest? *Government Information Quarterly, 37*(1), Article 101422.

Pidgeon, N. F., Poortinga, W., Rowe, G., Horlick-Jones, T., Walls, J., & O'Riordan, T. (2005). Using surveys in public participation processes for risk decision making: The case of the 2003 British GM nation? Public debate. *Risk Analysis, 25*(2), 467–479.

Pieper, A. K., & Pieper, M. (2015). Political participation via social media: A case study of deliberative quality in the public online budgeting process of Frankfurt/Main, Germany 2013. *Universal Access in the Information Society, 14*(4), 487–503.

Pina, V., Torres, L., & Royo, S. (2017). Comparing online with offline citizen engagement for climate change: Findings from Austria. *Germany and Spain. Government Information Quarterly, 34*(1), 26–36.

Piotrowski, S., & Liao, Y. (2012). The usability of government information: The necessary link between transparency and participation. In H. L. Schachter, & K. Yang (Eds.), *The state of citizen participation in America* (pp. 163–194). Charlotte, NC: Information Age Publishing.

Pirannejad, A., Janssen, M., & Rezaei, J. (2019). Towards a balanced E-participation index: Integrating government and society perspectives. *Government Information Quarterly, 36*(4), Article 101404.

Porwol, L., Ojo, A., & Breslin, J. G. (2018). Social software infrastructure for e-participation. *Government Information Quarterly, 35*(4), S88–S98.

Ríos, A. M., Benito, B., & Bastida, F. (2017). Factors explaining public participation in the central government budget process. *Australian Journal of Public Administration, 76*(1), 48–64.

Rixon, D. (2010). Stakeholder engagement in public sector agencies: Ascending the rungs of the accountability ladder. *International Journal of Public Administration, 33*(7), 347–356.

Robson, M., & Kant, S. (2007). The development of government agency and stakeholder cooperation: A comparative study of two Local Citizens Committees'(LCCs) participation in forest management in Ontario, Canada. *Forest Policy and Economics, 9*(8), 1113–1133.

Roche, S., Nabian, N., Kloeckl, K., & Ratti, C. (2012). Are 'smart cities' smart enough. In *Global geospatial conference* (pp. 215–235).

Romero, M., & Keidan, G. (2017). California's 2014 ballot initiative transparency act (BITA) and its impact on public involvement in the ballot initiative process. *California Journal of Politics and Policy, 9*.

Rosener, J. B. (1978). Citizen participation: Can we measure its effectiveness? *Public Administration Review, 38*, 457–463.

Rowe, G., & Frewer, L. J. (2000). Public participation methods: A framework for evaluation. *Science, Technology & Human Values, 25*(1), 3–29.

Rowe, G., & Watermeyer, R. P. (2018). Dilemmas of public participation in science policy. *Policy Studies, 39*(2), 204–221.

Royo, S., Yetano, A., & Acerete, B. (2014). (a). E-participation and environmental protection: Are local governments really committed? *Public Administration Review, 74* (1), 87–98.

Sandoval-Almazan, R., & Gil-Garcia, J. R. (2012). Are government internet portals evolving towards more interaction, participation, and collaboration? Revisiting the rhetoric of e-government among municipalities. *Government Information Quarterly, 29*, S72–S81.

Sanford, C., & Rose, J. (2007). Characterizing eParticipation. *International Journal of Information Management, 27*(6), 406.

Schmidthuber, L., Hilgers, D., & Rapp, M. (2019). Political innovation, digitalisation and public participation in party politics. *Policy & Politics, 47*(3), 391–413.

Shapiro, S. (2008). Does the amount of participation matter? Public comments, agency responses and the time to finalize a regulation. *Policy Sciences, 41*(1), 33–49.

Skarmeas, D., Leonidou, C. N., Saridakis, C., & Musarra, G. (2019). Pathways to civic engagement with big social issues: An integrated approach. *Journal of Business Ethics*, 1–25.

So, B. W. Y. (2014). Civic engagement in the performance evaluation of the public sector in China: Building horizontal accountability to enhance vertical accountability. *Public Management Review, 16*(3), 341–357.

Somarakis, G., & Stratigea, A. (2014). Public involvement in taking legislative action as to the spatial development of the tourist sector in Greece—The "OpenGov" platform experience. *Future Internet, 6*(4), 735–759.

Stich, B., & Holland, J. H. (2011). Using a multiple criteria decision-making model to streamline and enhance NEPA and Public participation processes. *Public Works Management & Policy, 16*(1), 59–89.

Syma Czapanskiy, K., & Manjoo, R. (2008). The right of public participation in the law-making process and the role of legislature in the promotion of this right. *Duke J. Comp. & Int'l L., 19*, 1.

Templier, M., & Par´e, G. (2015). *A framework for guiding and evaluating literature reviews* (p. 37). Communications of the Association for Information Systems.

Thipe, T., De Souza, M., & Luwaya, N. (2015). The advert was put up yesterday: Public participation in the traditional courts bill legislative process. *NYL Sch. L. Rev., 60*, 519.

Toots, M. (2019). Why E-participation systems fail: The case of Estonia's Osale. Ee. *Government Information Quarterly, 36*(3), 546–559.

Tuler, S., & Webler, T. (2010). How preferences for public participation are linked to perceptions of the context, preferences for outcomes, and individual characteristics. *Environmental Management, 46*(2), 254–267.

Uittenbroek, C. J., Mees, H. L., Hegger, D. L., & Driessen, P. P. (2019). The design of public participation: Who participates, when and how? Insights in climate adaptation planning from the Netherlands. *Journal of Environmental Planning and Management, 62*(14), 2529–2547.

Urquhart, C., & Fernandez, W. (2013). Using grounded theory method in information systems: The researcher as blank slate and other myths. *Journal of Information Technology, 28*, 224–236.

Veronesi, G., & Keasey, K. (2015). Patient and public participation in the English NHS: An assessment of experimental implementation processes. *Public Management Review, 17*(4), 543–564.

Videira, N., Antunes, P., Santos, R., & Lobo, G. (2006). Public and stakeholder participation in European water policy: A critical review of project evaluation processes. *Environmental Policy and Governance, 16*(1), 19–31.

Voinov, A., & Bousquet, F. (2010). Modelling with stakeholders. *Environmental Modelling & Software, 25*(11), 1268–1281.

Wahl, C. (2013). Swedish municipalities and public participation in the traffic planning process–where do we stand? *Transportation Research Part A: Policy and Practice, 50*, 105–112.

Webler, T., & Tuler, S. (2006). Four perspectives on public participation process in environmental assessment and decision making: Combined results from 10 case studies. *Policy Studies Journal, 34*(4), 699–722.

Williams, C. B., Gulati, G. J. J., & Yates, D. J. (2013, June). Predictors of on-line services and e-participation: A cross-national comparison. In *Proceedings of the 14th annual international conference on digital government research* (pp. 190–197). ACM.

Wodschow, A., Nathan, I., & Cerutti, P. (2016). Participation, public policy-making, and legitimacy in the EU Voluntary Partnership Agreement process: The Cameroon case. *Forest Policy and Economics, 63*, 1–10.

Wu, H., He, Z., & Gong, J. (2010). A virtual globe-based 3D visualization and interactive framework for public participation in urban planning processes. *Computers, Environment and Urban Systems, 34*(4), 291–298.

Abbot, C. (2020). Losing the local? Public participation and legal expertise in planning law. *Legal Studies*, 1–17.

Alexei, G. D., & SHUBINA, T. F.. (2018). Public participation in planning a comfortable urban environment on the example of the Arkhangelsk region. *SOCIAL AND ECONOMIC DEVELOPMENT, 33*, 76.

Ball, A., Soare, V., & Brewis, J. (2012). Engagement research in public sector accounting. *Financial Accountability & Management, 28*(2), 189–214. Bobbio, L. (2019). Designing effective public participation. *Policy and Society, 38*(1), 41–57.

Boivin, A., Lehoux, P., Burgers, J., & Grol, R. (2014). What are the key ingredients for effective public involvement in health care improvement and policy decisions? A randomized trial process evaluation. *The Milbank Quarterly, 92*(2), 319–350.

Boote, J., Baird, W., & Sutton, A. (2011). Public involvement in the systematic review process in health and social care: A narrative review of case examples. *Health Policy, 102*(2), 105–116.

Bouchard, N. (2016). The dark side of public participation: Participative processes that legitimize elected officials' values. *Canadian Public Administration, 59*(4), 516–537.

Brach, A. M. (2005). A taxonomy for stakeholder involvement in public sector transportation research and technology programs. *Public Works Management & Policy, 9*(3), 223–231.

Brown, G., & Eckold, H. (2020). An evaluation of public participation information for land use decisions: Public comment, surveys, and participatory mapping. *Local Environment, 25*(2), 85–100.

Burgess-Allen, J., & Owen-Smith, V. (2010). Using mind mapping techniques for rapid qualitative data analysis in public participation processes. *Health Expectations, 13*(4), 406–415.

Clark, J. K. (2018). Designing public participation: Managing problem settings and social equity. *Public Administration Review, 78*(3), 362–374. Cowie, P. (2017). Performing planning: Understanding community participation in planning through theatre. *Town Planning Review, 88*(4), 401–422.

Daniels, T., Williams, I., Bryan, S., Mitton, C., & Robinson, S. (2018). Involving citizens in disinvestment decisions: What do health professionals think? Findings from a multi-method study in the English NHS. *Health Economics, Policy and Law, 13*(2), 162.

Danielson, S., Webler, T., & Tuler, S. P. (2009). Using Q method for the formative evaluation of public participation processes. *Society & Natural Resources, 23*(1), 92–96.

De Filippi, F., Coscia, C., & Cocina, G. G. (2020). Digital participatory platforms for urban regeneration: A survey of Italian case studies. *International Journal of E-Planning Research (IJEPR), 9*(3), 47–67.

De Piccoli, N., & Rollero, C. (2010). Public involvement in social and political participation processes: A gender perspective. *Journal of Community & Applied Social Psychology, 20*(3), 167–183.

Dean, R. (2019). Control or influence? Conflict or solidarity? Understanding diversity in preferences for public participation in social policy decision making. *Social Policy & Administration, 53*(1), 170–187.

Du, G., Kray, C., & Degbelo, A. (2020). Interactive immersive public displays as facilitators for deeper participation in urban planning. *International Journal of Human–Computer Interaction, 36*(1), 67–81.

Dut¸u, A., & Diaconu, M. (2017). Community participation for an open public administration: Empirical measurements and conceptual framework design. *Cogent Business & Management, 4*(1), 1287980.

Eccleston, R., & Stubbs, R. (2016). Public sector participation and compliance across national and global transparency regimes. *International Journal of Public Administration, 39*(10), 758–770.

Enaifoghe, A., & Cotties, A. (2019). South Africa's decentralization problems of citizenry participatory democracy in local municipality development. *AFFRIKA Journal of Politics, Economics and Society, 9*(1), 91–116.

Evans, B., Parks, J., & Theobald, K. (2011). Urban wind power and the private sector: Community benefits, social acceptance and public engagement. *Journal of Environmental Planning and Management, 54*(2), 227–244.

Gagliardi, D., Schina, L., Sarcinella, M. L., Mangialardi, G., Niglia, F., & Corallo, A. (2017). Information and communication technologies and public participation: Interactive maps and value added for citizens. *Government Information Quarterly, 34* (1), 153–166.

Gangadharan, S. P. (2009). Public participation and agency discretion in rulemaking at the Federal Communications Commission. *Journal of Communication Inquiry, 33*(4), 337–353.

Gelders, D., Brans, M., Maesschalck, J., & Colsoul, N. (2010). Systematic evaluation of public participation projects: Analytical framework and application based on two Belgian neighborhood watch projects. *Government Information Quarterly, 27*(2), 134–140.

Geys, B., Heinemann, F., & Kalb, A. (2010). Voter involvement, fiscal autonomy and public sector efficiency: Evidence from German municipalities. *European Journal of Political Economy, 26*(2), 265–278.

Gil, A., Calado, H., & Bentz, J. (2011). Public participation in municipal transport planning processes–the case of the sustainable mobility plan of Ponta Delgada, Azores, Portugal. *Journal of Transport Geography, 19*(6), 1309–1319.

Güiza, F., & Stuart, N. (2018). When citizens choose not to participate in volunteering geographic information to e-governance: A case study from Mexico. *GeoJournal, 83* (5), 1151–1167.

Habermas, J. (1996). *Between facts and norms: Contributions to a discourse theory of law and democracy*. Cambridge, MA: MIT Press.

Hagen, L., Harrison, T. M., Uzuner, ¨O., May, W., Fake, T., & Katragadda, S. (2016). E-petition popularity: Do linguistic and semantic factors matter? *Government Information Quarterly, 33*(4), 783–795.

Hainz, T., Bossert, S., & Strech, D. (2016). Collective agency and the concept of 'public'in public involvement: A practice-oriented analysis. *BMC Medical Ethics, 17*(1), 1.

Haltofova, B. (2018). Using crowdsourcing to support civic engagement in strategic urban development planning: A case study of Ostrava, Czech Republic. *Journal of Competitiveness, 10*(2), 85–103.

HARUT¸ A, C., & Bianca, R. A. D. U.. (2010). Citizen participation in the decision making process at local and county levels in the Romanian Public Instituitons. *Transylvanian Review of Administrative Sciences, 6*(31), 76–92.

Hensengerth, O., & Lu, Y. (2019). Emerging environmental multi-level governance in China? Environmental protests, public participation and local institution-building. *Public Policy and Administration, 34*(2), 121–143.

Jong, D., Menno, D. T., Neulen, S., Jansma, & Sikke, R. (2019). Citizens' intentions to participate in governmental co-creation initiatives: Comparing three co-creation configurations. *Government Information Quarterly, 36*(3), 490–500.

Karner, A., & Marcantonio, R. A. (2018a). Achieving transportation equity: Meaningful public involvement to meet the needs of underserved communities. *Public Works Management & Policy, 23*(2), 105–126.

Karner, A., & Marcantonio, R. A. (2018b). Achieving transportation equity: Meaningful public involvement to meet the needs of underserved communities. *Public Works Management & Policy, 23*(2), 105–126.

Kim, S., & Lee, J. (2019). Citizen participation, process, and transparency in local government: An exploratory study. *Policy Studies Journal, 47*(4), 1026–1047.

Kinzer, K. (2018). Picking up speed: Public participation and local sustainability plan implementation. *Journal of Environmental Planning and Management, 61*(9), 1594–1611.

Lee, H., Tsohou, A., & Choi, Y. (2017). Embedding persuasive features into policy issues: Implications to designing public participation processes. *Government Information Quarterly, 34*(4), 591–600.

Lehoux, P., Daudelin, G., & Abelson, J. (2012). The unbearable lightness of citizens within public deliberation processes. *Social Science & Medicine, 74*(12), 1843–1850.

Lev-On, A., & Steinfeld, N. (2015). Local engagement online: Municipal Facebook pages as hubs of interaction. *Government Information Quarterly, 32*(3), 299–307.

Liao, Y., & Schachter, H. L. (2018). Exploring the antecedents of municipal managers' attitudes towards citizen participation. *Public Management Review, 20*(9), 1287–1308.

Little, P. C. (2009). Negotiating community engagement and science in the federal environmental public health sector. *Medical Anthropology Quarterly, 23*(2), 94–118.

Lord, J. K., & Cheng, A. S. (2006). Public involvement in state fish and wildlife agencies in the US: A thumbnail sketch of techniques and barriers. *Human Dimensions of Wildlife, 11*(1), 55–69.

Mackenzie, J., & Krogman, N. (2005). Public involvement processes, conflict, and challenges for rural residents near intensive hog farms. *Local Environment, 10*(5), 513–524.

Maiello, A., Christov˜ao, A. C., de Paiva, N., Britto, A. L., & Frey, M. (2013). Public participation for urban sustainability: Investigating relations among citizens, the environment and institutions–an ethnographic study. *Local Environment, 18*(2), 167–183.

Mannarini, T., & Fedi, A. (2018). Using quali-quantitative indicators for assessing the quality of citizen participation: A study on three citizen juries. *Social Indicators Research, 139*(2), 473–490.

Martin, G. P. (2011). The third sector, user involvement and public service reform: A case study in the co-governance of health service provision. *Public Administration, 89*(3), 909–932.

Masvaure, S. (2016, December). Elusive public participation: Citizen decision-making in budget formulation process in the City of Harare, Zimbabwe. In *, Vol. 27. Urban Forum* (pp. 447–463). Netherlands: Springer. no. 4.

Migchelbrink, K., & Van de Walle, S. (2020). When will public officials listen? A vignette experiment on the effects of input legitimacy on public officials' willingness to use public participation. *Public Administration Review, 80*(2), 271–280. Mohammadi, S. H.,

Norazizan, S., & Nikkhah, H. A. (2018). Conflicting perceptions on participation between citizens and members of local government. *Quality & Quantity, 52*(4), 1761–1778.

Nam, T. (2012). Dual effects of the internet on political activism: Reinforcing and mobilizing. *Government Information Quarterly, 29*, S90–S97.

Natarajan, L., Lock, S. J., Rydin, Y., & Lee, M. (2019). Participatory planning and major infrastructure: Experiences in REI NSIP regulation. *Town Planning Review, 90*(2), 117–139.

Ned, L., & Lorenzo, T. (2016). Enhancing the public sector's capacity for inclusive economic participation of disabled youth in rural communities. *African Journal of Disability, 5*(1), 1–9.

Neresini, F., & Bucchi, M. (2011). Which indicators for the new public engagement activities? An exploratory study of European research institutions. *Public Understanding of Science, 20*(1), 64–79.

Nonami, H., Hirose, Y., Ohnuma, S., Midden, C., & Ohtomo, S. (2015). Effects of voice and similarity on procedural fairness and trust: A dual process model of public acceptance based on representatives' participation. *Asian Journal of Social Psychology, 18*(3), 216–224.

Ocloo, J. E., & Fulop, N. J. (2012). Developing a 'critical'approach to patient and public involvement in patient safety in the NHS: Learning lessons from other parts of the public sector? *Health Expectations, 15*(4), 424–432.

Okal, J., Kanya, L., Obare, F., Njuki, R., Abuya, T., Bange, T., & Bellows, B. (2013). An assessment of opportunities and challenges for public sector involvement in the maternal health voucher program in Uganda. *Health research policy and systems, 11* (1), 38.

Oliveira, G. H. M., & Welch, E. W. (2013). Social media use in local government: Linkage of technology, task, and organizational context. *Government Information Quarterly, 30* (4), 397–405.

Predmore, S. A., Stern, M. J., Mortimer, M. J., & Seesholtz, D. N. (2011). Perceptions of legally mandated public involvement processes in the US Forest Service. *Society & Natural Resources, 24*(12), 1286–1303.

Primmer, E., & Kyll¨onen, S. (2006). Goals for public participation implied by sustainable development, and the preparatory process of the Finnish National Forest Programme. *Forest Policy and Economics, 8*(8), 838–853.

Radu, B. (2019). The impact of transparency on the citizen participation in decision-making at the municipal level in Romania. *Central European Public Administration Review, 17*(1), 111–130.

Rafique, Z., & Khoo, S. L. (2018). Role of community-based organizations (CBOs) in promoting citizen participation. *International Journal of Sociology and Social Policy., 38*(3/4), 242–258.

Raisio, H., & Carson, L. (2014). Deliberation within sectors. Making the case for sector mini-publics. *International Review of Social Research, 4*(1), 75–92.

Revyakin, S. (2018). On the effectiveness of electronic platforms of citizen participation in public administration. *Public administration issues, 2*, 94–113.

Roberts, J. J., Lightbody, R., Low, R., & Elstub, S. (2020). Experts and evidence in deliberation: Scrutinising the role of witnesses and evidence in mini-publics, a case study. *Policy Sciences*, 1–30.

Rodríguez Bolívar, M. P. (2015). The influence of political factors in policymakers' perceptions on the implementation of Web 2.0 technologies for citizen participation and knowledge sharing in public sector delivery. *Information Polity, 20*(2,3), 199–220.

Saab, F., de Souza Bermejo, P. H., Garcia, G. C., Pereira, J. S., & e Silva, S. D. A. M.. (2018). Does public consultation encourage social participation? *Journal of Enterprise Information Management., 31*(5), 796–814.

Sæbø, Ø., Flak, L. S., & Sein, M. K. (2011). Understanding the dynamics in e-participation initiatives: Looking through the genre and stakeholder lenses. *Government Information Quarterly, 28*(3), 416–425.

Scardina, A. V., Mortimer, M. J., & Dudley, L. (2007). Getting past the who and how many to the how and why in USDA Forest Service public involvement processes. *Forest Policy and Economics, 9*(8), 883–902.

Schiele, J. J., & McCue, C. P. (2006). Professional service acquisition in public sector procurement: A conceptual model of meaningful involvement. *International Journal of Operations & Production Management, 26*(3), 300–325.

Seekamp, E., Harris, C. C., Hall, T. E., & Craig, T. Y. (2010). A mixed methods approach to measuring depth of group information processing in the context of deliberative public involvement. *Journal of Mixed Methods Research, 4*(3), 222–247.

Shapiro, S. (2018). Can analysis of policy decisions spur participation? *Journal of Benefit-Cost Analysis, 9*(03), 435–461.

Silva, P., Tavares, A. F., Silva, T., & Lameiras, M. (2019). The good, the bad and the ugly: Three faces of social media usage by local governments. *Government Information Quarterly, 36*(3), 469–479.

Simone Byrd, L. (2009). Collaborative corporate social responsibility: A case study examination of the international public relations agency involvement in the United Nations Global Compact. *Corporate Communications: An International Journal, 14*(3), 303–319.

Smalec, A. (2018). Participatory budgeting as a form of community involvement in the territorial government bodies management. In *Economic and Social Development: Book of Proceedings* (pp. 1–10).

Smith, J. W., Leahy, J. E., Anderson, D. H., & Davenport, M. A. (2013). Community/ agency trust and public involvement in resource planning. *Society & Natural Resources, 26*(4), 452–471.

Sønderskov, M. (2019). Do local politicians really want collaborative governance? *International Journal of Public Sector Management., 32*(3), 320–330. Song, H. (2020). Perceived standing: Exploring why people accept or reject others' access to public participation in local environmental conflicts. *Local Environment, 25*(5), 397–413.

Soteri-Proctor, A. (2010). Making use of qualitative tools: Towards a fuller understanding of the voluntary sector's engagement with public service delivery. *International Journal of Social Research Methodology, 13*(5), 411–424.

Srdjevic, Z., Funamizu, N., Srdjevic, B., & Bajˇceti´c, R. (2018). Public participation in water management of Krivaja River, Serbia: Understanding the problem through grounded theory methodology. *Water Resources Management, 32*(15), 5081–5092.

Susha, I., & Gr¨onlund, Å. (2014). Context clues for the stall of the Citizens' initiative: Lessons for opening up e-participation development practice. *Government Information Quarterly, 31*(3), 454–465.

Svaljek, S., Raˇsi´c Bakari´c, I., & Sumpor, M. (2019). Citizens and the city: The case for participatory budgeting in the City of Zagreb. *Public Sector Economics, 43*(1), 21–48.

Tang, J. J., Maroothynaden, J., Bello, F., & Kneebone, R. (2013). Public engagement through shared immersion: Participating in the processes of research. *Science Communication, 35*(5), 654–666.

Thapa, B. E., Niehaves, B., Seidel, C. E., & Plattfaut, R. (2015). Citizen involvement in public sector innovation: Government and citizen perspectives. *Information Polity, 20* (1), 3–17.

Trousset, S., Gupta, K., Jenkins-Smith, H., Silva, C. L., & Herron, K. (2015). Degrees of engagement: Using cultural worldviews to explain variations in public preferences for engagement in the policy process. *Policy Studies Journal, 43*(1), 44–69.

Turcanu, C., Perko, T., & Laes, E. (2014). Public participation processes related to nuclear research installations: What are the driving factors behind participation intention? *Public Understanding of Science, 23*(3), 331–347.

Vicente, M. R., & Novo, A. (2014). An empirical analysis of e-participation. The role of social networks and e-government over citizens' online engagement. *Government Information Quarterly, 31*(3), 379–387.

Wang, P. (2014). Government intervention and the empowerment process: Citizen involvement in the 2010 Shanghai World Expo. *Journal of Public Affairs, 14*(2), 130–141.

Xu, Z., Shan, J., Li, J., & Zhang, W. (2020). Extending the theory of planned behavior to predict public participation behavior in air pollution control: Beijing, China. *Journal of Environmental Planning and Management, 63*(4), 669–688.

Yang, K. (2016). Creating public value and institutional innovations across boundaries: An integrative process of participation, legitimation, and implementation. *Public Administration Review, 76*(6), 873–885.

Zheng, Y., & Schachter, H. L. (2017). Explaining citizens' E-participation use: The role of perceived advantages. *Public Organization Review, 17*(3), 409–428.

Zheng, Y., Schachter, H. L., & Holzer, M. (2014). The impact of government form on e-participation: A study of New Jersey municipalities. *Government Information Quarterly, 31*(4), 653–659.

