



HERMAN RESENDE SANTOS

**E-DEMOCRACY AND SOCIOPOLITICAL
DIGITAL INTERACTIONS:
ANALYSING CO-CREATION IN
PUBLIC SECTOR INNOVATION**

LAVRAS – MG

2015

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**(E-DEMOCRACIA E INTERAÇÕES SOCIOPOLÍTICAS DIGITAIS:
ANALISANDO A CO-CRIAÇÃO NA INOVAÇÃO DO SETOR PÚBLICO)**

Dissertação apresentada à Universidade Federal de Lavras, como parte das exigências do Programa de Pós-Graduação em Administração Pública – Curso Mestrado Profissional, área de concentração em Gestão de Organizações Públicas do Estado, para a obtenção do título de Mestre.

Orientador

Dr. Dany Flávio Tonelli

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APROVADO em 23 de fevereiro de 2015.

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LAVRAS – MG

2015

A Deus, pela vida.
Ao meu filho, Raí, pela alegria e a realização de ser pai.
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RESUMO

O objetivo geral deste estudo consistiu na construção de um panorama integrado entre e-democracia, interações sociopolíticas digitais e inovações do setor público. No intuito de compreender as possíveis relações entre esses conceitos, este estudo foi estruturado sobre a busca de respostas para a seguinte questão norteadora: Quais as conexões podem ser estabelecidas entre o processo democrático de interações sociopolíticas digitais e a geração de inovações colaborativas no setor público? Os seguintes objetivos específicos orientaram a realização desta dissertação de mestrado: a) Mapear, a partir de uma revisão de literatura, a produção acadêmica sobre e-democracia; b) Propor uma estrutura conceitual para análise das interações sociopolíticas digitais; c) Verificar, no âmbito do Governo Federal Brasileiro, a validade estatística de um modelo teórico de inovação colaborativa no setor público. Considerando-se que a geração de valores públicos, por meio de abordagens colaborativas, pode representar um fator estruturante para processos dialógicos de aprimoramento das políticas públicas, observa-se a relevância deste estudo que propõe ferramentas conceituais, para a análise, melhoria e design para tais processos. As três etapas de realização do presente estudo são descritas a seguir: A primeira etapa da pesquisa consistiu em uma revisão sistemática da literatura sobre e-democracia. O primeiro artigo intitulado: “A Systematic Review of E-democracy” teve como objetivo explorar e sistematizar a produção acadêmica e conceitos relacionados ao tema. A segunda etapa consistiu em uma investigação sobre o impacto das emergentes Tecnologias da Informação e Comunicação, em específico, da Web 2.0, sobre as interações digitais entre o governo brasileiro e cidadão. Neste artigo, intitulado “Sociopolitical Digital Interactions’ Maturity: Analyzing the Brazilian States”, foi proposto um quadro conceitual chamado Maturidade das Interações Sociopolíticas Digitais “Sociopolitical Digital Interactions Maturity” (SDIM), tendo sido qualitativamente validado pela sua utilização para avaliar o atual estágio de maturidade dessas interações por 27 websites dos estados brasileiros. A terceira etapa consistiu em um estudo quantitativo, denominado “Collaborative Innovation in the Public Sector: A case of the Brazilian Federal Government” cujo foco centrou-se na abordagem coletiva de colaboração voluntária passível de ser utilizada para a geração de inovações do setor público. A conexão entre estes três artigos baseou-se na ideia de que, no ambiente virtual, governo e sociedade estabelecem processos democráticos de interações sociopolíticas digitais, capazes de instrumentalizar a geração de inovações do setor público.

Palavras-chave: Arquitetura participativa. Design institucional. Governo centrado no cidadão.

ABSTRACT

The general objective of this study consisted of building an integrated background among e-democracy, sociopolitical digital interactions and public sector innovations. In order to understand the possible relations between these concepts, this study was structured on the search for answers to the following guiding question: What connections can be established among the democratic process of sociopolitical digital interactions and the generation of public sector collaborative innovations? The following specific objectives guided the conduction of this Master's thesis: a) To map, through a systematic literature review, the academic production about e-democracy; b) To propose a conceptual framework for analysis of the sociopolitical digital interactions (SDI); c) To verify, in the context of the Brazilian federal government, the statistical validity of a theoretical model of public sector collaborative innovation. Considering that the generation of public values, through collaborative approaches may represent a structuring factor for a dialogical process of public policy improvement, the relevance of this study can be seen, a study which proposes conceptual tools for analysis, improvement and design for such processes. The three steps in the conduction of this study are described as follows: The first stage of the research consisted of a systematic literature review of e-democracy. The first article entitled: "A Systematic Review of E-democracy" aimed to explore and systematize the academic production and concepts related to the theme. The second stage consisted of an investigation into the impact of the emergent Information and Communication Technologies, specifically the Web 2.0, on the digital interactions between the Brazilian government and citizens. In this paper, entitled "Sociopolitical Digital Interactions' Maturity: Analyzing the Brazilian States" a conceptual framework was proposed called Sociopolitical Digital Interactions Maturity (SDIM) which was qualitatively validated through its use to assess the current stage of maturity of these interactions through the websites of the 27 Brazilian states. The third stage consisted of a quantitative study, called "Collaborative Innovation in the Public Sector: A case of the Brazilian Federal Government" whose focus was centered on the collective approach of volunteer collaboration likely to be used for the generation of public sector innovations. The connection between these three papers was based on the idea that in the virtual environment, government and society establish democratic processes of sociopolitical digital interactions, capable to instrumentalize the generation of public sector innovations.

Keywords: Participative architecture. Institutional design. Citizen-centered government.

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LISTA DE ABREVIATURAS

(LIST OF ACRONYMS)

ANT	Actor-Network Theory
CAPR	Context, Actors, Processes, Results
CIMO	Context, Intervention, Mechanisms, Outcome
CIPP	Context, Inputs, Processes, Products
ICT	Information and Communication Technologies
IDP	Ideological Discourse Placements
SDI	Sociopolitical Digital Interactions
SDIM	Sociopolitical Digital Interactions Maturity

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FIRST PART

1 INTRODUCTION

The relationships between society and the State is one of the core objects of study of Public Administration. It contemplates a vast field of research and touches upon themes such as power relations, government regimes, social participation, engagement, public governance, public management models, etc.

Technological development, specifically that of information and communication technologies (ICT), has promoted significant changes in participative architectures and expanded the public space towards the digital environment, opening new avenues for democratic participation and instrumentalizing, through Web 2.0, concepts such as sharing and collaboration, the emergence of “new models of citizenship” (NAMBISAN; NAMBISAN, 2013, p. 6).

Based on the assumption that partnerships between government and citizens, may constitute a strategic process for the promotion of development, the general objective of this study was established and consisted of building an integrated background between e-democracy, sociopolitical digital interactions (SDI) (SANTOS; TONELLI; BERMEJO, 2014); and public sector collaborative innovations.

In order to understand the possible relationships between these concepts this study was structured on the search for answers to the following guiding question: What connections can be established between the democratic process of sociopolitical digital interactions and the generation of public sector collaborative innovation?

The following specific objectives guided the conduction of this Master's thesis:

- a) To map e-democracy academic production through a systematic literature review;
- b) To propose a conceptual framework for sociopolitical digital interaction analysis (SDI);
- c) To verify, in the context of the Brazilian federal government, the statistical validity of a theoretical model of public sector collaborative innovation.

Considering that the generation of public values through public sector innovations may represent a structuring factor for the improvement of public policies, the relevance of this study can be seen, as it is a study which proposes conceptual tools for analysis, improvement and design for such processes.

Public values may be understood as concrete governmental actions that “create the conditions for economic prosperity, civility in social relationships, and the advancement of justice” (Moore; Benington, 2011, p. 257). According to Mulgan (2007, p. 6) “public sector innovation is about new ideas that work at creating public value. The ideas have to be, at least in part, new (rather than improvements); they have to be taken up (rather than just being good ideas); and they have to be useful”.

The perception of the intrinsic advantages related to the capacity to generate strategic knowledge through processes of capture and use of collective intelligence leads to the importance of planning Governmental policies of participation and intelligence.

The efficient combination among these factors may consist of a precious asset capable to constitute government strategic advantage giving support to the formulation of answers to complex challenges and to the improvement public values generation processes in non-linear and unpredictable environments.

In parallel to the opening of new digital avenues for democratic participation and cooperation, which may optimize the processes inherent the policy cycle, for the provision of public services and the government performance itself, it is necessary to consider from a critical perspective that these processes may also be used as neoliberal tools for the maintenance of the “political-economic *status quo*” (ROY, 2015, p. 61).

2 THEORETICAL BACKGROUND

The research approaches focused on interactive processes between state and non-state actors leads to the concept of Networked Governance, pointed out by Benington and Hartley (2001) as one of the three main categories of governance and public management models in the post-war period, which is based on partnership and is oriented to public value generation.

States are complex organizations, composed by entangled political arrangements made up of collective and personal interests that lead even to contradictory actions and planning. Critical reflections about the role of the State and the very nature of the sociopolitical interactions steer the perception of a basic duality related to the states' adoption of market-centric and/or of citizen-centric government models.

A possible theoretical location for the perception and the critiques related to the two faces of the sociopolitical interactions may be sustained by the contractualist approach to the origins of the State, which specifically comprises the visions of Marx and Rousseau. Marx sees in the very nature of the State, its function as an instrument of social domination used by rich classes to promote the defense of its economic interests; whereas Rousseau observes these characteristics as an institutional disfunction of the state.

The conflicting nature of the orientations of the State, leads to a fundamental duality intrinsic to government actions: to defend the economic interests of the administrative elite and consequently maintain the political-economic status-quo or to promote the common good, the plural access to resources and the design of inclusive power relations. These antagonistic and even complementary perspectives design the complexity of government-society power arrangements and networks. These ambiguous characteristics inherent in the State and the sociopolitical interactions "can also be seen as competing, in

that they co-exist as layered realities [...] with particular circumstances or contexts calling forth behaviours and decisions related to one or the other conception” (HARTLEY, 2005, p. 29).

The digital collaborative processes are able to produce hegemonic or sustainable (counter-hegemonic) public values, reinforcing the understanding about the potential of public policies on reinforcing the maintenance of the “political-economic *status quo*” or promoting emancipative consciousness. According to Roy (2015) the principal perspectives related to the possible developments of collaborative processes refers to the following perspectives.

2.1 Citizen-centric perspective

A government committed to opening and fostering the provision of transparent public information, dialogical communications and sociopolitical collaboration steer the conduction of public policies to the promotion of basic conditions for human dignity; the full access to civil, political and social rights; and the formulation of discourses and practices capable to promote emancipation and democratic pluralism.

According to this perspective, collaborative processes have the potential to improve democracy and public management processes; to empower people in the defense of public interests; to increase the capacity to mobilize and contest, to foster democratic engagement through the promotion of civic culture, political education, social participation and society politicization.

This government perspective is based on the alignment among social, political, economic and environmental issues and education is considered the cornerstone of strategic advantages for the promotion of sustainable development.

2.2 Market-centric perspective

The hegemonic neoliberal paradigm in which government and society are immersed, is characterized by the commitment of the states to the competitive logic of market expansion (BRENNER; THEODORE, 2002; PECK; TICKELL, 2002).

The concepts mentioned by Roy (2015, p. 61) as “political-economic status quo”, “naturalized order of domination” (Roy, 2015, p. 60), “neoliberal power geometries” (Roy, 2015, p. 62) represent almost insurmountable barriers to government promotion of counter-hegemonic discourses and practices, which are deeply engaged with the improvement of the state economic performance in a globalized market context.

The prevalence of economic growth over environmental and socio-cultural needs; the promotion of the “market-centric state agenda” (ROY, 2015, p. 59); the protection of the elites and capital owners interests; the imposition and maintenance of “political-economic status quo” (ROY, 2015, p. 61); the promotion of depoliticization and annulation of possible “counter hegemonic developments” (ROY, 2015, p. 59); consist of guiding directives of government actions, which in this way, influence the very nature of the sociopolitical interactions.

From this market-centric perspective, collaborative processes are seen as tools, capable of involving people in superficial games of cooperation that deviate the public attention from the possibility to challenge the power relations, moving, at the same time, the state’s responsibility over private actors. In this way, collaborative governmental manouvers may consist of intentional strategies for the distraction of people, which are based on the allowance of decisions on small things, inside restrict polical systems in which what is appropriate and acceptable is previously defined.

Within these neoliberal hegemonic projects prominent trends may be observed such as, the decrease of critical conscience and critical reflexions; the depoliticization processes that undermine the social capacity of agency and resistance; the creation of a illusion of democracy; and superficial citizens' empowerment, that instrumentalize the strategy of "making power inequalities invisible" (ROY, 2015, p. 61).

In this context, co-creation may comprise an important tool for the promotion of neoliberal hegemony, if it contributes to the increase of government competitive strategic advantage, predominantly in the economic field, followed by the depoliticization of society.

A critical perspective on the public governance processes which may comprise co-creation, is provided by Santos (2005). The author considers the governmental openness to civic participation as illusory democratic processes, pointing out that when governments allows social participation, it is restricted to punctual objectives, which happen inside a pre-established range of conduct norms that do not contemplate the possibility to question the neo-liberal paradigm and status-quo of power relations.

In spite of the perception of the limits of co-creation, it may represent an important tool for the promotion of citizen empowerment, social politicization, democratic and governmental improvement.

2.3 Actor-Network-Theory

The interpretative theoretical lens of Actor-Network-Theory – ANT has permeated the analyses developed through this work. According to ANT "entities are hybrid [...] and the process of construction of reality occurs simultaneously and inseparably based on human and non-human elements" (TONELLI, 2012, p. 5).

A key feature related to the ANT approach refers to the socio-technical nature of networks and the perception that human and non-human actors transform each other and consequently the reality through interactive processes. The continuous re-configurations of power arrangements, involve the establishment of new self-concepts and leads to the idea of reality transformation. Technology, for instance, empowers humans and organizations conferring new capacities and potentials to them; at this point ANT conceives the emergence of new actors, that are more than the sum of human and non-human elements.

From this perspective sociopolitical digital interactions consist of more than government-citizen relations instrumentalized by ICTs; through the ANT perspective, the relationships established between these hybrid actors are able to generate new citizens and new governments, endowed with increased capacity to work with information, to communicate and to collaborate.

Considering that through interaction processes human and non-human actors transform and create reality, one can observe the relevance of the connections established between hybrid actors and networks in the generation of sociopolitical changes, that leads to the perception that “social structure is not a noun but a verb” (LAW, 1992, p. 385) in a continuous process of change.

The perception that human and non-human elements compose technological and sociopolitical hybrid systems results in the consideration that the digital relations among citizens and governments represent the possibility of opening new public governance horizons, but the core questions remain about the very nature of the power relations.

2.4 Research Model

This study consists of the design of correlations among e-democracy, sociopolitical digital interactions and public sector collaborative innovation. The location of these concepts within a conceptual scheme was proposed intending to provide a systemic vision of the relationship among the papers that compose this Master's thesis.

Reframing CIPP model for evaluation of programs, projects, personnel, products, institutions, and systems (STUFFLEBEAM, 2003) composed of (Context, Inputs, Processes and Products); and the Denyer and Tranfield (2009) CIMO model (Context, Intervention, Mechanisms, and Outcome) which points out specific critical dimensions for investigation, the CAPR conceptual scheme was developed specifically for this research,.

The CAPR conceptual scheme (see Figure 1) was used as the main structure of this study guiding the integrative perspective among its constituent elements: (i) Context, (ii) Actors, (iii) Processes and (iv) Results.

Analysing this study from the CAPR perspective, it is possible to observe its structuring function in the conduction of the articles. The first paper "A Systematic Review of e-democracy" provided ideas related to the CONTEXT, understood as the digital environment where the PROCESSES of democratic relationships among the ACTORS (human and non-human; state and non-state) in a specific government and society are established. The second paper called "Sociopolitical Digital Interactions' Maturity: Analyzing the Brazilian States" explores the maturity levels of democratic interaction (process) among Government and society (actors) in the digital environment (context). The third paper, called "Collaborative Innovation in the Public Sector: A case of the Brazilian Federal Government" explores the collaborative processes of

generation of Public sector innovations, which comprises the generation of outputs (results), of new public values.

Following this rationale it is observed that the CAPR conceptual scheme ordinales this socio-technical approach about governance networks. The connection between these concepts is based on the idea that in the digital environment, government and society establish democratic processes of sociopolitical digital interactions, capable to instrumentalize the generation of public sector innovations.

