# ANALYSIS OF THE KNOWLEDGE PRODUCTION NETWORK ON THE E-DEMOCRACIA INITIATIVE

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**Abstract**: The article aims at analyzing the academic production – from 2009 to 2017 – regarding a democratic innovation program developed by the Brazilian House of Representatives called *e-Democracia*. Three analysis methodologies were applied: content analysis to identify authors, institutions and areas of knowledge; lexical analysis of abstracts and keywords using the IRaMuTeQ software and network analysis of the bibliographic references of the materials. The results indicate that this subfield presents some differences in relation to the area of internet and politics (I&P) in Brazil, especially with regard to institutions and areas of activity. Nevertheless, the co-citation network reveals that key authors from the large area of I&P also are central here. It is concluded that this subfield presents particularities in relation to the field, such as the entry of new institutions and areas of knowledge. However, the main lines of research and authors in the large area of internet and politics are maintained.

**Keywords**: Digital Democracy; e-Democracia; Open Parliament; Scientometrics.

## 1 Introduction

The objective of this article is to understand the development of subfields of studies and research on digital democracy based on the analysis of the *e-Democracia* (e-Democracy) – a participative democratic innovation in Brazil – and its progressive recognition as a relevant research object. The program. The program – in the form of a portal called *e-Democracia* – was launched in 2009 at the initiative of the House of Representatives of Brazil. It was developed with the aim of offering Brazilian citizens channels of communication and interaction with deputies, in addition to offering a specific instrument for the shared construction of bills

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(FARIA, 2012, 2015, 2016; FREITAS; FIUZA; QUEIROZ, 2015; MITOZO *et al*, 2016). To observe trends in this subfield, initially, a mapping of the authors who worked on the initiative, the most relevant themes and subthemes and the types of works produced was carried out. Of special interest were the analysis of the relationships between researchers from the network of citations and co-citations, identifying the main areas of knowledge and institutions involved.

The initial curiosity was born from the observation of a considerable production about the *e-Democracia* in the last years, of its significant visibility and, with this, an academic – and not academic – production. *E-Democracia* started to be an object of analysis with sufficient consistency and stability for measurements and application of different methodologies. The initiative's main objective is to encourage the participation of society in the debate on various issues related to citizen demands, which may transform this participation into processes of collaborative production of bills.

According to its main creator, the objectives of the *e-Democracia* include improving the interaction between society and the House of Representatives, strengthening the role of the Legislative Branch in the formulation of public policies, stimulating responsible and constructive social participation, improving the understanding of Brazilian society about the complexity of legislative work and increasing the transparency regarding the process (FARIA, 2012, p. 185). Therefore, although its most immediate focus is on the e-participation, *e-Democracia* also presents tools and processes directly related to other democratic values, such as public deliberation, transparency and representation.

This research analyzed 62 academic materials (such as articles, papers, monographs, dissertations, reports, etc.) published (or presented) in Brazil between 2009 and 2017 that presented the *e-Democracia* as a central object of discussion, observation and reflection. Initially, a quantitative content analysis of general aspects of academic productions, such as authors, institutions and areas of operation, was carried out. Then, the abstracts and keywords available of all materials were analyzed using an automated lexical analysis, performed by the IRaMuTeQ software, which allowed us to identify themes and keywords of the production. Finally, network analysis was performed with bibliographic references of all materials to allow a better understanding of networks of authors and even the existence of specific schools of thought.

The initial results indicate that new institutions gain prominence in studies on digital democracy compared to the large area of internet and politics (I&P) in Brazil (cf. Sampaio *et al*, 2016), as well as other areas of operation appear more frequently. However, by analyzing the keywords and the co-citation networks, there are indications that it is a subfield quite similar to the field of I&P.

## 2 Internet and politics in Brazilian research

Most studies in the field of Internet and Politics (I&P), an area in which studies on the *e-Democracia* are inserted, tend not to focus directly on the concept of digital democracy, except for the survey by (2015). In general, either an open assessment is carried out (studies on the internet and politics) or efforts are concentrated on the elaboration of more specialized concepts within the literature of digital democracy, such as cyberactivism, online deliberation and specific forms of e-participation.

In a broader perspective, the study by Sampaio, Bragatto and Nicolás (2016) is concerned with understanding the formation of the Internet and Politics (I&P) field as a subfield of Communication and Politics in Brazil. The study evaluates 526 articles from 11 events in the area of Social Communication, Political Science, Sociology and Social Sciences between 2000 and 2014.

If 1996 is a watershed year in international literature on digital democracy, Brazilian literature seems to take another decade. Until 2005, according to Sampaio *et al* (2016), articles did not exceed 2% of the total. The growth occurs more significantly from 2006 (3.8%). In turn, the period between 2012 and 2014 alone represents 43.1% of the total articles analyzed, which shows a rapid growth in production in recent years, probably encouraged by studies of online social networks (cf. Gomes, 2016).

Regarding institutions and authors, the study by Sampaio *et al* (2016) points out that there are considerably more authors in the area of Communication (45.6%) than in Political Science (13.9%), Social Sciences (8, 0%) and Sociology (7,4%)[8], he majority of whom are already doctors (30%). Even so, master's students (26.4%) and doctoral students (19.4%) represent almost half of the analyzed population. It is interesting to note that some of the most traditional universities in the country are not among the main producers of I&P literature.

The four institutions that lead the production of articles are the Federal University of Bahia (UFBA, 9.7%), the Pontifical Catholic University of the State of São Paulo (PUC-SP, 8.9%), the Federal University of Minas Gerais (UFMG, 6.5%) and the Federal University of Paraná (UFPR, 6.5%). This does not mean a significant change in the predominance of production by regions. The Southeast region maintains a concentration of literature (45.8%), followed by the Northeast (14.1%) and South (13.8%) regions, which is explained by the notability of the UFBA and the UFPR, respectively (SAMPAIO; BRAGATTO; NICOLÁS, 2016).

The study by Santos, Aldé and Schwambach (2016) can be particularly rich to explain the situation. Unlike the previous study, based on articles of events, the authors analyzed dissertations and theses in the area of Communication and Politics focused on Internet and

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[8] The work by Curtinovi and Parmeggiani (2015) also highlights the preponderance of the Communication area (47%) over Political Science (18%) and Social Sciences (5%).