Appendix 1.A

Table 1.A.1 Coded variables of ethical issues

Ethical issues Coded variables	References
Transparency	[1,2,4,5,6 ,7,9,12 ,13,14 ,21,25 ,41,47 ,59, 79,84,91,92, 114, 138,162, 192, 166, 116, 102, 72]
Legitimacy	[10,51,14,15 ,28,35 ,36,47,54, 65,111,2, 3,6,27 ,54, 99,121, 177, 103, 102, 58]
Representativeness	[1,4,3,5,2,17,18,23,12,13,27,41,42,45 ,47,51 ,54,56, 62,65 ,68,71, 73, 78,81 ,91, 106,108, 111,113, 117, 120,162, 184, 186, 206, 199, 160, 156, 153, 124, 102]
Trust	[1,2, 3,4,5, 10,12 ,15,35 ,39,42, 50,51,55 ,59,68 ,87, 90,92 ,96 ,104,108, 113,114, 117,118, 192, 157, 148, 200]
Fairness/unfairness	[1,2,3 ,23,28 ,50,68, 114,117, 126, 103, 102, 83, 58]
Inclusiveness	[5,14, 15,56, 63, 76, 78, 84,104, 111, 22, 138, 116,77]
Equity/equality	[4,5, 6,15, 27,54, 62,63, 69, 106, 113,114, 136, 162, 196, 167, 103, 58]
Justice	[1,2, 3,9, 15,48 ,78,113, 196, 103]
Accountability	[1,2, 3,5, 9, 10, 47,50, 56,80, 91,92, 104]
Conflict of interest	[1,3, 6,7, 9,13, 15,16, 23,35 ,95]
Independence of the process	[162]
Independence/ freedom	[41,54, 55]
Accessibility	[2,9,50]
Responsiveness	[2,15, 56,81, 104,113, 77]
Openness	[2,4, 14,44, 47,54, 55,56, 96,108, 116, 58]
Honesty	[4]

Awareness	[15,51,63,75,76,84,87,117]
Dignity/ respect	[15. 15, 55, 113, 76, 9]
Anonymity	[6]
Integrity	[54]
Reciprocity	[162]
Data closure	[192]
Mock compliance	[25]
Information quality	[1, 4, 5, 13, 21, 39, 50, 59, 62, 70, 104, 108, 114, 117]
Credibility	[55, 106, 121]

Table 1.A.2 Coded variables of efficiency and effectiveness issues

Efficiency issues Coded variables	References
Costs	
Costs and benefits derived from the PP (cost inefficiencies/ expensiveness)	[3, 6, 23, 30,35, 20, 26]
Investment on time and energy	[81, 89]
Resources needed for the PP	[111]
The cost of technology and ICTs use in the PP	[44, 60, 170]
Outcomes	
What are the outcome-related goals of the process?	[73, 108]
Better Policy and implementation decisions	[35]
Financial outcomes	[9, 113]
Learning	[105]
Inclusion of public values and preferences	[105]
Gain of control over policy process	[35]
Quality of decision	[105]
Fostering trust	[105]
Reduction of conflicts	[105]
Operational effectiveness	[51,56]
- Endorsement of Benefits from the technology	[73]
Implementation of results	[162]
Impacts	
Need for long period/ long term to assess impacts	[69,160]
Evidencing impact/speculating superficial impacts	[160]
Difficulty and slowness of impact assessment	[160]
Estimate how much impact the opinions will have	[13, 32,106, 114]
Assess a wide range of impact types	[55]

Table 1.A.3 Coded variables of political issues

Political issues Coded variables	References
Power relationships	[3,4,6,7, 10,15,27, 28,35 ,39,44,47,48, 50,54, 69,80, 82,92, 108,113, 121,136, 203, 177, 156, 150, 147, 147, 110, 58]
Manipulation	[1,32,42,54,117,119]
Marginalization	[14,15,25, 44, 54,59,78, 99, 103]
legitimation	[10,27,28, 76, 113, 124]
Status-quo	[27,42,47,104,119]
Political leadership	[6,15,20,39, 104,106]
Political attitude towards participation	[101,106, 123,138, 153, 184]
Lobbying	[15,10, 106]
Political Participation culture	[1, 3,9, 15,16, 18,35, 48, 73,162, 158,153, 148]
Political structure	[10, 15, 47, 79, 82,91, 104, 174, 179, 231]
Political control	[1, 10, 15, 20, 70, 79, 113, 138, 150]
Political perceptions	[171, 158, 147]
Political knowledge and governance	[10,12, 175, 118, 175, 189, 158]

Table 1.A.4 Coded variables of stakeholders' and social issues

Stakeholders' issues Coded variables	References
Stakeholders' Influence	[1,2,4,6 ,8,9,15 ,16,17 ,18,23, 27,28,36,39,41,44 ,47,54,55,56, 62, 67, 71,73 ,76, 78 ,81,88,89,92,99, 104,105,106,108,121, 136, 196, 177,156, 148, 83]
Stakeholders' involvement/level	[1,2,4,5,6,7,8,9,12,13 ,14,15,16,17,18,23,27,29,31, 35,36,41,42,45,47,49 ,54,62,69, 71,74,76,80,81,84, 90,92, 100,101,105 ,106, 107, 108, 111,118, 155, 83, 72, 186, 166]
Stakeholders' motivation/willingness	[4,75,87,90,100, 150, 85, 18,74,98 ,170, 177, 141,124, 252]
Nimbyism (citizens' opposition)	[1,2,26,39, 51]
Stakeholders' reward/ tangible benefit	[252, 200]
Stakeholders' perceptions	[26, 66, 147, 163, 205, 184, 200, 192, 194, 204, 168, 200]
Stakeholders' capacities	[13, 65, 15, 47, 75, 103, 13, 87, 49, 35, 150, 101, 162, 68]
Stakeholders' Social Issues	
Stakeholders' needs, preferences and priorities	[2,4,7 6 ,27,29,37,38 ,42,45,52, 56 ,65, 71, 80, 81, 86,87,91,96, 100, 108, 113, 114, 118, 162,104, 196, 121, 160, 156, 155 , 85, 176]

Stakeholders' characteristics	[6, 65, 15, 47, 75, 96, 100, 166, 154, 27, 49, 85, 170, 163, 110, 172, 54, 162, 173, 150, 141]
Stakeholders' living context	[6,55,65,15,29,36,38 ,39,71, 141, 104, 108,162, 156]
Stakeholders' values, cultures and ideologies	[45, 47, 2, 110, 90, 16, 148, 92, 6, 36]
Stakeholders' subjective norms	[101, 205, 110, 252, 114]
Stakeholders'/Social awareness	[9, 18, 27, 150, 148]

Table 1.A.5 Coded variables of technology issues

Technology issues Coded variables	References
Use of technological solutions/tools	[6,13,14, 16,18,37, 44, 59, 60 79, 84, 92, 179, 181, 188, 195, 155]
Use of GIS-based and visualization tools	[6, 11, 37, 38, 44, 46, 52, 95, 112, 185, 200]
Use of Internet, the Web and Social Media	[74, 79, 91, 164, 6,13,37, 82, 84, 175, 180, 183, 202]
User-friendliness of applications	[37, 44, 184, 207, 166, 200]
Technologies capacities and limitations	[37,44, 114, 112, 117, 162]
The digital divide	[6,37,92, 170, 172,166,141]
Technology political challenges	[74, 92, 190]
Technology Security	[171]

Table 1.A.6 Coded variables of administration issues

Administration issues Coded variables	References
Problem, goals, purposes and proposals identification	[1,7,9,12, 15,18,19 ,22,26, 27, 47, 62, 36,69,71,75,106, 162, 163, 187, 160, 116]
Evaluation, monitoring and assessment	[1,5,13, 14,33,36,39,55 ,70,78,92,96 ,113,114,121, 188, 196, 160]
Temporal effectiveness	[1,4,5,6,13,15, 22,23,26 ,27,35,36,39 ,41,47,49,50,51,59,62, 67,84, 86,89, 105,106,104,108 ,111, 160]
Needed resources	[1,4,12,49,59 ,73,106,107 ,118, 162, 203]
Planning	[2,6,9,13,27,31, 39,42,56, 104,113, 165, 169,191]
Design	[27, 76, 104, 152, 209, 156, 113, 167]
Innovation	[2,13,42,54,76, 190, 102]
Consensus building	[3,4,6,13,15, 16,17,18,19, 55,81 ,84, 95,96, 104,106,108 ,113,114]
Scientific support	[5,13,23, 32, 39,69,96, 108]
Management	[4,13,21, 49,70,75,106 ,108,111,113, 188]

Relevant stakeholders identification	[7,12,105 ,111,121, 162, 201, 156]
Use of adequate approaches, tools, techniques and methods	[6, 7,13,14,18,22 ,29,42,49,55,61,62 ,69,75, 84,96,104 ,105, 106, 108,111,114, 176, 178, 197,206,148]
Effective communication	[1, 13, 14,21,23,27 ,36,39,42, 47, 49, 52,55,56 ,62, 76,80,92,111, 121, 138, 162, 171, 208, 209, 149, 148, 200]
Empowerment, co-learning and supporting of stakeholders	[12, 14, 18, 27, 35, 39, 49,55, 56,59,62,67 ,78,92, 101,104,113, 114,121,126, 148,141, 72]
Performance	[55,64,69, 71,73,104]
Enhancing real influence	[69,104, 188]
Context adaptability	[1,47,104,111]
Validity and overseeing	[13,33,39]
Generated data analysis	[73, 81, 151, 181]

Table 1.A.7 Coded variables of economic issues

Economic Issues Coded variables	References
The economic situation/development	[16,18, 30, 47, 79, 65, 180, 175, 193]
Transport and logging	[127, 18]
The need for additional economic resources for participation	[16]
The need for introducing economic data in participation processes	[95]

Table 1.A.8 Coded variables of socioeconomic issues

Socioeconomic (and demographic) Coded issues	References
Socioeconomic characteristics	[4,79, 100, 172, 178, 180, 192, 205]
Socioeconomic location	[178]
Sociodemographic variables/ demographics (age, race, gender)	[101, 20, 27, 79, 98,100,111, 172,92, 178, 203]

Table 1.A.9 Coded variables of legislative issues

Legislative issues Coded variables	References
Legal framework	[2, 12, 13, 15, 131, 203,197, 156, 141]
Legislation roles, actions and constraints	[15, 35, 71, 84, 86, 92,99]
Institutional requirements	[113, 118, 131, 179, 203]
Legal expertise	[202, 198]

References – Appendix 1.A

[1] Aubin, R., & Bornstein, L. (2012). Montréal's Municipal Guidelines for Participation and Public Hearings: Assessing Context, Process and Outcomes. *Canadian Journal of Urban Research*, *21*(1), 106-131.

[2] Cătălin, B. A. B. A., CHERECHEȘ, R., Cristina, M. O. R. A., & ȚICLĂU, T. (2009). Public participation in public policy process–case study in seven counties from North-Western region of Romania. *Transylvanian Review of Administrative Sciences*, *5*(26), 5-13.

[3] Bingham, L. B., Nabatchi, T., & O'Leary, R. (2005). The new governance: Practices and processes for stakeholder and citizen participation in the work of government. *Public administration review*, *65*(5), 547-558

[4] Booth, A., & Halseth, G. (2011). Why the public thinks natural resources public participation processes fail: A case study of British Columbia communities. *Land use policy*, *28*(4), 898-906

[5] Bouchard, N. (2016). The dark side of public participation: Participative processes that legitimize elected officials' values. *Canadian Public Administration*, *59*(4), 516-537.

[6] Brabham, D. C. (2009). Crowdsourcing the public participation process for planning projects. *Planning Theory*, *8*(3), 242-262.

[7] Bryson, J. M., Quick, K. S., Slotterback, C. S., & Crosby, B. C. (2013). Designing public participation processes. *Public administration review*, *73*(1), 23-34.

[8] Burgess-Allen, J., & Owen-Smith, V. (2010). Using mind mapping techniques for rapid qualitative data analysis in public participation processes. *Health Expectations*, *13*(4), 406-415

[9] Simone Byrd, L. (2009). Collaborative corporate social responsibility: A case study examination of the international public relations agency involvement in the United Nations Global Compact. *Corporate Communications: An International Journal*, *14*(3), 303-319

[10] Chaney, P. (2015). Exploring the pathologies of one-party-dominance on third sector public policy engagement in liberal democracies: Evidence from meso-government in the UK. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, *26*(4), 1460-1484.

[11] Cheu, R., Valdez, M., Kamatham, S., & Aldouri, R. (2011). Public preferences on the use of visualization in the public involvement process in transportation planning. *Transportation Research Record: Journal of the Transportation Research Board*, (2245), 17-26

[12] Cliquet, A., Kervarec, F., Bogaert, D., Maes, F., & Queffelec, B. (2010). Legitimacy issues in public participation in coastal decision making processes: case studies from Belgium and France. *Ocean & Coastal Management*, *53*(12), 760-768

[13] Coglianese, C., Kilmartin, H., & Mendelson, E. (2008). Transparency and Public Participation in the Rulemaking Process: A Nonpartisan Presidential Transition Task Force Report. *University of Pennsylvania Law School, July*

[14] Cunningham, C. A., & Tiefenbacher, J. P. (2008). Evaluating the effectiveness of public participation efforts by environmental agencies: repermitting a smelter in El Paso, Texas, USA. *Environment and Planning C: Government and Policy*, *26*(4), 841-856.

[15] Syma Czapanskiy, K., & Manjoo, R. (2008). The right of public participation in the law-making process and the role of legislature in the promotion of this right. *Duke J. Comp. & Int'l L.*, *19*, 1

[16] Daley, D. M. (2008). Public participation and environmental policy: what factors shape state agency's public participation provisions?. *Review of Policy Research*, *25*(1), 21-35.

[17] Danielson, S., Webler, T., & Tuler, S. P. (2009). Using Q method for the formative evaluation of public participation processes. *Society & natural resources*, *23*(1), 92-96

[18] Castro, C. M. D. (2013). Public hearings as a tool to improve participation in regulatory policies: case study of the National Agency of Electric Energy. *Revista de administração Pública*, *47*(5), 1069-1087

[19] de Luca, S. (2014). Public engagement in strategic transportation planning: An analytic hierarchy process based approach. *Transport Policy*, *33*, 110-124

[20] De Piccoli, N., & Rollero, C. (2010). Public involvement in social and political participation processes: A gender perspective. *Journal of Community & Applied Social Psychology*, *20*(3), 167-183

[21] De Santo, E. M. (2016). Assessing public "participation" in environmental decision-making: Lessons learned from the UK Marine Conservation Zone (MCZ) site selection process. *Marine Policy*, *64*, 91-101.

[22] De Vries, M. S. (2007). Public participation in policy processes: Towards a research agenda. *Administratie si Management Public*, (8), 144

[23] Decker, S. E., & Bath, A. J. (2010). Public versus expert opinions regarding public involvement processes used in resource and wildlife management. *Conservation Letters*, *3*(6), 425-434

[24] André, P. avec la collaboration de P. Martin et G. Lanmafankpotin (2012). « Participation citoyenne », dans L. Côté et J.-F. Savard (dir.), Le Dictionnaire encyclopédique de l'administration publique

[25] Eccleston, R., & Stubbs, R. (2016). Public Sector Participation and Compliance across National and Global Transparency Regimes. *International Journal of Public Administration*, *39*(10), 758-770

[26] Evans, B., Parks, J., & Theobald, K. (2011). Urban wind power and the private sector: community benefits, social acceptance and public engagement. *Journal of environmental planning and management*, *54*(2), 227-244

[27] Everatt, D., Marais, H., & Dube, N. (2010). Participation… for what purpose? Analysing the depth and quality of public participation in the Integrated Development Planning Process in Gauteng. *Politikon*, *37*(2-3), 223-249

[28] Gangadharan, S. P. (2009). Public participation and agency discretion in rulemaking at the Federal Communications Commission. *Journal of Communication Inquiry*, *33*(4), 337-353

[29] Gauvin, F. P., Abelson, J., Giacomini, M., Eyles, J., & Lavis, J. N. (2010). "It all depends": Conceptualizing public involvement in the context of health technology assessment agencies. *Social science & medicine*, *70*(10), 1518-1526

[30] Geys, B., Heinemann, F., & Kalb, A. (2010). Voter involvement, fiscal autonomy and public sector efficiency: evidence from German municipalities. *European journal of political economy*, *26*(2), 265-278

[31] Gil, A., Calado, H., & Bentz, J. (2011). Public participation in municipal transport planning processes–the case of the sustainable mobility plan of Ponta Delgada, Azores, Portugal. *Journal of Transport Geography*, *19*(6), 1309-1319

[32] Gjersoe, N. L., & Hood, B. (2013). Changing children's understanding of the brain: a longitudinal study of the Royal Institution Christmas Lectures as a measure of public engagement. *PloS one*, *8*(11), e80928

[33] Hainz, T., Bossert, S., & Strech, D. (2016). Collective agency and the concept of 'public'in public involvement: A practice-oriented analysis. BMC medical ethics, 17(1), 1

[34] Rosener J B, 1978, Citizen participation: can we measure its effectiveness? Public Administration Review 38 457 ^ 463

[35] HARUŢA, C., & Bianca, R. A. D. U. (2010). Citizen Participation in the Decision Making Process at Local and County Levels in the Romanian Public Instituitons. *Transylvanian Review of Administrative Sciences*, *6*(31), 76-92

[36] Henningsson, M., Blicharska, M., Antonson, H., Mikusiński, G., Göransson, G., Angelstam, P., ... & Jönsson, S. (2015). Perceived landscape values and public participation in a road-planning process–a case study in Sweden. *Journal of Environmental Planning and Management*, *58*(4), 631-653

[37] Howard, T. L., & Gaborit, N. (2007). Using virtual environment technology to improve public participation in urban planning process. *Journal of Urban Planning and Development*, *133*(4), 233-241.

[38] Hunt, L. M., Robson, M., Lemelin, R. H., & McIntyre, N. (2010). Exploring the acceptability of spatial simulation models of outdoor recreation for use by participants in public participation processes. *Leisure Sciences*, *32*(3), 222-239

[39] Jami, A. A., & Walsh, P. R. (2016). Wind Power Deployment: The Role of Public Participation in the Decision-Making Process in Ontario, Canada. Sustainability, 8(8), 713

[40] Benzies, K. M., Premji, S., Hayden, K. A., & Serrett, K. (2006). State-of-the-evidence reviews: advantages and challenges of including grey literature. Worldviews on Evidence-Based Nursing, 3(2), 55-61.

[41] Kahila-Tani, M., Broberg, A., Kyttä, M., & Tyger, T. (2016). Let the citizens map—public participation GIS as a planning support system in the Helsinki master plan process. *Planning Practice & Research*, *31*(2), 195-214

[42] Kim, S., & Schachter, H. L. (2013). Citizen participation in the budget process and local government accountability: Case studies of organizational learning from the United States and South Korea. *Public Performance & Management Review*, *36*(3), 456-471

[43] Mahood, Q., Van Eerd, D., & Irvin, E. (2014). Searching for grey literature for systematic reviews: challenges and benefits. Research synthesis methods, 5(3), 221-234.

[44] Lagos, T. G., Coopman, T. M., & Tomhave, J. (2014). "Parallel poleis": Towards a theoretical framework of the modern public sphere, civic engagement and the structural advantages of the internet to foster and maintain parallel socio-political institutions. *New Media & Society*, *16*(3), 398-414

[45] Lehoux, P., Daudelin, G., & Abelson, J. (2012). The unbearable lightness of citizens within public deliberation processes. *Social science & medicine*, *74*(12), 1843-1850

[46] Lei, L., & Hilton, B. (2013). A spatially intelligent public participation system for the environmental impact assessment process. *ISPRS International Journal of Geo-Information*, *2*(2), 480-506

[47] Li, T. H., Ng, S. T., & Skitmore, M. (2012). Public participation in infrastructure and construction projects in China: From an EIA-based to a whole-cycle process. *Habitat International*, *36*(1), 47-56

[48] Little, P. C. (2009). Negotiating community engagement and science in the federal environmental public health sector. *Medical anthropology quarterly*, *23*(2), 94-118

[49] Lord, J. K., & Cheng, A. S. (2006). Public involvement in state fish and wildlife agencies in the US: a thumbnail sketch of techniques and barriers. *Human Dimensions of Wildlife*, *11*(1), 55-69

[50] Mackenzie, J., & Krogman, N. (2005). Public involvement processes, conflict, and challenges for rural residents near intensive hog farms. *Local Environment*, *10*(5), 513-524

[51] Maiello, A., Christovão, A. C., Nogueira de Paiva Britto, A. L., & Frey, M. (2013). Public participation for urban sustainability: investigating relations among citizens, the environment and institutions–an ethnographic study. *Local Environment*, *18*(2), 167-183

[52] Mansourian, A., Taleai, M., & Fasihi, A. (2011). A web-based spatial decision support system to enhance public participation in urban planning processes. *Journal of Spatial Science*, *56*(2), 269-282

[53] Boudjelida, A., Mellouli, S., & Lee, J. (2016, March). Electronic citizens participation: Systematic review. In Proceedings of the 9th International Conference on Theory and Practice of Electronic Governance (pp. 31-39). ACM.

[54] Martin, G. P. (2011). The third sector, user involvement and public service reform: a case study in the co-governance of health service provision. *Public Administration*, *89*(3), 909-932

[55] Martineau-Delisle, C., & Nadeau, S. (2010). Assessing the effects of public participation processes from the point of view of participants: significance, achievements, and challenges. *The forestry chronicle*, *86*(6), 753-765

[56] Masvaure, S. (2016, December). Elusive Public Participation: Citizen Decision-Making in Budget Formulation Process in the City of Harare, Zimbabwe. In *Urban Forum* (Vol. 27, No. 4, pp. 447-463). Springer Netherlands

[57] Doran, M. A., & Daniel, S. (2014). Geomatics and Smart City: A transversal contribution to the Smart City development. Information Polity, 19(1, 2), 57-72.

[58] Mannarini, T., & Fedi, A. (2018). Using quali-quantitative indicators for assessing the quality of citizen participation: A study on three citizen juries. Social Indicators Research, 139(2), 473-490.

[59] Measham, T. G., Brake, L., Robinson, C. J., Larson, S., Richards, C., & Smith, T. F. (2011). NRM engagement between remote dryland communities and government agencies: success factors from Australia. *Journal of Arid Environments*, *75*(10), 968-973

[60] Benjamin, S. M. (2006). Evaluating e-rulemaking: Public participation and political institutions. *Duke Law Journal*, 893-941

[61] Haltofova, B. (2018). Using crowdsourcing to support civic engagement in strategic urban development planning: A case study of Ostrava, Czech Republic. Journal of Competitiveness.

[62] Castro, C. M. D. (2013). Public hearings as a tool to improve participation in regulatory policies: case study of the National Agency of Electric Energy. *Revista de administração Pública*, *47*(5), 1069-1087

[63] Ned, L., & Lorenzo, T. (2016). Enhancing the public sector's capacity for inclusive economic participation of disabled youth in rural communities. *African Journal of Disability*, *5*(1), 1-9

[64] Neresini, F., & Bucchi, M. (2011). Which indicators for the new public engagement activities? An exploratory study of European research institutions. *Public Understanding of Science*, *20*(1), 64-79

[65] Neshkova, M. I. (2014). Does agency autonomy foster public participation?. *Public Administration Review*, *74*(1), 64-74.

[66] Zheng, Y., & Schachter, H. L. (2017). Explaining citizens' E-participation use: The role of perceived advantages. *Public Organization Review*, *17*(3), 409-428.

[67] Nilsson, B., Peterson, B., Holden, G., & Eckert, C. (2011). Design Med Omtanke: Participation and sustainability in the design of public sector buildings. *Design studies*, *32*(3), 235-254

[68] Nonami, H., Hirose, Y., Ohnuma, S., Midden, C., & Ohtomo, S. (2015). Effects of voice and similarity on procedural fairness and trust: A dual process model of public acceptance based on representatives' participation. *Asian Journal of Social Psychology*, *18*(3), 216-224

[69] Ocloo, J. E., & Fulop, N. J. (2012). Developing a 'critical'approach to patient and public involvement in patient safety in the NHS: learning lessons from other parts of the public sector?. *Health Expectations*, *15*(4), 424-432

[70] Okal, J., Kanya, L., Obare, F., Njuki, R., Abuya, T., Bange, T., ... & Bellows, B. (2013). An assessment of opportunities and challenges for public sector involvement in the maternal health voucher program in Uganda. *Health research policy and systems*, *11*(1), 38

[71] O'Meara, W. P., Tsofa, B., Molyneux, S., Goodman, C., & McKenzie, F. E. (2011). Community and facility-level engagement in planning and budgeting for the government health sector–A district perspective from Kenya. *Health Policy*, *99*(3), 234-243

[72] Radu, B. (2019). The Impact of Transparency on the Citizen Participation in Decision-Making at the Municipal Level in Romania. Central European Public Administration Review, 17(1), 111-130.

[73] Pidgeon, N. F., Poortinga, W., Rowe, G., Horlick-Jones, T., Walls, J., & O'Riordan, T. (2005). Using surveys in public participation processes for risk decision making: The case of the 2003 British GM nation? Public debate. *Risk Analysis*, *25*(2), 467-479

[74] Pieper, A. K., & Pieper, M. (2015). Political participation via SM: a case study of deliberative quality in the public online budgeting process of Frankfurt/Main, Germany 2013. *Universal Access in the Information Society*, *14*(4), 487-503

[75] Predmore, S. A., Stern, M. J., Mortimer, M. J., & Seesholtz, D. N. (2011). Perceptions of legally mandated public involvement processes in the US Forest Service. *Society & Natural Resources*, *24*(12), 1286-1303

[76] Primmer, E., & Kyllönen, S. (2006). Goals for public participation implied by sustainable development, and the preparatory process of the Finnish National Forest Programme. *Forest policy and Economics*, *8*(8), 838-853

[77] Enaifoghe, A., & Cotties, A. (2019). South Africa's decentralization problems of citizenry participatory democracy in local municipality development. AFFRIKA Journal of Politics, Economics and Society, 9(1), 91-116

[78] Raisio, H., & Carson, L. (2014). Deliberation within sectors. Making the case for sector mini-publics. *International Review of Social Research*, *4*(1), 75-92

[79] Ríos, A. M., Benito, B., & Bastida, F. (2017). Factors explaining public participation in the central government budget process. *Australian Journal of Public Administration*, *76*(1), 48-64

[80] Rixon, D. (2010). Stakeholder engagement in public sector agencies: ascending the rungs of the accountability ladder. *International Journal of Public Administration*, *33*(7), 347-356

[81] Robson, M., & Kant, S. (2007). The development of government agency and stakeholder cooperation: A comparative study of two Local Citizens Committees'(LCCs) participation in forest management in Ontario, Canada. *Forest Policy and Economics*, *9*(8), 1113-1133

[82] Rodríguez Bolívar, M. P. (2015). The influence of political factors in policymakers' perceptions on the implementation of Web 2.0 technologies for citizen participation and knowledge sharing in public sector delivery. Information Polity, 20(2, 3), 199-220

[83] Rafique, Z., & Khoo, S. L. (2018). Role of community-based organizations (CBOs) in promoting citizen participation. *International Journal of Sociology and Social Policy*.

[84] Romero, M., & Keidan, G. (2017). California's 2014 Ballot Initiative Transparency Act (BITA) and its Impact on Public Involvement in the Ballot Initiative Process. *California Journal of Politics and Policy*, *9*

[85] Srdjevic, Z., Funamizu, N., Srdjevic, B., & Bajčetić, R. (2018). Public participation in water management of Krivaja River, Serbia: understanding the problem through Grounded Theory Methodology. *Water Resources Management*, *32*(15), 5081-5092.

[86] Scardina, A. V., Mortimer, M. J., & Dudley, L. (2007). Getting past the who and how many to the how and why in USDA Forest Service public involvement processes. *Forest Policy and Economics*, *9*(8), 883-902

[87] Schiele, J. J., & McCue, C. P. (2006). Professional service acquisition in public sector procurement: A conceptual model of meaningful involvement. *International Journal of Operations & Production Management*, *26*(3), 300-325

[88] Seekamp, E., Harris, C. C., Hall, T. E., & Craig, T. Y. (2010). A mixed methods approach to measuring depth of group information processing in the context of deliberative public involvement. *Journal of Mixed Methods Research*, *4*(3), 222-247

[89] Shapiro, S. (2008). Does the amount of participation matter? Public comments, agency responses and the time to finalize a regulation. *Policy Sciences*, *41*(1), 33-49

[90] Smith, J. W., Leahy, J. E., Anderson, D. H., & Davenport, M. A. (2013). Community/agency trust and public involvement in resource planning. *Society & Natural Resources*, *26*(4), 452-471

[91] So, B. W. Y. (2014). Civic Engagement in the Performance Evaluation of the Public Sector in China: Building horizontal accountability to enhance vertical accountability. *Public Management Review*, *16*(3), 341-357

[92] Somarakis, G., & Stratigea, A. (2014). Public Involvement in Taking Legislative Action as to the Spatial Development of the Tourist Sector in Greece—The "OpenGov" Platform Experience. *Future Internet*, *6*(4), 735-759

[93] Soteri-Proctor, A. (2010). Making use of qualitative tools: towards a fuller understanding of the voluntary sector's engagement with public service delivery. *International Journal of social research methodology*, *13*(5), 411-424.

[94] Molinari, F. (2010, August). On sustainable eParticipation. In International Conference on Electronic Participation (pp. 126-139). Springer Berlin Heidelberg.

[95] Stich, B., & Holland, J. H. (2011). Using a multiple criteria decision-making model to streamline and enhance NEPA and Public participation processes. *Public Works Management & Policy*, *16*(1), 59-89

[96] Tang, J. J., Maroothynaden, J., Bello, F., & Kneebone, R. (2013). Public engagement through shared immersion: participating in the processes of research. Science communication, 35(5), 654-666.

[97] Piotrowski, S., & Liao, Y. (2012). The usability of government information: The necessary link between transparency and participation. In H. L. Schachter, & K. Yang (Eds.), The State of Citizen Participation in America (pp. 163–194). Charlotte, NC: Information Age Publishing.

[98] Thapa, B. E., Niehaves, B., Seidel, C. E., & Plattfaut, R. (2015). Citizen involvement in public sector innovation: Government and citizen perspectives. *Information Polity*, *20*(1), 3-17

[99] Thipe, T., De Souza, M., & Luwaya, N. (2015). The Advert Was Put up Yesterday: Public Participation in the Traditional Courts Bill Legislative Process. *NYL Sch. L. Rev.*, *60*, 519

[100] Trousset, S., Gupta, K., Jenkins-Smith, H., Silva, C. L., & Herron, K. (2015). Degrees of engagement: Using cultural worldviews to explain variations in public preferences for engagement in the policy process. *Policy Studies Journal*, *43*(1), 44-69

[101] Turcanu, C., Perko, T., & Laes, E. (2014). Public participation processes related to nuclear research installations: What are the driving factors behind participation intention?. *Public Understanding of Science*, *23*(3), 331-347.

[102] Cowie, P. (2017). Performing planning: understanding community participation in planning through theatre. *Town Planning Review*, *88*(4), 401-422

[103] Natarajan, L., Lock, S. J., Rydin, Y., & Lee, M. (2019). Participatory planning and major infrastructure: experiences in REI NSIP regulation. *Town Planning Review*, *90*(2), 117-139.

[104] Veronesi, G., & Keasey, K. (2015). Patient and Public Participation in the English NHS: An assessment of experimental implementation processes. *Public Management Review*, *17*(4), 543-564

[105] Videira, N., Antunes, P., Santos, R., & Lobo, G. (2006). Public and stakeholder participation in European water policy: a critical review of project evaluation processes. *Environmental Policy and Governance*, *16*(1), 19-31

[106] Wahl, C. (2013). Swedish municipalities and public participation in the traffic planning process–Where do we stand?. *Transportation Research Part A: Policy and Practice*, *50*, 105-112

[107] Wang, P. (2014). Government intervention and the empowerment process: Citizen involvement in the 2010 Shanghai World Expo. *Journal of Public affairs*, *14*(2), 130-141

[108] Webler, T., & Tuler, S. (2006). Four perspectives on public participation process in environmental assessment and decision making: Combined results from 10 case studies. Policy Studies Journal, 34(4), 699-722

[109] Freschi, A. C., Medaglia, R., & Nørbjerg, J. (2009, September). A tale of six countries: eParticipation research from an administration and political perspective. In International Conference on Electronic Participation (pp. 36-45). Springer Berlin Heidelberg.