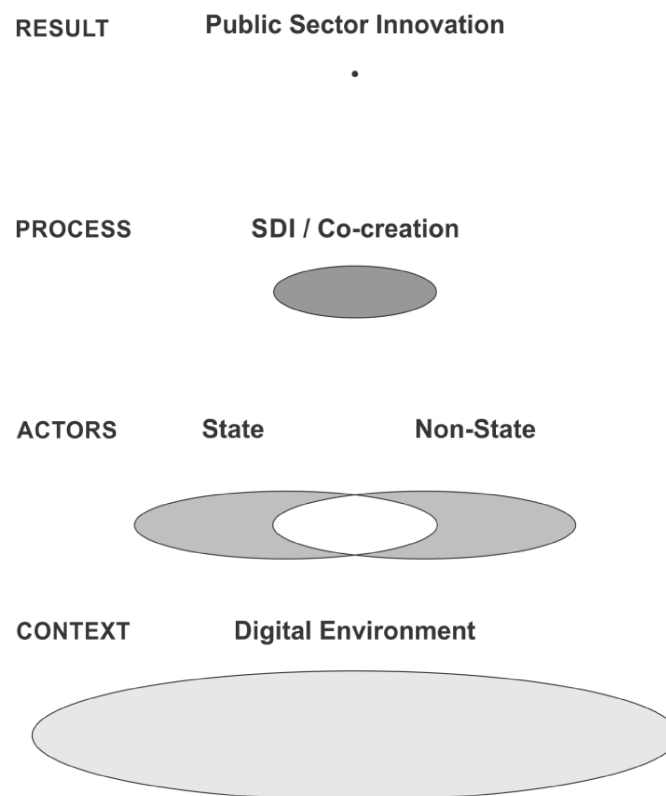


Figure 1 Conceptual Scheme of the study (CAPR)

3 GENERAL CONSIDERATIONS

The completion of this Master's thesis through articles, involved issues related to the structuring of research on sequential, complementary and coordinated discussed topics.

The dismemberment of the general objective into specific studies designed the rationale of this study. Each one of the articles that compose this academic project was conducted following a logical sequence, that outlines the research model and connects e-democracy, sociopolitical digital interactions and public sector innovations.

One of the perceived advantages related to the conduction of this study through articles consisted of the possibility of gradual validation and review feedbacks; as in the case of the first paper "Possibilities and Limits of E-participation: A Systematic Review of E-democracy", accepted for publication and presented in the EnANPAD 2014; and then formally submitted on January/2015 to the journal: Transforming Government: People, Process and Policy (TGPPP) under the name: A Systematic Review of E-democracy; and the second article "Sociopolitical Digital Interactions' Maturity: Analyzing the Brazilian States" accepted for publication and presented in the 20th Americas Conference on Information Systems, held in August, 2014 in the United States, whose extended version was published on January/2015 in the International Journal of Electronic Government Research (IJEGR).

The three steps of conduction of this study are described as follows:

The first stage of the research consisted of a systematic literature review of e-democracy. The article entitled: "A Systematic Review of E-democracy" aimed to synthesize conceptual links and propose a structured analysis of the theme through a systematic review of the last five years of academic discussions on e-democracy.

The second stage consisted of an investigation into the digital interactions between the Brazilian government and citizen. In this paper, entitled “Sociopolitical Digital Interactions’ Maturity: Analyzing the Brazilian States” a conceptual framework was proposed called Sociopolitical Digital Interactions Maturity (SDIM) which was qualitatively validated through its use to assess the current stage of maturity of this interactions through the websites of the 27 Brazilian states.

The third stage, entitled “Collaborative Innovation in the Public Sector: A case of the Brazilian Federal Government” consisted of a quantitative study, whose focus was centered on the collective approach of volunteer collaboration likely to be used for the generation of public sector innovations. The purpose of this study was to verify, in the context of the Brazilian federal government, the statistical validity of a theoretical model about the public sector collaborative innovation, composed of three constructs: Co-creation (understood as an interactive process of collaborative conception and construction of solutions/actions); Public sector innovation (previously defined in p.13) and Innovation ecosystem (related to organizing structures of collaboration among communities and actors). The software AMOS SPSS was used to analyse the empirical data through Structural Equation Modeling (SEM).

Intending to provide an integrated view of the three stages of this Master’s thesis, a research matrix was developed, based on Mazzon (1981).

Table 1 Research Matrix

Master's Thesis	Research Objective	Guiding Questions	Methodology
E-DEMOCRACY AND SOCIOPOLITICAL DIGITAL INTERACTIONS: ANALYSING CO-CREATION IN PUBLIC SECTOR INNOVATION	Build an integrated background between e-democracy, sociopolitical digital interactions (SDI) and public sector innovations; develop and test conceptual and theoretical models	What connections can be established among the democratic process of sociopolitical digital interactions and the generation of public sector collaborative innovation?	Master's Thesis including Journal Articles (Quali-Quant approach)
Article 1			
A Systematic Review of E-democracy	To synthesize conceptual links and propose a structured analysis of the theme through a systematic review of the last five years of academic discussions on e-democracy	What conceptual links can be established through this e-democracy systematic review?	Systematic literature review
Article 2			
Sociopolitical Digital Interactions' Maturity: Analyzing the Brazilian States	To propose a conceptual framework of understanding the levels of sociopolitical digital interactions' maturity (SDIM) and assess sociopolitical interactions currently observed in Brazilian states' websites	(1) how can the sociopolitical digital interactions' maturity levels be classified; and (2) what is the current developmental stage of digital sociopolitical interactions in Brazilian states' governmental websites?	27 Brazilian state government websites analysis, structured on the conceptual scheme SDIM
Article 3			
Public Sector Collaborative Innovation in the Context of Brazilian Federal Government	To verify, in the context of Brazilian federal government, the theoretical validity of a descriptive model of the process of public sector collaborative innovation	Which theoretical model can explain the process of collaborative public sector innovations?	The software AMOS SPSS was used to analyse the empirical data through Structural Equation Modeling (SEM).

Source: Adaptated from Mazzon (1981)

A general perspective on the three stages of this study leads to the perception of its main contributions as well as to an integrated view of its main findings.

3.1 Main Contributions

- a) Conceptual Scheme of the study - Context, Actors, Processes, Results (CAPR);
- b) Classification framework - Ideological discourse placements (IDP);
- c) Diagram - Core elements of e-democracy;
- d) Conceptual framework - Sociopolitical Digital Interactions' Maturity (SDIM);
- e) Theoretical model - Public Sector Collaborative Innovation.

3.2 Integrated view of findings

Given the great complexity involved in the “civil empowerment” process, the importance of open government data and open discussion channels between the society and the government are a fundamental requirement for promoting practical sociopolitical co-creation. In this sense, the induction of social empowerment implies in reviewing ideological positioning and the promotion of changes in the power structure and political culture.

Conceptual reflexions about e-democracy points out its potential to reshape social and political structures, if rethought of as a means of promoting social access to resources (KALLIO; KÄKÖNEN, 2002). In this way participative architectures based on processes of sharing decision-making power may lead to important sociopolitical interaction improvements, based on the

political and civic culture convergence with the need for transformation of political actions through public administration reforms.

At the same time that the perception of the paucity of co-creative tools on Brazilian government websites indicates a lack of government openness to a government-citizen collaborative model, that reinforces the current traces of highly concentrated political power and the late development of a civic culture, it is observed that it is not possible to infer the level of institutional democratic governmental development by checking the Sociopolitical Digital Interactions' Maturity (SDIM) of a government's website.

The perception of Brazilian federal government representatives that co-creation consists of a process capable to generate public sector innovation, which in turn leads to the development of the innovation ecosystem leads to the finding that co-creation may represent a key asset for the formulation of answers to complex challenges and the improvement of the public value generation processes in non-linear and unpredictable environments.

The capacity to generate public sector innovations through digital co-creative processes leads to the importance of planning government intelligence and e-participation policies which may consist of a key directive for the achievement of governmental strategic advantage and of social politicization.

In response to the research guiding question: What connections can be established among the democratic processes of sociopolitical digital interactions and the generation of public sector collaborative innovations? It was perceived that if the democratic processes are rethought as a means of promoting social access to public values, the sociopolitical digital interactions, specifically the co-creation, may represent an important tool for the generation of public sector innovations, governmental strategic advantages and sustainable development.

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SECOND PART - ARTICLES**ARTICLE 1 A SYSTEMATIC REVIEW OF E-DEMOCRACY ¹**

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Article formatted according to the standards of the Journal Transforming Government: People, Process and Policy (TGPPP). A previous version of this paper called: Possibilities and Limits of E-participation: A Systematic Review of E-democracy, was published and presented at EnANPAD 2014. Acknowledgements to Dr. Muhammad Mustafa Kamal.

¹ According to Tranfield et al. (2003) the systematic review may be structured using a three-phase approach which comprises: planning the review; conducting the review process; reporting and disseminating the results. Tranfield et al. (2003) do not point out specifications regarding the size or the kind of study samples analyzed, which are defined in the planning process. For this reason, even covering a small sample of papers in the proposed analysis, the methodology adopted in this article was considered as a systematic review, since it adopts the specified three-phase approach.

1 ABSTRACT

Purpose – This study was conducted to address the lack of systematic revisions about e-democracy. The purpose is to synthesize conceptual links and propose a structured analysis of the theme through a systematic review of the last five years of academic discussions on e-democracy.

Design/methodology/approach – A systematic literature review was carried out in order to answer the following question: What conceptual links can be established through this e-democracy systematic review?

Findings – Given the complexity of interests intrinsic to power relations, the establishment of new configurations of sociopolitical structures are seen as the only option to promote effective connections between citizens' e-participation and the real processes underlying public policies. The market-centric-government models need to be gradually replaced by sustainable models of government centred on citizens, education for sustainability, consciousness of public value and citizenship promotion as the foundation for the transformation of society, politics, governments and democracy.

Research limitations – Among the study's limitations, the methodological criteria for the selection of articles led to not exploring important published works, thereby limiting, for instance, the time period of publication to five years, only analysing journal articles and only choosing from three bibliographic databases.

Originality/value – Two conceptual diagrams were developed and used as analytical tools in this systematic review. They could be employed by academics and practitioners as a guidance framework for empirical studies and public policy design.

Keywords: political culture, citizenship, public value, sustainability.

Paper type: Literature review

2 RESUMO

Objetivo – Este estudo foi realizado para suprir a falta de revisões sistemáticas sobre e-democracia. O objetivo foi sintetizar elos conceituais e propor uma análise estruturada do tema por meio de uma revisão sistemática dos últimos cinco anos de discussões acadêmicas sobre e-democracia.

Projeto / metodologia / abordagem – A revisão sistemática da literatura foi realizada, a fim de responder à seguinte pergunta: Quais elos conceituais podem ser estabelecidos por esta revisão sistemática sobre e-democracia?

Conclusão – Dada a complexidade dos interesses intrínsecos às relações de poder, o estabelecimento de novas configurações de estruturas sociopolíticas é visto como a única opção para promover conexões efetivas entre e-participação cidadã e os reais processos subjacentes às políticas públicas. Os modelos de governo, centrados no mercado, precisam ser gradualmente substituídos por modelos sustentáveis de governo, centrados nos cidadãos, educação para a sustentabilidade, consciência de valor público e promoção da cidadania como base para a transformação da sociedade, da política, dos governos e democracia.

Limitações da pesquisa – Entre as limitações do estudo, os critérios metodológicos para a seleção de artigos levou a não exploração de importantes trabalhos publicados, limitando, assim, por exemplo, o período de tempo de publicação a cinco anos, apenas analisando artigos de jornal e somente escolhendo-os a partir de três bases de dados bibliográficos.

Originalidade / valor – Dois diagramas conceituais foram desenvolvidos e utilizados como ferramentas analíticas nesta revisão sistemática. Eles poderiam ser utilizados por acadêmicos e profissionais como um quadro de orientação para estudos empíricos e formulação de políticas públicas.

Palavras-chave: Cultura política. Cidadania. Valor público. Sustentabilidade.

Tipo de artigo: Revisão da literatura.

3 INTRODUCTION

In the literature, the definitions of electronic democracy vary considerably, some of which include the digitalization of the democratic processes; administrative optimization; deliberative or direct democracy; communication between society and government; expansion of democratic participation; political culture transformation and e-governance. For this reason, Kardan and Sadeghiani (2011) observed that there is no consensus on the definition and use of the term 'e-democracy'. The increasing transparency of the information flows; the facilitation of the coordination of activities between geographically dispersed citizens and actors; and the external visibility of government-citizen interaction platforms (Rhue and Sundararajan, 2013) are important characteristics of the relationship between technology and democracy which promote new perceptions about the transformational possibilities and limits of e-democracy.

The intense development of information and communication technologies (ICTs) and the increasing influence of values and concepts inherent to Web 2.0, such as interactivity, sharing and collaboration, induce the design of new participative architectures. These new participative architectures, in turn, lead to legal, technological, organizational, cultural and political challenges. E-democracy may represent a viable way to promote important changes in sociopolitical structures related to perceptions regarding the essentiality of the culture. Culture supports the power arrangement configurations and enables possible transformations of processes, people, government and policy. In order to understand the current academic debate on the topic of e-democracy, this study consisted of a systematic literature review and was guided by the following research question: What conceptual links can be established through this systematic review of e-democracy?

This article has been structured into five sections. After the introduction, the conceptual part of the Research Protocol is presented in Section 2; the methodological approach is discussed in Section 3; the review is conducted in Section 4 and Section 5 features a conclusive report.

4 RESEARCH PROTOCOL (First Part)

Vedel (2006) proposed an overview of the historical process of the development of e-democracy articulated in three phases comprising the periods 1950–60, 1970–80 and 1990–2000. According to Vedel, the first phase is called the ‘governing machine’, which refers to a view of optimization of the administrative machinery of the state. The second phase, ‘Teledemocracy to enhance social links’, is focused on the ‘revitalization of social connections among citizens’. The third phase, ‘Cyber-democracy as a new polity’, consists of the idea of creating a new political space. The conception of a virtual political space is related to the idea of digital multi-stakeholder democratic engagement platforms where sociopolitical digital interactions happen. This virtual political space is understood as ‘the bottom-up and top-down dynamics of a government-citizen democratic relationship instrumentalized by the ICTs’ (Santos, Tonelli, Bermejo, 2014, p. 4).

Singh and Walsh (2012) observe that the main focus of the e-democracy literature is addressing the challenges of expanding and encouraging citizen participation in democratic improvement through a digital environment. According to Harrison et al. (2012), studies on e-democracy usually focus on the relationship between ICTs and their potential to ‘amplify the political voice of ordinary citizens’ (Hindman, 2008, p. 6). In this sense, Arterton (1998, p. 627) points out that ‘As communication technologies erode the mediating roles played by secondary leadership, citizens and public officials interact directly with each other more intensively and more frequently’. Among several critical approaches of digital environments specifically concerning the Web 2.0 dynamics of government-society relations, it may be observed that the Internet has generated new modalities of social exclusion (i.e. the digital divide) and increased social control through big data policies. According to Hindman (2008, p. 142), ‘The persistence of the digital divide makes the failures of pluralism and online deliberation even more salient’. Observing, for instance, the relevance of open data for e-democracy as a basic resource for collaborative practices of improvement of governmental accountability and transparency, it may be noted that the ability to program and manipulate codes is a decisive digital divide that limits e-participation.

Considerations about the potential of Web 2.0 in empowering or apoliticizing society relates to the same critiques of the real purpose of public governance mechanisms posed by Santos (2005) and also resonate with the criticism of online deliberation. Santos (2005) observes that public governance may be used as an illusory mechanism of democratic engagement and participation in which superficial questions are debated and possibly decided through predetermined conditions that do not include questioning or challenging deep or structural power relations. Despite all the criticisms, human interactions through the digital environment are producing relevant cultural changes, and in this way ICTs may be considered an important element in the promotion of sociopolitical transformations.

At this point, considering the main question about the relationship between democracy and e-democracy, Kallio and Käkönen, J. (2002, p.3) point out that it may be structural.

...the problem could be that both politics and democracy do not anymore have a real meaning in current political structures and therefore people are losing their interest in politics. In case this is a justified conclusion, e-democracy fails to increase democracy. It only creates an illusion of democratic participation. In case the problem is more structural than just lack of participation, the whole question about e-democracy has to be connected to de and re-construction of social and political structures.