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Politics. The *corpus* of this research is considerably less extensive than the previous one, comprising 59 productions, but it is more comprehensive longitudinally, covering the period between 1992 and 2014. Another striking difference in relation to the work of Sampaio *et al* (2016) is the greater concern with the literature triggered by the authors, as well as specific characteristics of this type of scientific production, such as advisors and members of the board.

According to Santos, Aldé, Schwambach (2016), the five universities with the highest production are the UFBA (13), UFF (8), UFMG (6), PUC-SP (8) and UERJ (7), which reinforces the data already pointed out in the previous research, showing that The UFBA, UFMG and PUC-SP are, in fact, great research centers in the area of I&P. Furthermore, it reveals how the state of Rio de Janeiro presents considerable production.

Santos and colleagues (2016) also point out that it is not only the considerable production of researchers at these universities that draws attention, but also the orientation capacity of these researchers, pointing to the ability to train new professionals working in the area[9]. the study by Santos *et al* (2016) also demonstrates how these same researchers (together with their advisors) become the most referenced by the literature itself. 3,632 different authors were identified, but only 1,193 are used more than once and only 24 authors are cited more than 30 times[10].

Regarding the themes, the study by Sampaio, Bragatto, Nicolás (2016) shows a greater national interest in the social aspect (58.9%) than in the institutional aspect (41.1%), which confirms the finding of Gomes (2016) in relation to the growing international interest in the theme of "internet and society" (37%) within the theme of digital policy. The study also confirms that the national literature on Internet and Politics seems to dedicate a good part of its efforts to themes directly related to digital democracy, as is the case in international literature (Gomes, 2016).

The most common national conceptual approaches were "participation" (20.7%), "engagement" (18.3%), and "deliberation" (9.7%). Other more prominent issues of digital democracy, such as "transparency" (4.2%), "digital inclusion" (5.1%), "identity and citizenship" (5.3%) and "accountability" (2.1%) have also been identified. This does not mean the absence of digital politics, present in topics such as "political and electoral strategy" (9.5%), "political economy of communication" (6.8%) and "political representation" (2.7%) (SAMPAIO *et al*, 2016). The same themes appear as central in the analyzed works on the *e-Democracia*, as will

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[9] The presence of Wilson Gomes, at the UFBA (eight orientations), Vera Chaia, at the PUC-SP (six orientations), Afonso de Albuquerque, at the UFF (five orientations), Alessandra Aldé, at the UEJR (five orientations) and Rousiley Maia, at the UFMG (five orientations) explains the high production in these universities in both surveys.

[10] Removing foreign references, the most used authors are: Wilson Gomes (187), Rousiley Maia (101), Francisco Jamil Marques (99), Sérgio Braga (60), André Lemos (49), Rafael Cardoso Sampaio (46), Leonardo Avritzer (41), Luis Felipe Miguel (36), Raquel Recuero (36), Alessandra Aldé (36), Sivaldo Pereira da Silva (31) and Maria Alejandra Nicolas (31), confirming the central role of these researchers in Brazilian literature. It is also noteworthy that most authors are part of the research network of the National Institute of Science and Technology in Digital Democracy (INCT.DD).

be discussed in the results of the research presented here.

Within these conceptual approaches, the study by Sampaio *et al* also assesses the political object in focus in the articles, reaching the following data: "non-organized civil sphere" (27.6%), "government" (24.3%), "Social movements" (17.9%), "electoral campaigns" (13.7%). Such numbers show that most of the Brazilian literature deals with issues related to the civil sphere, either in the form of more spontaneous political actions and/or maintained by the non-organized citizen, or with a focus on civic organizations and social movements. However, both the focus on government and campaigns shows that institutional issues are also relevant to Brazilian I&P studies.

Similar numbers are seen in the themes identified by Santos *et al* (2016). Among the analyzed works, 52 related to "Communication and Civil Society" stand out; 38 fit into "Communication and Democracy" proposals; 25 are among the works of "Communication Policies"; 17 relate to "Media and Elections" and 16 to "Political Culture, Behavior and Public Opinion". Therefore, the theme "internet and society" also receives greater attention from the I&P area in Brazil, as occurs in international literature.

In turn, it cannot be ignored that, on several points, studies on digital democracy converge with those of electronic government (Pinho, 2008). Przeybilovicz, Cunha and Coelho (2015) carried out the most complete evaluation of the area, where they sought to verify in a comprehensive way the production on electronic government in the area of Administration in Brazil. To this end, the authors prospect the main events in the area[11] and the production of journals classified by CAPE (Coordination for the Improvement of Higher Education Personnel) with assessment equal to or above B2 in the Administration area (2012) in the period between 2007 and 2012, which resulted in 124 articles, involving 84 institutions, totaling 188 co-authorships.

Here, due to the focus on Administration, the leading institutions are notably different from those presented by Sampaio *et al* (2016) and Santos *et al* (2016), with only the UFBA remaining among the five largest research producers. According to the following data: University of São Paulo (17.7%), Federal University of Bahia (9.7%), Pontifical Catholic University of Paraná - PUC-PR (8.9%), Getúlio Vargas Foundation (8.1%) and University of Brasília (6.5%). Through a network analysis of the institutions based on the authors, the study points to a high centrality of the USP, which serves as a link for institutions in various regions of Brazil. In addition, other regional networks stand out, notably PUC-PR which connects researchers from the South, the Federal University of Santa Catarina (UFSC) to institutions in its state, the Federal University of Paraíba (UFPB) to institutions in the Northeast and Central-

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[11] Meeting of the National Association of Graduate Studies and Research in Administration (EnANPAD), Information Administration Meeting (EnADI), VII ANPAD Public Administration Meeting (EnAPG) and International Conference on Information Systems and Technology Management (CONTECSI).

west and Getúlio Vargas Foundation to non-academic institutions.

The analysis by Przeybilovicz, Cunha and Coelho (2015) also shows that most of the Administration literature in Brazil, in fact, is concerned, centrally, with e-government (n=33) and e-administration (n=25); however, there is also room for subthemes of digital democracy, such as e-governance (n=9), e-participation (n=8) and for e-democracy itself (n=6).

In this article, the objective is precisely to verify some of the possible differences that exist when the field aims at understanding and studying a specific object.