[110] Skarmeas, D., Leonidou, C. N., Saridakis, C., & Musarra, G. (2019). Pathways to Civic Engagement with Big Social Issues: An Integrated Approach. *Journal of Business Ethics*, 1-25.

[111] Wodschow, A., Nathan, I., & Cerutti, P. (2016). Participation, public policy-making, and legitimacy in the EU Voluntary Partnership Agreement process: The Cameroon case. *Forest Policy and Economics*, *63*, 1-10

[112] Wu, H., He, Z., & Gong, J. (2010). A virtual globe-based 3D visualization and interactive framework for public participation in urban planning processes. *Computers, Environment and Urban Systems*, *34*(4), 291-298.

[113] Yang, K. (2016). Creating public value and institutional innovations across boundaries: An integrative process of participation, legitimation, and implementation. *Public Administration Review*, *76*(6), 873-885

[114] Leung, M. Y., Yu, J., & Chan, Y. S. (2013). Focus group study to explore critical factors of public engagement process for mega development projects. *Journal of Construction Engineering and Management*, *140*(3), 04013061

[115] Royo, S., Yetano, A., & Acerete, B. (2014) (a). E-Participation and Environmental Protection: Are Local Governments Really Committed?. Public Administration Review, 74(1), 87-98.

[116] Smalec, A. (2018). Participatory budgeting as a form of community involvement in the territorial government bodies management. *Economic and Social Development: Book of Proceedings*, 1-10.

[117] Jao, I., Kombe, F., Mwalukore, S., Bull, S., Parker, M., Kamuya, D., ... & Marsh, V. (2015). Involving research stakeholders in developing policy on sharing public health research data in Kenya: views on fair process for informed consent, access oversight, and

community engagement. *Journal of Empirical Research on Human Research Ethics*, *10*(3), 264-277

[118] Brach, A. M. (2005). A Taxonomy for Stakeholder Involvement in Public Sector Transportation Research and Technology Programs. *Public Works Management & Policy*, *9*(3), 223-231

[119] Ball, A., Soare, V., & Brewis, J. (2012). Engagement research in public sector accounting. *Financial Accountability & Management*, *28*(2), 189-214

[120] Boote, J., Baird, W., & Sutton, A. (2011). Public involvement in the systematic review process in health and social care: a narrative review of case examples. *Health Policy*, *102*(2), 105-116

[121] Boivin, A., Lehoux, P., Burgers, J., & Grol, R. (2014). What are the key ingredients for effective public involvement in health care improvement and policy decisions? A randomized trial process evaluation. *The Milbank Quarterly*, *92*(2), 319-350

[122] Roche, Stéphane, Nashid Nabian, Kristian Kloeckl, and Carlo Ratti. "Are 'smart cities' smart enough." In Global geospatial conference, pp. 215-235. 2012.

[123] Sanford, C., & Rose, J. (2007). Characterizing eParticipation. International Journal of Information Management, 27(6), 406.

[124] Daniels, T., Williams, I., Bryan, S., Mitton, C., & Robinson, S. (2018). Involving citizens in disinvestment decisions: what do health professionals think? Findings from a multi-method study in the English NHS. *Health Economics, Policy and Law*, *13*(2), 162.

[125] Habermas, J. (1996). Between facts and norms: Contributions to a discourse theory of law and democracy. Cambridge, MA: MIT Press.

[126] Roberts, J. J., Lightbody, R., Low, R., & Elstub, S. (2020). Experts and evidence in deliberation: scrutinising the role of witnesses and evidence in mini-publics, a case study. *Policy Sciences*, 1-30.

[127] Marzouki, A. (2017). Towards a context-based Citizen Participation Approach : A literature review of citizen participation issues and a conceptual framework. 10th International Conference on Theory and Practice of Electronic Governance (ICEGOV) (Forthcoming, 7-9 Mars 2017).

[128] Fung, A. (2015). Putting the public back into governance: the challenges of citizen participation and its future. *Public Administration Review*, *75*(4), 513-522.

[129] Goldfinch, S., Gauld, R., & Herbison, P. (2009). The Participation Divide? Political Participation, Trust in Government, and E-government in Australia and New Zealand. *Australian Journal of Public Administration*, *68*(3), 333-350.

[130] Rowe, G., & Frewer, L. J. (2000). Public participation methods: A framework for evaluation. *Science, technology & human values*, *25*(1), 3-29.

[131] Hensengerth, O., & Lu, Y. (2019). Emerging environmental Multi-Level Governance in China? Environmental protests, public participation and local institution-building. *Public Policy and Administration*, *34*(2), 121-143.

[132] Ochara, N. M., & Mawela, T. (2015). Enabling social sustainability of e-participation through mobile technology. *Information Technology for Development*, *21*(2), 205-228.

[133] Cornwall, A. (2008). Unpacking 'Participation': models, meanings and practices. *Community Development Journal*, *43*(3), 269-283.

[134] Hays, R. A. (2007). COMMUNITY ACTIVISTS'PERCEPTIONS OF CITIZENSHIP ROLES IN AN URBAN COMMUNITY: A CASE STUDY OF ATTITUDES THAT AFFECT COMMUNITY ENGAGEMENT. *Journal of Urban Affairs*, *29*(4), 401-424.

[135] Bryson, J. M., Quick, K. S., Slotterback, C. S., & Crosby, B. C. (2013). Designing public participation processes. Public Administration Review, 73(1), 23-34.

[136] Saab, F., de Souza Bermejo, P. H., Garcia, G. C., Pereira, J. S., & e Silva, S. D. A. M. (2018). Does public consultation encourage social participation?. *Journal of Enterprise Information Management*.

[137] Charalabidis, Y., Gionis, G., Ferro, E., and Loukis, E. 2010. Towards a systematic exploitation of web 2.0 and simulation modeling tools in public policy process. In Electronic Participation. Springer, 1–12

[138] Sønderskov, M. (2019). Do local politicians really want collaborative governance?. *International Journal of Public Sector Management*.

[139] Tuler, S., & Webler, T. (2010). How preferences for public participation are linked to perceptions of the context, preferences for outcomes, and individual characteristics. *Environmental Management*, *46*(2), 254-267

[140] Bohman, S. (2014, September). Information technology in eParticipation research: a word frequency analysis. In International Conference on Electronic Participation (pp. 78-89). Springer Berlin Heidelberg.

[141] Ju, J., Liu, L., & Feng, Y. (2019). Design of an O2O citizen participation ecosystem for sustainable governance. *Information Systems Frontiers*, *21*(3), 605-620.

[142] Williams, C. B., Gulati, G. J. J., & Yates, D. J. (2013, June). Predictors of on-line services and e-participation: a cross-national comparison. In *Proceedings of the 14th Annual International Conference on Digital Government Research*(pp. 190-197). ACM.

[143] King, S., Conley, M., Latimer, B., & Ferrari, D. (1989). Co-design: A process of design participation. Van Nostrand Reinhold Company.

[144] Hakimpour, F., Aleman-Meza, B., Perry, M., & Sheth, A. P. (2006). Data Processing in Space, Time, and Semantics Dimensions.

[145] Al-Kodmany, K. (2000). Public participation: technology and democracy. *Journal of architectural education*, *53*(4), 220-228.

[146] Templier, M., & Paré, G. (2015). A Framework for Guiding and Evaluating Literature Reviews. *Communications of the Association for Information Systems*, *37*.

[147] Mohammadi, S. H., Norazizan, S., & Nikkhah, H. A. (2018). Conflicting perceptions on participation between citizens and members of local government. *Quality & quantity*, *52*(4), 1761-1778.

[148] Duțu, A., & Diaconu, M. (2017). Community participation for an open public administration: Empirical measurements and conceptual framework design. *Cogent Business & Management*, *4*(1), 1287980.

[149] Muluk, M. R. K., Danar, O. R., & Rahmawati, L. (2019). Community Participation and Development Planning in Local Government Level: A Study on the Formulation of Batu City Medium-Term Development Plan. *Bisnis & Birokrasi Journal*, *26*(3).

[150] Švaljek, S., Rašić Bakarić, I., & Sumpor, M. (2019). Citizens and the city: the case for participatory budgeting in the City of Zagreb. *Public Sector Economics*, *43*(1), 21-48.

[151] Shapiro, S. (2018). Can Analysis of Policy Decisions Spur Participation?. *Journal of Benefit-Cost Analysis*, *9*(03), 435-461.

[152] Bobbio, L. (2019). Designing effective public participation. *Policy and Society*, *38*(1), 41-57.

[153] Migchelbrink, K., & Van de Walle, S. (2020). When Will Public Officials Listen? A Vignette Experiment on the Effects of Input Legitimacy on Public Officials' Willingness to Use Public Participation. *Public Administration Review*, *80*(2), 271-280.

[154] Schmidthuber, L., Hilgers, D., & Rapp, M. (2019). Political innovation, digitalisation and public participation in party politics. *Policy & Politics*, *47*(3), 391-413.

[155] Revyakin, S. (2018). On the Effectiveness of Electronic Platforms of Citizen Participation in Public Administration. *Public administration issues*, (2), 94-113.

[156] Ianniello, M., Iacuzzi, S., Fedele, P., & Brusati, L. (2019). Obstacles and solutions on the ladder of citizen participation: A systematic review. *Public Management Review*, *21*(1), 21-46.

[157] Lee, Y., & Schachter, H. L. (2019). Exploring the relationship between trust in government and citizen participation. *International Journal of Public Administration*, *42*(5), 405-416.

[158] Liao, Y., & Schachter, H. L. (2018). Exploring the antecedents of municipal managers' attitudes towards citizen participation. *Public Management Review*, *20*(9), 1287-1308.

[159] Al-Kodmany, K. (2001). Visualization tools and methods for participatory planning and design. Journal of Urban Technology, 8(2), 1–37. http://doi.org/10.1080/1063073012007971

[160] Rowe, G., & Watermeyer, R. P. (2018). Dilemmas of public participation in science policy. *Policy Studies*, *39*(2), 204-221.

[161] Voinov, A., & Bousquet, F. (2010). Modelling with stakeholders. Environmental Modelling & Software, 25(11), 1268-1281

[162] Gelders, D., Brans, M., Maesschalck, J., & Colsoul, N. (2010). Systematic evaluation of public participation projects: Analytical framework and application based on two Belgian neighborhood watch projects. Government Information Quarterly, 27(2), 134-140.

[163] Sæbø, Ø., Flak, L. S., & Sein, M. K. (2011). Understanding the dynamics in e-Participation initiatives: Looking through the genre and stakeholder lenses. Government Information Quarterly, 28(3), 416-425.

[164] Nam, T. (2012). Dual effects of the internet on political activism: Reinforcing and mobilizing. *Government Information Quarterly*, *29*, S90-S97.

[165] Sandoval-Almazan, R., & Gil-Garcia, J. R. (2012). Are government internet portals evolving towards more interaction, participation, and collaboration? Revisiting the rhetoric of e-government among municipalities. *Government Information Quarterly*, *29*, S72-S81.

[166] De Filippi, F., Coscia, C., & Cocina, G. G. (2020). Digital Participatory Platforms for Urban Regeneration: A Survey of Italian Case Studies. *International Journal of E-Planning Research (IJEPR)*, *9*(3), 47-67.

[167] Clark, J. K. (2018). Designing public participation: Managing problem settings and social equity. *Public Administration Review*, *78*(3), 362-374.

[168] Kim, S., & Lee, J. (2019). Citizen participation, process, and transparency in local government: An exploratory study. *Policy Studies Journal*, *47*(4), 1026-1047.

[169] Oliveira, G. H. M., & Welch, E. W. (2013). Social media use in local government: Linkage of technology, task, and organizational context. *Government Information Quarterly*, *30*(4), 397-405.

[170] Epstein, D., Newhart, M., & Vernon, R. (2014). Not by technology alone: The "analog" aspects of online public engagement in policymaking. *Government Information Quarterly*, *31*(2), 337-344.

[171] Susha, I., & Grönlund, Å. (2014). Context clues for the stall of the Citizens' Initiative: lessons for opening up e-participation development practice. *Government Information Quarterly*, *31*(3), 454-465.

[172] Vicente, M. R., & Novo, A. (2014). An empirical analysis of e-participation. The role of social networks and e-government over citizens' online engagement. *Government Information Quarterly*, *31*(3), 379-387.

[173] Cegarra-Navarro, J. G., Garcia-Perez, A., & Moreno-Cegarra, J. L. (2014). Technology knowledge and governance: Empowering citizen engagement and participation. *Government Information Quarterly*, *31*(4), 660-668.

[174] Zheng, Y., Schachter, H. L., & Holzer, M. (2014). The impact of government form on e-participation: A study of New Jersey municipalities. *Government Information Quarterly*, *31*(4), 653-659.

[175] Girish, J., Williams, C. B., & Yates, D. J. (2014). Predictors of on-line services and e-participation: A cross-national comparison. *Government Information Quarterly*, *31*(4), 526-533.

[176] Bonsón, E., Royo, S., & Ratkai, M. (2015). Citizens' engagement on local governments' Facebook sites. An empirical analysis: The impact of different media and content types in Western Europe. *Government* information quarterly, 32(1), 52-62.

[177] Dean, R. (2019). Control or influence? Conflict or solidarity? Understanding diversity in preferences for public participation in social policy decision making. *Social Policy & Administration*, *53*(1), 170-187.

[178] Lev-On, A., & Steinfeld, N. (2015). Local engagement online: Municipal Facebook pages as hubs of interaction. *Government information quarterly*, *32*(3), 299-307.

[179] Jho, W., & Song, K. J. (2015). Institutional and technological determinants of civil e-Participation: Solo or duet?. *Government Information Quarterly*, *32*(4), 488-495.

[180] Guillamón, M. D., Ríos, A. M., Gesuele, B., & Metallo, C. (2016). Factors influencing social media use in local governments: The case of Italy and Spain. *Government Information Quarterly*, *33*(3), 460-471.

[181] Hagen, L., Harrison, T. M., Uzuner, Ö., May, W., Fake, T., & Katragadda, S. (2016). E-petition popularity: Do linguistic and semantic factors matter? Government Information Quarterly, 33(4), 783-795

[182] Urquhart, C. & Fernandez, W. (2013) Using grounded theory method in information systems: the researcher as blank slate and other myths. Journal of Information Technology, 28, 224–236.

[183] Corbett, J., & Mellouli, S. (2017). Winning the SDG battle in cities: how an integrated information ecosystem can contribute to the achievement of the 2030 sustainable development goals. *Information Systems Journal*, *27*(4), 427-461.

[184] Pina, V., Torres, L., & Royo, S. (2017). Comparing online with offline citizen engagement for climate change: Findings from Austria, Germany and Spain. *Government Information Quarterly*, *34*(1), 26-36.

[185] Gagliardi, D., Schina, L., Sarcinella, M. L., Mangialardi, G., Niglia, F., & Corallo, A. (2017). Information and communication technologies and public participation: interactive maps and value added for citizens. *Government Information Quarterly*, *34*(1), 153-166

[186] Alcaide–Muñoz, L., Rodríguez–Bolívar, M. P., Cobo, M. J., & Herrera–Viedma, E. (2017). Analysing the scientific evolution of e-Government using a science mapping approach. *Government information quarterly*, *34*(3), 545-555.

[187] Lee, H., Tsohou, A., & Choi, Y. (2017). Embedding persuasive features into policy issues: Implications to designing public participation processes. *Government Information Quarterly*, *34*(4), 591-600

[188] Porwol, L., Ojo, A., & Breslin, J. G. (2018). Social software infrastructure for e-participation. *Government Information Quarterly*, *35*(4), S88-S98.

[189] Janssen, M., & Helbig, N. (2018). Innovating and changing the policy-cycle: Policy-makers be prepared!. *Government Information Quarterly*, *35*(4), S99-S105.

[190] Toots, M. (2019). Why E-participation systems fail: The case of Estonia's Osale. *Government Information Quarterly*, *36*(3), 546-559.

[191] Naranjo-Zolotov, M., Oliveira, T., Casteleyn, S., & Irani, Z. (2019). Continuous usage of e-participation: The role of the sense of virtual community. *Government Information Quarterly*, *36*(3), 536-545

[192] DE JONG, Menno DT, NEULEN, Sharon, et JANSMA, Sikke R. Citizens' intentions to participate in governmental co-creation initiatives: Comparing three co-creation configurations. *Government information quarterly*, 2019, vol. 36, no 3, p. 490-500.

[194] Ju, J., Liu, L., & Feng, Y. (2019). Public and private value in citizen participation in E-governance: Evidence from a government-sponsored green commuting platform. *Government Information Quarterly*, *36*(4), 101400.

[193] Pirannejad, A., Janssen, M., & Rezaei, J. (2019). Towards a balanced E-Participation Index: Integrating government and society perspectives. *Government Information Quarterly*, *36*(4), 101404.

[194] Karner, A., & Marcantonio, R. A. (2018). Achieving transportation equity: Meaningful public involvement to meet the needs of underserved communities. *Public Works Management & Policy*, *23*(2), 105-126.

[195] Allen, B., Tamindael, L. E., Bickerton, S. H., & Cho, W. (2020). Does citizen coproduction lead to better urban services in smart cities projects? An empirical study on e-participation in a mobile big data platform. *Government Information Quarterly*, *37*(1), 101412

[196] Karner, A., & Marcantonio, R. A. (2018). Achieving transportation equity: Meaningful public involvement to meet the needs of underserved communities. *Public Works Management & Policy*, *23*(2), 105-126.

[197] Cascetta, E., Cartenì, A., Pagliara, F., & Montanino, M. (2015). A new look at planning and designing transportation systems: A decision-making model based on cognitive rationality, stakeholder engagement and quantitative methods. *Transport policy*, *38*, 27-39

[198] Abbot, C. (2020). Losing the local? Public participation and legal expertise in planning law. *Legal Studies*, 1-17.

[199] Kinzer, K. (2018). Picking up speed: public participation and local sustainability plan implementation. *Journal of Environmental Planning and Management*, *61*(9), 1594-1611.

[200] Güiza, F., & Stuart, N. (2018). When citizens choose not to participate in volunteering geographic information to e-governance: a case study from Mexico. *GeoJournal*, *83*(5), 1151-1167.

[202] Silva, P., Tavares, A. F., Silva, T., & Lameiras, M. (2019). The good, the bad and the ugly: Three faces of social media usage by local governments. *Government Information Quarterly*, *36*(3), 469-479.

[203] Pflughoeft, B. R., & Schneider, I. E. (2020). Social media as E-participation: Can a multiple hierarchy stratification perspective predict public interest?. *Government Information Quarterly*, *37*(1), 101422.

[204] Song, H. (2020). Perceived standing: exploring why people accept or reject others' access to public participation in local environmental conflicts. *Local Environment*, *25*(5), 397-413.

[205] Xu, Z., Shan, J., Li, J., & Zhang, W. (2020). Extending the theory of planned behavior to predict public participation behavior in air pollution control: Beijing, China. *Journal of Environmental Planning and Management*, *63*(4), 669-688.

[206] Brown, G., & Eckold, H. (2020). An evaluation of public participation information for land use decisions: public comment, surveys, and participatory mapping. *Local Environment*, *25*(2), 85-100.

[207] Du, G., Kray, C., & Degbelo, A. (2020). Interactive immersive public displays as facilitators for deeper participation in urban planning. *International Journal of Human–Computer Interaction*, *36*(1), 67-81.

[208] Alexei, G. D., & SHUBINA, T. F. (2018). Public participation in planning a comfortable urban environment on the example of the Arkhangelsk region. *SOCIAL AND ECONOMIC DEVELOPMENT*, (33), 76.

[209] Uittenbroek, C. J., Mees, H. L., Hegger, D. L., & Driessen, P. P. (2019). The design of public participation: who participates, when and how? Insights in climate adaptation planning from the Netherlands. *Journal of Environmental Planning and Management*, *62*(14), 2529-2547.

CHAPTER 2: PAPER 2: The identification of Stakeholders' living contexts in SPPs' data: A semantic, spatial and temporal model of patterns

RÉSUMÉ

La participation des parties prenantes (PPP) vise à impliquer les parties prenantes dans les processus de prise de décision concernant des choix importants affectant par exemple leurs organisations, leurs villes ou leurs communautés. La PPP est maintenue par le biais de processus de PPP (PPPP) qui peuvent être traditionnels (par exemple, des assemblées physiques) ou en ligne (par exemple, des forums en ligne). Qu'ils soient traditionnels ou en ligne, le but des PPPP est de collecter et d'analyser des données de manière à apporter un bénéfice à un processus décisionnel donné. Dans les PPPP, les parties prenantes tentent de communiquer [une partie de] leur contexte de vie, c'est-à-dire de présenter leurs objectifs, leurs problèmes quotidiens, leurs intentions et les enjeux auxquels ils sont confrontés dans leur environnement. Un enjeu majeur des décideurs est alors de s'assurer que les contextes de vie des parties prenantes sont capturés et pris en considération dans les PPPP pour une mise en œuvre plus efficace des projets et des politiques. Cet article se concentre sur la question spécifique de « l'identification des contextes de vie des parties prenantes » dans les données des PPP, et tente de rendre compte de la façon dont les parties prenantes identifient implicitement leurs contextes de vie dans leurs commentaires de participation.

Mots clés: la participation des parties prenantes, les contextes de vie des parties prenantes, l'analyse sémantique des données, l'analyse spatiale des données, l'analyse temporelle des données, les connaissances basées sur le lieu

ABSTRACT

Stakeholders' Participation (SP) aims to involve stakeholders in decision-making processes about significant choices affecting for example their organizations, cities or communities. SP is maintained through SP processes (SPPs) that may be traditional (e.g. physical assemblies) or online (e.g. online forums). Whether traditional or online, the purpose of SPPs is to collect and analyze data in a way that it would bring a benefit to a given decision-making process. In SPPs, stakeholders try to communicate [a part of] their living contexts, i.e. to present their objectives, daily problems, intentions, and issues they are facing within their environment. A major challenge of decision-makers is then to ensure that the living contexts of stakeholders are considered in SPPs for an effective implementation of project and policies. This paper focuses on the specific issue of the "stakeholders' living context identification" and attempts to account for how stakeholders implicitly identify their living contexts in their SP comments. Based on a qualitative analysis of SP data from four case studies in two countries, this paper identifies a set of semantic, spatial and temporal patterns allowing to capture the stakeholders' living contexts in SPPs data. Moreover, a conceptual model emphasizing the importance for decision-makers to capture and understand semantic, spatial and temporal dimensions in SPPs is proposed.

Keywords: stakeholders' participation, stakeholders' living contexts', semantic data analysis, spatial data analysis, temporal data analysis, place-based knowledge

2.1. Introduction

Stakeholders' Participation Processes (SPPs) aim to reinforce the engagement of stakeholders in decision-making processes about significant choices affecting for example their organizations, cities or communities. They are designated as "two-way dialogues" bringing several benefits compared to "one-way processes" (Batty et al., 2012). Unlike the approaches where only decision-makers and experts identify the problem and the potential solutions, the involvement of various stakeholders through SPPs may lead to better decisions (Marttunen et al., 2015). Stakeholders' Participation (SP) in decision-making processes brings information from different stakeholders with a diversity of views, values and needs. Over the recent years, cities, governments as well as other public and private organizations adopted SPPs to increase the effectiveness of their decision-making processes (Marzouki et al., 2018).

With the emergence of Information and Communication Technologies (ICTs), SPPs took new forms by the use for example of dedicated solutions or social media platforms, which led to the concept of electronic participation (e-participation). Even though e-participation gained much significance as a buzzword, it maintains the same goals of participation in its traditional form that are increasing the involvement of stakeholders and helping them achieve their communities' objectives (Aichholzer & Westholm, 2009; Panoupoulou et al., 2009). Beyond the necessity to use various types of technologies to achieve participation goals, effective SPPs "are grounded in analyzing the context closely" (Bryson et al., 2013, p.2). Indeed, one of the key issues identified in the literature is that SPP are, in some cases, disconnected from "stakeholders' needs, preferences and priorities" and, therefore, lacking responsiveness to their "living context" (Masvaure, 2016; Marzouki et al., 2022).

In SPPs, stakeholders try to communicate issues that are [part] of their living contexts, i.e. to present their objectives, daily problems, intentions, and issues they are facing within their environment (Marzouki et al., 2017b; Coe et al., 2001). A major challenge of decision-makers is then to ensure that the living contexts of stakeholders are considered in SPPs for an adequate comprehension of the stakeholders' inputs and consequently for effective decisions in project and policies implementation (Bryson et al., 2013; Charalabidis et al., 2010; Coe et al., 2001). Hence, it becomes important to develop tools and techniques that

help decision-makers capture and understand these living contexts.-However, capturing the information about the living contexts is challenging since this information is implicitly expressed in SPPs data. This study takes the first steps towards understanding what characterize the living context of a stakeholder in SPP data by answering the following research question: *How to identify stakeholders' living contexts in SPPs and what patterns do they use to represent these contexts in SP inputs?* In the context of this research, we will focus on textual inputs.

Following a qualitative approach, we will investigate in this study three dimensions of the living context that are: semantic, spatial and temporal dimensions. We will analyze comments (inputs) of SPPs according to these three dimensions in order to identify patterns related to each dimension. These comments are collected from four different case studies. Our findings show that, when extracted from data, these patterns help to capture the living context, enabling semantic, spatial and temporal contextualization of SPP data. Moreover, the findings highlight that the three dimensions are not independent from each other but they are interrelated. The rest of this paper is organized as follows. Section 1 provides the theoretical background for our research. In section 2 we outline our research design and follow it with a description of the research methodology and implementation. Section 3 presents our research findings. In section 4 we emphasize our research outcomes, which include the emergent conceptual model. In section 5, we present the theoretical implications, we conclude our research and we provide limitations and future research avenues.2.2. Theoretical Background

2.2.1. Stakeholders' Participation

Stakeholders' participation is defined as "the practice of consulting and involving members of the public in the agenda-setting, decision-making, and policy-forming activities of organizations or institutions responsible for policy development" (Charalabidis et al., 2010, p. 512). It is one among several mechanisms that are used to involve stakeholders' or their representatives in decision-making processes (Marzouki et al., 2017b). Stakeholders' participation is viewed from the perspective of who the stakeholders are, how the stakeholders are represented, why the stakeholders are involved and what the stakeholders are involved in (Bryson et al., 2013).

Generally, participation initiatives are of two types: spontaneous or solicited. Spontaneous participation consists of the spontaneous willingness of stakeholders to express their opinions or give suggestions for any organization (it could be a city, employer, government, etc.). Stakeholders can do it through different channels: physical or electronic forums, social media channels etc. For example, several cities around the word collect and analyze participation data, periodically, through their dedicated social media pages with the aim to enhance their efficiency and provide innovative plans to help address major urban strategic planning problems (Goldfinch et al, 2009; Bohman, 2014). Solicited participation consists of a more formal way of participation where different phases of a SPP are planned and a definite duration is fixed. For example, a government can initiate a participation campaign for a specific project and in a specific period of time to involve stakeholders about significant decisions concerning their communities. Whether solicited or spontaneous, the purpose of stakeholders' participation is to collect and analyze data in a way that it would bring a benefit to a given decision-making process, whatever its complexity. Hence, organizations should ensure that, the collected data is well understood to help provide decision-makers with the right information for an informed decision-making. This information has to be relevant in terms of usability, accuracy, accessibility, completeness and understandability, and should be provided timely (Marzouki et al., 2022). Moreover, this information should be related to stakeholders' daily problems and priorities and depict their collective goals and intentions (Bohman, 2014) and could be therefore considered as a reliable source to understand their living contexts.

2.2.2. Context and Contextualization in Stakeholders' Participation

2.2.2.1. The living context in SPPs

The living context is defined in (Bonson et al., 2015) as "*the information about local issues, the topics related to everyday life*" and *"the information relevant to individual stakeholder*" that "*directly affect stakeholders' lives*". It has to be considered to better respond to stakeholders' requests in a participation process. The analysis of stakeholder participation in local governments showed that there is "*a demand from the citizens' side to more effective communication about topics related to everyday life in their municipalities*" (Bonson et al., 2015, p.59). Indeed, the information about the living context (local issues, topics related to

everyday life) and the information relevant for the stakeholder are considered as the most important communication needs in stakeholders' participation (Johannessen et al., 2012). When topics discussed are "*distant from people's daily problems and priorities*" (Charalabidis et al., 2010, p.2), a SPP becomes limited and is below the initial expectations of organizations. This is consistent with the findings of (Veronesi & Keasey, 2015; Marzouki et al., 2022) stipulating that projects and policies emphasizing the importance of capturing context-specific contingencies, as driven by stakeholders' voices, can be more effectively implemented when room for interpretation and discretion is given to stakeholders. Thus, stakeholders and decision-makers need to be aware and share a common understanding of their living-contexts to ensure effectiveness in decision-making. This context awareness has the potential to improve problem solving processes, leading to a more effective implementation of projects and policies. However, the context is continuously changing and evolving over time. What is a collective need or priority for stakeholders today may change, evolve or no longer be a need or a priority in the medium or long term (Lafrance et al., 2019). Thus, stakeholders as well as decision-makers should be able to capture this change and to update their understanding to adequately meet the evolving needs of their communities.