The association between ICTs and e-democracy's core features, namely the instrumentalization of horizontal relations and its potential for transforming the government-citizen interactions, are addressed by several authors who analyse their impact on the design of new arrangements of political power (Silva, 2005). Although ICTs may have induced the popular desire for democratic participation, their predominant use in the participative processes has been focused on optimizing internal administrative procedures (i.e. the governing machine) rather than transforming political actions and political culture (Insua, 2008). Even if significant progress has been made regarding the provision of information and public services, dialogue and collaboration (the central dimensions of democratic governance) remain largely unrealized in the digital context (Roman and Miller, 2013). According to Coleman (1999, p. 17), this can

be explained by the understanding that ‘The factor which determines whether ICTs serve as a democratizing force is the political culture in which they develop’.

The intrinsic complexity of e-democracy programs relates to the plurality of legal mechanisms and the ideological and socio-technical values regarding political power distribution through digital multi-stakeholder democratic engagement platforms. Chadwick (2008) observes that the main challenge inherent in e-democracy programs is the establishment of connections between citizen e-participation with the real processes inherent in public policies. Considering the very nature of transparency, participation and collaboration in the context of government actions, Harrison et al. (2012, p. 83) suggest that ‘these processes should be viewed as means toward desirable ends, rather than administrative ends in themselves, as they appear to be currently treated’. This study was carried out in order to answer the following question: What conceptual links can be established through this systematic review of e-democracy? The purpose of this paper is to systematically review the current academic discussions on e-democracy, synthesise conceptual links and propose a conceptual structures for analysis of the theme.

5 METHODOLOGY

According to Mulrow (1994, p. 597), systematic review is a ‘fundamental scientific activity’ as it enables researchers to identify ‘key scientific contributions to a field or question’ (Tranfield, Denyer and Smart, 2003, p. 209). This study adopted a systematic literature review and its methodology design was based on the procedures proposed by Tranfield et al. (2003, p. 220) who observe that ‘The aim of systematic review is to provide collective insights through theoretical synthesis into fields and sub-fields’. The authors note that the main stages of a systematic review are as follows: (I) Planning, (II) Conducting and (III) Reporting. This study was likewise conducted in three distinct phases. Phase (I) was presented in the introduction (under subsection 1.1) and in the methodology (on subsection 3.1); Phase (II), which consisted in conducting the systematic review, is presented in Section 4; and Phase (III), i.e. Reporting, is presented with the conclusions in Section 5.

5.1 Research Protocol (Second Part)

This second part of the research protocol describes the criteria used to define the sample; the search strategy; the criteria for inclusion or exclusion of the articles; the information extraction and the analysis procedure.

5.1.1 *Sample definition*

The definition of the sample was based on a priori criteria for the definition of the indexed databases where they could be found, namely SAGE Journals online, Elsevier SCOPUS and Web of Knowledge Search Cross (Thomson Scientific / ISI Web Services). The second criteria that defined the initial amount of samples consisted in the use of the term 'e-democracy' as the keyword of the research.

5.1.2 *Search strategy*

The identification of the studies followed the Selection Criteria which consisted in filtering three times.

- Filter 1 - defined that works should be published since 2008;
- Filter 2 - concentrated on finding documents within the topics of Social Sciences / Public Administration / Social Sciences and Humanities; and
- Filter - 3 consisted in verifying whether the document was an article.

5.1.3 *Inclusion and exclusion criteria*

The Reading Criteria also consisted in filtering three times.

- Filter 4 - verification of the compatibility between title, abstract, keywords and the study's objectives;
- Filter 5 - gauging the affinity between introduction and conclusion, and the work's scope;
- Filter 6 - checking whether the results presented in the articles met the research objectives.

5.1.4 Information extraction

This process consisted of the following two procedures:

- The first procedure consisted in the identification of the methodological approaches and the main findings of the analysed papers (Table 3).
- The second procedure consisted in the identification of the most current words in the introduction and keywords of the 12 analysed papers utilizing the free IBM software called Manyeyes (Figure 2).

5.1.5 Analysis procedure

Three procedures were employed in order to analyse the main findings (which can be found in Table 3).

- First, the article's methodological approaches were analysed.
- The second procedure consisted in locating of the main findings of the analysed articles using the conceptual tool called E-democracy Core Elements (Figure 3).
- The third procedure consisted in the identification of the predominant ideology of the main findings through the use of the conceptual classification scheme called Ideological Discourse Placements (IDP) (Table 4).

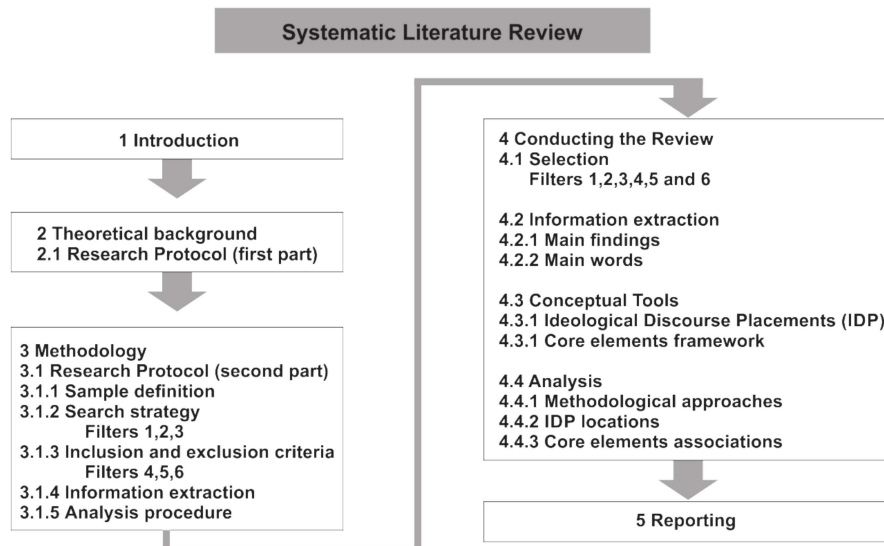


Figure 1 : Adapted from Tranfield et al. (2003); Colicchia and Strozzi (2012)

6 CONDUCTING THE REVIEW

6.1 Selection

After establishing the indexed databases (SAGE Journals online, Elsevier SCOPUS and Web of Knowledge Search Cross) and the keyword (e-democracy), 1044 documents were found on August 17, 2013. The following search filters were then applied: Filter 1 (works should be published since 2008); Filter 2 (delimitation of research areas: Social Sciences / Public Administration / Social Sciences and Humanities); and Filter 3 (verification whether the document was an article). After completing this process, 189 articles were selected.

SEARCH CRITERIA		Total Gross	Filter 1	Filter 2	Filter 3	Total
keyword search: <i>e-democracy</i>		E-democracy	≥ 2008	Research Areas	Articles	Partial
BASES						
1	SAGE Journals Online	324	165	163	89	89
2	SCOPUS Elsevier	439	257	100	82	82
3	Web of Knowledge	281	145	27	18	18
	Results	1044	567	290	189	189

Table 1: Search criteria, partial total

Next, the filters referring to the reading criteria were applied. Through Filter 4, the compatibility between the titles, abstract, keywords and the study's objective was verified; Filter 5 consisted in reading the introduction and conclusion, and gauging the affinity with the work's scope; and Filter 6 checked whether the results presented in the articles met the research objectives. Among the 189 selected articles, only 14 papers met the selection/reading criteria through the filtering processes.

READING CRITERIA		Total	Filter 4	Filter 5	Filter 6	Total
		Partial	Title Abstract Keyword	Introduction Conclusion	Meets the research objectives	
BASES						
1	SAGE Journals Online	89	5	1	1	1
2	SCOPUS Elsevier	82	14	12	11	11
3	Web of Knowledge	18	6	6	2	2
	Results	189	25	19	14	14

Table 2: Reading criteria, total

6.2 Information Extraction

The remaining 14 studies were read in full and the methodological approaches and the main findings of the analysed papers were identified.

6.2.1 Main Findings

N°	Author(s)	Year of Publication	Study Type	Findings
1	Åström, J.; Granberg, M.; Khakee, A.	2011	Exploratory study	E-participation has not had any significant impact on the question of powersharing. Power sharing requires more than just innovations in ICTs. (p. 583)
2	Črnič, T. O.	2012	Exploratory study	Evidences concerning the use of new technologies display greater inclination towards presenting the information to citizens rather than using communication technologies as vehicles of citizen feedback and participation. (p. 418)
3	Dahlberg, L.	2011	Critical-interpretative	Normative judgement cannot be avoided, as even an attempt to escape such judgement (through, say, an appeal to value-neutral science) is itself a judgement, normally in favour of status quo power relations. (p. 867)
4	Harrison, T. M. et al.	2012	Exploratory study	The creation of public value is the goal of public organizations; through public value, public organizations meet public goals with respect to substantive benefits as well as the intrinsic value of better government. (p. 83)
5	Insua, D. R.	2008	Exploratory study	Despite the excitement brought by technology, many of the current visions for its use are almost entirely conventional as they aim at facilitating, rather than transforming, political action. (p. 175)
6	Kardan, A. A.; Sadeghiani, A.	2011	Quali/Quantitative study	E-democracy is a new subject that focuses on the use of IT to enhance democracy. E-government initiatives could facilitate the provision of e-democracy requirements. E-democracy could be promoted by the initiatives of e-government, but the relationship between these two matters is not based on a universal principle. (p. 471)
7	Lee, C. P.; Chang, K.; Berry, F. S.	2011	Empirical analysis	e-participation is not yet a widely used channel of public opinion inputs, but it is a developing phenomenon related to institution design, policy development, and the policy decision-making process. (p. 450)
8	Marques, F.	2010	Exploratory study	Promoting participation requires more than the provision of communication resources, since civic culture and other peculiarities of each democracy system are determinant factors for influencing the patterns of political involvement. (p. 117)
9	Meijer, A. J.	2012	Exploratory study	New technologies increasingly enable citizens to organize their own forms of public value production. (p. 304)
10	Rothberg, D.	2008	Exploratory study	The mechanisms of democratic participation provided by the new technologies of information and communication represent the possibility of extending the public space. (p. 150)
11	Sandor, S. D.	2012	Exploratory study	Technological change cannot be judged outside the social, economic and political frameworks. Public administration reforms are far from being a consequence of new technologies. (p. 162)
12	Şendag, S.	2010	Quali/Quantitative study	To improve e-democracy culture and to enhance the participation level in online political activities it is critical to recognize teachers as the key players in e-democracy initiatives because they prepare future generations and facilitate learning activities for their preparation as future e-citizens. (p. 1692)
13	Singh, G.; Walsh, C. S.	2012	General review	Suggest the need to reflexively and critically rethink e-democracy as the production of access to resources with the goal of achieving greater equity and social justice. (p. 331)
14	Spirakis, G., Spiraki, C. & Nikolopoulos, K.	2010	Exploratory study	E-democracy is significant for citizen's empowerment and effective participation in decision-making processes regarding public affairs. It also affects the level of accountability and transparency of politicians and governments. (p. 83)

Table 3: Systematic review of selected studies' characteristics

Source: Adapted from Leeuw and Leeuw (2012)

6.2.2 Main words

In order to verify the most current words in the introduction (comprising the keywords) of the 14 selected papers, the free IBM software called Manyeyes was utilized.

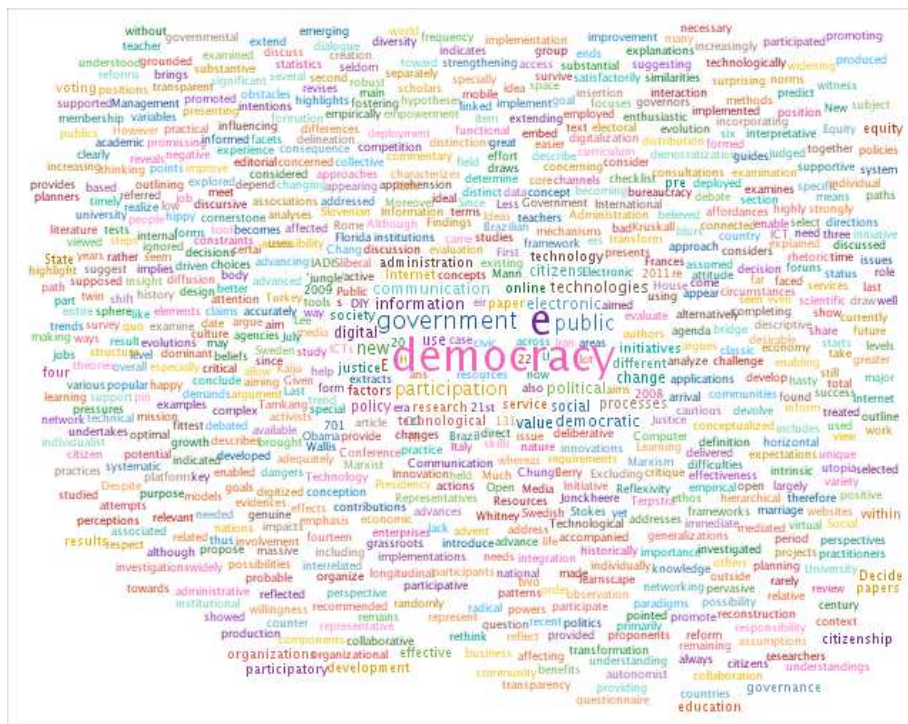


Figure 2: Word cloud mode of exhibition of the 14 selected papers' introduction and keywords.

Source: IBM Free software – Manyeyes

The 30 most current words, which are exhibited in decreasing order of occurrence, are as follows: Democracy; e; Government; Public; Participation; New; Technologies; Communication; Political; Information; Electronic; Democratic; Digital; Citizens; E; Social; Value; Use; Processes; Policy; Change; Society; Paper; Administration; Technology; Technological; Service; Research; Online and Justice.

These main words were used as a roadmap for the creation of the conceptual analytical tool called E-democracy Core Elements (Figure 3).

6.3 Conceptual Tools

6.3.1 The core elements of e-democracy

The gradual development of e-democracy conceptions and practices relates to its origins as a power regime consisting in a modality of mediation of the power relations between state and society. Dahl, Limongi and Paciornik (1997) relate the concept of responsiveness to democracy, considering its essence to be the correspondence among the actions of the state and the demands of people. According to Schlozman and Brady (1995), the central concept of democracy is democratic participation. The idea of **sociopolitical digital interactions** (understood as ‘the bottom-up and top-down dynamics of a government-citizen democratic relationship instrumentalized by the ICTs’; Santos, Tonelli, Bermejo, 2014, p. 4) was associated with the ascending flows of democratic participation (engagement, activism), the descending flows of governmental responsiveness (accountability, policies), the idea of a background (political culture) and the generation of public values.

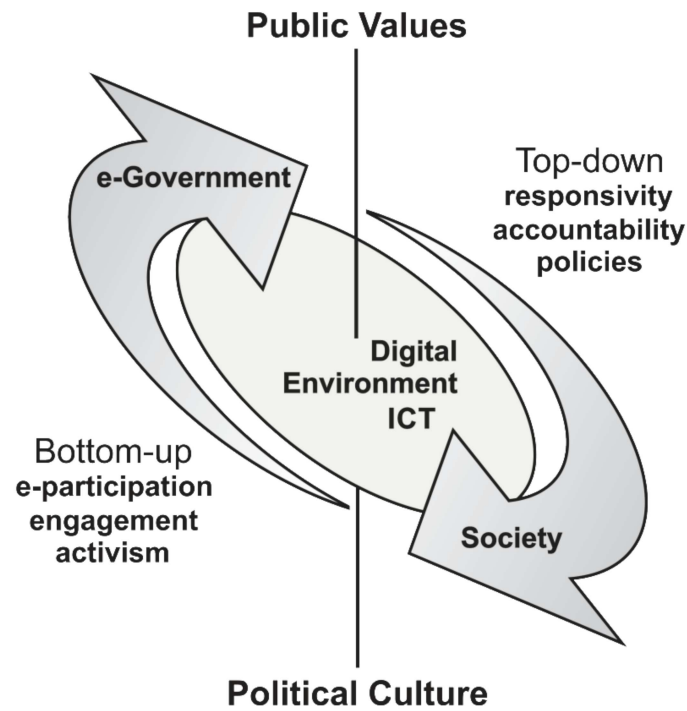


Figure 3: The core elements of e-democracy

This conceptual tool was used to analyse the paper's main findings, locating the principal arguments in one of the argumentative areas, which are as follows:

- Public values
- Society (citizens)
- Bottom-up power relations (e-participation, engagement, activism)
- Top-down power relations (responsivity, accountability, policies)
- e-government (public administration)
- Political culture (civic culture)
- Digital environment (ICTs, digital public space, digital multi-stakeholder democratic engagement platforms).