## 3 Methodology

The research that originated this article had as its central objective to understand the field of digital democracy from the analysis of the existing bibliographic production on the *e-Democracia* initiative of the House of Representatives. The launch of the *e-Democracia* portal by the House of Representatives arises from a technical core of the House different from that responsible for the *Portal da Câmara* (House of Representatives Portal) (MITOZO *et al*, 2016). The project started in a pilot format, having only two discussions organized in virtual communities that sought to discuss bill processing at the House: the climate change policy and the Youth Statute. Despite causing some fear among representatives because it resembles a tool of direct democracy (cf. MITOZO *et al*, 2016), "other communities were gradually created over the second half of 2009 and the first half of 2010, including communities for discussion about the Amazon, space policy and the regulation of digital inclusion centers (LAN houses)" (Faria, 2012, p.185).

After this initial stage, *e-Democracia* has established itself as one of the most relevant digital democracy projects in Brazil. In addition to being maintained by the legislature, *e-Democracia* has gradually become an innovation laboratory in the areas of participation, deliberation and transparency. In the same place, polls were available, libraries of articles on legislative topics and collective chats between citizens and representatives, as well as thematic forums based on bills that aimed to receive and encourage opinions and debates between representatives and represented (as explained above in the case of the Civil framework of the Internet). The *e-Democracia* also created the Wikilegis tool, which sought a collaborative construction of legislative texts. Therefore, its participants could "elaborate their own version of the bill, in addition to promoting specific changes in the original text of the bill or the substitute text presented by the representative rapporteur of the matter under discussion" (FARIA, 2015, p. 187).

According to Faria *et al* (2016), in these seven years of existence, the *e-Democracia* has consolidated itself as an instrument of participation and transparency in the House of Representatives. With an expressive number of participants and contributions, proximity to the decision-making center and a myriad of resources for participation and possibilities for online

discussions, capacity for innovation and temporal sustainability, the *e-Democracia* can be considered the project of democracy oldest and most perennial digital system in the Brazilian case and, consequently, has received wide academic attention.

It should also be noted that, in 2013, the Hacker Laboratory was launched, a democratic innovation laboratory that seeks to create and implement various tools and open parliament projects at the House of Representatives. The initiative can be described as a direct evolution of the *e-Democracia*, becoming a larger project that involves it[12]. It consists of a democratic innovation laboratory directly associated with the Legislative branch, aiming at the creation of innovative tools and/or initiatives that break with the bureaucratic standards of the traditional legislative process. In addition to taking on the *e-Democracia* and Wikilegis, LabHacker created new resources, such as "Parliamentary Rhetoric"[13], which consists of an analysis and visualization of the main themes present in the statements of Brazilian representatives. The tool organizes speeches in thematic bubbles, which allow easy viewing of the representatives who most address the topics. By clicking on a representative's name or image, you can view more information about him/her.

For the research in focus here, the institutions and regions of the authors were identified, the types of work and characteristics of the bibliographic production (considering themes and subthemes analyzed), the areas of knowledge involved and the relationships between researchers from the network of citations and co-citations. The citation network also allowed the analysis of characteristics that identified the formation of a possible network of authors and concepts, which may come to characterize possible schools of thought in formation, identifiable from the analysis of works on the *e-Democracia*.

The analyzed content was the keywords and abstracts of the works that had the *e-Democracia* or some aspect directly related to it as the central object of the study. The free software IRaMuTeQ[14] was used, developed by *Laboratoire d'Études et de Recherches Appliquées en Sciences Sociales* (LERASS) of the University of Toulouse. IRaMuTeQ allows diverse quantitative analyses on *textual corpora*[15]. It was possible to use a series of software resources to refine the research, such as word counting for the development of classic textual statistics; the search for concept networks; visualization of word clouds; the analysis of co-occurrence networks of terms; main words cited; analysis of similarities and differences between networks of interest and observation of proximity – or distance – between terms.

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[12]According to its website: "LabHacker is a space to promote the collaborative development of innovative citizenship projects related to the Legislative Branch. In addition to stimulating the development of digital applications that allow more intuitive and simplified visualization of legislative information, LabHacker promotes activities such as hackathons, hackdays on innovative themes, and creation and discussion workshops with experts, representatives, students from universities and public schools, and children interested in technology". http://labhackercd.net/about.html. Access on February 7, 2018.

[13] http://retorica.labhackercd.net/. Access on February 7, 2017.

[14] Available at: https://sourceforge.net/projects/iramuteq/. Access on July 30, 2018.

[15] Textual *corpus* refers to the total set of texts that are being analyzed in a research; in the case of the present research, there were two *corpora*: the set of all keywords for each work and the set of all abstracts.

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To generate initial quantitative indicators, a search was made for works that contained any mention of the *e-Democracia*, in the Google Scholar, Scielo and CAPES Journal Portal. There was also a search for works in CAPES' thesis and dissertation database. As "*e-Democracia*" can refer to both the object and the field of study, the searches were carried out in conjunction with other keywords that would help to differentiate it. Such as "Câmara dos Deputados (House of Representatives)", "projeto (project)", "iniciativa (initiative)" and "LabHacker", initially finding a total of 73 works that mentioned the *e-Democracia* project, including works in the English language.

Of this total, a set of 11 productions that only mentioned or touched the *e-Democracia* was excluded from the research, without containing an analysis directly related to the initiative. A database was created with the remaining 62 studies. Subsequently, a series of metadata about each study was manually cataloged, among them: authors and respective institutions of origin; concentration areas; types of work, such as articles for journals, book chapters, theses, dissertations and monographs; year of production publication; content of keywords and abstract for each document.

Subsequently, attention turned to the set of authors who appeared as references cited in each of the 62 studies analyzed. A database was produced containing all the names mentioned by each study, also counting the number of times that each name was mentioned in each study. From this, using free and open source software R (R CORE TEAM, 2017), quantitative indicators were built on the citations made by the studies, allowing to identify the most cited people or entities in the field.

A co-citation network was also produced between the names mentioned. According to White and Griffith (1981), the co-citation network is formed when we consider each author as an element (point or node) of the network and each study in which two authors appear together in the reference list as a relation (line or link) from the Web. That is, two authors are linked if they are cited in the same study. With that, it was possible to carry out analyses based on some indicators, such as the number of co-citations between authors, identifying authors with greater influence in the field and the relative proximity (or distance) between the authors when articulated by the 62 studies analyzed.