2.2.2.2. Semantic, Spatial and Temporal Contextualization in SPPs

The idea of contextualization aims to make explicit the living context that stakeholders' express implicitly in SPPs. Three dimensions could characterize the living context: semantic, space and time. First, the spatial dimension is very important to consider when we retrieve the living context in SPPs since more than 80% of participation data has a geospatial reference (Lafrance et al., 2019; Franklin & Hane 1992). The spatial dimension answers the question "where". In this sense, the spatial dimension provides an intuitive way to represent objects or events in a geographic space, allowing, among other things, the localization and the visualization of these objects or events. Objects with spatial dimension can be elements of our environment, such as natural geography objects (e.g. lands, vegetation, water, etc.) or human geography objects (e.g. roads, buildings, places, points of interest, etc.). Spatial dimension is often connected to the temporal dimension because spatial issues may change over time: "information on space-time changes can be an important asset for a successful SP" (Lafrance et al., 2019, p.1). Space and time are interconnected and depend on each other, and

together they make the spatio-temporal dimension (Andrienko et al., 2010). Hence, the second dimension to be considered in the living context is time.

Time is defined as the indefinite continued progress of existence and events in the past, present, and future (Oxford, 2011). The temporal dimension answers the question "when" (Lafrance et al., 2019). Time may be represented and measured in seconds, minutes, hours, days, weeks and so on. Time can also be linear or a cyclic sequence (Andrienko et al., 2010; Zhen et al., 2016). Cyclic refers to iterations of events, such as the seasons (Andrienko et al., 2010; Zhen et al., 2016). The temporal dimension can be viewed as composed of two primitives: time points and time intervals (Andrienko et al., 2010). A time point is an instant in time, and in contrast, a time interval is a temporal primitive with an extent. Beside spatial and temporal dimensions, there is also the semantic dimension.

The semantic dimension represents the meanings of the information that stakeholders give when they express their opinions during SPPs (Meersman, 1997). The semantic dimension answers the question "what are we discussing"? Combined with spatial and temporal dimensions, the semantic dimension generally refers to a theme or a topic to identify and describe concerns that can be spatially located (e.g. district, building, department, city etc.) and that may evolve over time. The theme can for example represent human related concerns, such as social, political, demographical, or environmental concerns. Adding the semantic dimension to spatial and temporal dimensions brings a sense to what is discussed, making it more meaningful and improves the understanding of the stakeholders' living context (Budak et al., 2006, Kuhn, 2003).

2.2.2.3. Semantic, spatial and temporal analysis in the literature

Semantic, spatial and temporal dimensions have been studied and apprehended in different ways in several disciplines such as geomatics, linguistics or computer science. Hereafter, we briefly present relevant literature about semantic, spatial and temporal dimensions analysis in order to consolidate the theoretical foundation of our research. Based on this literature, we present then our theoretical framework of semantic, spatial and temporal SPPs data contextualization.

Semantic analysis in the literature: The semantic analysis of data consists in applying techniques and algorithms to depict topics from data. In computer science, most of semantic analysis methods apply algorithms based on machine learning and statistical techniques. For

example, the use of unsupervised learning such as clustering algorithms to automatically detect topics within data (Teufl et al., 2011; Teufl et al., 2009). Besides unsupervised learning techniques, semantic patterns can also be used to better interpret the data by, for example, extracting terms (nouns, adjectives and verbs) from data and store them as nodes within a semantic network. Then, relations between terms can be represented. In this research, we aim to augment the foundation of existing techniques by identifying further semantic patterns in data to characterize the living contexts of stakeholders in SPPs comments.

Spatial analysis in the literature: We observe that there is no consensus on a given categorization of spatial entities in the literature (Aurnague et al., 2007). In general, we distinguish between two main spatial concepts: *objects* and *places* (Aurnague et al., 2007; Acedo et al., 2018). Objects are "*isolated material areas*" that do not identify portions of space; it indicates the function of the object rather than its location (Aurnague et al., 2007; Aurnague et al., 2010). For example, a wall is an object. On the other hand, places are entities fulfilling a localization function (Borillo, 1999; Acedo et al., 2018). They are "purely spatial entities" that can be determined through their contours by means of spatial coordinates (Casati & Varzi, 1999). For example, a city is a place. The concept of *place* is based on the existence of a frame of reference that is a context or a point of view (Batty et al., 2012). A frame of reference is defined as a "set of entities – places – endowed with spatial relationships that characterize their relative fixity during a given period and such that each determines an associated portion of space" (Aurnague et al., 2010). Frames of reference help to identify spatial entities since places are characterized by their stability or fixity (in a given period) within an appropriate frame of reference or by portions of space in which target entities can be located (Aurnague et al., 2004; Borillo, 1999). In this study, we limit the identification of spatial patterns in SPPs data to places or entities fulfilling a localization function.

Temporal analysis in the literature: Several lenses can be adopted to analyze temporality in texts (Battistelli, 2009). According to (Battistelli et al., 2006), "what happens psychologically in the case of time is the construction of a serial representation of events, processes and episodes ordered and/or anchored on the real time axis, on time axes in the future or on imaginary alternatives to the real time axis". To perform this representation, means are needed to identify the related time axis and then to locate a moment, an interval or an event.

Two main temporal concepts can be considered to analyze temporality in texts: "the levels of analysis and representation" and "the temporal orders" (Battistelli, 2009; Battistelli et al., 2006). Temporality in texts is understood at two main levels of analysis and representation: the first level refers to the task of anchoring temporal expressions (also called calendar expressions) in a calendar system (relating to "dates" or "durations"); while the second refers to the task of calculating the temporal ordering of events in a text (Battistelli, 2009). Regarding the concept of temporal orders, four major orders exist for the apprehension of time in texts that are: modal, temporal, aspectual and enunciative orders (Battistelli, 2009). Each of these orders asks the following questions:

- Modal order: Is the content in the text presented as certain, possible, imaginary, etc.?
- Aspectual order: Is the content presented as in progress or on the contrary as fully realized?
- Enunciative order: Who is speaking? Or who is presented as supporting such content?
- Temporal order: Is the content located in present, past, future time? What are its temporal coordinates?

Since we will analyze individual participation comments in this research, we will apply the first level of analysis and representation of temporal expressions. To this end, we will identify and classify temporal patterns, mainly "temporal expressions" existing in SP data with the aim to highlight the temporal dimension of stakeholders' living context. Moreover, we will determine which temporal order (fourth order) enable to apprehend the temporal dimension in textual SPP data.

Theoretical framework – Semantic, spatial and temporal SPPs data contextualization

We present in **Figure 2.1.** the theoretical framework of SPPs data contextualization that will be used in this paper. Our theoretical framework suggests that SPPs data might be endowed with semantic, spatial and temporal dimensions and if these dimensions are identified, it would offer a better understanding of the living contexts of stakeholders.
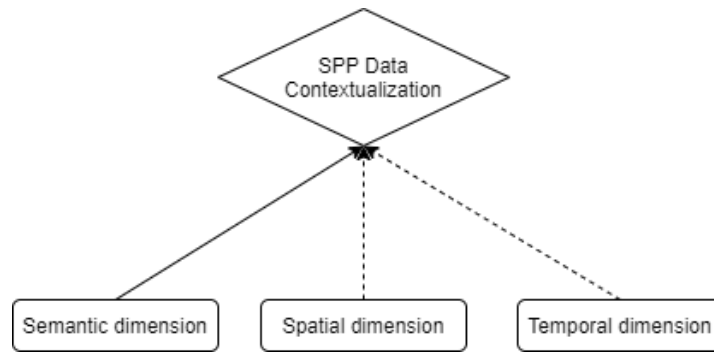
Figure 2.1. Theoretical framework – Semantic, spatial and temporal SPP data contextualization

In this framework, we consider that spatial and temporal dimensions are not mandatory (dotted lines). In fact, a stakeholder might not refer to spatial neither to temporal information in a SP comment. However, the semantic dimension is mandatory since a SP comment has necessarily a meaning to provide. In other words, a SP comment can address a topic without as much addressing spatial and/or temporal information while a SP comment cannot address spatial and / or temporal information without addressing a topic.

2.3. Research Design, Methodology and Implementation

The literature pointed to several studies related to SP focusing on different elements of participatory processes such as tools, engaging strategies, etc. (Porwol et al., 2018; Janssen & Helbig, 2018). However, there is still a need for studies to inform how to take advantage from SPPs data (Lafrance et al., 2019). Given this gap in the literature, the main research question of this paper is: *How to identify stakeholders' living contexts in SPPs and what patterns do stakeholders implicitly use to represent this context in SPP data?* To answer this research question, we will base our work on four different cases of SPPs in two different countries. This work will identify and categorize semantic, spatial and temporal patterns that stakeholders use to represent their living contexts through their SPP comments. A pattern in natural language corpus analysis is defined as a regular and repeated using of words and their synonyms in "*a way of deciding*" that the usage of these words and their synonyms count as "*a lexical meaning distinction*" (Hanks, 2004). The patterns identified in this study are a regular and repeated way of using words or their synonyms that is formulated in a SPP comment.

2.3.1. Methodology

This research adopts a qualitative approach. Specifically, we adopt a multiple-cases design strategy. A case study "*examines a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities (people, groups, or organizations). The boundaries of the phenomena are not clearly evident at the outset of the research and no experimental control or manipulation is used*." (Benbassat et al., 1987, p. 370). This research strategy is well aligned with our research objective. First, the use of a multi-case design is appropriate when a phenomenon is examined in a natural setting which is the case of our research. The data collected through the four cases is a naturally occurring data, where the four processes of participation took place in their natural settings. Second, as new forms of SPPs are emerging and considered as *contemporary phenomenon* (Benbassat et al., 1987), a qualitative approach is appropriate since it allows better flexibility to explore the phenomenon under analysis allowing to adjust the whole data collection and analysis process (Miles et al., 2013).

2.3.2. Data collection

Data collection depends on the research questions and the unit of analysis (Benbassat et al., 1987). Multiple data collection methods are typically employed in research case studies. In this research, we explored four cases and we diversified the data collection methods. The collected data is a set of comments stated by stakeholders in four different SPPs with the intention to participate and to bring an opinion that would influence a decision.

The first case study (case 1) consists of a SPP for the strategic planning that was carried out in a public university between November 2017 and February 2018. The second case study (case 2) is a SPP that was held between 2015 and 2016 for the construction of a public square in a district in Canada. The third case study (case 3) concerns an SPP aiming to collect citizens' comments about a public collective transport company's service. The data was collected between March 2017 and April 2017. Finally, the fourth case (case 4) is an SPP aiming to collect citizens' comments about their city where the data was collected between January 2017 and December 2017. The three first cases took place in Canada while the fourth one was in Tunisia. The two first cases (cases 1 and 2) are solicited SPPs and the two last one (cases 3 and 4) are spontaneous SPPs. The collected data comes from four different sources: recorded and transcribed data, online form data; a participation platform data; Twitter data and Facebook data (see Appendix 2.A). As our research objective is to study

SPP data which consists of a set of comments provided by stakeholders, our unit of analysis is an expression in an individual SP comment.

2.3.3. Data Analysis

2.2.3.1 Data Analysis Process

Following the data collection, we proceeded with the data analysis. Two major iterations of data analysis were performed. In the first iteration, we analysed the collected data of each case study. We applied a structured multi-steps approach that enabled a constant comparison between the data and the emergent concepts (Corbett & Mellouli, 2017). Hereafter, we present the different steps of our approach. For the first case, we followed an a priori approach for data analysis (Ryan & Bernard, 2003) that we aligned with the three dimensions of our theoretical framework. First, for each dimension, we adopted an open coding approach which required a deep reading of the primary data to instill the data and to depict and understand the underlying concepts. Then, we conducted an axial coding to reveal relationships between first order concepts and second order concepts for each dimension (see Table 2.1.). For each individual SP comment, we chose expressions as our unit of analysis to perform the coding; each expression in an individual participation comment that contained a pattern was added as an occurrence of that pattern. Finally, for the cases 2-3-4, we adopted an open coding approach with "Metacoding". Metacoding examines the relationship among a priori themes (already identified in open and axial coding of case 1) to discover potentially new themes and overarching meta-themes (Ryan & Bernard, 2003). For each data unit, we looked at which patterns were identified and which ones are emerging. Doing so, we were able to observe points of similarities and differences between the four cases.

In the second iteration, we reviewed all the emerging patterns from the first iteration with regard to the relevant literature on semantic, temporal and spatial analysis. This second iteration aimed to find out whether there were patterns or models of patterns in the literature that are similar to those identified during the first iteration, in order to align the empirical results of our research with the existing models in the literature (Urquhart et al., 2010). Only temporal patterns were adapted following the model of (Battistelli, 2009) that proposed a model of four calendar expressions, which are similar to most of (5 out of 6) the temporal patterns we identified in data (see Appendix 2.D). Indeed, 5 out of the 6 temporal patterns that we identified following the data analysis are similar to the calendar expressions of

(Battistelli, 2009) (see appendix 2.C). From these 5 patterns, 2 are subcategories of the same pattern of the model of (Battistelli, 2009), and the three others are similar to the other 3 patterns of the model of (Battistelli, 2009). For semantic and spatial dimensions no similar patterns were found in literature.

2.2.3.2 Data Coding

Data coding was conducted combining different techniques as recommended by (Ryan & Bernard, 2003), mainly "repetitions", "word-synonyms co-occurrence" and "similarities and differences". The "repetitions" technique identifies expressions that "*occur and reoccur*" in SPPs comments (Ryan & Bernard, 2003). "Word synonyms co-occurrence" identifies expressions that are "*equivalent*" (Ryan & Bernard, 2003) (synonyms) to other expressions and that can be classified in the same categories. "Similarities and differences" technique is a "*constant comparison technique*" that involves searching for similarities and differences by making systematic comparisons across units of data and cases (Ryan & Bernard, 2003).

In the first iteration, we interrogated the data using two 'seed' (Urquhart et al., 2010) questions: what are the patterns used by stakeholders to identify their living contexts? And do the identified patterns depend on the used tools (traditional or online)? The second question is mainly related to the data collected from the first case study where recorded and transcribed data come from a traditional (on-site) consultation and not from an online platform. Data coding was conducted following an iterative process of validation between the authors. The iterative process enabled refining our understanding of the identified patterns. We looked for expressions and meanings units that fit the pre-defined dimensions: semantic, spatial and temporal. Starting with case 1, we used open coding where we applied the techniques of "repetitions" and "word synonyms co-occurrence" to identify patterns (see **Table 2.1**.). Then, we applied an axial coding to build second order themes and evaluate patterns and their relationships. For cases 2, 3, and 4, we not only applied the same open coding strategy used for case 1 but we also applied the third technique of "similarities and differences" to compare data units of the four cases. We carried out all the coding processes iteratively, by looking back to the case (s) to validate the outcomes of the process. The results of the coding process are presented in **Table 2.1.**

Table 2.1. Data structure: Semantic, spatial and temporal patterns in SPP data

1st order concept	2nd order concept

Semantic dimension	
There is a glaring lack of, there is no initiative for, the obstacles we see, it worries me that there isn't, which poses a problem of	Issue
I think it would be interesting to, I make a proposal for, I would like to know if you would be ready, it will be interesting to ask, I think put more of, prove and listen to them, Let's decrease the speed	Suggestion
I experienced this more than 20 years ago, We experience this everyday here, for having lived it for 2 years, this is my third year here,	Lived experience
in 20 programs, at 30 km / h, 300 employees, law project 21, $ 1 million, The 9-meter rule, 36 buildings	Number/metric
United Nations, The Arctic council , The government of Quebec, World Health Organization, SPVM	Governing entity
Peter Simons, princess Lalla, Alexandre Tailleferre, Trump, Professor Sarah Woodruff	Reference
When will ? Why ? where is?	Question
Bravo to the driver who kept her smile and was very patient, Thanks once again to the authorities for their responsiveness,	Compliment
I am attaching a small text which appeared recently in, http://dailynews.mcmaster.ca/ smoke-free-campus-faq/, I attach the document presented	Attached link/document (online only)
#worstsubwayever #polmtl #Transports #vivemtl #heuresdepointe #lignebleu #ariana #winou_etrottoir #Abaslacorruption #Urgent #corruption #douanetunisienne	Hashtag (online only)
@stminfo @stm_Orange@stminfo @CAA_Quebec @stm_nouvelles @stminfo @JourdelaTerreQc @SPVM @tvanouvelles	Tag_mention (online only)
😳 😂 😳 👍	Emoticon
Spatial Dimension	
Senegal, Montreal, Maroc, Boston, France, Chad, City of Quebec, Cameroon,	Cities, Province and Countries
UQTR, USherbrook, Mc Master University, Western University	Similar organization with defined position
Institute EDS, Roger Van Den Hende botanical garden, PEPS, the department of Geography, Archeology and Anthropology	Internal entity with defined position
St-Louis-de-Gonzague college and Nazareth, The Musuem of Civilization	External entity with defined position
West African countries, the organic community garden, North America, In the north	Spatial entity with approximated position
A 'mini-plant' for anaerobic digestion on campus, an outdoor ice rink which would be located between the De Koninck and Pouliot pavilions, places where we can make "power naps"	Spatial entity hypothetical position
#ariana #sfax #menzah5 #communedelamarsa #kantaoui #tunis #zoo_tunis #parc_belvedere #municipalitédetunis #montreal	Spatial entity in hashtags (online only)
Ville de Quebec, Montreal, Gatineau, Gare de Vaudreuil	Spatial entity through location Stamp

	(online only)
Temporal dimension	
In september 2018, in january 2018, in 2020, by 2030, by 2050,	Future temporal expression
Since 1988, during fall 2015, during spring 2016, since january 2011, in 1999-2000, since 2004	Past temporal expression
in the next 3-4 years, for almost 30 years, last year, 4 years ago	Temporal expression depending on the comment date
In 2017 ... later, In January 2016 ... two months later, In 2014 .. 3 years before,	Temporal expression depending on another temporal expression in the comment
Since the second world war	Temporal expression recognized around the world
#8mars, #2030	Temporal expression in hashtags (online only)

2.4. Research Findings

The research question of this study is*: How to identify stakeholders' living contexts in SPPs and what patterns do stakeholders implicitly use to represent this context in SPP data?* To answer this research question, we focus on semantic, spatial and temporal patterns that stakeholders use to share some properties of their living contexts. As depicted in **Figure 2.2**, we identified 26 patterns following our semantic, spatial and temporal analysis of SPPs comments (see Tables 2.B.1-2.B.6 in Appendix 2.B). As the collected data is from both online and offline participation processes, we observed that some patterns are specific only to online participation while all the other patterns are independent of the mean used to participate. In the next subsections, we present and explain the final patterns identified for each dimension.
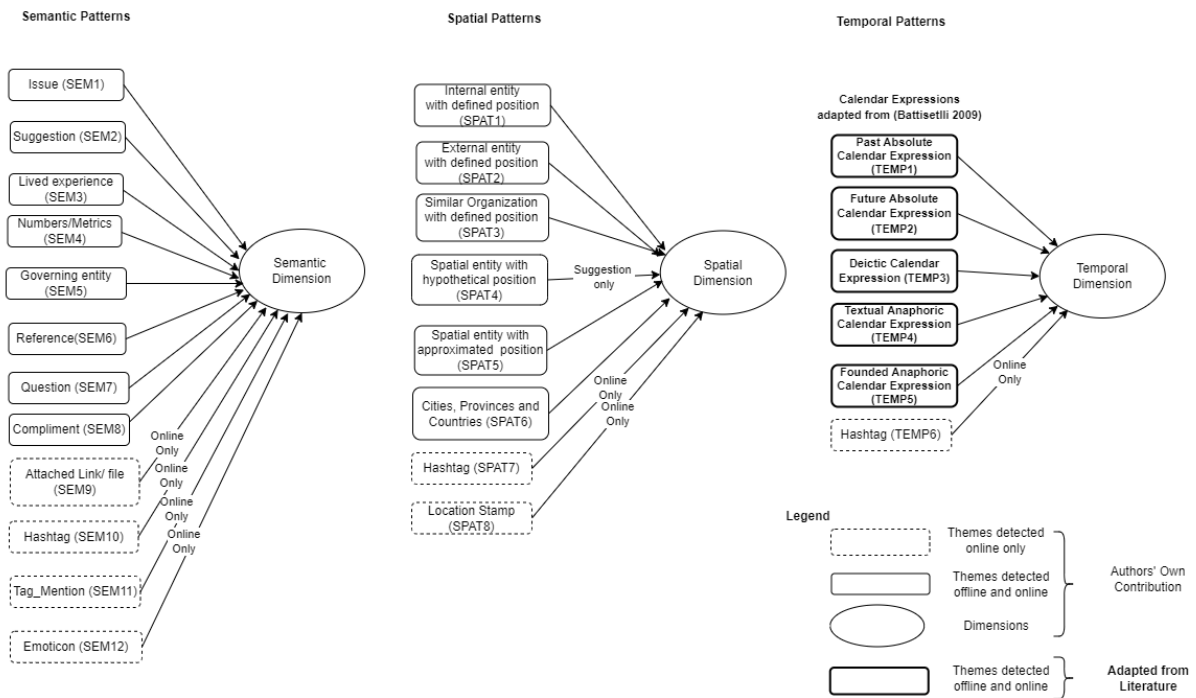
Figure 2.2. Semantic, spatial and temporal patterns in SPP data

2.4.1. Semantic patterns in SPP data

Our qualitative analysis of SPPs data allowed us to identify twelve semantic patterns that are: "issues (SEM1)", "suggestions (SEM2)", "lived experiences (SEM3)", "numbers/metrics" (SEM4), "governing entities (SEM5)", "references (SEM6)", "questions (SEM7)", "compliments (SEM8)", "attached link/file(SEM9)", "hashtag (SEM10)", "tag_mention (SEM11)" and "emoticon (SEM12)". For instance, a participation comment could contain only one semantic pattern, or combine several semantic patterns. For example, the following comment from case 1 has one semantic pattern, "suggestion (SEM2)": "*I am making a proposal that ethics and sustainable development courses be more widely taught in engineering programs*" (case 1). However the following comment combines two semantic patterns: "issue (SEM1)" and "number/metrics (SEM4)": "*A park bench with a piano that costs $20 000, an amount close to the average salary of a citizen, it's quite extravagant and bourgeois*". (case 2)

As shown in Tables 2.B.1 and 2.B.2 (Appendix 2.B), we found twelve semantic patterns that participants use to semantically represent their *living context*s. We observe that some semantic patterns were used more frequently than others. These patterns are "issue (SEM1)" that has been found in more than 52% of the comments, "suggestion (SEM2)" in more than

38% of the comments and "lived experience (SEM3)" in more than 19% of the analyzed comments.

We observe that when stakeholders express issues (SEM1), they generally use negative expressions such as for example "*the obstacles we see", "it worries me that", "there is no initiative for", "which poses a problem*" (cases 2 and 3). An issue is something that the stakeholders are aware of and that is specific to their specific environments. On the other hand, we observe that when stakeholders make suggestions, they usually use expressions such as "I suggest, I make the proposal to, Let's do etc." (cases 1 and 2). A suggestion (SEM2) is an idea or a plan to be considered. It implies a certain fact or situation that a stakeholder wishes to achieve. A suggestion can be brief or developed through arguments that are often important to consider because they reflect some properties of the stakeholders' living contexts. In the following, we present two suggestions in the same topic with different levels of specificity (brief and developed):

"I suggest building a place conducive to gatherings!" (Case 2) or "*With a local population involved and interested in its neighborhood, it would be important for [organisation case 2] to offer its citizens a multifunctional public space that resembles them. I make the proposal to put in place a unifying public place for people from the neighborhood or elsewhere.*" (Case 2). Finally, stakeholders refer to stories or lived experience (SEM3) that relates to the topic they discuss to argue the relevance of their opinions. Participants use specific expressions to share a lived experience such as: "*I experienced this", "for having lived it*" (cases 1 and 4). Besides the three most cited patterns, we present hereafter the other patterns:

- Participants can share "numbers/metrics (SEM4)" to quantitatively argue their opinion. Numbers/metrics are used often to show a critical situation (e.g., "*Tunisians throw away a billion plastic bags annually. It is an ecological disaster in good and due form. The other 700,000,000 bags are distributed by various other economic operators including municipal and central markets*") or to make a specific suggestion (e.g., "*Let's reduce the maximum speed to 30 km / h*" (Case1).

- Participants can also share "references (SEM6)" or "governing entities (SEM5)". A "reference" is a pattern that is defined as an "article, initiative, author, celebrity, public figure or a program that is evoked in a participation comment and to which one can refer either by a name or by an abbreviation". "Governing entities" are

incorporated or unincorporated association, committees, persons or any other entity that has authority to which stakeholders refer in their comments. Stakeholders can also ask questions ("questions (SEM7)") to acquire a knowledge about their living context or to make suggestions.

- Participants can make compliments ("compliments (SEM8)") to express their satisfaction with regard to decisions or actions taken by their decision-makers in their living context.Finally, from all the identified patters, we found that there are four semantic patterns that were specific to online comments and not to offline comments. These patterns are "attached link/file(SEM9)", "Tag_mention(SEM11)", a "hashtag (SEM10)" with a meaningful insight or an "emoticon (SEM12)" to express an emotion. These patterns are considered as semantic since their use enhances the meaning of the comment and could contribute to understand the living contexts. Links or files can contain relevant information related to the topic discussed in the SPPs comment and to the living contexts of stakeholders. "Tags" and "hashtags" are generally used in participation through social media channels (Potnis & Tahamtan, 2021). A tag_mention is a label to engage an individual, organization or any entity with a social profile when they mention them in a post or a comment (Potnis & Tahamtan, 2021). So, a tag in a SPPs comment refers to an individual or to an organization that stakeholders consider as relevant in their living contexts. A hashtag is a feature provided by social media channels enabling to highlight keywords of topics within a comment (Potnis & Tahamtan, 2021). An emoticon is a symbolic expression that stakeholders use to symbolize a facial expression, an emotion or an attitude (Cheikh-Ammar, 2018). It is a small icon composed of punctuation characters.

2.4.2. Spatial patterns in SPP data

As shown in Tables 2.B.3 and 2.B.4 in Appendix 2.B, we identified eight spatial patterns that participants use implicitly to identify their living contexts: "external spatial entity with a defined position (SPAT1)", "internal spatial entity with a defined position (SPAT2)", "similar spatial entities with defined positions (SPAT3)", "Internal spatial entity with a hypothetical position (SPAT4)", "spatial entity with an approximated position (SPAT5)",

"cities, Provinces and countries (SPAT6)", "spatial entity in a hashtag (SPAT7)", and "spatial entity through a location stamp (SPAT8)".

We observe that some spatial patterns were used more frequently than others. These patterns are "internal entity with defined position (SPAT1)" that has been found in more than 46% of the comments, "external entity with defined position (SPAT2)" in more than 15% of the comments and "spatial entity with approximated position" (SPAT5)" in more than 14% of the comments.

As stated in the theoretical background section, spatial pattern are places or entities fulfilling a localization function (Casati & Varzi, 1999). Spatial entities (SE) with defined position (DP) are places with a specific location (Aurnague et al., 2007). They are entities fulfilling a localization function (occupy a position) (Aurnague et al., 2007). These entities can be determined through their contours by means of coordinates (Casati & Varzi, 1999) where stakeholders give a very precise indication about the place. These patterns have been categorized according to the "frame of reference" of each organization of each case: internal, external or similar to each organization. This explains why the second order theme "Spatial entity with defined position" (see Table 2.B.2.) has been split into three separate categories of SE with DP: internal (SPAT1), external (SPAT2) and similar organization (SPAT3). For example, for SPAT1, if the organization is a city, then internal SE with DP are all the spatial entities within the frame of reference of the city such as districts, parks, or streets (see examples Tables 2.B.3 and 2.B.4 in Appendix 2.B). The external SE with a DP (SPAT2) are anchored outside the frame of reference of the organization. They are all spatial entities with a defined position that do not belong to the frame of reference of the organization. As examples for a city, we mention parks or districts that are outside the city. Finally, a similar SE with a DP (SPAT3) is of the same type as the organization interested in the SPPs; if the organization is a city then a SPAT3 would be another city. Our analysis indicates that generally stakeholders refer to similar organizations to make a comparison or to give an example or to propose a project.