6.3.2 Ideological Discourse Placements (IDP)

According to Santos (2005, p. 19), the main visions of the state may be classified according to two basic conceptions: the pessimistic conception which sees ‘the state as enemy’ or the optimistic conception which sees ‘the state as potential ally’. The first vision considers the state as a transnationalized ‘mere agent of the neoliberal globalization’ (Santos, 2005, p. 20). This pessimistic vision points to an increasing control of the political and governmental processes by market forces, observing the occurrence of a simple adaptive rearrangement of the liberal democratic system. The ideas of social exclusion and apoliticization promoted by market-centric governments are also associated with this vision. The second vision sees the state as a ‘social relation’ which is ‘intrinsically contradictory, that may be utilized as an ally in some fights against the oppression’ (Santos, 2005, p. 20). This optimistic vision advocates the capacity of ICTs for improving sociopolitical relations. The ideas of full citizenship and emancipation promoted by citizen-centric governments are also associated with this vision.

The classification scheme proposed by Dahlberg (2011) is related to the intrinsic understanding positions regarding the meaning of e-democracy which, according to the author, are as follows:

- Liberal-individualist – based on individualistic rationality, which maximizes the exploitation of one’s own interests;
- Deliberative – based on the formation of a consensus through dialogue;
- Counter-public – based on the ability of digital media to form groups of activism and protest; and
- Marxist Autonomists – based on the perception of the digital communication network’s potential to transcend state centralization and the capitalist system, understood as necessarily anti-democratic.

Taking into account the visions of Santos (2005) and Dahlberg (2011), a conceptual classification scheme called Ideological Discourse Placements (IDP) was elaborated and used to locate the intrinsic vision of the selected papers’ main findings. The perspectives

of change or maintenance of the power structures were also taken into consideration, i.e. the neoliberal globalization paradigm and the ‘counter-hegemonic globalization’ (Santos, 2005), understood here as the ‘sustainability’ paradigm. The correlated notions of government model and government strategy were also associated with this dichotomic vision.

PARADIGM	CITIZEN VISION	GOVERNMENT MODEL	GOVERNMENT STRATEGY
Neoliberal globalization	The State as enemy	Market-Centric Government	Social apoliticization
Sustainability	The State as potential ally	Citizen-Centric Government	Civic empowerment

Table 4: Ideological discourse placements (IDP)

Source: Adapted from Santos (2005) and Dahlberg (2011)

6.4 Analysis

6.4.1 Methodological approaches

As Table 3 illustrates, the majority of the analysed studies opted for qualitative methodological approaches. This correlates with the findings of Lee et al. (2011, p. 450) who claim that ‘most prior studies on e-government and e-democracy developmental models are based on intellectual speculation rather than data from empirical observation’.

Methodological approach		
Methodology	Papers	Quantity
Qualitative	2; 3; 4; 5; 8; 9; 10; 11; 13; 14	10
Quali/Quanti	1; 6; 12	3
Quantitative	7	1

Table 5: Methodological approach

6.4.2 E-Democracy Core Elements Associations

Although statements may touch more than one argument, normally one of them prevails as a guiding thought. After the identification of the principal argument in the main findings of each one of the 14 articles (Table 3), it was established the associations of the principal argument with the constitutive areas of the conceptual diagram (called E-democracy Core Elements). Table 6 below exhibits the amount of papers per area.

E-democracy Core Elements		
Constitutive Areas	Papers	Quantity
1 Values	4; 13	2
2 Society	12	1
3 Bottom-up power relations	1; 7; 8; 14	4
4 Top-down power relations	2	1
5 e-Government	6; 11	2
6 Political Culture	3; 5	2
7 Digital Environment	9; 10	2

Table 6: Arguments per e-democracy area

Considering this analysis it may be observed that most of the e-democracy approaches tend to argue about the bottom-up power relations between society and e-government, which supports Harrison et al.'s (2012) perception regarding the usual focus of e-democracy studies on ICTs' potential to 'amplify the political voice of ordinary citizens' (Hindman, 2008, p. 6) through political participation in public policy processes.

Area 1 (public values) is related to the objectives (the ends) of democratic processes and area 6 (political culture) is related to its background. Areas 2 (society), 3 (bottom-up power relations), 4 (top-down power relations), 5 (e-government) and 7 (digital environment) can be considered intermediary areas where the sociopolitical digital interactions take place. Thus, 10 of the 14 papers' main findings focused on this

intermediary phase of e-democracy processes, characterized by an instrumental vision of the ways to achieve democratic goals.

6.4.3 IDP locations

The use of the IDP conceptual scheme (Table 4) involved an analysis of the suggested ideas communicated through the papers' main findings (reported in Table 3). Using this analytical diagram, it was observed that among the analysed results, **four** cases indicated limitations of e-democracy and pointed out the tendency of neoliberal globalization maintenance. The **pessimistic** visions resonate with the critical vision regarding the illusion of e-democracy and consequently of e-participation and e-governance. These four cases identified caveats regarding the following:

- the non-promotion of decision-making power sharing through e-participation (Åström, Granberg & Khakee, 2011);
- the non-use of ICTs in establishing channels of feedback and social participation (Črnič, 2012);
- the instrumental technological vision that does not imply the transformation of political actions (Insua, 2008); and
- the non-use of e-participation as a channel for public opinion inputs (Lee et al., 2011).

Three results were characterized by an **optimistic** vision and pointed out perspectives related to citizen-centric government models:

- the ICTs' potential in enabling citizens to organize their own ways of producing public value (Meijer, 2012);
- the ICTs' potential in extending the public space through e-participation (Rothberg, 2008); and
- the significance of e-democracy in the promotion of citizens' empowerment, effective participation in decision-making processes, improvement of accountability and transparency processes (Spirakis et al., 2010).

Seven of the selected results produced **neutral** recommendations and observations without presenting a defined ideological positioning, although this is intrinsic to every discourse. These studies highlighted the following:

- the centrality of the process of public value creation to public organizations and that ‘transparency, participation, and collaboration, [...] should be viewed as means toward desirable ends’ (Harrison et al., 2012);
- the non-neutrality of speeches (Dahlberg, 2011);
- the independence between e-democracy and e-government (Kardan and Sadeghiani, 2011);
- the requirement of more than the provision of communication resources to the promotion of participation (Marques, 2010);
- the nonrelation between new technologies and public administration reforms (Sandor, 2012);
- the need for education for democratic culture and citizenship promotion (Şendağ, 2010); and
- the need to rethink e-democracy as a means of promoting social access to resources (Singh and Walsh, 2012).

Ideological Discourse Placements (IDP)

Vision	Papers	Quantity
Pessimistic	1; 2; 5; 7	4
Optimist	9; 10; 14	3
Neutral	3; 4; 6; 8; 11; 12; 13	7

Table 7: Arguments Categories

7 CONCLUSION

Sandelowski, Docherty and Emden (1997, p. 367) point out that the synthesis of previous studies is ‘seen as essential to reaching higher analytic goals and also

enhancing the generalizability of qualitative research'. According to Tranfield et al. (2003, p. 219), 'Linking themes across the various core contributions wherever possible and highlighting such links is an important part of the reporting process'. Taking into account the main findings of the analysed studies, the following linkage as well as a synthetic vision of its contributions was proposed:

- The predominance of qualitative methodological approaches to the topic indicates a lack of empirical data and of theoretical models rooted in praxis. Thus, the consolidation of electronic democracy theories was not observed, probably because of the scarcity of quantitative methodologies of construct validation.
- If rethought of as a means of promoting social access to resources, e-democracy may have great potential in terms of the 'de and re-construction of social and political structures' (Kallio and Käkönen, 2002, p. 3).
- The promotion of citizens' empowerment through e-participation may lead to the adoption of new practices of public value generation, understood as a core objective for public organizations' activities.
- Participative architectures based on processes of sharing decision-making power may lead to important improvements of sociopolitical interactions and may reshape approaches about e-democracy, e-governance and e-government.
- ICTs' potential to expand public space through digital multi-stakeholder democratic engagement platforms can only enable the promotion of democratic maturity if political and civic culture converge with the need for transformation of political actions through public administration reforms.
- In general, it is observed that e-participation channels are limited to information publicity instead of constituting a means of dialogical communication, feedback, public opinion inputs and government-citizen collaboration.
- Given the complexity of interests intrinsic to power relations, the establishment of new configurations of sociopolitical structures are seen as the only option to promote effective connections between citizens' e-participation and the real processes underlying public policies.
- The market-centric-government models need to be gradually replaced by sustainable models of government centred on citizens, education for sustainability and

consciousness of public value and citizenship promotion as the foundation for the transformations of society, politics, governments and democracy.

Reiterating Gomes (2005, p. 221), unfortunately our political system has an anti-public shield that ‘considerably reduces the real dimension and the real impact of public opinion both online and offline’. Furthermore, the negligible governmental willingness for a real citizen-centred government, perceived with variations from case to case, falls far short of the republican recommendations. In this sense, in order to establish basic conditions for sustainable democratic interactions, ‘developing trust between a government and its citizens is critical’ (Al-Sobhi, Weerakkody and Kamal, 2010, p. 19).

7.1 Limitations of Research

Among the study’s limitations, the methodological criteria for the selection of articles led to not exploring important published works, thereby limiting, for instance, the time period of publication to five years, only analysing journal articles and only choosing from three bibliographic databases.

7.2 Implications of Research for Theory and Practice

The proposed conceptual diagrams could be employed by academics and practitioners as a guidance framework for empirical and theoretical studies, as well as for public policy design. The conceptual framework’s organization of ideas is able to promote significant reflexions that can shape political and academic value structures, judgements and ideology (Jost, Federico and Napier, 2009).

7.3 Future Research Recommendations

Future studies could explore empirical validation of theoretical models of e-democracy and deep approaches related to its possible function (as power regime) to

transform society, politics and government relations towards desirable ends (Harrison et al., 2012).

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**ARTICLE 2 Sociopolitical digital interactions' maturity: analyzing the
Brazilian States**

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1 ABSTRACT

In the context of the “network society” structured on “digital communication” processes, new values and technologies induce changes in government-society relations. The aim of this study was to propose a conceptual framework of understanding the levels of sociopolitical digital interactions’ maturity (SDIM) in response to the following question: how can the sociopolitical digital interactions’ maturity levels be classified? To conduct this study, a qualitative methodological approach was adopted. The content analysis of the 27 Brazilian states’ government websites was structured on a conceptual scheme (SDIM), which allowed the verification and classification of digital interactive tools used in e-government portals. It was concluded that the levels of electronic interactivity do not represent institutional democratic development and that co-creation may generate continuous processes of public sector innovation.

Keywords: Government 2.0. Citizen-centered government. e-Governance. Collaboration. Co-creation.

2 RESUMO

No contexto da "sociedade em rede", estruturado sobre processos de "comunicação digital", novos valores e tecnologias induzem mudanças nas relações governo-sociedade. Objetivou-se neste estudo propor um quadro conceitual de compreensão dos níveis de maturidade das interações sociopolíticas digitais (SDIM) em resposta à seguinte pergunta: como podem os níveis de maturidade das interações sociopolíticas digitais ser classificados? Para realizar este estudo, foi adotada uma abordagem metodológica qualitativa. A análise do conteúdo de sites do governo dos 27 estados brasileiros foi estruturada em um esquema conceitual (SDIM), que permitiu a verificação e classificação de ferramentas interativas digitais usadas em portais de governo eletrônico. Concluiu-se que os níveis de interatividade eletrônica não representam desenvolvimento democrático institucional e que a co-criação pode gerar processos contínuos de inovação no sector público.

Palavras-chave: Government 2.0. Governo centrado no cidadão. e-Governança. Colaboração. Co-criação.

3 INTRODUCTION

In the “network society,” (p. 3) which is structured on “digital communication” (p. 3) processes (Castells & Cardoso, 2006), core concepts of the Web, such as informational space and global, collaborative, and interconnected dynamics (Berners-Lee, Fischetti & Dertouzos, 2000), became inherent to networks and induced changes in the institutional settings of states. This involved the development of new organizational models based on the orchestration of complex, open, and self-organizing systems. Such models are also based on the co-creation of results through partnerships with civil society (Mulgan, 2006).

The increasing use of information and communication technologies (ICT) in governmental processes tends to guide policy and institutional innovations. Designs of sociopolitical interface compatible with collaborative, contributory, and community patterns (Andersen, 2007) imply the remodeling of informational, legal, institutional, and technological structures of the state based on concepts related to Web 2.0, culminating in Government 2.0 (Chun, Shulman, Sandoval & Hovy, 2010).

Initiatives such as the Open Government Directive (U.S. Government, 2009), the British Government’s Big Society Program (Cameron, 2010), the Presidential Innovation Fellows (PIF) (U.S. Government, 2012), and Singapore’s eGov2015 Masterplan (Singapore Government, 2013) are based on processes of democratic participation, transparency, connection, collaboration, and co-production of public policies and values (Harrison et al. 2012).

The focus on digital channels of sociopolitical interaction encourages research on electronic tools and intersections between the interests and influences of various actors, from which conflicting and collaborative processes related to the public policy cycle are designed.

The goal of this research is to address the gap presented by Bonsón; Torres; Royo and Flores (2012) regarding the importance of analysis of government actions in the digital environment. Furthermore, this reiterates the gap pointed out by Cegarra-Navarro, Pachón & Cegarra (2012) in our understanding of ICT’s impact on government-citizen relations.

The immediate objective of this work was to propose a useful conceptual framework (SDIM) both for theoretical reflections on the theme and for the analysis and design of electronic tools for government websites. Through the SDIM, the contents of Brazil's 27 state government websites were analyzed.

The central questions in this study were as follows: (1) how can the sociopolitical digital interactions' maturity levels be classified; and (2) what is the current developmental stage of digital sociopolitical interactions in Brazilian states' governmental websites?

The relevance of this research resides in the following: the possibility of using the SDIM framework for analyses of governmental websites; its ability to guide the process of design and improvement of digital tools for participative architecture; for the promotion of sociopolitical interactions through the web; and the possibility of promoting discussions and exchanges between researchers and government agents.

This article is structured as follows: after outlining the literature review, the theoretical setting, and presenting the conceptual scheme of SDIM, the methodological approach is defined. The 27 Brazilian states' government websites are then analyzed and final thoughts are offered on the points discussed.

4 LITERATURE REVIEW

Web 2.0

The term “Web 2.0” dates back to 2004 and was coined by Dale Dougherty, then vice-president of O’Reilly Media, Inc. (Andersen, 2007). Web 2.0 is also known as “the wisdom Web, people-centric Web, participative Web, and read/write Web” (Murugesan, 2007, p. 34), which refers to further exploitation of the Web through a more interactive and collaborative dynamic.

The authors Chang and Kannan (2008) define Web 2.0 as “a networked world that supports individual users creating content individually and collectively, sharing and updating information and knowledge through sophisticated, diverse sharing devices and tools, and remixing and improving content created by each other” (p. 10). The concept of Web 2.0 is associated with the ideas of social software, social computing, participative web, user-generated content platforms, and the architecture of participation (O’Reilly, 2007; Andersen, 2007).

The intrinsic characteristics of Web 2.0 outline new trends in government-citizen interactions, establishing collaboration horizontal arrangements (Benkler, 2006) and the conception of new institutional designs based on practices of sharing decision-making power (Nam, 2012). Sharing decision-making power, in turn, implies the recognition of the collective intelligence, the enhancement of knowledge management tools, and the consequent enhancement of sociopolitical interaction channels.

The inherent values of Web 2.0 are “citizen-created content,” “free flow of information,” and “freedom of expression” (Bonsón et al. 2012, p. 124), which are based on collaborative and sharing dynamics that feed expectations among social actors concerning the modernization of government interfaces and public values production processes. In this way, it is possible to read about how non-human actors influence the behavior of human actors and alter the sociopolitical interaction network’s nature (Arunachalam and Sarkar, 2013).

According to Bonsón et al. (2012), “the impact of Web 2.0 on the public sector can be seen in four areas: a) improvement of public sector transparency; b) improvement

of policy making; c) improvement of public services; and d) improvement of knowledge management and cross-agency cooperation.” (p. 125). The authors also observe that the web-enabled technologies allow for “the mass distribution of the content of the official website as an amplification of the pre-existing unidirectional system, and/or the implementation of corporate dialog.” (p. 126).