In view of the fact that co-citation networks usually reveal denser groupings within them, that is, groups of references that are more frequently articulated by the studies analyzed, these groupings were also detected. For this, we used the algorithm for detecting leading eigenvector communities, developed by Newman (2006), which proved to be robust in exploratory tests.
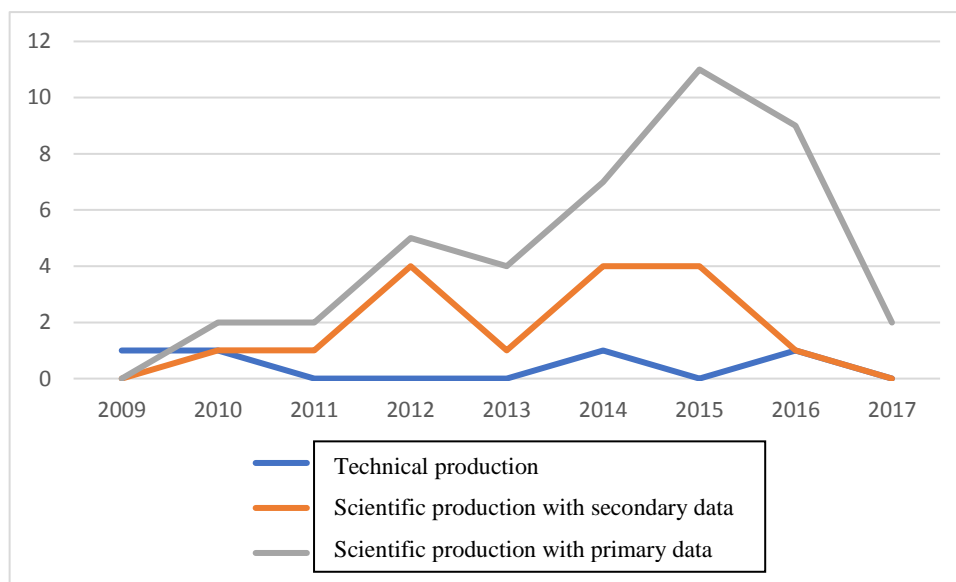
## 4 Results

The results of each survey are presented and discussed below.

### 4.1. Types of study and production

This research was interested in verifying whether the production about the *e-democracia* era was predominantly scientific or not. The following figure illustrates the analyzed scenario.

**Graphic 1**: Types of academic production on the *e-Democracia*[16]



**Source:** Own elaboration, 2018.

The history of bibliographic production of the *e-Democracia* can be divided into three stages. The first, from its beginning, in 2009, until 2011. This stage is characterized by the production of works with little empirical data on the platform and, perhaps because of this, there is a predominance of technical productions. At the time, there was very little information available on the platform, given its little maturity and time of existence. In total, there were two technical productions, two scientific productions with secondary data and four with primary data.

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[16] To be considered as scientific production, the following criteria were observed: it presents theoretical assumptions; uses concepts to understand the research object to be analyzed; it bases its conclusions on new, original research or on academic and government research already carried out. Still regarding scientific productions, two distinctions were applied: a. scientific production based on original research - reveals the potential of the initiative to provide primary data for new research; b. scientific production based on research already carried out - reveals the consolidation of the *e-Democracia* being classified here the works that worked with secondary data. Were considered as technical productions, those works with no theoretical framework, methodology or empirical evidence of the findings and analyses presented (whitepaper, some papers for congresses and book chapters).

From 2012 to 2014, the production becomes more based on research and most of it is scientific production with primary or secondary data – of the twenty-six works from this stage, twenty-five have such characteristics. The papers present theoretical assumptions and concepts developed to understand the research object to be analyzed; they base their conclusions on new, original research, with primary data, or on secondary data, the result of academic and government research already carried out. Greater theoretical and empirical refinement of the works is observed. The time of existence of the initiative contributes to this scenario, with a sufficient number of data available for collection, data analysis and conduction of research.

After three years of activities, the platform starts to offer relevant data and information for analysis, such as the history of discussions about bills in legislative communities and the actual processing of bills, making it possible to analyze not only the bill path until its approval, but also the controversies that often prevented it from proceeding and being sanctioned. In this second stage, therefore, most of the production is of works that present results of original research with theoretical and methodological rigor and peer review.

The third stage begins in 2015 and runs until 2017, when technical production was identified, five surveys with secondary data and twenty-two (or 78% of the total) carried out based on primary data. Most of the production related to the *e-Democracia*, therefore, is scientific, a large part of which is elaborated in the form of articles for journals, book chapters and work for the completion of undergraduate and graduate courses. It is interesting to note that the number of original scientific production has continued to increase over time despite the fact that the overall amount of work produced has decreased.

## 4.2. Regional and institutional origin

At first, basic formal characteristics associated with the authors responsible for the articles and studies identified, such as their institutional and regional origin, were analyzed. The majority of authors are from the Central-west region (48%), which can be explained by the fact that the initiative was developed in the country's capital and its coordination team is strongly linked to teaching activities and research developed at the University of Brasília (UnB). This proximity and curiosity about the initiative tend to generate joint projects and work.

In addition, authors from the Center for Formation, Training and Improvement (CEFOR) of the House of Representatives represent a large group of people interested in analyzing the *e-Democracia*. The southern region also has a considerable number of authors (14 out of 61, or 23% of the total), with those from the southeastern region (13 or 21% of the total) being the third group that has a clear interest in the research object in question.[17]. It is interesting to note that, as in the results of the research by Sampaio *et al* (2016) on Internet and

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[17] Two authors from the northeastern region (or 3% of the total) were identified, none from the northern region and 3 authors (or 5% of the total) from countries other than Brazil.

Politics studies, traditional universities in the country also do not appear as the main producers of knowledge about the *e-Democracia*, as highlighted in the graphic 2 below.

**Graphic 2**: Number of authors per institution
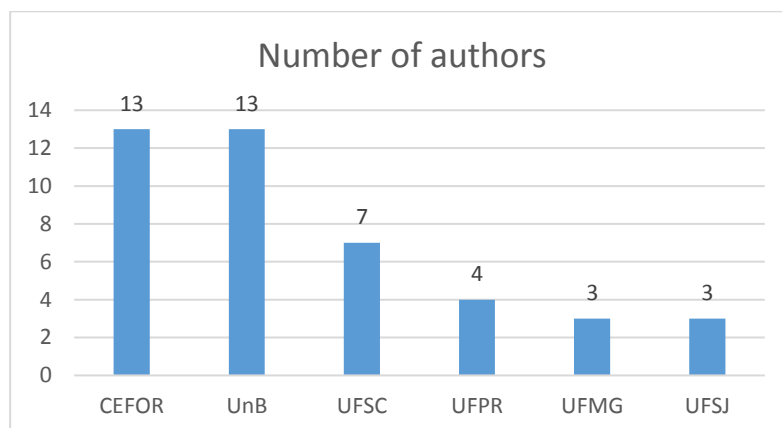


**Source:** Own elaboration, 2018.

Still, cities in the Southeast and South are highlighted, with institutions and researchers interested in the topic. This finding is observed both in the previous research mentioned and in the present research. While the Federal University of Bahia appears as the most important in the field of knowledge production on Internet and Politics in the field of Communication, the scenario analyzed here is somewhat different, with a preponderance of studies in the Central-west region, especially in Brasília.