Internal SE with a hypothetical position (SPAT4) are spatial entities that don't exist, but stakeholders indicate a specific position that they might occupy in the future. For example, a

stakeholder stated: "*I suggest setting up <u>a public square at the corner of Canardière and 4th avenue</u>*" (case 2). In this case, the public square doesn't exist but the streets exist.

SE with an approximated position (SPAT5) are places to which stakeholders do not give very specific indication about the location. For example, "*the organic community garden*" in the following example is an SE with approximated position: "*These fertilizers can be used in the <u>organic community garden</u>*" (case 1).

In fact, there are many organic community gardens inside and outside the organization which requires further examination to locate the garden that the stakeholder was pointing to.

Stakeholders also refer to cities, provinces and countries through their participation. These three types of spatial entities are grouped into the category of "cities, provinces and countries (SPAT6)". Eventually if the organization concerned with the SPP is a city, other cities would be "similar cities SPAT3 instead of SPAT6".

Finally, we found that two spatial patterns are specific to online participation that are "spatial entity in a hashtag (SPAT7)", and "spatial entity through a location stamp (SPAT8)". In fact, stakeholders might use patterns such as "*location stamp*" to identify a location or "*a hashtag*" to refer to a specific location. These two online patterns are enabled through features provided by social media channels to share spatial locations or coordinates. Indeed, it is important to underline that these two *online* patterns can contain the same spatial information that we can find in other spatial patterns, specifically those with defined position (e.g. city, internal SE with DP etc.). The only difference is in the way of representation of the information through the features provided by the used participation tools.

2.4.3. Temporal patterns in SPP data

Following our analysis of SPPs data (Battistelli et al., 2006), we identified six temporal patterns: "future absolute CE (TEMP1)" "past absolute CE (TEMP2)", "deictic CE (TEMP3)", "textual anaphoric CE (TEMP4)", "founded anaphoric CE (TEMP5)", and "temporal hashtag (TEMP6)" (see Tables 2.B.5 and 2.B.6 in Appendix 2.B). We observe that some temporal patterns were used more frequently than others. These patterns are "deictic calendar expression (TEMP3)" that has been found in more than 19% of the analyzed comments and "past absolute calendar expression (TEMP1)" in more than 12% in the

comments. As emphasized in section 2.3.1, five out of the six temporal patterns that we detected in SP data are similar to the four main types of calendar expressions presented in (Battistelli, 2009) which are: absolute CE, deictic CE, textual anaphoric CE and founded anaphoric CE. In Appendix C, we explain how we adapted the model to emerge temporal patterns that are specific to SP data.

Thus, in our final model of temporal patterns, we augmented the absolute CE by two patterns "past absolute" and "future absolute" and we added "the temporal hashtag" pattern. Hereafter we explain each of the temporal patterns.

Future absolute CE is an important information in SPPs since decision-making processes may be concerned with projects or policies to be implemented in the future. For example, we have the following comment: "*The [organization case 1] would offer the passes at a lower cost and, since it is about sustainable development, [organization case 1] could write off that expense in this fund. Could this offer a trial for a year starting in <u>September 2018?</u>*" (Case 1). In this comment, "*year starting in <u>September 2018" is</u>* a future absolute CE. Either with specific suggestions about projects to be implemented in future, or by highlighting relevant predictions/forecasts related to the subject discussed, future absolute CE reflect the expectation of stakeholders' about their living context in the future.

"Past absolute CE" refers to an absolute date or a duration in the past. This temporal information is significant since stakeholders may try to point to a specific period in the past where events, decisions or projects have taken place. Usually, these events, decisions or projects are worth to know and to take in consideration in the ongoing decision-making process. Let's consider the following comment: "*A savage deforestation that has lasted since 2011 in the total indifference of the forest services to clear land and concrete it to the maximum despite the law and common sense, forever destroying ecosystems to cover with dust of cement, cypress, thyme and rosemary, wonderful flora with which nature has endowed what was a haven of peace. Let us affirm our solidarity and show our support to those like Nawaat who are part of the quest for the truth about the abuses which destroy all that we have most precious, our nature, our natural environment source of wealth and oxygen.*" (case 4). In this case, "*since 2011" is a "past absolute CE"*.

Deictic CE are temporal CE informing the date when a commentary was drafted. For example, a stakeholder asking the following question: "*We don't even count the number of outages on the orange line <u>since the start of the year</u> @stminfo, compensation for subscribers?*" (case 3). In this case, it becomes important to know the date when the commentary has been posted so that the organization can determine if actions need to be taken. This dceictic CE would be either a past absolute CE, which is the case in this example, or a future absolute CE.

A textual anaphoric CE pattern is used in comments telling a story and highlighting a succession of events where stakeholders for example share a living experience. Their identification depends on antecedent calendar expression that is identified earlier in the text or the comment. Just like deictic CE, they could be converted to past or future absolute CE and bring a similar added value in terms of temporal awareness for a decision-making process. Let us consider the following example where the textual anaphoric CE (3 years after) and its antecedent CE (in 2013) are outlined: "*there is an initiative that was launched **in 2013** at the time, among other things, of the rector and the leaders of the health establishments in the region which aimed to tackle so that promote partnerships with the communities have proposals unique so the idea was to say how can we be interested in research in health and social services other than by the strict end of the cure, or, of the molecule or, of the solution to a particular problem so uh It's not easy to broaden perspectives, but we were able to do so by organizing forums like this one, which brought together, 150 or 180 key people in health and social services research, health service delivery and social services as well, from the world of private research, then from the world of private companies involved in manufacturing. This process led to a common thread around which we should articulate our research efforts, namely the concept of sustainable health. <u>**3 years** **after**</u> the start of this initiative...my deep conviction is that it is possible to break the silos*". (Verbatim from case 1)

Founded anaphoric CE are based on the knowledge of the world. They can correspond to a specific "date" or "duration" but also to a more or less "fuzzy" date. For instance, a participant in case 1 refers to a founded anaphoric CE to warn the risk of making decisions

that date back to a certain outdated time: *" we shouldn't do a bit like <u>in the 1950s</u> with programs aimed at women and others aimed at men..."* (case 1)

Finally, temporal hashtags are specific to online participation tools. As for the semantic and the spatial dimensions, stakeholders use features provided by new technologies to share their temporal perception about their living context. In temporal hashtags, stakeholders can share any of the previous six temporal patterns identified in SP.

2.5. Research outcomes

Thus far, we presented 12 semantic patterns, 8 spatial patterns and 6 temporal patterns to identify the living context of stakeholders in SPPs data.

Following the axial analysis, continued questioning of our data led as to note relationships between semantic, spatial and temporal dimensions. Moreover, since we detected patterns that are specific to online participation (online only patterns) for the three dimensions, we note that information technologies could play an important role in highlighting the stakeholder's living contexts in SPPs.

Relationships between semantic, spatial and temporal dimensions

The first relationship between dimensions is **complementarity**. In our theoretical framework, we conceptualized semantic, spatial and temporal dimensions as three separate dimensions of the stakeholders' living contexts. Based on our interpretation of data, we came to understand that spatial and temporal patterns are used by stakeholders to complement the semantic patterns they provide. Therefore, spatial and temporal dimensions are complementary to the semantic dimension.

In fact, to give sense to their living context in their comments, stakeholders use semantic patterns. To be more specific about the information provided through the semantic patterns, they may provide spatial (e.g., spatial entities with defined position) and/or temporal information (e.g., future absolute calendar expressions). Indeed, 100% of the SPP comments analyzed have a semantic dimension providing at least one or more semantic patterns. More than 83% of these comments have at least a spatial pattern and 36% of these comments have at least a temporal pattern. However, 0% of the analyzed SPP comments have a spatial and/or a temporal dimension without providing a semantic pattern. Based on our findings, we note

that the identification of spatial and temporal patterns in SPP data must be directly related to semantic patterns. In other words, the identification of spatial entities (e.g., cities, similar organizations) and temporal expressions (e.g., future calendar expression, past calendar expression) in SPPs data without relating to semantic entities (e.g., issues, suggestions, compliments), would not bring an added value in understanding the living contexts of stakeholders from SPP data.

Second, we discovered that **correlations** can be detected between patterns of different dimensions. A correlation between patterns means a connection between two or more patterns[3] in a way that they occur together in a repeated manner in comments. Again, detected correlations are between the semantic dimension and other dimensions. Thus, correlation could be considered as a sub-relationship of complementarity.

For example, in some comments, we noted the co-occurrence of the following patterns in different comments: "Suggestion (SEM2)" and "Spatial entity with hypothetical position (SPAT4)", and "suggestion (SEM2)" and "Future absolute Calendar expression (TEMP2)". These correlations depict that in some cases, stakeholders who provide suggestions (SEM2), provide also hypothetical (SPAT4) locations or future dates in relation to the suggestion (TEMP2). For instance, the pattern "future absolute calendar expression (TEMP2)" has been found in 2% of the analyzed comments. In 60% of these comments, (SPAT4) was used with a suggestion (SEM2). In 40% of these comments, (TEMP2) was used with a suggestion (SEM2). As the frequency of future calendar expressions (TEMP2) is not very high in our data sample, the observation on the possibility of detecting such correlations between patterns is noted but could be further validated in future research. In Appendix 2.D, we present comments from different cases to emphasize the correlations detected between these patterns.

Based on our interpretation of these relationships, we note that the identification of spatial and temporal information in SPP data will be needed to help decision-makers complement their understanding about the living contexts. To fulfill this need, spatial and temporal dimensions should be identified and analyzed as complementary dimensions to the semantic dimension of the stakeholders' living contexts. This way, spatial and temporal dimensions

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[3] CORRELATION | meaning in the Cambridge English Dictionary

should help to locate in space and time, the semantic information that stakeholders provide in SPPs (input).

The role of information technology in highlighting stakeholders' living contexts

As emphasized in results, "online only" patterns have been detected for each dimension. In fact, online only patterns in SPP data are resulting from the use of IT-based participation tools. These participation tools provide several IT-features to users such as the possibility to attach a file in participation platforms, and the hashtag (#) and the tag (@) in social media platforms. Our interpretation of online only patterns included a comparison between online only and other patterns.

Our main observation is that an online only pattern can provide the same information as an offline pattern. It is only the way the information is presented in the data that differs (e.g., adding a hashtag, stamping a location instead of a simple text). Moreover, we remark that "online only" patterns are more observable or explicit than other patterns in SPP data since they are preceded by symbols or special characters.

For example, as emphasized in results, using a hashtag (online only pattern), a stakeholder could either provide a semantic information: e.g. an "issue (SEM1)", a temporal information e.g. "a future absolute calendar expression (TEMP2)" or a spatial information e.g. a "city (SPAT6)". By definition, hashtags aim to highlight keywords or topics within a text, e.g., to make them more explicit in data.

Another example is the "tag_mention (SEM11)" pattern. In SPPs, some stakeholders use this IT-feature to mention either a "reference (SEM6)" or a "governing entity (SEM5). However, when the participation is physical or when the tool used does not provide the "tag_mention" feature (for example "participation platform (case 2)"), we remarked that stakeholders just mention the "reference" or the "governing entity" in textual manner, which makes it less observable or explicit (or more implicit) in SPP data.

Similarly, for "location Stamp (SPAT8)", which is an online pattern that is provided by social media tools in our case studies. Location stamps enable to highlight in a more explicit manner spatial patterns that are often implicit in SP data (such as "internal SE with DP (SPAT1)" and "external SE with DP (SPAT2)". According to our analysis, we note that despite the abundance of spatial patterns in SP data, the use of "location stamps" by stakeholders is very

limited. Even when the participation tool allows to use a location stamp (e.g. social media channel), stakeholders textually mention places they wish to highlight, which makes their detection more difficult in textual data.

The analysis of online patterns vs offline-online patterns enabled us to note the importance of providing suitable IT-features that are sensitive to the semantic, spatial and temporal dimensions. For example, specific IT-features that enable to identify issues, spatial entities and temporal expressions would help stakeholders to more explicitly highlight and communicate important information about their living context to decision-makers in SPPs. Indeed, IT-features that are mainly provided by social networks should be extended to all other e-participation means. Based on our interpretation of the data, we note that IT could help to build the necessary capacities to automatically identify the stakeholder's living contexts in future SPP tools.

Hereafter, we present a conceptual model for the stakeholders' living contexts identification in SPPs. In this model, we suggest that the interrelated semantic, spatial and temporal dimensions, as well as IT, are central in highlighting the living contexts in SPPs. Moreover, we show the importance for decision-makers to capture and to understand the semantic, spatial and temporal patterns in SPP data in order to ensure a decision-making that is consistent with and responsive to stakeholders' living contexts.

A conceptual model for the stakeholders' living contexts identification in SPPs

For SPPs to be responsive to stakeholders' input, an understanding of their living contexts will be needed. As illustrated in **Figure 2.3.**, stakeholders provide inputs in SPPs with the aim to influence decision-making processes about significant choices affecting their communities, and consequently, to lead to better decisions (Marttunen et al., 2015). SPPs generate data that decision-makers have the challenge to analyze and to understand in order to help stakeholders achieve their communities' objectives (Aichholzer & Westholm 2009; Panopoulou et al., 2009). The concept of the stakeholders' living context, as illustrated in Figure 2.3., is at the core of SPP data. Drawing on our findings, we conceptualize the stakeholders' living context in SPP data as an adaptive collection of semantic, spatial and temporal patterns that are interrelated and whose identification and understanding holistically support decision-making, thereby enabling SPPs outcomes to be grounded in analyzing the

context closely (Bryson e tal., 2013). Within the process of identification and understanding of the living contexts, existing, and emerging technologies relevant to participation such as social media, participation platforms, among others, will play an important role in supporting SPPs data collection, analysis and representation (Corbett & Mellouli, 2017).

To further elaborate the role of the identification and the understanding of stakeholders' living contexts for generating effective SPPs outcomes, we emphasize the interactions that are needed between stakeholders and decision-makers through SPPs.

As described previously, SPPs represent the space in which stakeholders present their objectives and priorities that are embedded on their living contexts. As such, they require the collection of a broad range of data from stakeholders with a diversity of views and needs. Equipped with this data (output from SPPs), decision-makers can engage in a process of analysis and discussions of semantic, spatial and temporal patterns, which allows for more informed decisions, better definitions around projects and policies and the identification of the critical challenges for responding to stakeholders' living contexts. Semantic, spatial and temporal patterns provide not only a rich information to inform decision-makers but also support their capacity to build feedback about how decisions respond-to and impact stakeholders living contexts over time (Roche et al., 2012).

Here, information technology has an important role to play in supporting the living contexts' identification in SPPs. As emphasized previously, participation tools that are endowed with IT-features could considerably help in the process of identification and analysis of semantic, spatial and temporal patterns in SPP data. However, the use of IT is not an end in itself but a mean to achieve traditional participation goals (Marzouki et al., 2022). Existing and emergent technologies help to support the process of identification, analysis and representation of the living contexts' patterns in data. The concept of the living contexts within SPPs data remains central to SPPs whether stakeholders use IT-based or traditional participation tools. The challenge is in capturing and analyzing patterns of the living contexts from data, and IT has the potential to permit automatic capture, deep and detailed analysis and intuitive representation of these patterns (Corbett & Mellouli, 2017). This interpretation explains why IT is in dotted lines in our proposed model.
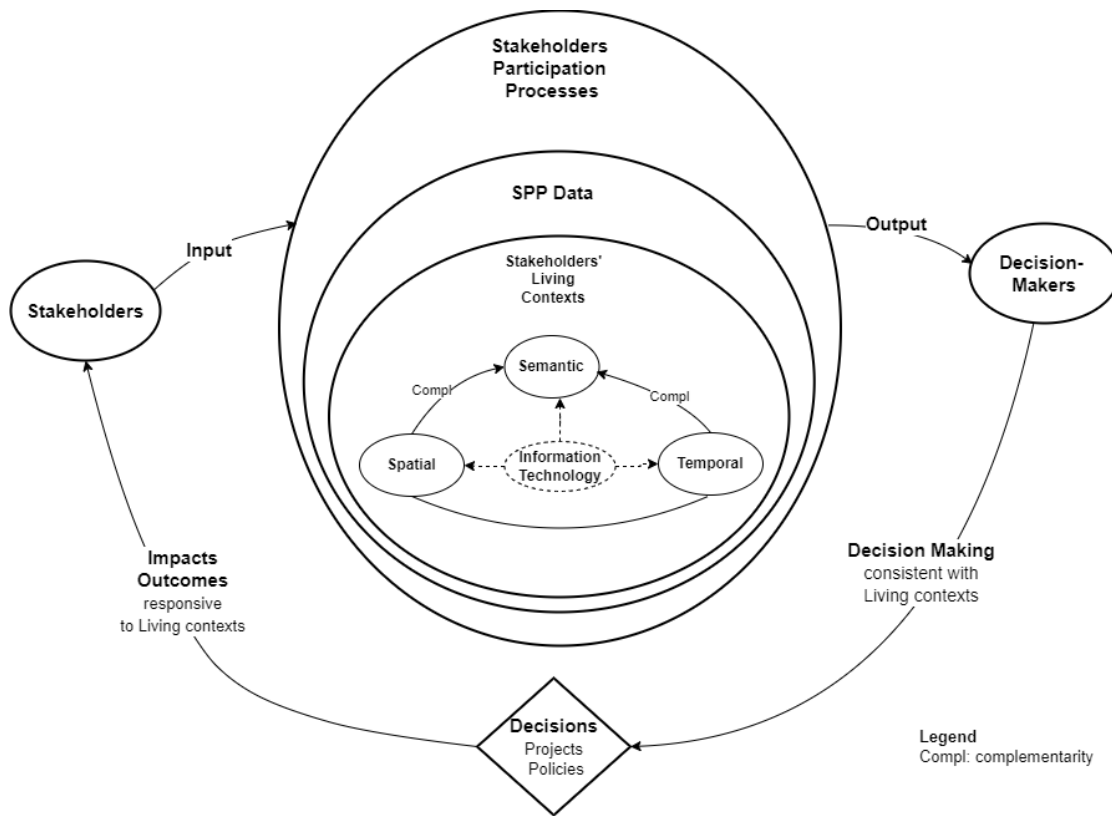
Figure 2.3. A conceptual model for decision-making based on the stakeholders' living contexts identification in SPPs

Based on our findings, we suggest that, to help stakeholders explicitly identify their living contexts and for decision-makers to better capture the living context, IT-based tools that are sensitive to the detection of semantic, spatial and temporal patterns will be needed. Moreover, better effort should be incurred to encourage stakeholders make-sense and appropriate IT-features in electronic tools (Cheikh-Ammar, 2018). Using innovative technologies, such as participatory GIS (Corbett & Mellouli, 2017), spatial and temporal patterns that are complementary to understanding the semantic patterns in SPPs data, would be valued. In addition, we suggest that other technologies including data analytics coupled with spatio-temporal visualization could allow for automatic identification of complementarities and correlations between patterns. Such technologies can support stakeholders' in explicitly identifying their living contexts and help decision-makers to better capture it, understand it and visualize it to ensure consistent and responsive decision making.

In order to ensure effective SPPs, purposeful interactions must occur between stakeholders and decisions makers. The identification and the understanding of the semantic, spatial and

temporal dimensions of the stakeholders' living contexts are at the core of these interactions. Through new context-sensitive technological capacities, organizations concerned with SPPs can make concrete progress toward building effective SPPs leading to smarter projects and policies implementation (Roche et al., 2012).

2.5. Discussion

With the goal to understand how stakeholders identify their living context in SP comments, we analyzed in this study data from four cases studies and we proposed an empirical model of semantic, spatial and temporal patterns. Following a qualitative approach, 26 final patterns emerged that we classified into 12 semantic patterns, 8 spatial patterns and 6 temporal patterns. Moreover, the relationships between dimensions as well as the role of information technology in highlighting these dimensions were emphasized. Drawing on these finding, a conceptual model of the stakeholders' living contexts identification in SPPs is proposed, presenting practical implications of our findings. The following theoretical implications arise from this study.

First, the semantic patterns identified in the empirical model are complementary to previous research. Previous semantic analysis in literature enables to categorize comments according to general topics based on "words" detection and classification (Teufl & Kraxberger, 2011; Teufl et al., 2009; Quillian, 1968). Our semantic analysis of SP data, uses "expressions" rather than "words" and proposes 12 semantic patterns that are complementary to topics' detection. Indeed, in addition to topics, we note that stakeholders identify "issues", "suggestions", "lived experiences", "governing entities" etc. that could be detected in SP comments to emphasize their living context. By detecting these semantic patterns, decision-makers can develop a better understanding of the context in which their stakeholders live, leading to smarter and more informed decisions. Indeed, the semantic patterns identified in this research demonstrates that the intelligence of organizations and cities could be enhanced through the stakeholders' identification of the different semantic patterns, to which spatial and temporal patterns bring a complementary view.

Second, we note that stakeholders identify "purely spatial entities" (Casati & Varzi, 1999) in SP comments to refer to their living contexts. We identified 8 spatial patterns that stakeholders use to identify their living contexts in SP comments. The identification of spatial

patterns in SP data requires determining the frame of reference which consists of the geographic location of the organization concerned with the SPP data (Aurnague et al., 2007; Aurnague et al., 2010). The frame of reference of the organization enable to locate the spatial entities detected in SP data and to endow them with spatial relationships that characterize their relative fixity during a given period. Our findings are consistent with previous research stipulating that frames of reference are fundamental to locate and to follow the evolution over time of spatial entities, to which, in our study, stakeholders refer while they identify their living contexts in SP data (Casati & Varzi, 1999). However, to the best of our knowledge, no previous research analyzed the spatial dimension and identified spatial patterns that stakeholders' use in their participation comments to share their sense of place. We believe that detecting spatial dimension, in combination and complementarity to semantic patterns will help decision-makers to develop their knowledge about stakeholders' relationship to places and sense of place (Acedo et al., 2018).

Third, with regard to the temporal analysis, our focus in this research was on the identification of temporal patterns that stakeholders use in SP data to temporally identify their living context. For that, we identified 6 temporal patterns that stakeholders use in SP comments to enable their anchoring in a time axis (or a calendar system). Our analysis aligns with the first level of temporal analysis highlighted by authors in (Battistelli et al., 2006) which consists of the identification of temporal expressions in texts. Nonetheless, the second level which consists of "calculating the temporal ordering of events in a text" (Battistelli et al., 2006) is considered as a perspective for future research.

Moreover, as emphasized in theoretical background, four temporal orders (modal, aspectual, enunciative and temporal) for the detection of time in texts are identified in literature (Battistelli et al., 2006). Following our temporal analysis of SP data, we note that the identification of temporal expressions in SP data is consistent with the "temporal order". The temporal order asks if the temporal content is located in present, past or future. The modal orders ask about the certainty of the content, which does not apply in SP since SP comments should be analyzed in an objective manner. The aspectual order considers the aspectual properties of the lexical level (verbs, nouns, objectives) and grammatical markers which is

out of the scope of our research. Finally, the enunciative order considers several interlocutors in text units which does not apply in our research since participation comments are individual. The findings of this study establish a fundamental ground to the identification of the stakeholders' living context from SPP data. The empirical model of semantic, spatial and temporal patterns as well as the conceptual model of the stakeholders' living contexts identification presented so far offer a better comprehension of the benefit that SPP data might outstand in understanding the living contexts of stakeholders.

Our findings have implications for both traditional and electronic participation since SP data is generated using both means. For traditional participation, qualitative analysis could be applied to detect semantic, spatial and temporal patterns from collected data. For e-participation, tools that are sensitive to the stakeholders' living context, e.g., providing IT-features to explicitly identify patterns, should also be developed in future. Moreover, our empirical model of patterns can be extended according to future needs. As there has been a growing interest in tools and methods based on the notion of space and place, in the last years, such as softGIS methods (Rantanen & Kahila, 2009; Kitta & Kahila, 2011) and volunteered geographic information (VGI) (Goodchild, 2007), the patterns identified in this research could be used to help decision-makers to develop a better qualitative understanding of social synergies in cities and organizations. Overall, our research aligns with recent studies demonstrating that the intelligence of an organization (e.g. a city) is related to its stakeholders (e.g. citizens) ability to understand and to share events or phenomena that characterize its internal dynamics and external relations (Acedo et al., 2018). Through the semantic, spatial and temporal patterns identified and classified in this research, this demonstration is now concrete and future research and tools may be based on the patterns to develop features to better capture the events and phenomena that stakeholders are living, and to enhance the intelligence and the responsiveness of decision-makers to stakeholders' living contexts (Goodchild, 2007; Rantanen & Kahila, 2009; Lussault, 2007).

2.6. Conclusion

In this research, we propose a model of semantic, spatial and temporal patterns for the identification of stakeholders' living contexts in SPPs data. Moreover, we present a conceptual model where we emphasize the relationship between the three dimensions of

patterns, the role of IT and the importance for decision-makers to capture these patterns in order to enhance their responsiveness to their stakeholders' living contexts. Notwithstanding its promising findings, this study has some limitations. The first limitation consists on not considering data from all participation tools such as emerging participative technologies e.g. Volunteered Geographic Information (VGI) and 3D sophisticated visualization platforms. The choice of the participation tools in this study was guided by the nature of the targeted data which is mainly textual and which was generated in a natural way. As sophisticated participation' tools are already endowed with spatial and temporal functionalities and IT features, these tools may push users to make sense and to appropriate these features and to probably generate patterns that are different from the patterns which are generated spontaneously in a simple textual way (e.g. maps, visualization features). For this reason, we have omitted to refer to this kind of tools since our objective was to understand the way the living context is naturally expressed by stakeholders in SP data. However, our results confirm the relevance of GIS-based tools and provide important knowledge to consider in the design and implementation of these tools in the future. Several avenues for future research arise from this study. First, future research could investigate the possibility to adapt existing artificial intelligence algorithms to automatically apply the semantic, spatial and temporal contextualization approach through automatic identification of patterns in SP data. According to Gartner's report on emerging technologies4, incorporating machine learning in particular enhances the decision-making process and provides valuable insights from large-scale data. Detecting semantic, spatial and temporal patterns through machine learning techniques could help capturing the living contexts form SP data and thus helping decision-makers make more effective decisions generating better outcomes and impacts. Thus, the finding of our research offers theoretical background for future participative technologies using artificial intelligence techniques. Second, future studies could be based on our finding that are derived from "naturally occurring SP data" analysis to evaluate emerging participative technologies such as VGI and 3D sophisticated visualization platforms and to

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http://www.gartner.com/document/3383817?ref=solrAll&refval=175496307&qid=34ddf525422cc7 1383ee22c858f2238a, Visited in 25/10/2016

determine how much these tools are representative of stakeholders living contexts based on semantic, spatial and temporal patterns (Roche et al., 2012). Third, future research could confirm frequency of patterns depending on the nature of the tool used (online, offline, social media, participation platform etc.) based on a larger amount of SP data. Knowing the frequency of patterns according to the participation tool would be helpful to identify relevant patterns for each participation tool. Finally, future research could focus on the detection of correlations between patterns with the aim to detect two or three-dimensional level patterns, depending on the patterns present in the SP data.