E-Government and Government 2.0

Among the several definitions of e-Government, it is possible to observe a historical process of development of associated meanings and conceptions that, according to Janssen and Estevez (2013), delineated the following three distinct phases or “waves of e-Government research,” (p. S3) characterized by the focused dislocation from a techno-centric to a citizen-centric approach: First wave—Electronic Government (e-Government); Second wave—Transformational Government (t-Government); and Third wave—Lean Government (l-Government).

Luna-Reyes, Gil-Garcia, and Romero (2012) observed that “Electronic government involves a complex web of relationships between technological, organizational, institutional, and contextual variables.” (p. 324) In this way, the authors describe four areas of application for electronic government: i) e-services (public services through ICT); ii) e-management (government operations, internal efficiency, and efforts directed at government reform and administration); iii) e-democracy (to promote citizen participation in its many manifestations and encourage democratic relationships between government, citizens, and other social actors); and iv) e-public policy (the creation of a legal and regulatory framework that facilitates electronic government initiatives and fosters an atmosphere conducive to the information society).

The definition of t-Government was proposed by Weerakkody, Janssen and Dwivedi (2011) and consists in an “ICT-enabled and organization-led transformation of government operations, internal and external processes and structures to enable the realization of services that meet public-sector objectives such as efficiency, transparency, accountability and citizen centricity.”(p. 327).

According to Janssen and Estevez (2013), the conception of I-Government consists of a “smaller government utilizing ICT to connect, engage and involve the public in solving societal problems, resulting in changes in traditional roles”(p. S4).

From this developmental perspective, it may be noted that an increasing change, related to more expanded visions about e-Government and its complex role, implicates building, managing and sustaining relationships between actors through “Government Information Networks” (Janowski, Pardo & Davies, 2012, p. S1).

Observing the emerging collaborative trends inherent to public governance practices and to a “citizen-centered government” (Eggers, 2007, p. 13), the need to study and better understand the Sociopolitical Digital Interactions (SDI) processes is noted, moving the analytical focus from technological and organizational models of e-Government maturity to the expansion of approaches related not only to citizens’ perspectives, but to the co-creation processes themselves, which are increasingly consolidated as new dynamics of relation between state and non-state actors.

According to the definition presented by the Agimo (2009, p. 2) report of the Government 2.0 Taskforce

Government 2.0 is not specifically about social networking or technology...It represents a fundamental shift in the implementation of government—toward an open, collaborative, cooperative arrangement where there is (wherever possible) open consultation, open data, shared knowledge, mutual acknowledgment of expertise, mutual respect for shared values and an understanding of how to agree to disagree. Technology and social tools are an important part of this change but are essentially [just] an enabler in this process.

Government 2.0 is characterized by the use of “technologies, applications, and values” of Web 2.0 (Osimo, 2008, p. 41) and consists of the adoption of Web 2.0 by governments through practices and public administration data socialization processes (Johannessen, 2010). This implies the adoption of pluralistic forms of government called “governance web” (Tapscott, Williams and Herman, 2007, p. 2).

The tendency toward citizen-centered government is due to technological influences, especially the Web 2.0 technologies (Eggers, 2007). Initiatives related to Web 2.0, such as citizen-sourcing, are generally being consolidated in the public sector and are a priority for President Obama's administration (Schellong, 2009). Although a large number of agencies are implementing practices of citizen-sourcing (Bronk and Smith, 2010), there has been a gap between reality and the visions of the potential of Government 2.0.

Meijer and Thaens (2010) also perceive a gap between the innovative potential of 2.0 ideas and the operational reality of government organizations. According to these authors, this gap is due to a lack of alignment between organizational strategies and the values inherent to collaborative technologies. Promoting this alignment implies the creation of an environment for collaborative culture within government agencies (Chang & Kannan, 2008) as an important condition for achieving Government 2.0.

Network

Early studies of intergovernmental relations (Rhodes, 1986), governmental actors, and interest groups' patterns of exchange led to the idea that both the agenda and the outcome policies were outlined by the networks. The policy networks originate from the increasing complexity of social problems, the actors' diversity, and conflicts of interest (Fleury, 2002). Networks consist of nodes interconnecting systems (Castells & Cardoso, 2006) they are collective constructions that enable interventions in social reality through participatory management (Junqueira, 2004).

The distinction between the three basic types of network topology ("centralized, decentralized, and distributed") was developed in 1964 by Paul Baran,(p. 4) who outlined the main characteristics of distributed networks, which are reflected in collaborative digital networks. A sociotechnical perspective reveals the centrality of information and digital networks in the processes of socioeconomic transformation (Castells & Cardoso, 2006). Referring to the concept of a "network society" structured on digital communication networks, Castells and Cardoso (2006) devised the term "network-state." (p.15)

The processes of experience sharing and collective learning, enabled by social media, are related to the intrinsic dynamics of the virtual communities and social networks; Bonsón et al. (2012) pointed out that social media “result(s) from the application of Web 2.0 technologies in the current online social environment,” (p. 124) which reiterates the emergence and gradual consolidation of an environment for collaborative culture that fosters civil engagement and consolidates the governance networks.

An offshoot of the network approaches is the work of Bruno Latour, John Law, and Michel Callon, which gave rise to the actor-network theory (ANT). ANT is based on the idea of a network of connections between human and non-human hybrid actors interacting heterogeneously through complex alliances that include the transformation of the actors themselves through the interaction process. The power arrangements established through the sociopolitical interactions influence one’s self-definition of the actors and their roles in a democratic context of associations between entities. Furthermore, it integrates the very existence of the elements that compose it (Law, 1987).

Citizen-government interactions

Studies dealing with the relationship between citizens and government have always been present in the research and practice of public administration (King, Stivers & Box, 1998; Denhardt & Denhardt, 2011). The growing trend of governments’ approaches to the citizen-centered model (Citizen-Centric-Government), which refers to the conduction of priorities and services based on the needs of society, induces governments to rethink and reshape their political interactions with citizens (Arunachalam & Sarkar, 2013).

The concept of “citizen co-production” (Johnston & Hansen, 2011, p. 6) is based on the vision of citizens as government partners. According to Linders (2012), the citizen-government “co-production” categories are: i) Citizen Sourcing (Citizens to Government); ii) Government as a Platform (Government to Citizen); and iii) Do it Yourself Government (Citizen to Citizen). Linders (2012, p. 448) observes that this

collaboration processes may occur on three different levels: a) Design “of government programs and services and plan for its execution”; b) Day-to-Day Execution “operations...transactions...and negotiation toward the production of a public good”; and c) Monitoring (evaluation and improvement).

Janowski, Pardo, and Davies (2012) observed that “governments can no longer afford to address increasingly complex and interdependent public goals alone or step back and rely on the markets. Instead, they have to work through networks of state and non-state actors to organize existing resources, knowledge and capabilities in the pursuit of public goals,” (p. S1) which reiterates Bertot, Jaeger, Munson, and Glaisyer (2010), who observed the need to “rethink traditional boundaries between individuals, the public, communities, and levels of government”(p. 5), concerning “how the public and government interact, develop solutions, and deliver services” (p. 5).

5 THEORETICAL SETTING

Actor-Network Theory and Co-creation: the foundations for the SDIM conceptual framework

Several studies have been shaped concerning co-creation processes and the consequent narrowing of relations between state and society. Examples of these kind of studies are found in the literature of participative policies concerning public transport (Nunes & Cunha, 2014), science and technology (Rogers-Hayden & Pidgeon, 2008), and urban planning (Izvercianu, Seran, & Branea, 2014). The maturity level of sociopolitical interaction, called co-creation, reiterates this kind of approach and is defined by Szkuta, Pizzicannella, and Osimo (2014) as the collaborative involvement of citizens on the co-production of public services and policies. In recent years, a significant increase of studies in this field coincided with the advancement of the Web 2.0 trend (Szkuta et al. 2014).

One important difference between this article’s perspective and the approach of other papers relates to the co-creation conception, not only as a result of interaction between people, but as a result of the articulation of various constituent elements of

collectivities, that reiterates Latour (2009), who breaks with the modern view based on the separation between nature and society. According to the previous assumption there is no ontological difference between materiality and humanity, which inculcates the notion that reality is formed and the performed by heterogeneous and symmetric elements, human and non-human, called actor-network (Latour, 2005; Latour & Woolgar, 1986; Tonelli, Brito, & Zambalde, 2011). In this sense, the co-creative activity in the relationship between state and society presupposes the construction of the actor-network, such as the Web 2.0 platform of sociopolitical interactions.

Through the Actor-Network Theory (ANT) lens, the analysis of action leads to the perception that it (the action) is not restricted by specific actors. The action is always distributed, shared, and performative. Actors are not isolated but constitute simultaneous associations of people and physical artifacts, which assume an important role in the narratives. Usually, the actor and the action clearly assume human characteristics of intentional conduct. On the other hand, the actant could better describe the construction of macro-actors such as corporations, societies, and institutions (Czarniawska, 2009).

Based on the ANT, the co-creation approach relies on a firm commitment to abstain from a unilateral domain of action, be it intended by the state or the society. In the real world, there is no possibility that this large dominance occurs by any predefined actor. As stated by Latour (1999), no one was ever able to dominate the results of an action. It is common for the scientist or architect to be surprised by the results of his action (Latour, 1999; Tonelli et al. 2011). Through co-creation, predictability is given up to allow innovation, arising from the interaction between heterogeneous elements derived from the state, the society, and the several other spheres of reality, which creates associations and institutions that are not defined only by a single sphere but by hybrid, heterogeneous and multifaceted corporations.

6 PROPOSAL OF THE SDIM CONCEPTUAL FRAMEWORK – ADAPTATION AND REFRAMING

In order to conduct this study, the concept of sociopolitical digital interactions was elaborated, which here is understood as the bottom-up and top-down dynamics of a government-citizen democratic relationship instrumentalized by the information and communication technologies (ICTs).

Sociopolitical Digital Interactions' Maturity (SDIM) categorization represents a possible way to analyze, design and improve formal and informal horizontal arrangements of democratic participation mediated by electronic tools, which can optimize informative, communicative and collaborative interaction processes between government and society. Understanding digital multi-stakeholders engagement platforms remits to the ideas of “network-state”, “network society” and governance networks built upon the relationship between human and non-human, between state and non-state actors.

The concept of maturity in reference to the sociopolitical digital interactions refers to the complexity level of the digital government-society relations. The main ideas that structure the understanding of sociopolitical digital interactions' complexity delineate a route for action based on:

- . the provision, dissemination and access to information as an initial condition for interactions;
- . the establishment of connection between human and non-human (state and non-state) actors through communicative exchanges and dialogue; and
- . the collaborative interactions that may culminate in co-creation processes.

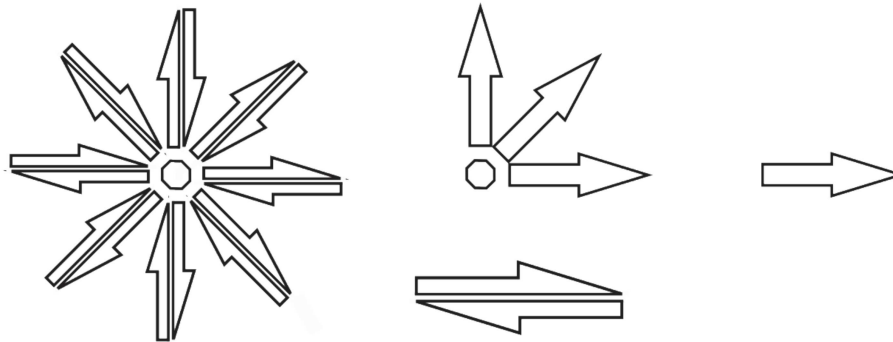
The conceptual framework of SDIM led to understanding the maturity levels of sociopolitical interaction related to its inherent information-flow dynamics and associated with its corresponding digital interactive tools.

Maturity levels

The maturity levels of sociopolitical digital interactions were conceived from the combination of Vedel's democratic process sequences classification (information, discussion, and decision) (Vedel, 2006); the three strategic thrusts that structure the vision of a *Collaborative Government* according to the Singaporean Government's eGov2015 Masterplan of the Singapore Government (2013) (which are Co-creating for Greater Value; Connecting for Active Participation; and Catalysing Whole-of-Government Transformation); and government-citizen relations in policy-making discussed by the Organisation for Economic Co-operation and Development (OECD, 2001) (information, consultation, and active participation). By combining these categorizations, it was established that the production, dissemination and access to information corresponds to the basic level of interaction; discussion was related with communication processes and determined the connection level; and decision was associated with consultation, collaboration, and active participation, and thus the co-creation level was established.

Information flow dynamics

The idea of the information flow dynamics was developed from the categorization of government-citizen relations in policy-making discussed by the Organisation for Economic Co-operation and Development (OECD, 2001), which stated that information consists of a one-way relation, consultation and active participation (a relation based on partnership) consists of a two-way relation. The classification of the government-citizen interaction dynamics observed in the conceptual scheme of SDIM was based on the sense of informational flows. These were classified into the following: (1) unilateral (government information to citizen); (2) bilateral (communication between government and citizens, and between one individual to many); and (3) multilateral (collaboration between government and citizens, between one individual to many, and many individuals to one), (see Figure 1).



A) multilateral, B) bilateral, and C) unilateral

Figure 1: Information flow dynamics

Digital interactive tools

In order to explore possible forms of promoting an alignment between democratic processes and the web 2.0 platforms of e-participation, this approach of sociopolitical interactions' electronic modalities remits to the idea of "Government Information Networks" (Janowski et al. 2012) focusing on the information flow dynamics intrinsic to digital tools, which instrumentalize the relations between state and non-state actors.

The establishment of associations between maturity levels and digital interactive tools was inspired by the ideas about the correlations between Web 2.0 applications in government websites and information work provided by Chua, Goh, and Ang (2012). The authors identified four levels of information work (acquisition, dissemination, organization, and sharing) that were reshaped in the conception of sociopolitical digital interactions.

From this categorization, associations between sociopolitical interaction and digital tools were established, taking into account the information flow dynamics that characterize each one of the digital interactive tools. In this way, the tree correspondent maturity levels and information flow dynamics were associated with each one of the following tools:

- . Co-creation (Level 3): e-vote, e-petitions, opinion polls, challenges, wikis, discussion forums, applications, open channel for suggestions, open data.
- . Connection (Level 2): social networks, professional networks, chat, contact forms/email, multimedia sharing services, comment boxes.
- . Information (Level 1): blogs, microblogs, RSS feed, newsletter, downloading information availability, search engine.

These schemes structured relevant aspects of virtual interfaces, guidelines for e-government, and sociopolitical interactions, from which a conceptual scheme of SDIM was formulated that combined maturity levels, information flow dynamics, and digital tools of government-citizen interaction (See Table 1).

Maturity Levels	Description	Information Flow Dynamics	Digital Interactive Tools
CO-CREATION Level 3	Consultation; Collaboration; Participative Construction; Collective Intelligence.	Multilateral Flow	e-vote; e-petitions; opinion polls; challenges; wikis; discussion forums; applications; open channel for suggestions; open data
CONNECTION Level 2	Communicative Exchanges Dialogue; Discussion and Sharing.	Bilateral Flow	social networks; professional networks; chat; contact forms / e-mail; multimedia sharing services; comment box
INFORMATION Level 1	Production; Dissemination and Access	Unilateral Flow	blogs; microblogs; RSS feed; newsletter; downloading information availability; search engine

Table 1: Conceptual framework of Sociopolitical Digital Interactions' Maturity (SDIM)

7 RESEARCH METHODOLOGY

To conduct this study, a qualitative methodological approach was adopted. The content analysis of the 27 Brazilian states' government websites was structured on the conceptual scheme of SDIM, which allowed the verification and classification of digital interactive tools used in e-government portals. The research was conducted in the steps described below.

i. Definition of the research universe

The research universe was defined as the 27 states of Brazil. The study proceeded to diagnose the current stage of development of sociopolitical interactions mediated by digital tools observed in the institutional websites of each of the federation's member states.

ii. Verification of sociopolitical interaction digital tools on government websites

In part, the methodological procedures used by Chua et al. (2012) were replicated in terms of the approach to verifying digital tools on government websites. The content analysis of the 27 Brazilian states' government websites was performed and recorded from December 18–21, 2013. The presence or absence of 21 electronic tools of sociopolitical interactions (blogs, microblogs, RSS feed, newsletter, downloading information availability, search engine, social networks, professional networks, chat, contact forms / e-mail, multimedia sharing services, comment box, e-vote, e-petitions, opinion polls, challenges, wikis, discussion forums, applications, open channel for suggestions, open data) was checked and the identified tools were classified according to a verification table (see Table 2). From the fulfillment of one table for each governmental website and according to the scoring criteria, the SDIM Ranking was established.