24 organizations were identified that have some work directly related to the *e-Democracia*. It is worth mentioning that all works were developed at universities and teaching and research institutions. 17 of them, or 71% of the total, have only one author and one production. Only 30.65% of the studies have co-authored works. Seven institutions, out of 24, have more than one production. The organization that has the most work in the area is the Center for Formation, Training and Improvement of the House of Representatives, in Brasília, where several professionals from the House take postgraduate courses, including professionals working in the *e-Democracia* itself. Of the 24 institutions, two North American universities (University of Hull & Harvard Kennedy School) and a Portuguese University (University of Minho) were identified.

These data indicate something expected, that by focusing on a more specific object of digital democracy, new institutional actors can gain relevance and importance in relation to the general field of studies. This is clearly the case with the UnB, which is generally not among the five most relevant universities in terms of studies on the Internet and Politics (I&P), but which has become one of the main producers of knowledge about the *e-Democracia*. In particular, different courses at the UnB presented research on the project, namely Social Communication,

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Political Science and Public Policies.

## 4.3 Areas of Knowledge

The subfield of digital democracy tends to be multidisciplinary, which seems to be reproduced in the analyses on the *e-Democracia*. In 62 works produced on the initiative over nine years, 19 areas of knowledge are involved. However, only four stand out for the most significant participation in numerical terms. Political science was responsible for 26.5% of the production, while the Communication area was responsible for 12.5% of the works. The third most productive area of concentration was that of the Public Affairs[18] (11%) and then that of Law (9.5%). By combining the four areas mentioned, 59.5% of production is reached.

In the research carried out regarding the field of Internet and Politics (I&P) in Brazil (SAMPAIO; BRAGATTO; NICOLÁS, 2016), about 60% of the production originated in the areas of Communication (45.6%) and Political Science (13.9%). Despite the recognized multidisciplinarity, these data suggest that the field of digital democracy begins to have some areas of knowledge that are becoming central to its academic production.

When investigating the area of knowledge in which the doctoral theses were prepared, the same scenario is observed. Three theses were developed, one from Political Science at the UERJ, one from Communication at the PUC-RS and the third from the Public Affairs at the University of Brasília (UnB). The ten master's dissertations identified also confirm the tendency for the same areas of knowledge to concentrate production. Of the total, three were developed in Political Science, two in Communication, one in the Public Affairs, one in Law, one in Administration, one in Information Science and, finally, one in Engineering[19]. The four central areas reappear - Communication, Political Science, Law and the Public Affairs.

As expected, by specializing the study of an object, the subfield begins to show differences in relation to the broader area of internet and politics. Nevertheless, it is worth noting that areas that are little seen in the broader field of I&P, gain strength in studies on the *e-Democracia*, as is the case with Law and Public Policies, something also seen in the emergence of other prominent institutions, as is the case with the UnB. This is in line with the data of Sampaio and colleagues (2016) who demonstrate that Communication, in general, is more

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[18] According to Pires *et al.*, "Public Affairs is an expression used by professors, researchers, students, recent graduate professionals and directors of courses in Public Administration, Public Policy Management, Public Management, Social Management and Public Policies, from Brazilian universities, to designate, essentially, a multidisciplinary field of teaching, research and technopolitical actions, within the scope of Applied Social Sciences and Human Sciences. Which addresses subjects, themes, problems and issues of public interest, collective well-being and inclusive public policies, in a renewed republican perspective when facing governmental actions, actions of organized civil society movements and interactions between government and society, in the search for sustainable socioeconomic development, in the context of deepening democracy" (Pires *et al.*, 2014, p. 112). It is observed, therefore, that academic productions in the field of public affairs and their courses are distributed in several areas and subfields of knowledge, such as Political Science, Administration, Sociology, Economics and Demography.

[19] The dissertation was developed in a postgraduate course at the Technological Center of the Federal University of Santa Catarina Engineering/Management/Technology, a specific area of evaluation by CAPES.

interested in objects from the social aspect, while Political Science focuses primarily on institutional objects, as is the case with the *e-Democracia*. However, in addition, the data shows that there are other areas interested in digital democracy that are more distant from political communication, as is the case with law and the different courses in the public field, which are highlighted in studies on the *e-Democracia*.