Appendix 2.A

Table 2.A.1. Case studies description

Case number	Case 1	Case 2	Case 3	Case 4
Organization type	University	District	Public collective transport company	City
Size	45000 students 7050 employees (including professors, teachers, other employees)	107 885 residents	32760 customers	2 426 000 habitants
Country/city	Canada/Québec	Canada/Québec	Canada/Montréal	Tunisia/Tunis
Nature of participation process	Participatory campaign for strategic planning	Citizen participation process concerning the construction of a public square	Customers participation about the company's services – Tweets	Citizen participation about their city – A FB page
Period in which comments were made	Between November 2017 and February 2018	Between 2015-2016	Between March 2017 and April 2017	Between January 2017 and December 2017
Nature of the participation process	Solicited	Solicited	Spontaneous	Spontaneous
Data collected	-Forums -Web form	-Participation dedicated platform	-Social media (Twitter)	-Social media (Facebook)
Overage size of a comment (by word)	-Forum: 273 words -Web Form: 171 words	33 words	25 words	63 words

Number of SP comments generated	Collected: -Forums: 156 (42540 word) -Web Form: 297 (50740 word) **Analyzed:** -Forums: 33 -Web Form: 29 **Total: 62**	Collected: 126 (4185 word) **Analyzed**: 70	Collected: 3587 Tweets (89600 word) **Analyzed**: 68	Collected: 791 (49941 word) **Analyzed**: 44
Collection techniques	-Recording -CSV file (provided by the university)	-CSV file (provided by the city)	-CSV file (Collected through Twitter API)	-CSV file (Collected through Facebook API)
Language	French	French	French	French

Appendix 2.B

Table 2.B.1. Semantic Patterns in both online and offline SP data

Semantic Pattern	Code name	Code meaning	Illustrative quotes
Issue	SEM1	An important topic or problem for debate or discussion	*"For student parents, the reality is often one of reconciling family, studies, work. The difficulties they encounter are varied, touching on scheduling conflicts, poverty, exhaustion, problems accessing child care"* (case 1) "*AGAIN! Metro: long outage of more than an hour on the orange line*" (Case 3) "*For your information, Tunisians throw away a billion plastic bags annually. It is an ecological disaster in its due form.*" (Case 4)
Suggestion	SEM2	An idea or plan put forward for consideration	"*I am making a proposal that ethics and sustainable development courses be more widely taught in engineering programs*" (Case 1) "*I suggest building a public square at the corner of Canardière and 4th avenue. It is already a public square but it is not frequented due to the lack of attraction*" (Case 2)
Lived experience	SEM3	A representation and understanding of human's experiences, choices, and options	"*We've been stuck for an hour and a quarter and our children are waiting*" (Case 3) "*Last summer, when we had a piano on 3rd Avenue (which I would love to see again this year too!), We could see people of all generations meeting there.*" (Case 2)
Numbers/ metrics	SEM4	A number or a measure of something.	"*Let's reduce the maximum speed to 30 km / h*" (Case1) "*Why is the service so slow to Côte-Vertu? 25 min to do 3 stations, and again stopped.*" (Case 3)

			"*A park bench with a piano that costs $ 20,000, an amount close to the average salary of a citizen, it's quite extravagant and bourgeois*" (Case 2)
Gove rning entity	SEM5	An incorporated or unincorporated association, committee, person or any other entity that has authority	"*Have in its database all professionals and executives of the Ministry of International Relations*" (Case 1) "*for compliance with the specifications of the Ministry of Women and Family Affairs*" (Case 4) "*To restore confidence in the SPVM (Montreal Police Department), transparency is needed on a permanent basis, not periodically*" (Case 3)
Refer ence	SEM6	Article, initiative, author, celebrity, public figure, program listed in participants comments and to which on can refer either by a name or an abbreviation.	"*to be inspired by the multiple proposals and ideas that have emerged as part of the Idex excellence initiative in France.*" (Case 1) "*The STL offers a compensation program to dissatisfied customers*" (Case 3) "*The UN organized the World Road Safety Film Festival*" (Case 4)
Quest ion	SEM7	A sentence worded or expressed so as to elicit information. It generally refer to an issue or a suggestion or both in the participation context.	"*When will @ amt_info finally ban smoking on the docks?*" (Case 3) "*what to do in case of fire? And the most shocking question how this promoter obtained his authorization from the civil protection?*" (Case 4)
Comp limen t	SEM8	A polite expression of praise or admiration.	"*I want to thank you for these user-friendly, innovative and ecological improvements. With this development, you enhance the look and quality of your infrastructures*" (Case 1) "*Bravo to the driver of the Express 550 who kept her smile and was very patient during the traffic jam earlier!!*" (Case 3) "*Thank you once again to the authorities for their responsiveness, and thank you to the members of the group who shared or reacted to the post :)*" (Case 4)

Table 2.B.2 Semantic Patterns in SP data online only

Online Only Semantic Pattern	Code name	Code meaning	Illustrative quotes
Link or document/ file	SEM9	Attached to the comment. Online only.	"*These two challenges, as reflected in the proposed mandate for the future, included in the document "attached" to this commentary*" (Case 1) "*It looked like that at the Berri-UQAM metro station a few minutes ago before the announced resumption of service on the orange line https://t.co/jA93Oeba1x*" (Case 3)
Tag	SEM11	A label attached to someone or something for the purpose of identification or to give other information.	"*The phone thief at Jarry station who runs away from a girl and a man @stminfo @SPVM*" (Case 3) "*@stminfo when will the Azurs be on the green line and low fares for low-income*

			people? #polmtl #Transport @CraigSauve" (Case 3)
Hashtag	SEM10	A word or phrase preceded by a hash sign (#), used on social media websites and applications, especially Twitter, to identify digital content on a specific topic.	*"Escalator that has gone down for 1 week. Today all the stairs are broken! # DuCollège # accessibility"* (Case 2) *"every time there is a #delivery the #customers #tunisians #corrupted ask for 200 dinars #Share please #douane #tunisienne #corruption"* (Case 4)
Emoticon	SEM12	A representation of a facial expression such as :-) (representing a smile), formed by various combinations of keyboard characters and used to convey the writer's feelings or intended tone.	*"ok problem on the Orange line is it possible to stop the messages after 30 seconds 😵"* (Case 2) *"This is what we call, walking on eggshells, we saw nothing and the cars coming in the opposite direction dazzled us 😫😫"* (Case 4)

Table 2.B.3. Spatial patterns in both online and offline SP data

Spatial pattern	Code name	Code meaning	Illustrative quotes
Internal spatial entity_ Defined position	SPAT1	A spatial entity with specific location that is internal to the organization concerned with the participation data.	*"Despite the presence of parks, there is a lack of public space in Vieux-Limoilou, especially in a central position."* (case 2) *"Here at the Mont royal station it is pushing back."* (case 3)
External spatial entity_ Defined position	SPAT2	A spatial entity with specific location that is external to the organization concerned with the participation data.	*"Lead by example as the plateau Mont royal does in Montreal (my humble opinion)"* (Case2)
Similar organization_ Defined position	SPAT3	A spatial entity with specific location that is a similar organization. Example (organization= city, the SPAT3= another city, organization = university, SPAT3 = another university etc.)	*"Strengthen the partnership with the UADB (Alioune Diop University of Bambey, Senegal)"(Case 1)* *"I found this box (we find it everywhere on the island of Montreal since last summer) on the edge between the sidewalk and the street. I hope one day we will see it in Tunis"* (case 4)
Spatial entity_ Hypothetical position	SPAT4	A spatial entity which does not really exist but which may occupy a position in a spatial frame of reference in the future. Usually it is presented as a suggestion in PP.	*"I suggest setting up an outdoor skating rink that would be located between the De Koninck and Pouliot pavilions"* (Case 1) *"it is therefore very attractive that would have family residences on campus for student parents"* (Case 1)

			"*I suggest setting up <u>a public square at the corner of Canardière and 4th avenue</u>*" (Case 2)
Spatial entity_ approximated position	SPAT5	A spatial entity that exists but that the way that it is specified in the text does not enable to identify its spatial coordinates.	"*These fertilizers can be used in the <u>organic community garden</u>*" (Case 1) "*Why is the service so slow to Côte-Vertu?*" (Case 3)
Cities_ provinces_ Countries	SPAT6	Cities, provinces and countries cited in comments. Eventually if the organization concerned with PP is a city, other cities would be "Similar cities SPAT3 instead of SPAT6".	"*By 2050, <u>Africa</u> will be the most populous continent and we will have to innovate to think about policies*" (Case 1) "*Lead by example as the plateau Mont royal does in <u>Montreal</u> (my humble opinion)*" (Case2)

Table 2.B.4. Spatial patterns in SP data online only

Online Only Spatial Pattern	Code Name	Code meaning	Illustrative quotes
Hashtag	SPAT7	A word or phrase preceded by a hash sign (#), used on social media websites and applications, especially Twitter, identifying a spatial entity. This spatial entity could be of type (SPAT1, SPAT2, SPAT3, SPAT5, SPAT6)	"*#Marsa Can you transform your villa into a 3-storey building with ten apartments? Anarchic Construction !! La MARSA Here is a building under construction in the city of Ezzahira La Marsa: 14 rue de l'Océan pacifique Marsa Erriadh*" (case 4)
Location Stamp	SPAT8	A fixed place that is restricted through spatial coordinates and represented through a GIS (e.g. a specific location with the red stamp on google map)	"*Hello @amt_info. Would there be paving of the Vaudreuil station parking lot in the near future? A real field of mud. <u>Gare de Vaudreuil</u>*" (case 3)

Table 2.B.5. Temporal patterns in both online and offline SP data

Temporal constructs	Code name	Code meaning	Illustrative quotes
Past absolute calendar expression (CE)	TEMP1	CE indicating an absolute "date" or "duration" in the past	"*this is interesting because <u>the 2016 Nobel Prize in Physics</u> readily admits*" (Case 1) "*That of <u>2014</u>, the Limoilou in the street, having cost $ 20,000, I fear the amount that will be invested.*" (Case 2)
Future absolute CE	TEMP2	indicating an absolute "date" or "duration" in the future	« *Could this offer a trial for a year starting in <u>September 2018</u>*" (Case 1)

			"..to the impact of big data artificial intelligence of all these elements that will ensure that by 2022" (Case 1)
Deictic CE	TEMP3	CE requiring knowledge of the date the commentary was drafted. The date the commentary was written should be known.	*"We don't even count the number of outages on the orange line since the start of the year @stminfo, compensation for subscribers?"* (Case 3) *"two weeks ago through the governorate order office for immediate cancellation of the closure order"* (Case 4)
Textual anaphoric CE	TEMP4	CE whose temporal antecedent must be found in the commentary.	*"there is an initiative that was launched in 2013 .. 3 years after the start of this initiative"* (Case 1) *"today, I went to the toll at 7:44 and I paid in cash the lady hands me a ticket from a subscriber who went 10 minutes before me"* (Case 4)
Founded anaphoric CE	TEMP5	CEs based on the knowledge of the world. All of these expressions can correspond to a specific "date" or "duration" in the past.	*"we shouldn't do a bit like in the 1950s with programs aimed at.."* (Case 1) *"after having explored, buildings dating from the 15th to the 19th century"* (case 4)

Table 2.B.6. Temporal Patterns in SP data online only

Online Only Spatial Pattern	Code Name	Code meaning	Illustrative quotes
Temporal Hashtag	TEMP6	A word or phrase preceded by a hash sign (#), used on social media websites and applications, especially Twitter, identifying a temporal entity. This temporal entity could be of type TEMP1 or TEMP2.	*"You women, you charm it .. Happy Women's Day and THANKS 💐 Far from the public debate .. Today is #8March, an exceptional day"* (case 4)

Appendix 2.C

Adaptation of emerging temporal categories according to the categorization of Calendar Expressions of (Battistelli 2009)
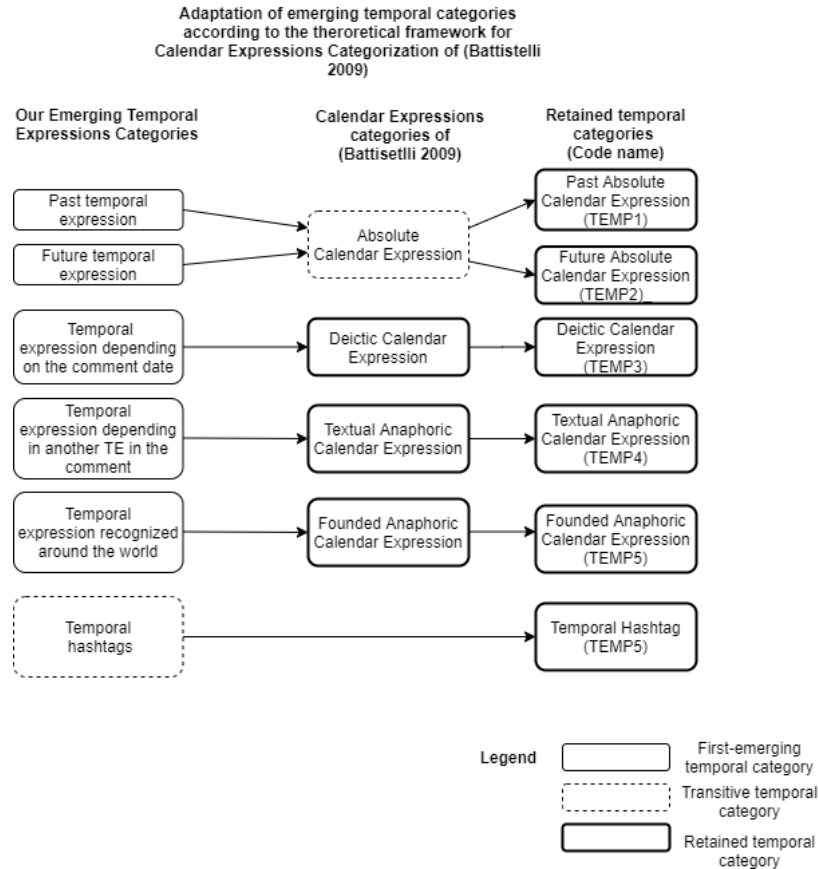

Adaptation of emerging temporal categories according to the theroretical framework for Calendar Expressions Categorization of (Battistelli 2009)

Figure 4. Adaptation of temporal patterns to the categorization of (Battistelli 2009)

Appendix 2.D

Table 2.D.1. Correlations detected between patterns

Correlated patterns	SPPs comment	Patterns
Suggestion (SEM2) And **SE with hypothetical position** (SPAT4)	"*I suggest setting up* an outdoor *skating rink that would be located between the De Koninck and Pouliot pavilions*" (Case 1)	SEM2 : « *I suggest* » SPAT4 : « *skating rink that would be located between the De Koninck and Pouliot pavilions*"
	"*I suggest setting up a public square at the corner of Canardière and 4th avenue*" (Case 2)	SEM2 : « *I suggest* » SPAT4 : « *public square at the corner of Canardière and 4th avenue*"

	« *I think that the university must present itself as a society in itself**… I think it would be** very attractive to have <u>**family residences on campus**</u> for student parents.*" (Case 1)	SEM2 : « <u>***I think it would be***</u> » SPAT4 : « *family residences on campus* »
	"<u>***I suggest to***</u> build a <u>***biogas 'mini-factory' on campus***</u> in order to valorize all residual materials and produce sustainable fertilizers at the same time" (case 1)	SEM2 : « *I suggest to* » SPAT4 : « *a biogas mini factory* » on *compus* »
Suggestion (SEM2) And **Future absolute calendar expression** (TEMP2)	« ***Could this*** offer a trial for a year starting **in** <u>**September 2018?**</u>" (Case 1)	SEM2 : « *Could this* » TEMP2 : « <u>*in september 2018*</u> »
	"***I suggest not waiting*** until **March 1, 2017** and starting tomorrow morning to take the reusable baskets when going to the supermarket to do the shopping. This civic approach will prevent us from throwing away 300,000,000 plastic bags annually." (case 3)	SEM2 : « ***I suggest*** » TEMP2 : « <u>***March 1, 2017***</u> »
	"***it would be interesting to*** think about the impact of the artificial intelligence of big data of all these elements which will ensure that **by 2022** it is clear that if we do nothing, we will have outdated graduates" (case 1)	SEM2 : « ***It would be interesting*** » TEMP2 : « ***by 2022*** »

References

Acedo, A., Painho, M., Casteleyn, S., & Roche, S. (2018). Place and city: Toward urban intelligence. ISPRS International Journal of Geo-Information, 7(9), 346

Aichholzer and H. Westholm, "Evaluating eparticipation projects: practical examples and outline of an evaluation framework," European Journal of ePractice,
vol. 7, no. 3, pp. 1–18, 2009.

Andrienko, G., Andrienko, N., Demsar, U., Dransch, D., Dykes, J., Fabrikant, S. I., ... & Tominski, C. (2010). Space, time and visual analytics. International Journal of Geographical Information Science, 24(10), 1577-1600.

Aurnague, M. (2004). Les structures de l'espace linguistique: regards croisés sur quelques constructions spatiales du basque et du français (Vol. 56). Peeters Publishers.

Aurnague, M., Hickmann, M., & Vieu, L. (Eds.). (2007). The categorization of spatial entities in language and cognition (Vol. 20). John Benjamins Publishing.

Aurnague, M., Hickmann, M., & Vieu, L. (2010). Les entit\'es spatiales dans la langue:\'etude descriptive, formelle et exp\'erimentale de la cat\'egorisation. arXiv preprint arXiv:1003.4898.

Battistelli, D. (2009). La temporalité linguistique: circonscrire un objet d'analyse ainsi que des finalités à cette analyse (Doctoral dissertation, Université de Nanterre-Paris X).

Batty, M., Axhausen, K. W., Giannotti, F., Pozdnoukhov, A., Bazzani, A., Wachowicz, M., ... & Portugali, Y. (2012). Smart cities of the future. The European Physical Journal Special Topics, 214(1), 481-518.

Battistelli, D., Minel, J. L., & Schwer, S. R. (2006). Représentation des expressions calendaires dans les textes: vers une application à la lecture assistée de biographies. Trait. Autom. des Langues, 47(3), 11-37.

Benbasat, I., Goldstein, D. K., & Mead, M. (1987). The case research strategy in studies of information systems. MIS quarterly, 369-386.

Bohman, S (2014, September) "Information technology in eparticipation research: a word frequency analysis," in International Conference on Electronic Participation, pp. 78–89, Springer, 2014.

Bonsón, E., Royo, S., & Ratkai, M. (2015). Citizens' engagement on local governments' Facebook sites. An empirical analysis: The impact of different media and content types in Western Europe. Government information quarterly, 32(1), 52-62.

Borillo, A. (1999). Partition et localisation spatiale: les noms de localisation interne. Langages, 53-75.

Bryson, J. M., Quick, K. S., Slotterback, C. S., & Crosby, B. C. (2013). Designing public participation processes. Public administration review, 73(1), 23-34.

Budak Arpinar, I., Sheth, A., Ramakrishnan, C., Lynn Usery, E., Azami, M., & Kwan, M. P. (2006). Geospatial ontology development and semantic analytics. Transactions in GIS, 10(4), 551-575.

Casati, R., & Varzi, A. C. (1999). Parts and places: The structures of spatial representation. Mit Press.

Charalabidis, Y., Gionis, G., Ferro, E., & Loukis, E. (2010, August). Towards a systematic exploitation of web 2.0 and simulation modeling tools in public policy process. In International Conference on Electronic Participation (pp. 1-12). Springer, Berlin, Heidelberg.

Cheikh-Ammar, M. (2018). The IT artifact and its spirit: a nexus of human values, affordances, symbolic expressions, and IT features. European Journal of Information Systems, 27(3), 278-294.

Coe, A., Paquet, G., & Roy, J. (2001). E-governance and smart communities: a social learning challenge. Social science computer review, 19(1), 80-93.

Coelho, T. R., Pozzebon, M., & Cunha, M. A. (July 2021) Citizens influencing public policy-making: Resourcing as source of relational power in e-participation platforms. Information Systems Journal.

Corbett, J., & Mellouli, S. (2017). Winning the SDG battle in cities: how an integrated information ecosystem can contribute to the achievement of the 2030 sustainable development goals. Information Systems Journal, 27(4), 427-461.

Cornwall, A. (2008). Unpacking 'Participation': models, meanings and practices. Community development journal, 43(3), 269-283.

Franklin, C., & Hane, P. (1992). An Introduction to Geographic Information Systems: Linking Maps to Databases [and] Maps for the Rest of Us: Affordable and Fun. Database, 15(2), 12-15.

Fung, A. (2015). Putting the public back into governance: The challenges of citizen participation and its future. Public administration review, 75(4), 513-522.

Goldfinch, S., Gauld, R., & Herbison, P. (2009). The Participation Divide? Political Participation, Trust in Government, and E-government in Australia and New Zealand. Australian Journal of Public Administration, 68(3), 333-350.

Goodchild, M.F. Citizens as Sensors: The World of Volunteered Geography. GeoJournal 2007, 69, 211–221.

Hanks, P. (2004, July). Corpus pattern analysis. In Euralex Proceedings (Vol. 1, pp. 87-98). Lorient: Université de Bretagne-Sud.

Harrison, C., Eckman, B., Hamilton, R., Hartswick, P., Kalagnanam, J., Paraszczak, J., & Williams, P. (2010). Foundations for smarter cities. IBM Journal of research and development, 54(4), 1-16.

Janssen, M., & Helbig, N. (2018). Innovating and changing the policy-cycle: Policy-makers be prepared! Government Information Quarterly, 35(4), S99-S105.

Johannessen, M. R., Flak, L. S., & Sæbø, Ø. (2012, September). Choosing the right medium for municipal eParticipation based on stakeholder expectations. In International Conference on Electronic Participation (pp. 25-36). Springer, Berlin, Heidelberg.

Lafrance, F., Daniel, S., & Dragićević, S. (2019). Multidimensional web GIS approach for citizen participation on urban evolution. ISPRS International Journal of Geo-Information, 8(6), 253.

Kuhn, W. (2003). Semantic reference systems. International Journal of Geographical Information Science, 17(5), 405-409.

Kyttä, M.; Kahila, M. SoftGIS Methodology—Building Bridges in Urban Planning; GIM International (The Global Magazine Geomatics): Lemmer, The Netherlands, 2011; Volume 25.

Lussault, M. L'Homme Spatial. La Construction Sociale de l'espace Humain: La Construction Sociale de l'espace Humain; Le Seuil: Paris, France, 2007

Marttunen, M., Mustajoki, J., Dufva, M., & Karjalainen, T. P. (2015). How to design and realize participation of stakeholders in MCDA processes? A framework for selecting an appropriate approach. EURO Journal on Decision Processes, 3(1-2), 187-214.

Marzouki, A., Lafrance, F., Daniel, S., & Mellouli, S. (2017b, June). The relevance of geovisualization in Citizen Participation processes. In Proceedings of the 18th annual international conference on digital government research (pp. 397-406).

Marzouki, A., Mellouli, S., & Daniel, S. (2018, May). Spatial, temporal and semantic contextualization of citizen participation. In Proceedings of the 19th Annual International Conference on Digital Government Research: Governance in the Data Age (pp. 1-8)

Marzouki, A., Mellouli, S., & Daniel, S. (2022). Understanding issues with stakeholders participation processes: A conceptual model of SPPs' dimensions of issues. Government Information Quarterly, 101668.

Masvaure, S. (2016, December). Elusive Public Participation: Citizen Decision-Making in Budget Formulation Process in the City of Harare, Zimbabwe. In Urban Forum (Vol. 27, No. 4, pp. 447-463). Springer Netherlands

Meersman, R. (1997). Introduction: An Essay on the Role and Evolution of Data (base) Semantics. In Database Applications Semantics (pp. 1-7). Springer US.

Miles, M. B., Huberman, A. M., & Saldana, J. (2013). Qualitative data analysis: Sage.

Molinari, F. (2010, August). On sustainable eParticipation. In International Conference on Electronic Participation (pp. 126-139). Springer, Berlin, Heidelberg.

Oxford Dictionaries: Time. Oxford University Press. 2011. Retrieved 18 December 2011.

Panopoulou, E., Tambouris, E., & Tarabanis, K. (2009). eParticipation initiatives: How is Europe progressing. European Journal of ePractice, 7(2009), 15-26.

Porwol, L., Ojo, A., & Breslin, J. G. (2018). Social software infrastructure for e-participation. Government Information Quarterly, 35(4), S88-S98.

Potnis, D., & Tahamtan, I. (2021). Hashtags for gatekeeping of information on social media. Journal of the Association for Information Science and Technology.

Quillian, M.R.: Semantic memory (1968)

Rantanen, H.; Kahila, M. The SoftGIS Approach to Local Knowledge. J. Environ. Manag. 2009, 90, 1981–1990.

Ryan, G. W., & Bernard, H. R. (2003). Techniques to identify themes. Field methods, 15(1), 85-109

Roche, S., Nabian, N., Kloeckl, K., & Ratti, C. (2012, May). Are 'smart cities' smart enough. In Global geospatial conference (pp. 215-235).

Teufl, P., & Kraxberger, S. (2011, August). Extracting semantic knowledge from twitter. In International Conference on Electronic Participation (pp. 48-59). Springer, Berlin, Heidelberg.

Teufl, P., Payer, U., & Parycek, P. (2009, September). Automated analysis of e-participation data by utilizing associative networks, spreading activation and unsupervised learning. In International Conference on Electronic Participation (pp. 139-150). Springer, Berlin, Heidelberg.

Urquhart, C., Lehmann, H. & Myers, M.D. (2010) Putting the 'theory' back into grounded theory: Guidelines for grounded theory studies in information systems. Information Systems Journal, 20, 357–381.

Veronesi, G., & Keasey, K. (2015). Patient and Public Participation in the English NHS: An assessment of experimental implementation processes. Public Management Review, 17(4), 543-564.

WAKABI, Wairagala et GRÖNLUND, Åke. Citizen-to-citizen vs. citizen-to-government eparticipation in uganda: Implications for research and practice. In : International Conference on Electronic Participation. Springer, Cham, 2015. p. 95-107.

Zheng, Y., Wu, W., Chen, Y., Qu, H., & Ni, L. M. (2016). Visual Analytics in Urban Computing: An Overview. IEEE Transactions on Big Data, 2(3), 276-296

CHAPTER 3: Affordances and IT features for automatic identification of the Stakeholders' living contexts' patterns in SPP data

RÉSUMÉ

Étant donné que les parties prenantes expriment implicitement leurs contextes de vie dans leurs commentaires de PPP à travers des patterns sémantiques, spatiaux et temporels, il devient important d'étudier comment développer des fonctionnalités informatiques, permettant aux parties prenantes d'exprimer explicitement leurs contextes de vie dans les données des PPP. L'objectif de ce chapitre est d'offrir une compréhension des affordances et des fonctionnalités informatiques nécessaires à l'identification automatique des contextes de vie des parties prenantes dans les données SPP. En se basant sur les théories des affordances et du réalisme critique, une analyse théorique des patterns sémantiques, spatiaux et temporels caractérisant les contextes de vie des acteurs dans les données des PPP est établie. S'appuyant sur cette analyse, ce chapitre propose une conceptualisation des affordances et des fonctionnalités informatiques pour l'identification automatique des contextes de vie des parties prenantes dans les données des PPP. Des fonctionnalités informatiques illustratives et une plate-forme prototype sont proposées pour illustrer l'opérationnalisation des affordances et des fonctionnalités informatiques dans la pratique.

Mots clés : la participation des parties prenantes, les contextes de vie des parties prenantes, l'analyse de données, patterns, affordances, fonctionnalités TI

ABSTRACT

As stakeholders implicitly express their living contexts in their SPP comments through semantic, spatial and temporal patterns, it becomes important to investigate how to develop IT-features, allowing stakeholders to explicitly express their living contexts in SPPs data. The objective of this chapter is to offer an understanding of the affordances and the IT-features that are necessary for the automatic identification of stakeholders' living contexts in SPP data. Using the theories of affordances and critical realism, a theoretical analysis of the semantic, spatial and temporal patterns characterizing the stakeholders' living contexts in SPPs data is established. Building on this analysis, this chapter proposes a conceptualization of affordances and IT-features for the automatic identification of stakeholders' living contexts in SPP data. Illustrative IT-features and a prototype platform are proposed to illustrate the operationalization of affordances and IT-features in practice.

Keywords: stakeholders' participation, stakeholders' living contexts, data analysis, patterns, affordances, IT-features

3.1. Introduction

In chapter II, we qualitatively analyzed SPPs data and we identified 26 semantic, spatial, and temporal patterns that characterize the stakeholders' living contexts. Of these patterns, seven are online patterns and 19 are independent of the used mean to participate. We will refer to the independent patterns as the general patterns. The general patterns are: "issue", "suggestion", "lived experience", "number/metric", "governing entity", "reference", "question" and "compliment" for the **semantic dimension**, "internal spatial entity with defined position", "external spatial entity with defined position", "similar spatial entity with defined position", "spatial entity with hypothetical position", "spatial entity with approximated position", "cities, provinces and countries" for the **spatial dimension**, and "past absolute calendar expression", "future absolute calendar expression", "deictic calendar expression", "textual anaphoric calendar expression" and "founded anaphoric calendar expression" for the **temporal dimension**.

From the analyzed data, we noticed that general patterns are implicitly identified in SPPs data, so their detection and classification is not a trivial task. An implicit pattern is a pattern that is present in data but that someone cannot consciously detect or recognize when parsing or analyzing the data[5]. In addition, and from the analyzed data, we observed that online patterns (which are hashtags, tag-mentions, emoticons, attached links/files, spatial stamps) are more explicit than the general patterns. For example, hashtags, tag_mention, spatial stamps (@, # etc.) in SPP comments can be detected and observed given the symbols and/or the special characters they contain. Indeed, online patterns are generated when stakeholders adopt information technology features (IT-features) of the online tools used for participation. IT-features are the main resources of an IT system provided to users, enabling them to discover actions they can accomplish using this system (Griffith & Northcraft, 1994, Goodhue, 1995, Griffth, 1999). Thus, we notice that the IT-features, provided by online participation tools, help stakeholders to explicitly express their living contexts in SPPs. So, it becomes important to investigate how to develop IT-features for the general patterns adapted to SP comments to allow stakeholders explicitly express their living contexts.