CO-CREATION TOOLS (Level 3) Y/N	CONNECTION TOOLS (Level 2) Y/N	INFORMATION TOOLS (Level 1) Y/N
e-vote	social networks	blogs
e-petitions	professional networks	microblogs
opinion polls	chat	RSS feed
challenges	contact forms / e-mail	newsletter
wikis	multimedia sharing services	downloading information availability
discussion forums	comment box	search engine
applications		
open channel for suggestions		
open data		

Table 2: Roadmap for digital interactive tools verification

iii. Scoring criteria

The categories shown in Table 2 were assigned numeric values depending on the sociopolitical interaction dynamics' maturity (complexity) levels. Thus, every co-creation digital tool pertaining to participatory construction (Level 3) is assigned the value of a point in the hundreds; every connection digital instrument relating to communicative exchanges (Level 2) is assigned the value of a point in the tens; and every information electronic tool regarding the information production and distribution activities (Level 1) is assigned the value of a point in the units place.

Although the availability of data can be classified as a one-way information flow and therefore as a information tool (level 1), the fact that the data meets in an open format affords it a characteristic of co-creation (level 3). Also, it consists of an invitation to collaborative forms of sociopolitical interaction that may culminate in applications, challenges, and wiki platforms of shared work between government and citizens. Therefore, the availability of Open Data has been classified as a co-creative digital instrument (level 3).

An example of the scoring procedure—Rio Grande do Sul government website

Based on the scoring criteria directives, each one of the Brazilian states' government websites were analyzed. The verification procedure consisted of noting the presence or absence of the digital interactive tools and web 2.0 applications listed in Table 3. Following the checklist, the verification table was filled. For each observed listed item a value of 1 point was attributed, and for each absent (non-observed) item the value of 0 was assigned in the corresponding line of the table.

According to the scoring criteria, different values were related to each maturity level of sociopolitical digital interactions. In this way, each co-creation tool (Level 3) was attributed the value of 100 points; each connection tool (Level 2) was attributed the value of ten points; and each information tool (Level 1) was attributed the value one point. Then the sum of the corresponding layer values established the position rankings.

In the case of Rio Grande do Sul's state government website (<http://estado.rs.gov.br/>), four co-creation tools (Level 3) were identified (e-vote, opinion polls, wikis and open data), equaling 400 points. Four connection tools (Level 2) were identified (social networks, contact forms/email, multimedia sharing services and comment boxes) totaling 40 points. Four information tools (Level 1) were observed (microblog, RSS feed, downloading information availability and search engine) totaling four points.

Digital Interactive Tools and Web 2.0 Applications		Yes/No 1/0
CO-CREATION TOOLS (Level 3)		1 = 100
e-vote		1
e-petitions		0
opinion polls		1
challenges		0
wikis		1
discussion forums		0
applications		0
open channel for suggestions		0
open data		1
Sub-total		4.0.0
CONNECTION TOOLS (Level 2)		1 = 10
social networks		1
professional networks		0
chat		0
contact forms / e-mail		1
multimedia sharing services		1
comment box		1
Sub-total		0.4.0
INFORMATION TOOLS (Level 1)		1 = 1
blogs		0
microblogs		1
RSS feed		1
newsletter		0
downloading information availability		1
search engine		1
Sub-total		0.0.4
TOTAL		4.4.4

Table 3: Verification table (checklist) - Rio Grande do Sul government website

The total value of the tree strands [Co-creation (400) + Connection (40) + Information (4)] of the Rio Grande do Sul state government website equaled 444 points. The SDIM ranking was established comparing this value with the other government websites.

8 FINDINGS

The concept of collaborative platforms applied to the governmental context refers to the growing challenges (technical, political, and ideological) faced by governments regarding the promotion of citizen co-production of knowledge, information (Misuraca, 2009; Johannessen, 2010; Nam, 2012), services, and public policies.

Sharing information and promoting political discussions can lead to citizens' empowerment; however, the co-creative practices of social participation in the public policies cycle (formulation, implementation, and evaluation), the extraction of knowledge and its use in collective intelligence formatting consists of the most advanced levels of digital sociopolitical interaction. Acting on these levels implies the government's democratic and technical maturity as well as the promotion of an alignment between "Operational Web 2.0 strategies" and "organizational strategic orientation" (Meijer & Thaens, 2010, P. 113).

This study represents a specific point in the analysis of digital interactive tools between society and State, classifying the nature of government-citizen relations. Modes of democratic participation, mediated by electronic tools, configure interactive processes of communication and collaboration between government and society, and insert new codes in the "network state" software, which can result in governmental innovations (Bloch & Bugge, 2013). The Brazilian federation's states' government websites were ranked according to the scoring criteria established in the methodological procedures section.

Ranking	State	SDIM	Tool Quantities	Ranking	State	SDIM	Tool Quantities
1 ^o	Rio Grande do Sul	4.4.4	12		Paraná	0.3.4	7
2 ^o	São Paulo	1.4.5	10		Goiás	0.3.4	7
3 ^o	Pernambuco	1.3.5	9		Amazonas	0.3.4	7
4 ^o	Maranhão	1.3.4	8	10 ^o	Santa Catarina	0.3.3	6
5 ^o	Espírito Santo	1.3.3	7		Amapá	0.3.3	6
	Roraima	1.3.3	7		Paraíba	0.3.3	6
6 ^o	Rio de Janeiro	1.2.4	7	11 ^o	Mato Grosso do Sul	0.2.3	5
7 ^o	Ceará	1.1.4	6		Acre	0.2.3	5
8 ^o	Minas Gerais	0.3.5	8	12 ^o	Pará	0.2.2	4
	Mato Grosso	0.3.5	8	13 ^o	Rondônia	0.2.1	3
	Rio Grande do Norte	0.3.5	8	14 ^o	Tocantins	0.1.3	4
	Piauí	0.3.5	8		Sergipe	0.1.3	4
9 ^o	Distrito Federal	0.3.4	7	15 ^o	Bahia	0.1.1	2
				16 ^o	Alagoas	0.0.2	2

Table 4: Ranking the 27 Brazilian Federation's states' government websites

It was observed that the government websites of Rio Grande do Sul, São Paulo, and Pernambuco had the highest number of interactive tools (12, 10, and 9, respectively). In contrast, the electronic portals of Alagoas, Bahia, Sergipe, and Tocantins had the smallest number of government-citizen interactive tools (2, 2, and 4, respectively).

In Table 5, sociopolitical interaction electronic tools on government websites were organized and arranged by category.

The study identified the most widely adopted mechanisms and digital tools: the availability of downloading information (26/27 = 96.3%), followed by search and contact forms/email (25/27 = 92.6%), microblogging (Twitter) (21/27 = 77.8%), social networking tools (Facebook) (20/27 = 74.1%), multimedia sharing (YouTube) (18/27 = 66.7%), and RSS feed (14/27 = 51.8%).

The following tools were detected less: e-voting, wiki, suggestions, and chat (1/27 = 3.7%); comment boxes (2/27 = 7.4%); blogs (3/27 = 11, 1%); and opinion polls and open data (4/27 = 14.8%).

The tools that were not detected on the state governments' websites included the following: e-petitions, challenges, permanent discussion forums, applications, and professional networks (LinkedIn).

CO-CREATION						CONNECTION					INFORMATION											
e-vote	e-petitions	opinion polls	challenges	wikis	discussion forums	applications	open channel for suggestions	open data														
1	4	1	1	4																		
Subtotal						Subtotal					Subtotal											
11						20					66						95					

Table 5: Digital interactive tools quantities by category

Source: Adapted from Chua et al. (2012)

Rankings of the Brazilian states' SDIM levels were based on the number of electronic tools observed at each interactive level; thus, websites such as Minas Gerais' (35), which counted five tools at level 1 (microblogs, RSS feed, newsletter, downloading information availability, and search engine), three tools at level 2 (social networks, contact forms/e-mail, and multimedia sharing services), a total of eight tools, were rated below portals like Ceará's (114), which had four tools at level 1 (microblogs, RSS feed, downloading information availability, and search engine), one tool at level 2 (contact forms/e-mail), and one tool at level 3 (open channel for suggestions), a total of six tools.

It may be observed that the scoring criteria greatly value the level 3 tools (hundreds), which characterize democratic co-creation modalities that empower citizens to collaborate in the policy-making cycle (OECD, 2001) in detriment of Level 1 tools (units) of information dissemination; the developed criteria may be considered as a qualitative criteria to the detriment of the quantitative criteria of simple tools counting. An example is the previously mentioned comparison between the Minas Gerais government website that counted eight tools and was classified below the Ceará government website that totaled six tools because of the categorization of the perceived tools. This approach determines the distinction between high and low website rankings.

From the 172 government-citizen interaction tools detected, 95 (55.2%) were level 1, 66 (38.4%) were level 2, and 11 (6, 4%) were level 3. This indicates a predominance of levels 1 and 2 interaction tools on governmental websites, and a tendency not to promote level 3 interactions.

It was observed that the use of level 3 tools is very limited in the Brazilian government. Nonetheless, there is a growing global trend toward citizen-centered governmental practices, caused in part by rising citizen expectations of public governance and government-society partnerships (Chua et al. 2012). In the context of Brazil, there is a noticeable timidity in the practice of interactive instrumentation at level 3. Perhaps this is because of the country's patrimonial and bureaucratic historical legacy, which has been characterized by governmental closure to social participation initiatives in democratic processes.

The omission of certain tools on the governments' websites, such as electronic petitions (e-petitions), challenges, discussion forums, and permanent applications, denotes traces of political centralization. This centralization comes at the expense of practical power-sharing in decision-making processes and impedes governmental openness to a co-creative public policy model.

Also indicated by the study is the incipient capacity of Brazilian states to operationalize, from collaborative processes, the extraction of collective intelligence and identification of value trends that could be used for political strategy processes (Suh, Park and Jeon, 2010); social sentiment analysis (Di Caro & Grella, 2012); mining of opinions, data, and texts (Robaldo & Di Caro, 2013); the production of applications that streamline service delivery and public information; and what Chalmers (2013) calls the "open social innovation" (p. 13). The absence of permanent forums in electronic portals represents the unwillingness and inability to manage differing opinions and opposition criticisms that may impact the political image of the government.

It is important to note the state of Rio Grande do Sul's initiative to modernize the practices of democratic participation in the national digital realm, highlighting the Portal of Participation (<http://www.participa.rs.gov.br/>) and the Digital Cabinet (<http://gabinetedigital.rs.gov.br/>), which are accessible through the state's government

website. In contrast, the study noted the large deficit of sociopolitical digital interaction tools available through the state of Alagoas' government website.

9 CONCLUSION

The perception of a tangled dynamic between actors and networks, as well as between governments and citizens, leads to the essentiality of sociopolitical interaction approaches to the extent that an actor's behavior mutually stimulates conceptual reviews, actions, and reactions from the state.

The promotion of democratic institutional development from government-society interfaces is based on compliance factors inherent in the actor-network circuit, such as education, social participation, public governance, the material context (non-human), legal mechanisms, electronic tools, etc.; these are intrinsic to the public values production process. The digital interfaces consist of effects and processes of a continuous and reciprocal network transformation. Given the great complexity involved in the "civil empowerment" process, the importance of open government data and open discussion channels between the society and the government is a fundamental requirement for promoting practical sociopolitical co-creation and collaboration. In this sense, the induction of social empowerment implies a revision of ideological positioning and the promotion of changes in the power structure and political culture, which culminates in the policy processes related to government innovations "public sector innovations".

The proposed driving objective of this study was achieved by responding to the question of a possible way to classify the Sociopolitical Digital Interactions' Maturity levels, which consisted in the development of a conceptual framework (SDIM) that demonstrated theoretical usefulness when structuring a focused understanding for analysis and evaluation of government-citizen interactions electronic tools. SDIM is likely to be used as a guide for designing and improving government-society digital interactions tools on government websites. This will be done with the aim of increasing the e-democratic participation processes through which society informs, communicates,

and collaborates with government, thereby positively influencing the state's actions (public policy).

Reiterating the gaps presented by Bonsón et al. (2012) and Cegarra-Navarro et al. (2012), the study addressed issues related to the understanding of how new ICTs impact government-citizen relations and government actions through the digital environment. Analyses of the current stage of digital sociopolitical interactions development observed in governmental websites of Brazilian states showed that most of the electronic tools provided by state governments focus on level 1 (information) and have a tendency to shy away from the instrumentalization of interactions on level 3 (co-creation).

Based on this perception, the low technological complexity and democratic unwillingness of the analyzed governments websites regarding the instrumentalization of democratic participation processes, particularly in the collaborative dimension, was observed. There is an incipient capacity of Brazilian state governments to operationalize mechanisms of social empowerment, collective intelligence extraction, and identification of trends of values that can be used in processes of policy formulation strategy.

The Web 2.0 social values changed social expectations regarding government actions. Static websites and information (level 1) tools are only aligned with the most elementary part of any e-democratic participation policy promotion. The perception of the paucity of co-creation (level 3) tools reinforces the current traces of highly concentrated political power and the late development of a civic culture, which has culminated in timid practices of shared decision-making. It indicates a lack of government openness to a government-citizen co-creative and collaborative model.

This picture recalls legacies of a historical process characterized by colonial exploitation, neglect, and oppression of popular political participation initiatives, as well as a nation in which the social structure has been strongly marked by long-term slavery, a period of military repression, and patrimonial, centralized government. These characteristics have shaped a stance/behavior where grassroots movements engaged in democratic participation represented an affront to institutionalized power. Those who dared oppose the Portuguese crown (colonial phase) or the military government (military coup phase) were punished as an example to others. These political processes have

consolidated a culture of inconsideration of grassroots democratic participation that still currently reflects the governmental unwillingness to implement public policies (such as e-petitioning and challenges) attuned with co-creation (level 3) tools of sociopolitical collaboration that requires a political culture open to sharing decision-making power.

Characterized as a historically oligarchic state and thus locked out of the practices of public governance, democratic participation, and effective sociopolitical interaction, the e-Government Portal of Maranhão was ranked fourth in the general classification with respect to levels of SDIM for submitting an opinion poll. From the contextual observation of this case, it was established that it is not possible to infer the level of institutional democratic development of the state governments by checking the SDIM of a government's website.

If the example of Rio Grande do Sul is taken as a parameter for comparison between the other state government websites, it is noted that there is a long way to go with regard to electronic democracy development in the Brazilian states. In this way it is important to highlight the leadership of the state of Rio Grande do Sul concerning the adoption of co-creation (level 3) tools.

Regarding the limitations of this study, it must be stressed that the universe analyzed was a narrow one, restricted to the states of Brazil. It must also be mentioned that the analysis of government websites was undertaken by one person, which prevented the cross-referencing of reviews and limited the revision of the results of the analysis.

Future studies could expand the scope of analysis to other contexts and generate comparisons between sociopolitical, economic, and technological indicators between countries, regions, continents, etc.; this could help to verify possible hypotheses about the correlation between levels of SDIM and other categories of analysis. A specific methodological approach could also be adopted in order to validate SDIM as a theoretical model.

The practical contributions of this study concerning the conceptual framework of SDIM are related to the development of a tool that can be used in processes of design, analysis, and improving the digital interactions between government and society on government websites and collaborative architectures. This will provide new insights to managerial, societal, and technological approaches.

The theoretical contributions of this paper are related to the reinforcement of the collaborative, co-productive, and co-creative approaches, which relies not exclusively on the expansion from a techno-centric to a citizen-centric approach, but on the understanding that opening information, discussion, and collaboration channels for co-creation relies on the articulation of various constituent (human and non-human) elements of collectivities. Based on the perception that the non-predictability of the action courses allow innovation and the consequent co-creation of new hybrid, heterogeneous, and multifaceted associations, institutions, and networks, it was possible to affirm that co-creation may generate continuous processes of public sector innovation.