**Graphic 3**: Number of Authors by area of knowledge
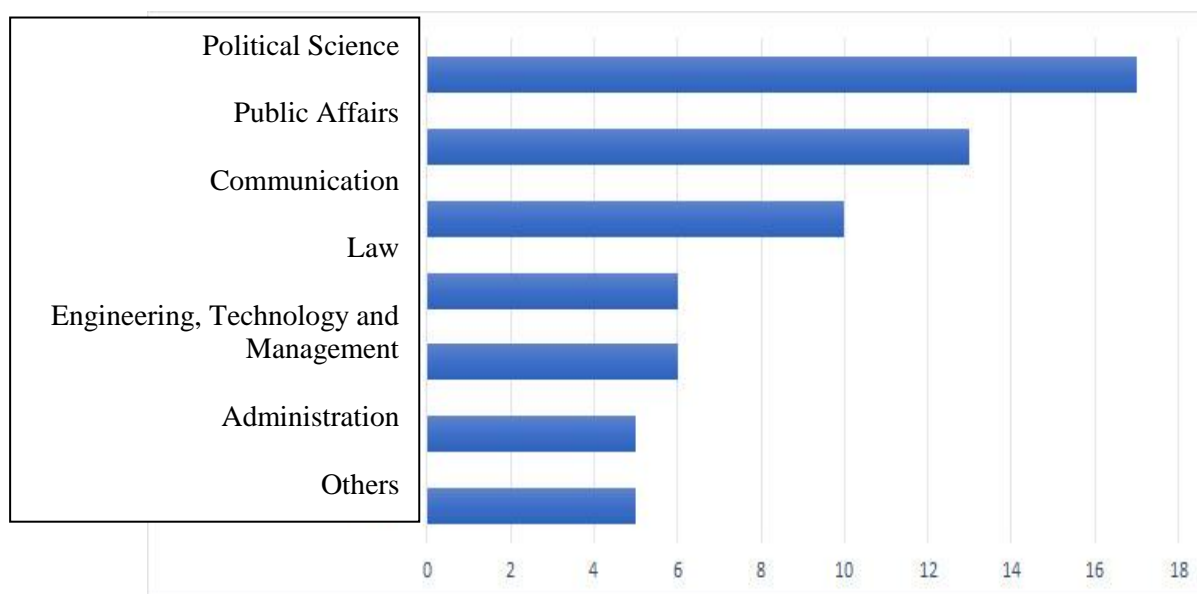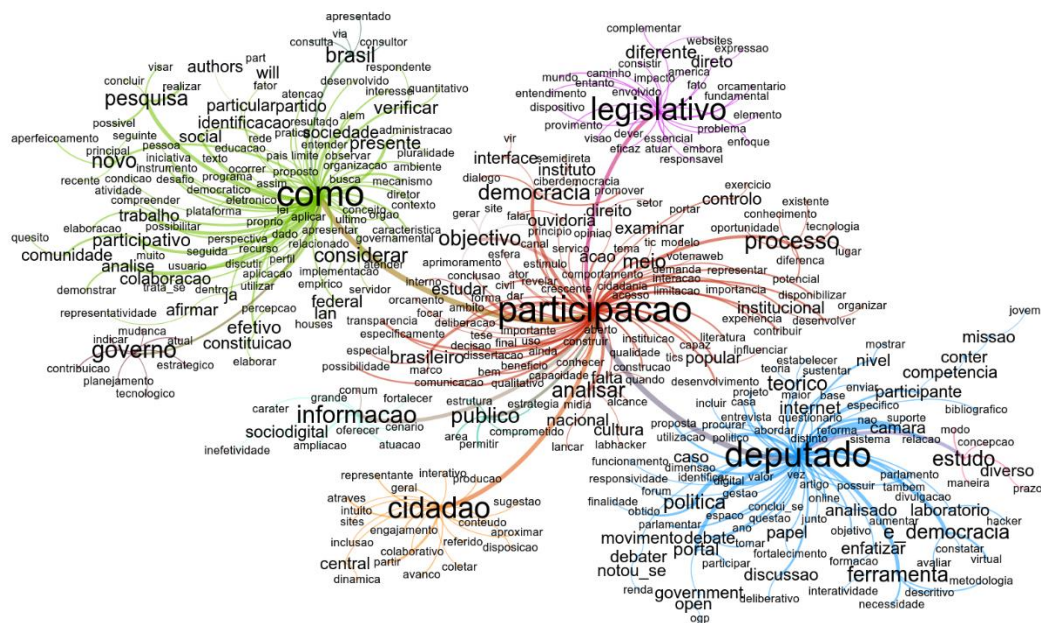


**Source:** Own elaboration, 2018.

## 4.4 Themes and terms

In each of the identified stages, there is a predominance of certain themes and subthemes. Especially in the second stage of production on the *e-Democracia*, there is a tendency to discuss specific topics, with more in-depth discussions.

Such themes include crowdsourcing - or practices dedicated to raising material and immaterial resources in a collaborative way for the construction of public policies and other government actions. Crowdlaw, or the collaborative production of laws; analysis of the processes that lead (or not) to citizen participation; limitations on the possibilities for tools for digital political participation to enhance democracy; development of taxonomy to understand the mechanisms of operation of initiatives based on indicators that analyze governance structure, organizational culture and sustainability (FREITAS; EWERTON, 2018). As a general trend in the field of digital democracy, issues such as social control, transparency, democratic innovation are also beginning to be addressed in the studies analyzed.

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The analysis with IRaMuTeQ allowed gathering the most frequent words in the analyzed abstracts. The word "participation" is the one that appears the most (92 times), being, therefore, central to most of the analyzed works. The term can appear alone or combined with others, developing reflections about participatory democracy, citizen participation, digital political participation, political participation, e-participation and many other possibilities that reveal important concepts to the field of digital democracy. Other very common terms are "política (politics)" (55 vezes), "cidadão (citizen)" (54 times), "e-democracia" (50 times) and "informação (information)" (47 times). Such terms are present in practically all the production analyzed, as shown in the following figure.

**Graph 1:** Co-occurrence network of words extracted from abstracts



**Source:** Own elaboration, 2018.

As can be seen in figure 05, four main groups of words were found. All of them have a significant connection with the central group, the one in which the terms "participação (participation)", "informação (information)", "cidadão (citizen)" appear more frequently. "Participação (participation", in particular, appears as the main central theme, uniting other clusters such as "democracia (democracy)", "processo (process)", público (public)", "legislativo (legislative)", "cidadão (citizen)" and "deputado (representative)", showing that literature tended to deal with the *e-Democracia*, especially, as a platform that allows citizen participation in interaction with their political representatives.

The terms "como (how)", "pesquisa (research)" and "analisar (analyze)" were also found with considerable frequency, revealing the characteristic of most of the works being referenced in research. In this sense, the appearance of the first term demonstrates the existence

of different analyses, for example, regarding "how certain research was done", "how the results were discovered and analyzed", "how the initiative improves democracy", "how citizen participation happens" etc. However, words that made references to research methods or techniques did not form a cluster, which may be an indication of not being valued in the abstract.

It is interesting to note that even though the *e-Democracia* is predominantly based on dialogical tools, the term "deliberação (deliberation)" and its similar terms (for example, dialogue, debate, discussion etc.) do not form a prominent cluster. Furthermore, as much as it is among its objectives, the same happens with transparency and close terms/concepts, such as "parlamento aberto (open parliament)", "accountability" or even "publicidade (advertising)"[20]. Finally, it is also important to highlight that the main analytical key of our article seems to be little present in the studied subfield, or even, digital democracy and similar terms also do not form a cluster between the abstract words. In all of these cases, we found different data in the keywords, as highlighted below.

The co-occurrence network of words produced with the keywords of the analyzed works shows similarities with the previous ones and other notable differences. The term "democracia (democracy)" is the most frequent, appearing 23 times, accompanied by the words "participação (participation)" (20 times), "política (politics)" (19 times) and "e-democracia" (13 times).