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[5] Implicit Definition & Meaning - Merriam-Webster

The development of these IT-features is a challenging activity since the "identification of easily manoeuvrable sets of features that are theoretically and conceptually comprehensible" for a given IT system is recognized as a difficult task (Cheikh-Ammar 2018, p. 2). In contrast, the theories of affordances and of critical realism facilitate the theoretical and conceptual identification and comprehension of IT-features for a given IT system (Volkoff & Strong 2013). Hereafter, we explain why these theories are relevant for the identification of IT-features for the living contexts' patterns' detection in SP.

First, the concept of IT-features is related to the concept of affordances since IT-features afford users, offers opportunities/possibilities for actions for users (Cheikh-Ammar 2018). Thus, to identify IT-features, it's relevant to identify and to understand the affordances that these features offer to users in a given system. Second, to understand the theoretical meaning of affordances in a given system, it is necessary to argue how affordances arise (their status), the relationship between the actions (arising from affordances) and the systems (or structures) offering these affordances, the relationships between sub-affordances (as affordances are decomposable), and the concrete outcomes that actors experienced or expected to experience from the use of these systems (Mutch 2010; Volkoff & Strong 2013). We develop this theoretical meaning *by connecting these affordances to their critical realism roots*; which means to analyze these affordances according to the principles of critical realism (Volkoff & Strong 2013, p. 822). In fact, the principles of critical realism consolidate the theoretical understanding of affordances by highlighting; their status (real, actual and empirical), their relational aspect, their concrete outcomes and their application at different levels (Volkoff & Strong 2013). Third, as IT evolves rapidly, and consequently IT-features too, offering a theoretical understanding of affordances for the identification of stakeholders' living contexts will help to consolidate the theoretical and the conceptual foundation for the development of future participation systems (e.g., platforms, tools). As affordances and IT-features are subject to actualization over time (Volkoff & Strong 2013), such an understanding will be relevant as a basis to ensure (or at least help) that the evolving conceptualisations of affordances and IT-features for SP tools, takes into consideration the stakeholders' needs in terms of the living contexts identification in SP.

So, the main research question addressed in this chapter is: what are the necessary affordances and IT-features for the automatic identification of stakeholders' living contexts' patterns in SPP data? The objective of this chapter is then to offer a better understanding of the automatic identification of semantic, spatial and temporal patterns of the stakeholders' living contexts in SPP data, based on the concepts of affordances and IT-features. Automatic identification aims to make explicit the implicit patterns of the living contexts.

This chapter is organized as follows. We start by introducing, in Section 3.2. the concepts of "affordances", "IT features" and "critical realism". In Section 2, we will use these concepts to analyze and offer a theoretical understanding of the affordances that stakeholders seek to exercise in order to identify their living contexts' in SPPs. Building on this understanding, we will establish in Section 3 an analysis of the semantic, spatial and temporal patterns to propose a conceptualization of affordances and IT-features for the automatic identification of stakeholders' living contexts in SPs data. In Section 4, illustrative IT-features and a prototype platform are proposed to illustrate the operationalization of affordances and IT-features for the identification of stakeholders' living contexts in SP data. We conclude the chapter by a discussion and future research avenues.

3.2. Theoretical background
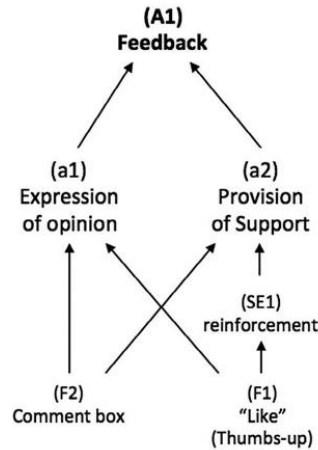
3.2.1. Affordances

The word affordances, originated by (Gibson 1986), "refers to what is offered, provided, or furnished to someone or something by an object". For example, a fallen log affords to someone the opportunity to sit. In information systems (IS), the term affordances has been used to refer to the use and/or ways of using an object as perceived by a user (Norman 1988). In (Volkoff & Strong 2013), affordances in information systems are defined as "the potential for behaviours associated with achieving an immediate concrete outcome and arising from the relation between an object (e.g. an information technology (IT) artifact) and a goal-oriented actor or actors" (p.823). For example, in an enterprise resource planning (ERP) system, the affordances can be the possibilities to: record data, to analyze data or to visualize business processes. As a second example in a mobile system, users have the following affordances: to call someone, to send a message, to take a photo or to access applications. As

a third example, in participation platforms, we can cite affordances to share a comment, to interact positively or negatively with other comments, or to reply to comments.

3.2.2. IT-features and their relationship to affordances

IT features are defined by (Griffith & Northcraft, 1994) as the "building blocks" of IT and constitute the main resources provided to users (Griffith & Northcraft, 1994). They help users discover the actions that it is possible to perform (affordances) (Cheikh-Ammar, 2018). In general, the use of IT-features enables users of IT systems to exercise the affordances, perform potential actions provided by a system. Moreover, affordances are inherently hierarchical since they exist at different levels of abstractions and emerge from different structural levels (Volkoff & Strong, 2013). For example, based on (Cheikh- Ammar 2018), an e-mail system affords users the possibility of collaborating with others (a high-level affordance). This affordance can be decomposed into a series of sub-affordances such as sending and receiving messages (medium-level affordances), and these sub-affordances can then be further decomposed into lower-level affordances such as replying and /or forwarding messages (Savoli, 2012). Affordances and sub-affordances at different levels are enabled through IT-features that the system offers to users. The IT-features on an email system are provided through the on-screen buttons such as "send button", "forward button" etc. As affordances are possibilities for actions, IT-features as well as users' actions can also be at different levels (e.g. high-level, medium-level).

Using the example of a Social Network System (SNS), (Cheikh-Ammar 2018) demonstrates how features such as "comment box" affords SNS' users the possibility to share messages with their friends and followers (see **Figure 3.1.**).

Figure 3.1. Features and affordances on SNS (Cheikh-Ammar, 2018)

In the next section, we introduce, the concept of critical realism and we apply its principles to offer a theoretical understanding of affordances and IT-features for the stakeholders' living contexts' identification.

3.2.3. Critical realism

Critical realism (CR) is a philosophy of science that is based on a set of ontological principles. The core idea of CR is that a "natural and social reality should be understood as an open stratified system of objects with causal powers" (Morton 2006). It has three principles.

The first principle of CR is **the real-actual-empirical stratification**. It means that social entities, natural objects and conceptual entities (such as opinions and goals) have three layers (Bhaskart 1998a, Mingers 2004a, Volkoff & Strong 2013). The first layer is the real layer: these objects and entities exist independently of how they are perceived. The second layer is the actual: it includes actual outcomes that have been generated from the real layer, using different mechanisms. The third layer is the empirical: it includes the outcomes that have been generated AND observed using these mechanisms.

The second principle of CR is **the distinction between structures and actions**. Structures are assumed to pre-exist actions, creating conditions for actions (Mutch 2010, Volkoff & Strong 2013). A structure is for example an IT-tool, and an action consists of using this tool. From the critical realism perspective, understanding the outcomes associated with introducing new structures (e.g. information systems, IT-tools) can be viewed as understanding the mechanisms associated with these structures (Much 2010). According to

(Archer 1995; Volkoff et al. 2007), new or elaborated structures may or may not emerge from actions (for example, new spatial IT-features may emerge when users of a system identify spatial entities in a textual manner). Moreover, structures have the power to motivate or discourage, to enable or to constrain an action (Volkoff & Strong 2013).

The third principle of CR is **the structures stratification**. This means that structures themselves can be stratified. Specifically, structures "may consist of various components but rather than being a simple aggregation of parts, they combine into assemblages (Delanda 2006), whose causal properties emerge from the interactions between parts, and are not an additive combination of the properties of the components" (Volkoff et Strong 2013). For example, let us consider an IT-platform as a structure and semantic, spatial and temporal dimensions as the main components of this structure. When a stakeholder participates using this platform (as a structure), causal properties may emerge from the interactions between the properties of each dimension as components of this platform. In our analysis, we illustrate the properties of each dimension using: "what" for semantic, "where" for spatial and "when" for temporal. The causal properties are the stakeholders' living contexts themselves. For example, when stakeholders identify patterns such as lived experiences, spatial locations (e.g. places where these experiences happened) and calendar expressions (e.g. dates when these experiences happened), each pattern apart has a property. The interactions between the properties of each dimension (what, when, where) emerge the living contexts which are the causal properties characterizing what stakeholders are living. CR principles can increase the understanding of mechanisms that are needed to achieve outcomes from actions (Fox 2009). In IS literature, scholars recommend for studies seeking to identify affordances, to connect affordances to their critical realist roots (Volkoff & Strong 2013).

3.3. Understanding "The possibility to identify the living context" through the critical realism core principles

Generally, stakeholders participate through SP processes that may be physical (offline) or online. Thus, according to the theory of affordances, traditional and online SP processes offer opportunities for stakeholders to participate. When online tools are used for participation, these tools offer to stakeholders' possibilities to share comments for example and some participation tools offer more IT-features than others (Chouikh et al, 2016; Fares et al., 2018).

For example, in SNS channels, stakeholders can reply to comments, tag places, symbolize emotions through emoticons etc. while in other platforms like web forms, IT-features may be limited, e.g. stakeholders can just share a textual comment (Sanford & Rose 2007; Kahila-Tani et al., 2019).

To participate or to share a comment, our model of patterns shows that stakeholders apprehend SPP as "a space of possibilities" to identify their living contexts through patterns. In this vein, "the possibility to identify the living context" is a high-level affordance that can be decomposed into a series of sub-affordances such as the possibility to identify semantic, spatial and temporal patterns (medium-level affordances) as presented in Chapter 2.

Hereafter, we develop our arguments to consolidate the theoretical meaning of our affordances (high-level and medium level) based on the core principles of CR.

3.3.1. The identification of stakeholders' living context according to the real-actual-empirical stratification principle of CR

Under critical realism, conceptual entities, such as opinions, are real and exist independently of how we perceive them (Fleetwood 2005). This represents the first layer, the *real*. According to critical realism, this foundational layer is associated with mechanisms that generate outcomes. These outcomes represent the layer of the *actual* (Volkoff & Strong 2013). However, these outcomes may not be observed. Some mechanisms help to make outcomes observable. When outcomes are observed, they constitute the *empirical layer*. These mechanisms are uncovered through retroduction, 'which is a process of working backward from the empirical outcomes we observe to the underlying mechanisms that could logically have produced these outcomes' (Danemark et al. 2002; Volkoff et Strong 2013). Applying this principle to the high-level affordance "the possibility to identify the living context", an opinion[6] has three foundational layers: the real, the actual and the empirical.

In SP, we consider that each comment stems from an opinion. Our focus here is not on the opinion as a it is, but on the stakeholder's living context expressed in the opinion. Following this logic, a stakeholder's living context expressed in an opinion is a conceptual entity that is real and that exists independently of how we perceive it (Fleetwood 2005). This is the first

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[6] We consider that each participation comment stems from an opinion.

layer, the *real* one. The *real* layer could be associated with mechanisms that generate outcomes (Volkoff & Strong 2013). In SP, stakeholders use mechanisms such as SP tools to share their comments. When tools with no or limited IT-features are used, most of the patterns of the living contexts remain implicit in SP data. Thus, "the possibility to identify the living context (resulting on the patterns of the living contexts)" is at the *actual* layer since the living context is not observed. One way to detect and observe these patterns is through the provision of IT-features enabling the automatic highlight of these patterns of the living contexts in SPP data. IT-features have the power to afford stakeholders to explicitly express their living contexts in SP data, so to make them observable in data. If these patterns are observed (e.g. detected), then the identification of the living context is as the *empirical* layer.

In **Figure 3.2.**, we represent the analysis of the affordance "possibility to identify the living context" through the real-actual-empirical stratification principles of critical realism, where we outline mechanisms enabling the transition from one layer to another.
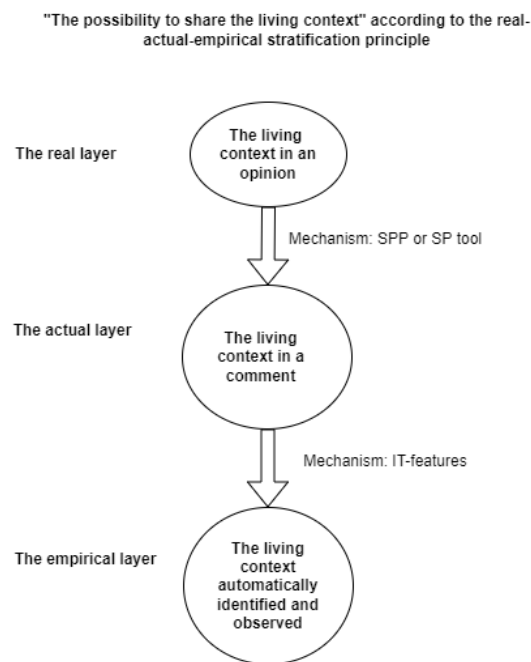
Figure 3.2. The real-actual-empirical stratification of "the possibility to identify the living context"

Now that we have applied the first principle of CR to understand the layers (or the status) of an affordance, we will apply the second principle of CR to understand the separation between structure and action.

3.3.2. The identification of stakeholders' living context according to the separation of structure and action principle of CR

While an affordance is a possibility for action, the second core principle of critical realism is the distinction between action (or agency) and structure (e.g. IT tool) (Carter and New 2004, Mutch 2010). First, actions and structures are temporally separated: structures are assumed to pre-exist actions, creating the conditions for those actions (Mutch 2010, Volkoff & Strong 2013). As our main high-level affordance is "the possibility to identify the living context", the associated high-level action is "identifying the living context". In **Figure 3.3**, we represent the analysis of the action "identifying the living context" through "the separation between structures and actions principle of critical realism.

In SP, a participation tool could be considered as the structure and the action consists in "identifying the living context in a comment (high-level action)" (see **Figure 3.3.**). The participation tool and the action "identifying the living context" are temporally separated. The participation tool being launched at time t1, the action is completed later on at time t1 + Δt (respectively, t1and t1+Δt, in **Figure 3.3.**) since the participation tool is assumed to pre-exist the action creating for stakeholders the conditions for "identifying the living contexts".

The identification of semantic, spatial and temporal patterns are medium-level actions that stakeholders perform to express their living contexts. As new structures may emerge from actions, we argue that new or elaborated semantic, spatial and temporal IT-features may emerge, at time t2, from these medium-level actions (see **Figure 3.3.**). These IT-features enable to emerge, at time t3, new structures (see structure 2 in **Figure 3.3.**) affording stakeholders to explicitly identify their living contexts in SPP data. When new structures encompassing new/elaborated IT-features emerge, they will pre-exist actions (namely new structures emerging at time t3, new actions completed at time t3 + Δt, see **Figure 3.3.**), creating conditions for stakeholders' to explicitly express their living contexts.
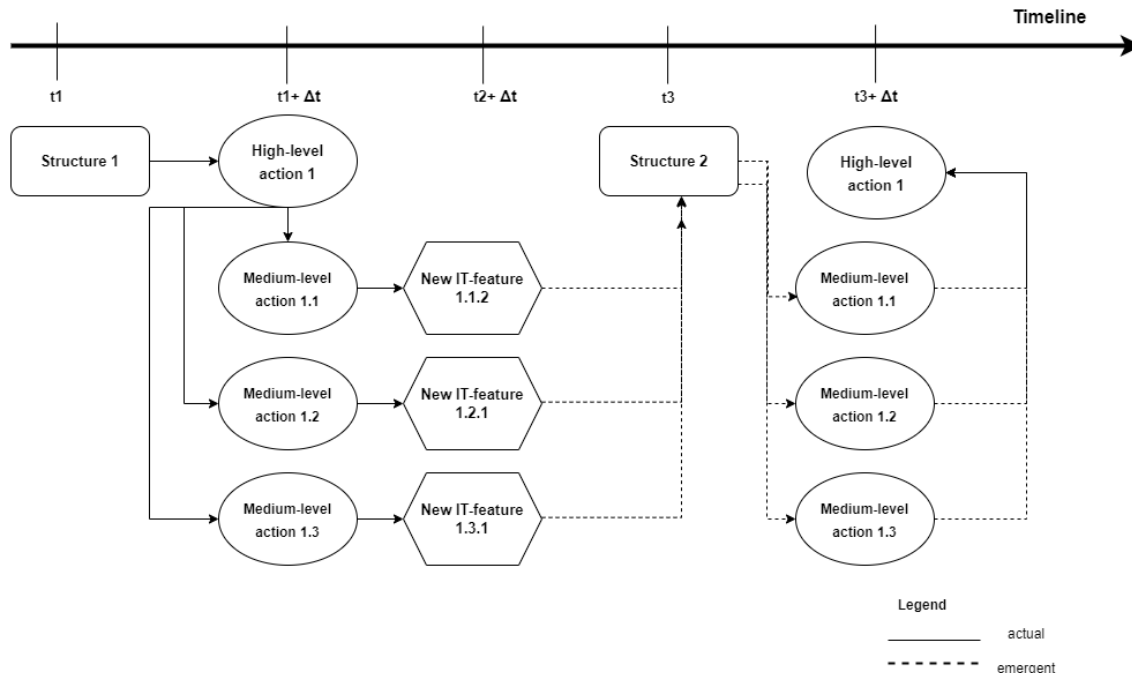
Figure 3.3. The temporal separation between actions and structures

Moreover, structures and actions (or agency) have very different properties and powers (Carter and New 2004). Unlike actions, structures are enduring (Volkoff & Strong 2013). They have the power to motivate or discourage, to enable or to constrain an action, which is called "material causality" (Carter & New 2004). For example, features to express a facial expression such as emoticons, or those enabling to stamp a spatial location in a map or a calendar expression in a time axis offer better opportunities for stakeholders' to explicitly express their living contexts in their comments, leading to different outcomes (Lafrance et al., 2019). However, IT-features may be limited in some tools, especially for general patterns (other than online) of the living context. Thus, based on the CR principle of separation of structures and actions we argue that participation tools with higher semantic, spatial and temporal IT-features affordances will not only help to afford but also to motivate stakeholders' to explicitly express their living contexts' and to shape a variety of possible outcomes from the use of these tools (Jasperson et al., 2005).

3.3.3. The identification of stakeholders' living context according to the structures stratification principle of CR

As emphasized by (Volkoff & Strong 2013), structures themselves can be stratified. Specifically, they "may consist of various components. However, rather than being a simple

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aggregation of components, causal properties may emerge from the interactions between their components and are not just an additive combination of the properties of the components" (Elder-Vass, 2005; Elder-Vass, 2007). Interactions between components of a structure have the potential to generate a complex web of interpenetrating outcomes (Volkoff & Strong 2013). This view enables us to explore how components of a given structure interact rather than considering each of them individually (Volkoff & Strong 2013).

Let's consider a participation platform as a structure offering "the possibility to identify the living context" (high-level affordance) (see **Figure 3.4.**). We suppose that our structure consists of three components (equivalent to the three dimensions) which are: semantic, spatial and temporal components. Each component enables to highlight a property of the living contexts (through IT-features): semantic, spatial and temporal properties to which we refer as the "what", the "where" and the "when" in **Figure 3.4**.

Applying the principle of structures stratification, we note that properties of the stakeholders' living contexts emerge from the interactions between properties of each component (dimension) of our structure (e.g. what issue or suggestion is identified, and where and when this issue/or a suggestion is happening/is to be considered). This is consistent with our findings in Chapter 2 stipulating that spatial and temporal patterns are complementary to the semantic information of the stakeholders' living contexts (complementary relationship). Thus, structures for the identification of the stakeholders' living contexts should offer semantic, spatial and temporal affordances and IT-features in a way enabling their interactions rather than offering each of them individually.

Moreover, the interactions between semantic, spatial and temporal dimensions have the potential to generate a complex web of interpenetrating outcomes with regards to the identification of the living contexts (see outcomes possibilities in **Figure 3.4.**). These outcomes are a combination of semantic, spatial and temporal properties in different ways, leading to a better identification and representation of the stakeholders' living contexts.
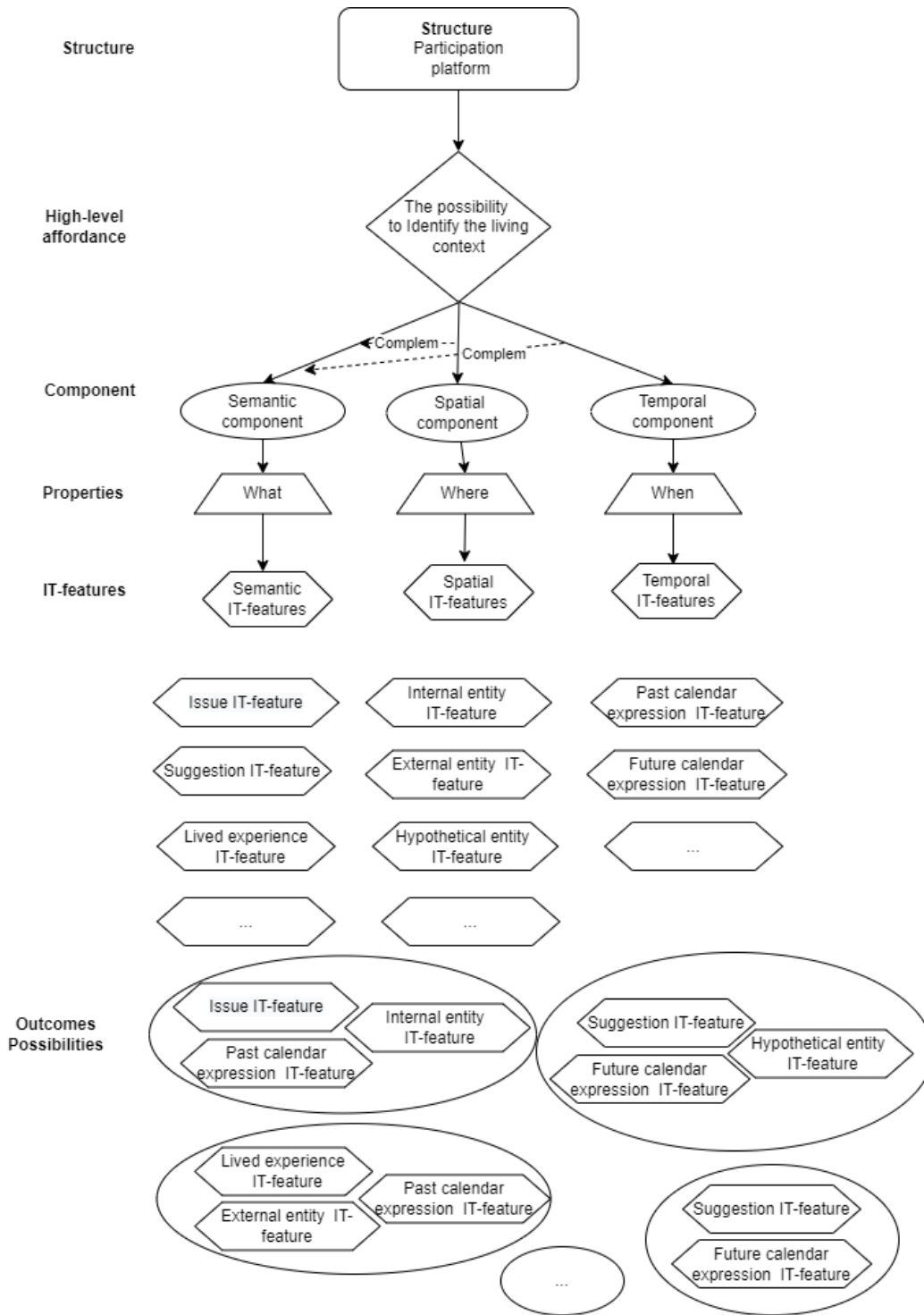
Figure 3.4. The structures stratification (for sake of simplicity, this figure only shows one layer of affordances)

In **Figure 3.4.**, we represented the structure stratification principle of a participation platform, where the high-level affordance consists of "the possibility to identify the living context" and

the components of our platform consist of "semantic, spatial and temporal components". In this representation, we outlined: the properties of each component (what, where and when), examples of IT-features for each component of our structure, and potential interpenetrating outcomes resulting from the interactions between the use of IT-features of the three components. In **Figure 3.5**, we present examples of how possible outcomes enable stakeholders to combine semantic, spatial and temporal IT-features, creating possibilities to make emerge causal properties which are their living contexts in SPP data.
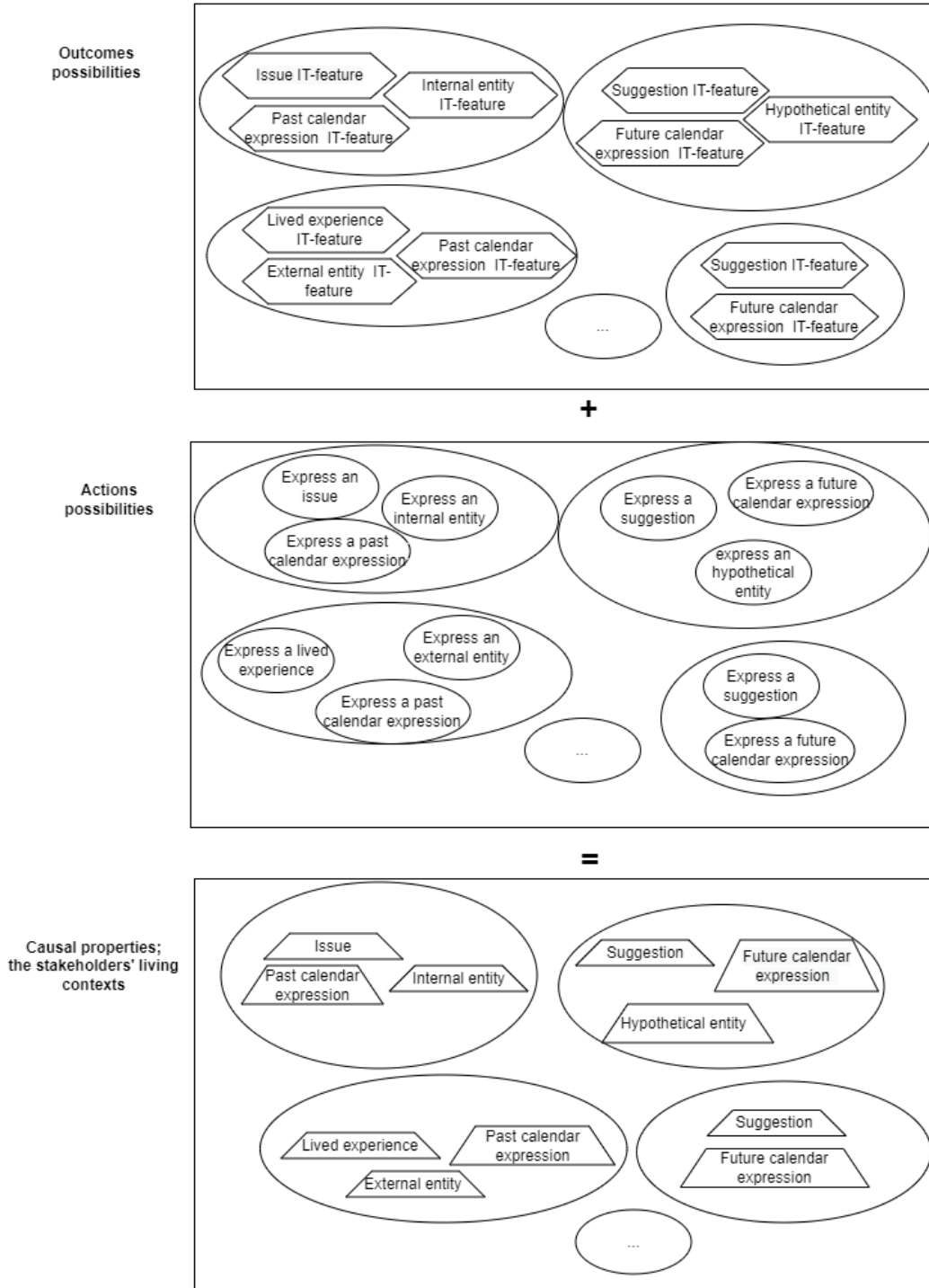
Figure 3.5. Illustration of causal properties: the stakeholders' living contexts (continuation of **Figure 3.4**.)