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**ARTICLE 3 Collaborative innovation in the public sector: a case of the
Brazilian Federal Government**

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1 ABSTRACT

The purpose of this study is to verify the statistical validity of a *collaborative public sector innovation* model in the Brazilian Federal Government context. This model essentially addresses aspects of co-creation, public sector innovation, and innovation ecosystem. Structural Equation Modeling results show a good model fit. It is concluded that the collaborative processes of creation (co-creation) generate new public values and foster public sector innovation. This stimulates the development of an innovation ecosystem supported by new public values and co-creative dynamics.

Keywords: Co-creation. Innovation ecosystem. Public sector innovation. Public value. Public governance.

2 RESUMO

Objetivou-se neste estudo verificar, no contexto do Governo Federal Brasileiro, a validade estatística de um modelo teórico sobre inovação colaborativa no setor público. Esse modelo, essencialmente, aborda aspectos de co-criação, inovação no setor público e ecossistema de inovação. Os resultados da Modelagem de Equações Estruturais (MEE) demonstraram um bom ajuste do modelo. Concluiu-se que os processos colaborativos de criação (co-criação) geram novos valores públicos e fomentam a inovação no setor público. Isso estimula o desenvolvimento de um ecossistema de inovação sustentado por novos valores públicos e dinâmicas co-criativas.

Palavras-chave: Co-criação. Ecossistema de inovação. Inovação no setor público. Valor público. Governança pública.

3 Introduction

The capacity to generate collaborative innovation in the public sector is being gradually perceived as a strategic asset associated with competitive advantage from a go-vernment perspective. This is related to the optimization of the processes that generate public value. According to Szkuta, Pizzicannella and Osimo [1] (p.560), the collaborative relationships between government and society have been “defined in several overlapping ways and terms” such as: government 2.0 [2], open government, public services 2.0 [3], government as a platform [4], wiki government [5], networked go-vernment [6], etc. These initiatives converge on the essentiality of dialogical relations between state (public) and non-state (private) actors, which compose the "Go-vernment Information Networks" [7]. They refer to the perception of emerging patterns of interaction and action in non-linear and unpredictable environments.

These emergent governance models agree that the extraction and use of collective competencies and intelligence forms a potential source of strategic knowledge and advantage, which can be effectively employed in overall management and democratic improvement. The capacity to explore collective intelligence relates to the concept of “smart governance” and "smart government”, which according to Gil-Garcia, Helbig and Ojo [8] (p.11) refers to “activities that creatively invest in emergent technologies coupled with innovative strategies to achieve more agile and resilient government structures and governance infrastructures”. According to the European Commission [9] (p.5), public sector innovations are capable of "unlocking radical productivity improvements and efficiency gains, to foster the creation of more public value and a better response to societal challenges". However, at the same time, it is also highlighted that the factors that prevent more and better innovations in the public sector have "limited knowledge and application of innovation processes and methods" [9] (p.5).

Sørensen and Torfing [10] (p.17) observe that there is no “commonly accepted theoretical framework for analyzing collaborative innovation in the public sector”. According to Chathoth et al. [11] (p.19), “research should explore the process of co-production and co-creation from a strategic perspective”. In reviewing the literature, it was observed that there is a lack of theoretical models empirically validating collaborative innovation in the public sector. To fill this research gap, this study will verify the theoretical validity of a descriptive model for public sector collaborative innovation in a Brazilian federal government context. The model evaluates three constructs: Co-creation, Public sector innovation and Innovation ecosystem. The development of this paper was in line with the following guiding question: Which theoretical model can explain the process of collaborative public sector innovations? The following objectives were thus established:

- a) Propose a theoretical model that describes the elements of public sector collaborative innovations.
- b) Statistically verify the validity of the proposed model using structural equation modeling (SEM).

The structure of this paper is as follows: section 2 introduces the theoretical background, which presents the operational definitions of the constructs, the hypotheses development, and the conceptual model; section 3 presents the methodology, while section 4 shows the results from SEM and offers discussions on the same; section 5 then highlights the conclusions from this study.

4 Theoretical Background

The processes of interaction, sharing and collaboration intrinsic to the concept of web 2.0 guide the design of new participatory architectures [1]. Given the complex social, cultural, political and economic challenges inherent to the public governance processes, it is observed that the emergence of networks and relationships are reiterated by concepts like network society, network state [12], governance networks [10], government information networks [7], etc. The generation of public sector innovations through collaborative processes is being perceived as a strategic tool for the promotion of governmental competitive advantage, capable of increasing citizen trust on democracy and on the government itself.

One example of such innovative public policies is the Presidential Innovation Fellows (PIF) Program, which is a partnered initiative of the White House Office of Science and Technology Policy (OSTP) and the U.S. General Services Administration (GSA). The program intends to accelerate the achievement of results for the American people; bringing “the principles, values, and practices of the innovation economy into government” [13]. As stated in White House website: “*This highly-competitive program recruits talented, diverse individuals from the innovation community and pairs them with top civil servants to tackle many of our Nation’s biggest challenges, and to achieve a profound and lasting social impact*”. Programs such as PIF represent the amalgamation of public policies with collaborative public sector innovations.

4.1 Constructs, hypotheses and conceptual model

The theme of this study concerns an emergent vision related to the citizens, which, according to Nambisan and Nambisan [14] (p.6) is associated with the “shift from that of a passive service beneficiary to that of an active, informed partner or co-creator in public service innovation and problem-solving”. New democratic institutional designs, capable of integrating these models of citizenship and their relationships with government activities are supported by two fundamental aspects: the innovation ecosystem and the innovation platform (Nambisan and Nambisan [14] (p.7). The operational definitions of the three constructs: Co-creation, Public sector innovations and Innovation Ecosystem explored in this study have been presented in table 1.

Constructs	Operational definitions	Sources
Co-creation	CC 1 . Access and openness of transparent public information	Prahalad and Ramaswamy (2004); Santos, Tonelli e Bermejo (2014)
	CC 2 . Continuous dialogical communication	Prahalad and Ramaswamy (2004); Santos, Tonelli e Bermejo (2014)
	CC 3 . Collaborative creation	Bason (2010); Santos, Tonelli e Bermejo (2014)
	CC 4 . Engagement experience	Ramaswamy e Gouillart (2010)
Public Sector Innovation	PSI 1 . New Ideas/designs implementation	Koch e Hauknes (2005); Mulgan (2007); Windrum (2008); Bason (2010)
	PSI 2 . Public Value Generation	Vargo, Lusch e Morgan (2006); Mulgan (2007); Bason (2010)
	PSI 3 . Social distribution and appropriation of value	Gault (2012)
Innovation ecosystem	IE 1 . Communities for new co-creation experiences	Nambisan (2013); Estrin (2008)
	IE 2 . Shared worldview	Nambisan (2013)
	IE 3 . Architecture of participation	Nambisan (2013)

Table 1 - Operational definitions of constructs

Source: adapted from Chen, Tsou, and Ching [15].

4.1.1 Co-creation

In 1996, co-creation was first defined by Kambil, Ginsberg and Bloch [16]. Studies about open innovation [17], user-led innovation and customer-active paradigm [18], and the participatory and convergence culture established co-creation approaches [19], originated from private sector investigations about co-production, which considered them as external source of efficiency gains [20; 21; 22]. A possible comprehension of co-creation, from a strategic perspective, could be the one of ‘intelligence or/and competence capture’. Zwass [23] points out at the “intellectual space of co-creation research” that comprises of: Virtual communities and social capital; Commons, Open access, Open source; Collective Intelligence; and Open Innovation.

In response to the question "what is co-creation?" Prahalad and Ramaswamy [24] (p. 8) argue that: *“Co-creation is about joint creation of value by the company and the customer. Joint problem definition and problem solving. Creating an experience environment in which consumers can have active dialogue and co-construct personalized experiences; Continuous dialogue. Co-constructing personalized experiences. Innovating experience environments for new co-creation experiences”*.

As principal outcomes of the co-creative process, Nambisan and Nambisan [14] (p. 6) point out: *Problem identification, discovery and definition. Solution conceptualization. Solution design and development. Support/facilitation of public innovations adoption and diffusion*. In the public sector context, co-creation refers to the idea of democratic participation, which may involve a process of politicization of society. According to Santos, Tonelli and Bermejo [25], co-creation is found in the most complex level of Sociopolitical Digital Interactions (SDI), and the background of co-creation refers to informational and communicative processes.

The observable variables for the *co-creation* construct were defined as follows:

CC.1. Access and openness of transparent public information

“Transparency of information is required to create the trust between institutions and individuals” [26].

CC.2. Continuous dialogical communication

Prahalad and Ramaswamy [26] (p. 10) observe that “dialogue involves more than listening and reacting. It requires deep engagement, lively interactivity, empathetic understanding, and a willingness by both parties to act, especially when they’re at odds”. According to Theunissen [27] (p. 613), “Co-creational thinking emphasizes communication and dialogue. Meaning is not static; it is created together and dependent on the continually evolving (or devolving) social environment”.

CC.3. Collaborative creation

Bason [28] observes that co-creation consists of a model of innovative design through which solutions are conceived and built with people.

CC.4. Engagement experience

According to Ramaswamy and Gouillart [29] (p. 35), “engaging people to create valuable experiences together” is the “core principle” for transforming organizations to incorporate co-creation. The co-creational activity is based on an engagement experience.

4.1.2 Public Sector Innovation

One of the pioneering studies in public sector innovation was ‘Incentives to innovate in public and private organizations’ by Roessner [30]. According to Windrum [31], innovations can be produced from new designs and concepts related not only to the final production/provision of services and policies, but also related to the interaction with stakeholders. Sørensen and Torfing [32] suggest that public innovation is based on a nonlinear and open-ended process of collaborative innovation. According to Mulgan [33] (p. 6), “*The simplest definition is that public sector innovation is about new ideas that work at creating public value. The ideas have to be at least in part new (rather than improvements); they have to be taken up (rather than just being good ideas); and they have to be useful.*”

The observable variables for the *Innovation ecosystems* construct were defined as follows:

PSI.1. New ideas/designs Implementation

The generation of tangible or intangible results, as well as the new ways of interaction with stakeholders may be related to the following typology of public innovations, as proposed by Windrum [31], which draws from Koch and Hauknes [34] and comprises of: service innovation; service delivery innovation; administrative and organizational innovation; conceptual innovation; policy innovation and systemic innovation.

PSI.2. Public Value Generation

The main approaches to the concept of public value are characterized by two distinct views, the one of societal consensus [35] and the other related to concrete government policies that “*create the conditions for economic prosperity, civility in social*

relationships, and the advancement of justice” [36] (p. 257). These imply increasing trust on government and public interest.

PSI.3. Social distribution and appropriation of the generated public value.

Regardless of the nature of approaches to the concept of public value, it is appropriate to consider that “there is no value until an offering is used [...] experience and perception are essential to value determination” [37] (p. 44). Gault [38] suggests that the understanding of implementation could be improved by verifying if it is made available to the potential users.

4.1.3 Innovation Ecosystem

Innovation ecosystem may be considered as a hybrid and complex arrangement of actors and networks; the initial research about Innovation ecosystem focused its role on private sector. Mercan and Göktas [39] (p. 102) observed that “innovation ecosystem consists of economic agents and economic relations as well as the non-economic parts such as technology, institutions, sociological interactions and the culture”. According to Nambisan and Nambisan [14] (p.7), “Innovation ecosystem relates to the organizing structure for an ensemble of actors (e.g., citizens, government agency employees, nonprofits) to collaborate, to come together and co-create” and comprises of a “foundational element of the support infrastructure needed for hosting citizen co-creation activities”.

The observable variables for the *Innovation ecosystems* construct were defined as follows:

IE.1. Communities for new co-creation experiences

Nambisan and Nambisan (2013; [14] (p. 10) note that it is necessary to “Build and sustain the community of innovators”. According to Estrin [40] (p. 37), “innovation ecosystems are made up of communities of people with different types of expertise and skill sets”.

IE.2. Shared worldview

Promoting “a shared worldview among citizens and government employees” [14] (p. 10) is based on a cultural dimension of innovation ecosystem that tends to create a common understanding and willingness (social capital) related to collaborative innovation experiences.

IE.3. Architecture of participation

Nambisan and Nambisan [14] (p. 10) point out that defining the “architecture of participation to coordinate collaboration activities” is an essential part of the innovation ecosystem infrastructure, making it the innovation platform; these aspects are related to the regulation of collaborative activities, and the establishment of a “physical or virtual venue for citizen co-creation”.

4.2 Hypotheses Development

Several studies have observed positive effects of collaboration on innovation practices [41; 42; 43; 44; 45]. However, empirical research related to the verification of the extent of co-creative effects on public sector innovation, and on the innovation ecosystem, as well as the public sector innovation effects on innovation ecosystem, is scarce. It was thereby proposed that co-creation enhances public sector innovation processes, as citizen inputs foster co-creation practices. Thus, public Sector will work together to develop and implement new public values.

H1. Co-creation has a positive effect on Public sector innovation

Considering that public sector innovation can enhance the design quality of innovative collective arrangements (Innovation ecosystem), the following hypothesis was proposed,

H2. Public sector innovation has a positive effect on Innovation ecosystem

It is assumed that citizens' collaboration will contribute in enhancing the synergy of collective arrangements (Innovation ecosystem), and drive the innovative potential to higher levels. The following hypothesis was thus proposed,

H3. Co-creation has a positive effect on Innovation ecosystem

4.3 Conceptual Model

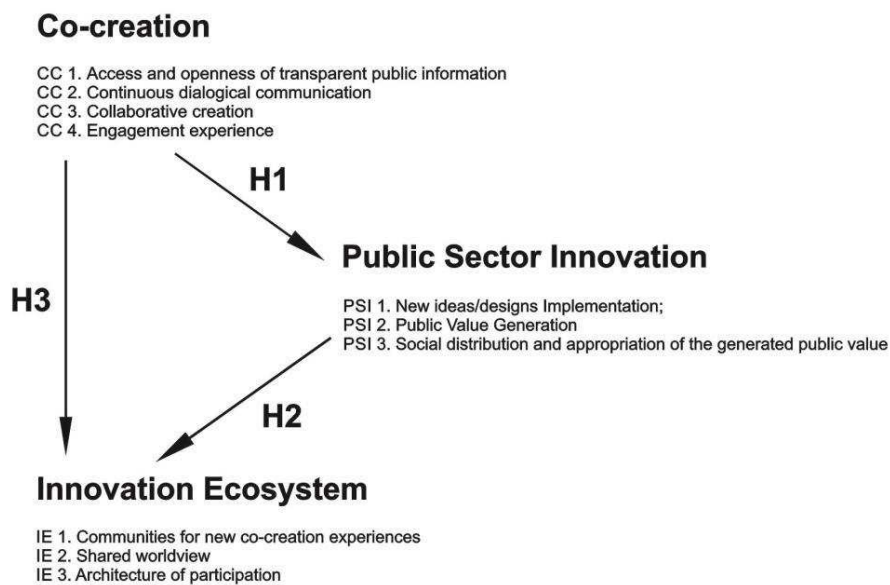


Figure 1- Conceptual model

5 Methodology

In examining the relationships between co-creation, public sector innovation, and innovation ecosystem in a Brazilian context, a quantitative study was undertaken that was analyzed using Structural Equations Model (SEM). The SEM analysis was run using AMOS 22.0 (statistical tool).

According to Debata *et al.* [46] (p. 27), “SEM depicts a diagram or a pictorial representation of a model that is transformed into a set of equations. The set of equations are solved simultaneously to test model fit and estimate parameters”.

SEM is based on multivariate analysis that combines factor analysis [47] and path analysis [48]. This allows the verification of the statistical validity of theoretical models that support descriptive theories (explanations about mechanisms of occurrence of events) and/or normative theories that “define what causes the outcomes of interest” [49] (p. 6).

5.1 Samples, questionnaire and data collection

For this research, a non-probabilistic and convenience sampling approach was adopted based on the availability of the respondents for filling out the survey. This sample included representatives from the Brazilian federal government. Questionnaires were uploaded on Survey Monkey (web platform) and e-mailed to relevant addresses found in the Executive, Legislative and Judiciary websites; a total of 3582 emails were sent out. The questionnaires were first sent on 22nd December 2014, and the data collection process ended on 20th January 2015. A total of 231 responses came in, of which, 170 questionnaires were complete, 57 had missing answers (24 with one missing answer, and 33 with two missing answers), and four questionnaires had repetitive patterns. It was thereby decided that the 170 complete questionnaires, plus the 24 questionnaires with one missing answer will be considered for empirical evaluations, making up a total of 194 valid responses for this study. One missing value in the 24 questionnaires was substituted with the simple average of other responses.