**Graph 2:** Co-occurrence network of keywords



**Source:** Own elaboration, 2018.

As in the case of abstracts, it is clear that the term "participação (participation)" remains the central keyword, uniting the different fields of study. However, here, the subfields of the internet and politics are clearly represented. Very close to the idea of participation, we would

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[20] Nevertheless, the cluster around the term "information" may, eventually, be more connected to transparency work. There is, however, the possibility that the information here is being thought of as something important to a more qualified and effective participation.

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have the subfield of "deliberação online (online deliberation)" and, shortly thereafter, of "democracia digital (digital democracy)", which is a bridge both for students of electronic government and for those of communication and transparency. On the other side of the quadrant, there would be more legislative studies, focusing, notably, on digital parliament (online), information and digital society. Notably, the situation is repeated to the extent that there are no terms related to the use of research methods or techniques, which reinforces the finding that it is something little addressed by this research subfield.

As can be seen, several identified words coincide with the recurring conceptual approaches found in the research by Sampaio *et al* (2016) and in the investigation by Gomes (2016).

## 4.5 Network of citations and co-citations

The authors most cited[21] in the analyzed papers were Jamil Marques, Cristiano Faria, Wilson Gomes and Jürgen Habermas. When analyzing the performance of each of them, we can see the relatively uniform distribution among some main areas of knowledge that develop works on the *e-Democracia*: Communication, Political Science, Law and the very multidisciplinary area of the public field, which includes policies public, public policy management, public management, among others. Social sciences and philosophy also appear as relevant areas.

When accounting for all identified co-citations, we obtained a network with 1,963 authors and 175,418 co-citation relationships between them. To better work and visualize this amount of data, we identified subnets and filtered the most central nodes as a cutoff criterion. Thirteen co-citation subnets were identified in the broader network of authors interested in the *e-Democracia*, each with its leader. The three subnets with the highest number of co-citations are those led by Cristiano Faria, Manuel Castells and Joseph Schumpeter. It means that these leaders are the most central nodes in the network when considering their degree. The community leader is the node with the highest degree of interactions in that community. It means that Schumpeter[22], for example, may have been cited in a document that cited a large number of authors (and this gave him a significant degree of centrality within the network); however, the author does not necessarily appear in a significant number of works, calling into question its centrality.

For this reason, another cutoff criterion was also used, that of the centrality measure of connections of weight 9 or higher. In this case, a different scenario is observed. Here, it is not enough for an author to have many co-citations to appear on the network, but he needs to be co-

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[21] The most cited authors considered here are those who obtained more than 1.1% of the total references or more than 50 citations.

[22] It is curious to note that Schumpeter is recognized as an elitist author, notably opposed to citizen participation in political daily life, with the exception of elections (Schumpeter, 1942). Therefore, it is more likely that his theories will be triggered to be countered and criticized with the example of the *e-Democracia*.

cited together with another author at least 9 times, demonstrating his/her importance for the network and his/her recognition among peers. The following figure shows the network found from this criterion, revealing the central nodes (authors) of the network.
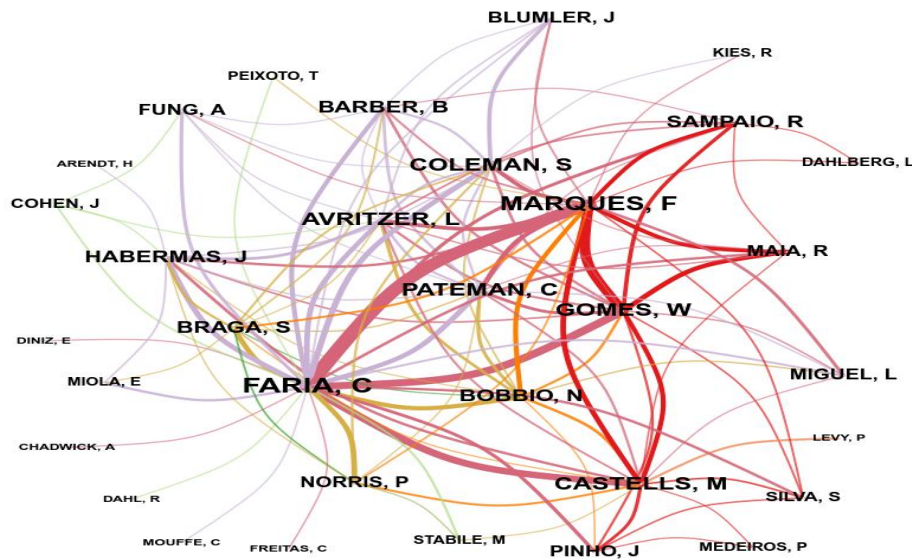
**Graph 3:** Circular co-citation network
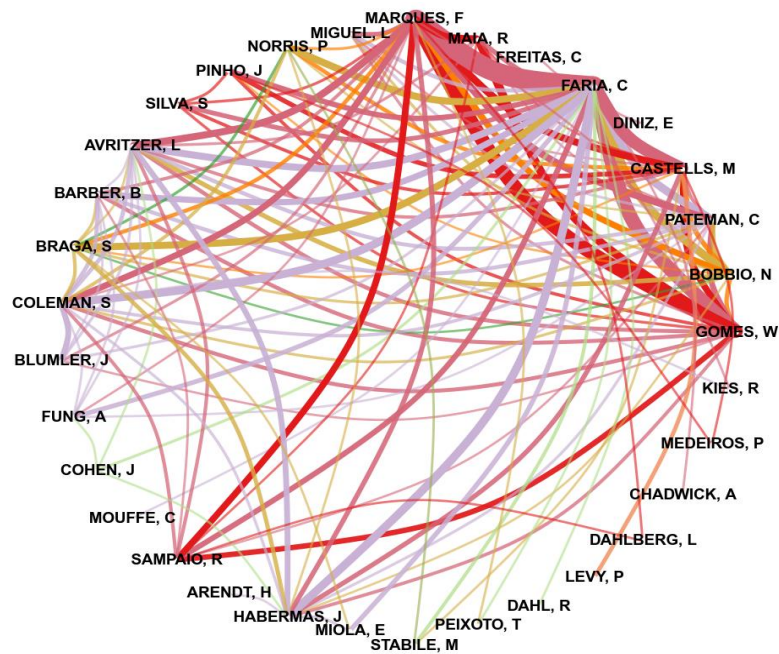
The following figure shows another way of visualizing the network with its subnets, highlighting, in the center, those authors most cited. This time, the position of each element of the network was determined by a force algorithm, described by Fruchterman and Reingold (1991), which means that the distance between the elements in the figure reflects their proximity in the network.