In conclusion, when semantic, spatial and temporal IT-features are limited or absent in a participation tool, the possibility to make emerge interactions between the properties of each component (e.g. semantic and temporal or semantic and spatial) in order to identify the

stakeholders' living contexts is limited too. Thus, we argue that adequate IT-features play an important role to highlight the causal properties leading to a better identification of the stakeholders' living contexts in SPP data.

3.4. Affordances and IT-features for the automatic identification of the living contexts' in SP

Now that we elaborated our theoretical arguments supporting the relevance of uncovering affordances and IT-features for the living contexts' patterns' identification based on the CR principles, we will analyze our semantic, spatial and temporal patterns in order to conceptualize affordances and IT-features for the identification of the living contexts in SP. As we have two main categories of patterns: (online patterns and general patterns), we will analyze each of the categories separately. To guide our analysis, we asked for each pattern in each category the following questions: What is the affordance associated with each pattern? And what are the IT features associated with each pattern to enable automatic identification of the stakeholders' living contexts in SP data?

3.4.1. Affordances and IT-features for online patterns

As noted in Chapter 2, online only patterns are generated when stakeholders use IT-features of the online tools used for participation. For example, the patterns "attached-link/file (SEM9)", "tag mention (SEM11)" and "location stamp" (SPAT8)" are present in SP data thanks to the IT-features of the used tool. Concretely, these IT-features are provided through

on-screen buttons such as the ones using the following symbols: " 🖇 " and " 🔗 " for

attaching a file or a link, "@" or " 👥 " for tagging an entity and " 📍 " for stamping a location.

In Table 3.1., we conceptualize 7 affordances derived from online patterns that stakeholders seek to exercise to express their living contexts in SP data. As affordances are possibilities for actions, all proposed affordances are phrased as "Possibility to do an action" (e.g., "the possibility to attach a file", "the possibility to tag someone", and "the possibility to stamp a location"). In order to distinguish between patterns and their corresponding affordances, we used the following format: SEM_aX (affordance) for SEMX (pattern), SPAT_aY (affordance) for the pattern SPATY(pattern) etc.

Table 3.1. Affordances derived from online patterns

Dimension	Pattern/IT-feature	Affordance
Semantic	Attached link/file (SEM9)	Possibility to attach a link/file (SEM_a9)
	Hashtag (SEM10)	Possibility to highlight keywords/topics (SEM_a10)
	Tag_mention (SEM11)	Possibility to tag an entity (SEM_a11)
	Emoticon (SEM12)	Possibility to share an emotion (SEM_a12)
Spatial	Hashtag (SPAT7)	Possibility to highlight a spatial entity (SPAT_a7)
	Location stamp (SPAT8)	Possibility to stamp a location (SPAT_a8)
Temporal	Hashtag (TEMP6)	Possibility to highlight a temporal expression (TEMP6)

Our analysis of affordances and IT-features associated to online patterns' leads to the following observations. First, to help stakeholders express their living contexts in future SPPs, we suggest to extend IT-features associated to online patterns to further IT-based tools for SP. Second, based on these affordances, we suggest developing more elaborated IT-features in future to help stakeholders explicitly express their living contexts in their SP comments. For example, specific symbols could be designed for spatial and temporal hashtags to dissociate them from typical hashtags when it comes to identify spatial and temporal entities.

3.4.2. Affordances and IT-features for General patterns

Following our analysis of the general patterns detected in SP data, we note that the possibilities to identify these patterns are affordances that stakeholders seek to exercise to emphasize their living contexts in SP. For example, the patterns: "issues (SEM1)", "similar organization with defined position (SPAT3) and "past absolute CE (TEMP1), are associated with the following affordances that stakeholders seek to exercise: the "possibility to share an issue", the "possibility to share a similar organization with defined position" and the "possibility to share a past absolute CE". To help stakeholders explicitly express and decision-makers explicitly observe and understand the living contexts in SP, IT-features will be needed in future SP-tools.

In **Table 3.2.** we conceptualize affordances, from general patterns, that stakeholders seek to exercise to identify their living contexts in SP. We suggest that the IT-features for these affordances could be developed in future IT-tools to help stakeholders discover possibilities for automatically express their living contexts' in SPPs data.

Table 3.2. Affordances derived from general patterns

Dimension	Pattern	Affordance
Semantic	Issue (SEM1)	A possibility to express an issue (SEM_a1)
	Suggestion (SEM2)	A possibility to express a suggestion (SEM_a2)
	lived experience (SEM3)	A possibility to express a lived experience (SEM_a3)
	Number/metric (SEM4)	A possibility to express a Number/metric (SEM_a4)
	Governing entity (SEM5)	A possibility to express a Governing entity (SEM_a5)
	Reference (SEM6)	A possibility to express a Reference (SEM_a6)
	Question (SEM7)	A possibility to express a Question (SEM_a7)
	Compliment (SEM8)	A possibility to express a Compliment (SEM_a8)
Spatial	Internal entity with defined position (SPAT1)	A possibility to express an Internal entity with defined position (SPAT_a1)
	External entity with defined position (SPAT2)	A possibility to express an External entity with defined position (SPAT_a2)
	Similar organization with defined position (SPAT3)	A possibility to express a Similar organization with defined position (SPAT_a3)
	Spatial entity with hypothetical position (SPAT4)	A possibility to express a Spatial entity with hypothetical position (SPAT_a4)
	Spatial entity with approximated position (SPAT5)	A possibility to express a Spatial entity with approximated position (SPAT_a5)

	Cities, Provinces and countries (SPAT6)	A possibility to express Cities, Provinces and countries (SPAT_a6)
Temporal	Past absolute calendar expression (TEMP1)	A possibility to express a Past absolute calendar expression (TEMP_a1)
	Future absolute calendar expression (TEMP2)	A possibility to express a Future absolute calendar expression (TEMP_a2)
	Deictic calendar expression (TEMP3)	A possibility to express a Deictic calendar expression (TEMP_a3)
	Textual anaphoric calendar expression (TEMP4)	A possibility to express a Textual anaphoric calendar expression (TEMP_a4)
	Founded anaphoric calendar expression (TEMP5)	A possibility to express a Founded anaphoric calendar expression (TEMP_a5)

As SP data is intended to help decision-makers in their decision-making processes, the automatic identification of patterns generated through the use of IT-features would speed up the process of observing and understanding these patterns, and therefore helps improving decision-makers' responsiveness to stakeholders' living contexts.

3.5. Illustrative operationalization of affordances and IT-features for the identification of the stakeholders' living contexts in SP

In order to illustrate the operationalization of IT-features for the identification of the living contexts in SP data, we propose in **Figure 3.6** a set of semantic, spatial and temporal IT-features that could be provided to stakeholders as part of SP tools' IT-features to help them discover the actions to express their living contexts in SP data.

For each semantic, spatial and temporal pattern, a specific IT-feature is proposed for each pattern (see **Figure 3.6**).

In addition to sharing a comment, a participation platform including the proposed semantic, spatial and temporal IT-features (see **Figure 3.7.**), affords stakeholders to explicitly express their living contexts'. In this way, 'affordances and goal-directed actions to identify the living contexts' in SP data merge together in and through the interrelations between the constituent parts of semantic, spatial and temporal dimensions enabling automatic identification and

representation of the causal properties which are the stakeholders' living contexts'' (Elder-Vass, 2007, Cheikh-Ammar 2018).

Figure 3.6. Proposed IT-features for the automatic identification of stakeholders' living contexts in SP data

As argued through CR' principles, the proposed prototype platform (see **Figure 3.7.**) is a proof of concept for the mechanisms enabling to visualize how the stakeholders' perception about their living contexts' (initially as a conceptual entity in their opinions) could be translated into observable patterns, moving from the *real* to the *empirical* layer and favoring a better representation and understanding of the properties of the stakeholders' living contexts'. However, as affordances are possibilities for actions, stakeholders' may or may not use the proposed IT-features to express semantic, spatial and temporal properties of their living contexts'. When IT-features are not used, the identification of the living contexts may remain in the actual layer. This is the illustration of the first principle of real-actual-empirical stratification of CR through our prototype platform.

Regarding the second principle of CR "the temporal separation between structures and actions", our proposed platform is a proof of concept for the emergence of a new participation structure from stakeholders' actions (e.g. stakeholder' action: the implicit identification of a pattern in his SP comment). This new structure is based on new and elaborated IT-features resulting from the stakeholders' expression of patterns in SP data.

Figure 3.7. Prototype platform for the operationalization of IT-features for the stakeholders' living contexts' identification

Finally, regarding the third principle of CR, "the structures stratification", our prototype platform shows how causal properties which are the living contexts' may emerge from the interactions between the semantic, spatial, and temporal IT-features use. As our platform enable stakeholders to combine several IT-features from the three dimensions, it enables interactions between the dimensions rather than offering each of them individually (Volkoff & Strong 2013). The several possibilities to combine IT-features are outcomes possibilities for stakeholders using the prototype platform. Eventually, more sophisticated IT-features can be implemented such as "3D timelines IT-features" for temporal affordances and "3D geo-visualization IT-features" for spatial affordances (Lafrance et al 2019). Those proposed in this chapter are for illustrative purpose.

In the following example of SP comment from (case 1 introduced in chapter 2) (**Figure 3.8.**), we illustrate how IT-features could be used by a stakeholder to explicitly express its living context in SP data.

Figure 3.8. Example of the identification of the living contexts in an SP comment on the prototype platform

As information technologies evolve rapidly resulting on new IT systems emerging every day, we believe that our conceptualization of affordances and IT-features for the identification of stakeholders' living contexts in SP represent a relevant foundation to enhance the development of evolving IT features to enable the exercising each of the lowest level of semantic, spatial and temporal affordances in SP.

Conclusion

We established in this chapter a theoretical and conceptual analysis of SP patterns based on the theories of affordances and of critical realism. Indeed, the main findings of this chapter are a theoretical comprehension and a conceptualization of the affordances and the IT-features for the automatic identification of the stakeholders' living contexts in SP data. Therefore, we consider that this research represents a foundation to future research and projects aiming to design participatory technologies. The knowledge provided by this research would help to conceive and implement future generations of participative technologies favoring responsiveness and awareness to/about the living contexts of stakeholders through the detection of semantic, spatial and temporal dimensions that SP data

outstands. In addition, we consider that our findings offer a theoretical background for future participative technologies using artificial intelligence techniques. For example, future research could focus on implementing participation platforms which integrate artificial intelligence algorithms that automatically enable the semantic, spatial and temporal contextualization through automatic identification of patterns in SP data. Finally, we would like to emphasize that the IT features suggested in this research are for illustrative purposes. As new technologies evolve rapidly, emerging feature could be used and endowed with increased capacities of sense-making and increasingly sophisticated functionalities.

References

Archer, M. S. 1995. Realist Social Theory: The Morphogenetic Approach , Cambridge, UK: Cambridge University

Batty, M., Axhausen, K. W., Giannotti, F., Pozdnoukhov, A., Bazzani, A., Wachowicz, M., ... & Portugali, Y. (2012). Smart cities of the future. The European Physical Journal Special Topics, 214(1), 481-518.

Bhaskar, R. 1998a. "General Introduction," in Critical Realism: Essential Readings , M. S. Archer, R. Bhaskar, A. Collier, T. Lawson, and A. Norrie (eds.), London: Routledge, pp. ix-xxiv.

Carter, B., and New, C. (Eds.). 2004. Making Realism Work: Realist Social Theory and Empirical Research , London: Routledge.

Cheikh-Ammar, M. (2018). The IT artifact and its spirit: a nexus of human values, affordances, symbolic expressions, and IT features. European Journal of Information Systems, 27(3), 278-294.

Chouikh, A., Ojo, A., & Driss, O. B. (2016, March). Exploring the affordances of social media platforms in supporting emerging public service paradigms. In Proceedings of the 9th international conference on theory and practice of electronic governance (pp. 177-186).

Danermark, B., Ekstrom, M., Jakobsen, L., and Karlsson, J. C. 2002. Explaining Society, New York: Routledge.

DeLanda, M. 2006. A New Philosophy of Society : Assemblage Theory and Social Complexity , London: Continuum.

Elder-Vass, D. 2005. "Emergence and the Realist Account of Cause," Journal of Critical Realism (4:2), pp. 315-338.

Elder-Vass, D. 2007. "For Emergence: Refining Archer's Account of Social Structure," Journal for the Theory of Social Behaviour (37:1), pp. 25-44.

Fares, F., Taha, D. S., & Sayad, Z. T. E. (2018). Achieving public participation in inaccessible areas using virtual reality a case study of Beit Hanoun–Gaza–Palestine. Alexandria Engineering Journal, 57(3), 1821-1828.

Fleetwood, S. 2005. "Ontology in Organization and Management Studies: A Critical

Realist Perspective," Organization (12:2), pp. 197-222.

Gibson, J. J. 1986. The Ecological Approach to Visual Perception, Hillsdale, NJ: Lawrence Erlbaum Associates

Goodhue, D. L. (1995). Understanding user evaluations of information systems. Management Science, 41(12), 1827–1844.

Griffith, T. L., & Northcraft, G. B. (1994). Distinguishing between the forest and the trees: Media, features, and methodology in electronic communication research. Organization Science, 5(2), 272–285.

Griffith, T. L. (1999). Technology features as triggers for sensemaking. Academy of Management Review, 24(3) 472–488.

Jasperson, J., Carter, P. E., & Zmud, R. W. (2005). A comprehensive conceptualization of post-adoptive behaviors associated with information technology enabled work systems. MIS Quarterly, 29(3), 525–557.

Kahila-Tani, M., Kytta, M., & Geertman, S. (2019). Does mapping improve public participation? Exploring the pros and cons of using public participation GIS in urban planning practices. *Landscape and urban planning*, *186*, 45-55.

Lafrance, F., Daniel, S., & Dragićević, S. (2019). Multidimensional web GIS approach for citizen participation on urban evolution. ISPRS International Journal of Geo-Information, 8(6), 253.

Marttunen, M., Mustajoki, J., Dufva, M., & Karjalainen, T. P. (2015). How to design and realize participation of stakeholders in MCDA processes? A framework for selecting an appropriate approach. EURO Journal on Decision Processes, 3(1-2), 187-214.

Mingers,J. 2004a. "Re-establishing the Real: Critical Realism and Information Systems," in Social Theory and Philosophy for Infor- mation Systems , J. Mingers and L. Willcocks (eds.), Chichester, UK: John Wiley & Sons Ltd., pp. 372-406

Morton, P. (2006). Using critical realism to explain strategic information systems planning. JITTA : Journal of Information Technology Theory and Application, 8(1), 1.

Mutch, A. 2010. "Technology, Organization, and Structure - A Morphogenetic Approach," Organization Science (21:2), pp. 507-520.

Norman, D. A. 1988. The Psychology of Everyday Things , New York: Basic Books.

Savoli, A. (2014). Studying IT effects via functional affordances. Retrieved from http://biblos.hec.ca/biblio/theses/2014NO7.PDF

Volkoff, O., & Strong, D. M. (2013). Critical realism andaffordances: Theorizing IT-associated organizationalchange processes. MIS Quarterly, 37(3), 819–834.

Volkoff, O., Strong, D. M., and Eimes, M. B. 2007. "Technological Embeddedness and Organizational Change," Organization Science (18:5), pp. 832-848.

GENERAL CONCLUSION

In this thesis, we have been interested in the concept of Stakeholders Participation (SP) and to its added value for decision-makers. The objective was to offer a better understanding of SPPs within organisations in order to help organizations capture contextual information in SPPs data. SP is important for both stakeholders and organizations because it helps to increase responsiveness of organizations to stakeholders' living contexts. The main research question set in this thesis is:

How to capture the stakeholders' living contexts in stakeholders' participation processes (SPPs) data?

To meet this research question, three chapters of this thesis offered specific and complementary answers. First, a typology of issues as well as a conceptual model of SPPs dimensions were developed in Chapter 1, offering a multidisciplinary understanding of the issues that the implementation of SPPs faces. The typology is organized in nine categories, whereby, each category presents several factors that challenge the implementation of SPPs within organizations. The categories of issues are: *administration*, *economic*, *efficiency and effectiveness*, *ethical*, *political*, *legislative*, *stakeholders and social*, *technology* and *socio-economic*. Moreover, our conceptual model show that the categories of issues fit into four distinct dimensions and that, when it comes to implement SPPs in organizations, intra-dimensional and interdimensional influences exist among and within the four dimensions. These dimensions are: *Governance*, *Stakeholders*, *Application* and *Society*. Practical and research recommendations are provided to help both decision-makers and scholars mitigate these issues.

Second, Chapter 2 shed light on a specific issue that the implementation of SPPs face which is the identification of stakeholders' living contexts in SPPs. The findings increase the understanding of SPPs implementation by identifying and classifying the patterns to help decision-makers to capture the stakeholder's living contexts in SPPs inputs. Based on data collected from four case studies (from both traditional and online means) and qualitative analysis, our findings show that SPPs data are endowed with semantic, spatial and temporal patterns. We also show that the spatial and temporal patterns are complementary to the semantic patterns, enabling for example, to locate in space and time the issues that

stakeholders are facing in their daily life, the projects they suggest for their decision-makers and organizations to implement in the future etc. We argue the importance for decision-makers to capture and understand these patterns to ensure a decision-making that is consistent with and responsive to stakeholders' living contexts.

Finally, the theoretical analysis established in Chapter 3 offer a better understanding about the role that IT plays in highlighting the stakeholders' living contexts in SPPs. It conceptualizes the affordances and IT-features that are necessary for the identification of the living contexts in future participation tools. As SPPs generate data that decision-makers need to analyze to inform their decision-making processes, organizations need participation tools that facilitate the process of data collection and analysis. Our results inform decision-makers in terms of participatory technologies needs to take a better advantage from data and to make informed investments in terms of technology. Moreover, our results guide future research to develop participative technologies allowing the identification of stakeholders' living contexts from SPPs data, favouring better added value of SPPs collected data.

Scholarly Contributions

This thesis contributes to the understanding of the SPPs implementation within organizations in the SP literature. It answers to scholars calls to investigate the multidisciplinary nature of SP as well as to investigate the added value that SPPs data outstands. Hence, it offers a rich comprehension that is necessary to facilitate the integration of SPPs within organizations (Boudjelida et al., 2016; Freschi et al., 2009; Marzouki et al., 2017; Royo et al., 2014). The results of the three chapters offer a rich knowledge about how to effectively implement SP and capture stakeholders' living contexts to better inform decision-makers. This thesis provided three theoretical contributions to the field of SP: a conceptual model of SPPs dimensions of issues (Chapter 1), a semantic, spatial and temporal model for the stakeholders' living contexts identification in SPPs (Chapter 2), and a conceptualization of affordances and IT-features for the automatic identification of the living contexts patterns in SPPs (Chapter 3).

The conceptual model of SPPs dimensions of issues contributes to advancing SP research since it uncovers and categorizes the multidisciplinary issues facing the implementation of SPPs in organizations. As argued in (Freschi, Medaglia, & Nørbjerg, 2009; Roche et al.,

2012), interdisciplinary or transdisciplinary studies are needed to enhance participation processes in practice. With our study now serving as a baseline, future contributions could combine considerations of the application, governance, stakeholders, and society dimensions of issues to develop more informed and interdisciplinary participation approaches and guidelines.

The model of semantic, spatial and temporal patterns developed in chapter 2 can be exploited to capture and categorize the information about the stakeholders' living contexts in SPPs data (Teufl & Kraxberger, 2011; Teufl et al., 2009). The semantic, spatial and temporal patterns identified in Chapter 2 are complementary to previous research in the field. Previous data analysis techniques used for the analysis of SPPs data enable to categorize data according to general topics based on "words" detection and classification. Our analysis of SPPs data uses "expressions" rather than "words" and proposes a classification of patterns that are complementary to previous topics' detection techniques. This model contributes to building a more theoretical and analytical framework for the collection and analysis of data in the SP field.

The conceptualization provided in Chapter 3 contributes to SP literature offering a deep theoretical comprehension of the necessary affordances and IT-features for the identification of the stakeholders' living contexts in SPPs based on the theories of affordances and of critical realism. It contributes to building a theoretical view on the role of information technology in enhancing SPPs data collection and analysis, providing a robust theoretical foundation for the design of technologies specific to the SP field.

Practical contribution

This thesis offers practical contributions to decision-makers adopting and implementing SP in their organizations. First, organizations that implement SPPs do not necessarily consider the multidisciplinary issues of SPPs and don't take actions to mitigate these issues. Hence, SPPs risk to be ineffective and to miss the expected added value for decision-making within organizations (Marzouki et al., 2022). Providing decision-makers with multidisciplinary recommendations as well as a scenario of use to mitigate these issues help to enlighten their vision and to guide the actions they can take to face the issues and to make SPPs more effective. Second, this thesis provides decision-makers with knowledge about the value that

SPPs data can bring. Since a major challenge of decision-makers is to ensure that the living contexts of stakeholders are captured in SPPs data for an adequate comprehension of the stakeholders' inputs (Coe et al., 2001; Charalabidis et al., 2010; Bryson et al., 2013), this thesis provides empirical evidence about the value that SPPs data can bring through the identification and the categorization of the semantic, spatial and temporal patterns of the stakeholders' living contexts from real SPPs data. Finally, as IT is increasingly adopted in SP, the conceptualization of affordances and IT-features, as well as the prototype platform for the identification of patterns of the living contexts from participation data, provides decision-makers with a better understanding of the technologies needed to derive value from data and can guide them to adopt and integrate participatory tools. The operationalization of affordances and IT-features through the proposed prototype platform can help them to understand the practical role that IT tools play for the identification of stakeholders' living contexts patterns from SPPs data.

In Table 4.3., we present the summary of the contributions of the thesis' chapters.

Table 4.3. Summary of the contributions of the thesis' chapters

Research objective (G: General/ S: Specific)	Article 1	Article 2	Chapter 3
General research objective	**G:** Offering a better understanding of SPPs within organizations in order to help them capture contextual information in SPPs data		
Specific research objective	**S1:** Understanding the issues facing the SPPs within organizations	**S2:** Conceptualize the living contexts expressed in SPPs data	**S3:** Investigating the role of information technology in capturing stakeholders' living contexts the
Findings	Based on a systematic literature review, it	Based on a data from four case	Based on the theories of

	presents a multidisciplinary typology of SPPs issues and a conceptual model of SPPs dimensions issues. The article offers recommendations for research and practice to help organizations mitigate these issues.	studies, it identifies an empirical model of semantic, spatial and temporal patterns in SPPs data and a conceptual model for the stakeholders' living contexts identification in SPPs data.	affordances and critical realism, it offers a theoretical understanding leading to the conceptualization of the necessary affordances and IT-features for the identification of the stakeholders' living contexts in SPPs data.
Theoretical contribution	Contributes to SP literature through a multidisciplinary foundation for future research in this area and formulates recommendations for research.	The model of semantic, spatial and temporal patterns augments previous data analysis techniques and can be exploited to design frameworks and models for the stakeholders' living contexts in SPPs data in future research.	The theoretical understanding and the conceptualizations of affordances and IT-features represent a foundation that scholars can be based on to design and develop future tools.
Practical contribution	Presents a scenario of use in a real organizational context	Offers empirical evidence about the value that	Presents an operationalization of the proposed

	for the conceptual model of issues and formulates recommendations for decision-makers to apply in practice.	SPPs data outstands through the identification and the categorization of the patterns of the stakeholders' living contexts from real SPPs data.	conceptualization of affordances and IT-features through a prototype platform.

Limitations and Future Research

In addition to the aforementioned contributions of this thesis, there are limitations that need to be considered and that open avenues for future research. First, the findings of Chapter 1 are based on peer-reviewed academic literature. Moreover, we demonstrated the usefulness of our conceptual model of SPPs dimensions of issues on a single case study. Additionally, we have presented in Chapter 1 a limited set of recommendations to remedy issues presented in the conceptual model. Second, the analysis established in Chapters 2 and 3 has some limitations. The first limitation is related to not having taken into consideration data from all participation tools such as emerging participative technologies e.g. Volunteered Geographic Information (VGI) and 3D sophisticated visualization platforms. The choice of the participation tools in this study was guided by the nature of the targeted data which is mainly textual, and which was generated in a natural way. As sophisticated participation' tools are already endowed with spatial and temporal functionalities and IT features, pushing users to make sense and to appropriate these functionalities and to probably generate patterns different from those which are generated in a simple textual way (e.g. maps, visualization features), we have omitted to refer to this kind of tools since our objective was to understand the way living context is naturally expressed by stakeholders in SP data.

Several avenues for future research arise from this thesis. First, as participation is inherently about practice, useful future research could be based on grey literature (e.g. "relevant

information produced on levels of governments, business and industry where publishing is not the primary activity of the producing body" (Grey Literature Network Service, 2004) to complement the knowledge of SPP issues from practitioners' perspectives. Indeed, including grey literature could "broaden the scope to more relevant studies" (Mahood et al., 2014). So, it is useful to validate the results of academic, peer-reviewed studies to providing a more complete understanding of available knowledge and evidence (Benzies et al., 2006; Mahood et al., 2014). Second, the conceptual model of SPPs dimensions should be applied to more case studies to further show its usefulness and relevance. In this context, we believe that both researchers and practitioners still need more actionable recommendations to better assess the conceptual model. To this end, real-word experiences as documented in the grey literature could be used to develop these recommendations. Third, future research could investigate the possibility to implement artificial intelligence algorithms to automatically apply the semantic, spatial and temporal contextualization approach through automatic identification of patterns in SPPs data. According to Gartner's report on emerging technologies[7], incorporating machine learning enhances the decision-making process and provides valuable insights from large-scale data. Detecting semantic, spatial and temporal patterns through machine learning techniques could help capturing the living context form SP data and thus helping decision-makers make more effective decisions generating better outcomes and impacts. Finally, future studies could be based on our findings that are derived from "naturally occurring SP data" analysis to evaluate emerging participative technologies such as VGI and 3D sophisticated visualization platforms and to determine how much these tools are representative of stakeholders living context based on semantic, spatial and temporal patterns.

We believe that the adoption and the implementation of SPPs within organizations is crucial for decision-makers willing to be responsive to their stakeholders' living contexts. The findings of this thesis are only first steps on what needs to be done to go in that direction.

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[7]   http://www.gartner.com/document/3383817?ref=solrAll&refval=175496307&qid=34ddf525422cc7 1383ee22c858f2238a, Visited in 25/10/2016

REFERENCES

Benzies, K. M., Premji, S., Hayden, K. A., & Serrett, K. (2006). State-of-the-evidence reviews: advantages and challenges of including grey literature. Worldviews on Evidence-Based Nursing, 3(2), 55-61.

Bryson, J. M., Quick, K. S., Slotterback, C. S., & Crosby, B. C. (2013). Designing public participation processes. Public administration review, 73(1), 23-34.

Coe, A., Paquet, G., & Roy, J. (2001). E-governance and smart communities: a social learning challenge. Social science computer review, 19(1), 80-93.

Charalabidis, Y., Gionis, G., Ferro, E., & Loukis, E. (2010, August). Towards a systematic exploitation of web 2.0 and simulation modeling tools in public policy process. In International Conference on Electronic Participation (pp. 1-12). Springer, Berlin, Heidelberg.

Freschi, A. C., Medaglia, R., & Nørbjerg, J. (2009, September). A tale of six countries: eParticipation research from an administration and political perspective. In International conference on electronic participation (pp. 36–45). Berlin Heidelberg: Springer.

Grey Literature Network Service, 2004, Home: What is Grey Literature? - Grey Literature - LibGuides at California State University, Fullerton

Mahood, Q., Van Eerd, D., & Irvin, E. (2014). Searching for grey literature for systematic reviews: challenges and benefits. Research synthesis methods, 5(3), 221-234.

Marzouki, A., Mellouli, S., & Daniel, S. (2022). Understanding issues with stakeholders participation processes: A conceptual model of SPPs' dimensions of issues. Government Information Quarterly, 101668.

Roche, Stéphane, Nashid Nabian, Kristian Kloeckl, and Carlo Ratti. "Are 'smart cities' smart enough." In Global geospatial conference, pp. 215-235. 2012.

Royo, S., Yetano, A., & Acerete, B. (2014). (a). E-participation and environmental protection: Are local governments really committed? Public Administration Review, 74 (1), 87–98.

Teufl, P., & Kraxberger, S. (2011, August). Extracting semantic knowledge from twitter. In International Conference on Electronic Participation (pp. 48-59). Springer, Berlin, Heidelberg.

Teufl, P., Payer, U., & Parycek, P. (2009, September). Automated analysis of e-participation data by utilizing associative networks, spreading activation and unsupervised learning. In International Conference on Electronic Participation (pp. 139-150). Springer, Berlin, Heidelberg.