Based on the operational definitions of the constructs, the survey questionnaire had 10 questions, in alignment with the made propositions. Each question was related to the established observed variables for the three constructs of this study. The questionnaire did not target respondents’ demographic and ethnic characteristics. A cover letter describing the research purpose, its objectives, and a statement of confidentiality were sent to the respondents. Based on Chen, Ching, and Tsou’s [15] suggestion on offering an incentive, a declaration was made on the questionnaire that read: “the study’s findings would be made available to the respondents if they returned a completed questionnaire” (p.1336). All questions had to be answered across a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

6 Results and Discussion

According to Hair *et al.* [50], a minimum of 100 to 150 responses are necessary when using the maximum likelihood estimation technique (which has been adopted in this

study). With the fit indices showing acceptable values (table 2), the model was declared to be of an adequate fit.

Adjustment Measures	Referential Values	Results
<i>Chi-square on degrees of freedom (χ^2 / GL)</i>	$2 < \chi^2 < 3$	$(29,606/21) = 1,409$
<i>Root Mean Square Error of Approximation (RMSEA)</i>	$0,05 \leq \text{RMSEA} \leq 0,08$	0,035
<i>Tucker-Lewis Index (TLI)</i>	$\geq 0,9$	0,988
<i>Comparative Fit Index (CFI)</i>	$\geq 0,9$	0,992
<i>Goodness-of-Fit Index (GFI)</i>	$\geq 0,9$	0,967
<i>Normed Fit Index (NFI)</i>	$\geq 0,9$	0,961

Table 2 – Fit Indices

The reliability of the factors (see Table 3) was confirmed using Cronbach's Alpha, with all three factors having an alpha value greater than 0.7 [51]. Co-creation was initially composed of four items, but was later reduced to three, as eliminating variable cc1 in the reliability test resulted in a higher improved Cronbach's alpha.

Factor	Cronbach's Alpha (CC)	Items
Co-creation	0,772	3
Innovation Ecosystem	0,813	3
Public sector innovation	0,816	3

Table 3 – Reliability Test

As shown in Table 3, the loadings for the three observed variables were set at 1 for the identification of the model. All other variables significantly loaded onto the constructs. To verify the hypotheses validities (Table 4), the statistical significances and the magnitude of the estimated parameters were analyzed, based on t-values (or Critical Ratios), Factorial Loadings and Standardized Regression Coefficients (β). According to Hair et al. [50], the t-values reflect the significance of an estimated parameter. The factor loadings indicate the strength of each of the established relationships. A significant factor loading implies that the relationship between two variables is empirically proved [50]. Co-creation presented a highly significant factor loading of 0.534 (at 99.9%) on Innovation in the Public Sector.

			<u>Estimate</u>	β^1	S.E.	C.R.	P	<u>Hypotheses</u>
<u>Innovation</u>	<---	<u>Cocreation</u>	,588	,534	,105	5,598	***	<u>Supported</u>
<u>Ecosystem</u>	<---	<u>Innovation</u>	,512	,497	,094	5,470	***	<u>Supported</u>
<u>Ecosystem</u>	<---	<u>Cocreation</u>	,521	,459	,103	5,039	***	<u>Supported</u>
cc4	<---	<u>Cocreation</u>	1,000	,776				
cc3	<---	<u>Cocreation</u>	1,033	,760	,113	9,132	***	
cc2	<---	<u>Cocreation</u>	,872	,641	,109	8,010	***	
ie3	<---	<u>Ecosystem</u>	,896	,680	,097	9,272	***	
ie2	<---	<u>Ecosystem</u>	1,031	,855	,089	11,524	***	
ie1	<---	<u>Ecosystem</u>	1,000	,776				
psi1	<---	<u>Innovation</u>	1,000	,757				
psi2	<---	<u>Innovation</u>	1,034	,788	,104	9,972	***	
psi3	<---	<u>Innovation</u>	,991	,767	,101	9,778	***	

1. Standardized Regression Weights

Table 4 – Regression weights

As shown in the research model (Figure 2), the following three hypotheses were confirmed:

H1. Co-creation has a positive effect on Public sector innovation

H2. Public sector innovation has a positive effect on Innovation ecosystem

H3. Co-creation has a positive effect on Innovation ecosystem

SEM thus confirmed the statistical validity of the Collaborative Public Sector Innovation model. The results from this study showed that co-creation has a significant effect on Public Sector Innovation, and that Public Sector Innovation and Co-creation have positive effects on Innovation Ecosystem.

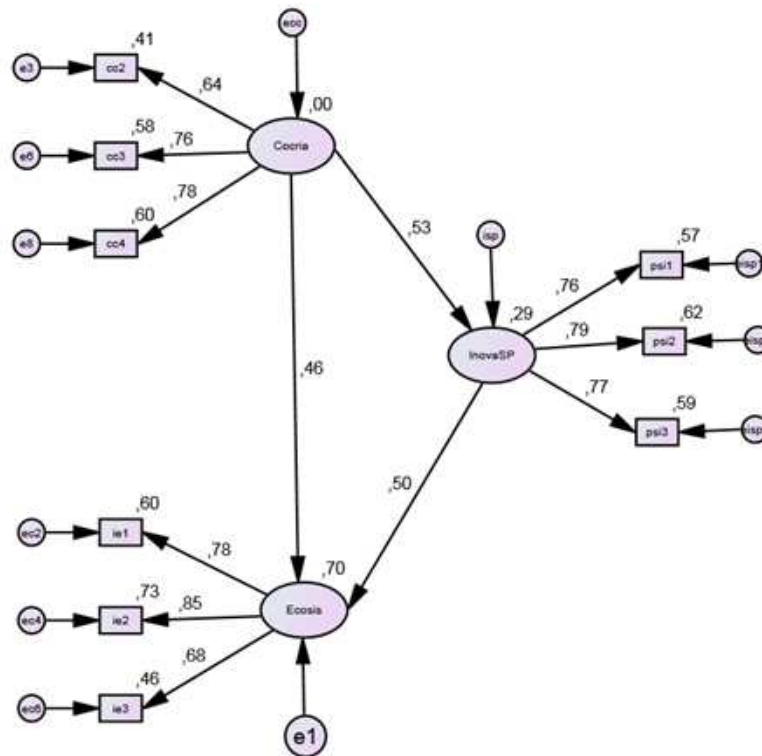


Figure 2 – Research model

7 Conclusions

In an attempt to fill in the research gap that pointed at the absence of a theoretical framework for collaborative public sector innovations [32], this paper evaluated, through a triangular model, the mutual effects of Co-creation, Public Sector Innovation and Innovation Ecosystem in a context of the Brazilian Federal Government. The study statistically validated the main idea, that is: *collaborative processes of creation (co-creation) generate new public values and foster the growth of public sector innovation. This stimulates the development of an innovation ecosystem that is supported by new public values and co-creative dynamics.* This study was based on the assumption that synergy among the three constructs may represent a strategic asset related to competitive advantage (from the government perspective) concerning the optimization of public value generation.

The key conclusions from this study are:

(a) Brazilian Federal Government representatives perceive co-creation as a process capable of generating public sector innovation, which leads to the development of

innovation ecosystem. Analysis of survey responses confirmed that co-creation has a positive influence on innovation ecosystem.

(b) Co-creation is a key asset to the formulation of answers to complex challenges and to the improvement of the processes generating public values in non-linear and unpredictable environments.

(c) The validated theoretical model may be a useful tool for understanding, analysing, improving and designing digital collaborative public sector innovations directly related to the development of innovation ecosystem.

(d) The capacity to generate public sector innovations through co-creative processes showcases the importance of policy planning by combining government intelligence and democratic participation.

(e) This design of public policies that incorporates government intelligence and democratic participation may offer a key directive for achieving strategic advantage in generating new public values and social politicization.

Limitations and Future Research

The theoretical validity of this model has been verified only in the Brazilian federal government context. Future research should consider exploring additional constructs, whilst applying the proposed research model in the context of other national governments.

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APPENDIX

APPENDIX A - Introductory letter

Innovation in the Public Sector - UFLA / MG

Hello,

The Federal University of Lavras - UFLA / MG is conducting a study whose objective is to verify the validity of the links between co-creation, innovation ecosystem and public sector innovation.

This study comes from a partnership between the Federal University of Lavras - UFLA / MG and Brunel University in the UK and is being conducted by Herman Resende Santos, Master's student of Public Administration at UFLA; Dr. Kawaljeet Kapoor from Brunel University, UK; Prof. Dr. Dany Flávio Tonelli, UFLA; Prof. Dr. Vishanth Weerakoodi from Brunel University, UK; Prof. Dalton Sousa, Federal University of Mato Grosso do Sul – UFMS and Prof. Dr. Paulo Henrique de Souza Bermejo, UFLA.

We would appreciate it very much if you could provide about 5 minutes of your time to fill out the online questionnaire.

Please click the link below and complete the questionnaire by Monday, January 20, 2015.

[SurveyLink]

Your identity will be kept in strict confidence. Once the completed questionnaire is verified, the results of this study will be sent to your email.

If you have any questions, please contact:

Herman Resende Santos (herman@posgrad.ufla.br) or
Dany Flávio Tonelli (danytonelli@dae.ufla.br).

If you do not want to answer this questionnaire, click the link below and your email will be automatically removed from our list.

[RemoveLink]

We thank you for your attention;
Respectfully,

Herman Resende Santos
Dany Flávio Tonelli

APPENDIX B - Introduction to the Questionnaire

The Federal University of Lavras - Ufla / MG is conducting a study whose objective is to verify the validity of the links between co-creation, innovation ecosystem and innovation in the public sector. We would like to know what types of practices are developed in your organization, department or office. This will help us to better understand the phenomenon of innovation in the public sector and to propose improvements in these processes. The questionnaire should only take 5 minutes and your responses will be completely anonymous. Upon verification of the completed questionnaire, the results will be sent to your email. If you have any questions about the questionnaire, please send us an email: herman@posgrad.ufla.br

Your feedback is very important to us! Thanks for your attention!!

Some concepts are presented below in order to establish a common understanding about the issues:

Co-creation: a model of interaction through which "solutions are designed and built jointly with the people" (Bason, 2010).

Innovation Ecosystem: is related to the organizational structures of collaborative processes between communities and stakeholders (citizens, civil servants) for the co-creation (Nambisan, 2013).

Public sector Innovation: "new ideas that work creating public value. The ideas should be (at least partly) new [...] must be implemented [...] and should be useful "(Mulgan, 2007).

Innovation communities: discussion groups and work through which knowledge and skills are shared to promote innovation.

Public values: principles, benefits, solutions to problems. "Concrete Government policies that [...] create the conditions for economic prosperity, civility in social relationships, the advancement of justice [...] to promote the public interest" (Benington and Moore, 2010).

APPENDIX C - Questionnaire

CO-CREATION (CC)

Through the digital environment...

	(1) strongly disagree	(2)	(3)	(4)	(5) strongly agree
CC1. Citizens have access to relevant, transparent and open public information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CC2. Citizens communicates and discusses its needs openly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CC3. Citizens work collaboratively with our organization.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CC4. Citizens actively participate on collaborative processes of government practices improvement.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

INNOVATION ECOSYSTEM (IE)

Through the digital environment...

	(1) strongly disagree	(2)	(3)	(4)	(5) strongly agree
IE1. Our organization fosters citizen's voluntary mobilization around themes that demands innovative solutions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IE2. Our organization encourages citizens to share knowledge and propose new ideas or new solutions to solve problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IE3. Our organization designs and implements regulation (rules, criteria,	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(1) strongly disagree (2) (3) (4) (5) strongly agree

specifications) and platforms related to co-creative practices among state and non-state actors.

PUBLIC SECTOR INNOVATION (PSI)

In recent years, our organization has ...

(1) strongly disagree (2) (3) (4) (5) strongly agree

PSI1. Implemented brand new practices related to services; policies; stakeholders interactions.



PSI2. Generated new public values (new problem solutions, best results to community, increased trust).



PSI3. Has facilitated citizen's access to generated new public values (new problem solutions, best results to community, increased trust).



APPENDIX D - Respondents Demographics

Respondents Demographics		
Branch	Federal Government Agencies	Qty. of Respondents
Executive	Ministry of Agriculture	56
	Ministry of Planning	28
	Ministry of Culture	1
	Ministry of the Environment	13
	Ministry of Foreign Affairs - Itamaraty	5
	Ministry of Transport	15
	Ministry of Mines and Energy	7
	Ministry of Education	13
	Ministry of Social Development and Fight against Hunger	9
	Secretary for the Promotion of Racial Equality	9
	Ministry of Tourism	7
	Secretary of Ports of the Presidency	2
	Ministry of Cities	2
	Ministry of Social Security	2
	Secretary of Human Rights of the Presidency of the Republic	5
	Secretary on Policies for Women	3
	Aviação civil	2
	Ministry of Defence	6
	Ministry of Fishing and Aquaculture	1
	Comptroller General of the Union (CGU)	1
Legislative	Senate	4
Judiciaire	Superior Electoral Court (TSE)	3
Total		194

APPENDIX E - Digital Interactive Tool's description

Digital Interactive Tools	Description	Examples
CO-CREATION		
e-vote	Electronic voting (also known as e-voting) is voting using electronic systems to aid casting and counting votes.	Regional Priorities Voting on Brazilian State of Rio Grande do Sul (Brazil)
e-petitions	An online petition (or Internet petition, or e-petition) is a form of petition which is signed online, usually through a form on a website.	e-people (South Korea); e-petitions (HM Government)
opinion polls	An opinion poll is a survey of public opinion from a particular sample. Opinion polls are usually designed to represent the opinions of a population by conducting a series of questions and then extrapolating generalities in ratio or within confidence intervals.	Queensland Government Statistician's Office (QGSO); Contribute to Open Government in Canada
challenges	Programs of collaborative creation of solutions for real problems held by governments.	The Presidential Innovation Fellow (USA); Desafio da sustentabilidade (Brazil)
wikis	A wiki (Listen/ 'wiki/ wik-ee) is an application, typically a web application, which allows collaborative modification, extension, or deletion of its content and structure	Wikilegis (Brazil)
discussion forums	An Internet forum, or message board, is an online discussion site where people can hold conversations in the form of posted messages.	Innovative working methods and transparency (UK Parliament)
applications	Independent websites, built to make it easier to report problems and suggestions, to visualize data and control Public Administration actions.	FixMyStreet (UK)
open channel for suggestions	A channel of communication between citizens and the public administration in order to receive: suggestions, complaints, denunciations and compliments. [2]	Ombudsman
open data	Open Data is freely available for all to use and redistribute as they wish, without restriction of licenses, patents or control mechanisms [3]	Brazilian open data portal
CONNECTION		
social networks	A dedicated website or other application which enables users to communicate with each other by posting information, comments, messages, images, etc. [1]	Facebook
professional networks	business-oriented social networking platform	LinkedIn
chat	Online chat, text message communication over the Internet in real-time	-
contact forms / e-mail	Electronic mail, most commonly referred to as email or e-mail since c.1993.[2] is a method of exchanging digital messages from an author to one or more recipients.	-
multimedia sharing services	websites hosting and allowing media or resources such as digital pictures and videos clips to be shared by users [4]	YouTube, Flickr, Instagram
comment box	Digital space where people can comment on content on the website	-
INFORMATION		
blogs	A blog is a website where entries are written in chronological order and commonly displayed in reverse chronological order.	Scottish Government Blogs
microblogs	Microblogging is a broadcast medium that exists in the form of blogging. A microblog differs from a traditional blog in that its content is typically smaller in both actual and aggregated file size. Microblogs "allow users to exchange small elements of content such as short sentences, individual images, or video links".[1] These small messages are sometimes called microposts.[2][3]	Twitter
RSS feed	A format for delivering regularly changing web content [5]	RSS feeds australia.gov.au
newsletter	A newsletter is a regularly distributed publication that is generally about one main topic of interest to its subscribers.	-
information downloading availability	making data reception to a local system from a remote system available to society	-
search engine	A web search engine is a software system that is designed to search for information on the World Wide Web.	-

[1] <http://www.oxforddictionaries.com/definition/english/social-network>

[2] <https://www.ouvidoria.sp.gov.br/Porta/Default.aspx>

[3] <http://dados.gov.br/>

[4] <http://www.igi-global.com/dictionary/media-sharing-sites-msss/18173>

[5] <http://www.whatissrss.com/>