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**Graph 4:** Co-citation network according to the strength of each node



**Source:** Own elaboration, 2018.

Figure 9 shows the centrality of each author more clearly. Those nodes associated or linked from thicker lines than the others - appearing in the center of the image – are those most cited in a greater number of works and in a way associated with more other nodes, forming a dense network of knowledge production.

This co-citation network also highlights the centrality of authors and theories of the internet and politics. It is interesting to note that, of the four most central authors (Wilson Gomes, Jamil Marques, Cristiano Faria and Manuel Castells), the first three belong to the National Institute of Science and Technology in Digital Democracy (INCT.DD), characterizing the Institute as central in the studied network[23]. This fact was also pointed out by Sampaio *et al* (2016), when analyzing the network of knowledge producers in the field of Internet and Politics. Furthermore, it is clear that the vast majority of authors present in our study are, in fact, in the great field of digital democracy[24]. However, it is clear that few authors in the field of e-government are frequently used in the co-citations, only Andrew Chadwick, José Antônio Pinho and Eduardo Diniz becoming evident.

In turn, it is notable as authors of face-to-face political participation, such as Carole Pateman, Benjamim Barber, Leonardo Avritzer and, to a lesser extent, Archon Fung are very active in the area. Avritzer, Jürgen Habermas, Rousiley Maia, Wilson Gomes, Stephen Coleman, Rafael Sampaio, Jamil Marques, Edna Miola, Raphael Kies and Lincoln Dahlberg would represent authors who use concepts closer to those of deliberative democracy (for

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[23] It is also the case of Rafael Sampaio, Christiana Freitas, Sérgio Braga, Edna Miola, Sivaldo Silva, as well as participants from international centers, such as Stephen Coleman, Tiago Peixoto and Raphael Kiss. For more information on INCT.DD, see https://inctdd.org/. Access on March 9, 2020.

[24] Jamil Marques, Wilson Gomes, Rafael Sampaio, Stephen Coleman, Jay Blumler, Sivaldo Silva, Lincoln Dahlberg, Edna Miola, Christiana Freitas, Pierre Lévy (i.e., Cyberdemocracy).

example, public deliberation, public sphere), including studies on deliberation in online environments. In turn, several thinkers of democratic theory are present, such as Norberto Bobbio, Chantal Mouffe, Robert Dahl, Luis Felipe Miguel and Hannah Arendt.

In turn, it is noticeable that the same does not happen with authors from subfields of digital democracy and even democratic theory, notably digital transparency and even the recent advances in the area of open government and open data. While there are authors in these lines (Jamil Marques, Sivaldo Silva, Tiago Peixoto and Wilson Gomes), it was evident that they neither form strong clusters (i.e. they are frequently cited) nor are they frequently used in the theme of transparency. Corroborating previous data, even with the emergence of the Hacker Laboratory and even with the creation of tools aimed at increasing the public transparency of the House of Representatives, the *e-Democracia* continues to be primarily analyzed as a political e-participation project (which may include analysis through existing online conversations inside it).

Therefore, it is pertinent to point out that few authors, in fact, of the literature of online parliaments (e-parliaments, parliaments 2.0, open parliaments etc.) have been seen in the literature. Despite the central position of Cristiano Faria and Stephen Coleman, few authors on the topic appear in our co-citation networks[25], leaving out, therefore, some of the main authors in the area[26]. Although it is only an isolated data, this can be indicative of a lack of specialization in the area.

It should also be noted that both in the words of the abstracts and in the keywords there are no terms linked to research methods or techniques, which may show a weakness in the area's research, something that could be verified in future research.

## 5 Conclusion

Analysis categories were developed and applied to evaluate the network of researchers interested in the *e-Democracia* initiative, a network that belongs to the broader field of Internet and Politics. Mapping was carried out to analyze the authors interested in the initiative, their institutional and regional origins, areas of knowledge and the types of work found. The analyses of relevant themes and terms was also fundamental for a more accurate understanding of the subfield of studies in question. In turn, the networks of citations and co-citations between authors were important tools for analysis, allowing the discovery of trends, such as the highlight of some theorists – and of some central institutions for the field of Internet and Politics in Brazil, such as the National Institute of Science and Technology in Digital Democracy (INCT.DD).

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[25] Also appearing: Sérgio Braga and Jamil Marques.
[26] For example: Andre Rehbein-Sathler, Antonio Teixeira de Barros, Cristiane Bernardes, Cristina Leston-Bandeira, Darren Lilleker, Franz Foltz, Malena Rehbein-Sathler, Paul Ferber, Philip Norton, Rachel Gibson, Rudy Pugliese, Thomas Zittel, Wainer Lusoli and so many others.

Our results indicate two relatively opposite directions. On the one hand, the institutions and areas of focus of studies on the *e-Democracia* are significantly different from those seen in the area of I&P, including allowing the entry of new actors, as is the case of the UnB, as an institution, and the areas of Law and Public Affairs. This shows that, by focusing specifically on certain themes and/or objects in the field of digital democracy, there are spaces that can be occupied by other actors and research centers.

On the other hand, when checking the co-occurrences of keywords and co-citations, we see that the studies on the *e-Democracia* are quite similar to those presented by the I&P area and, consequently, of communication and politics, with emphasis on those active in digital democracy. This tends to indicate that there is still room for other types of studies and conceptual apparatus in the evaluation of the object in question, as would be the case in related areas, such as electronic government, digital transparency and open government. Notably, in the analysis of co-citations, some of the main authors of online parliaments are not triggered, which could indicate a lack of specialization in the more specific themes and issues of a digital democracy tool linked to the Brazilian parliament.

The analytical categories mobilized can be used as a methodological apparatus for analyzing other e-participation tools, assessing their penetrability in the various areas of knowledge, in the different regions of the country and the world, as well as their consolidation – or not – as an instrument for expanding participatory democratic practices.

Future studies may also carry out analyses of citations and co-citations between authors, verifying the citations of the authors who emerged, for example, as leaders of the communities (or subnets) found. Would those mentioned as colleagues be from the same area of knowledge? With this it would be possible to verify – or not – a possible tendency to concentrate production in specific areas, leading to the reproduction of a traditional disciplinary structure in the field of scientific knowledge production in Brazil.

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