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# 28P. The Development of Studies on Electronic Government in Brazil: A bibliometric and sociometric study

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## ***Abstract***

This study aims to identify how the field of studies of electronic government is structured in Brazil. For this purpose, a bibliometric and sociometric study was conducted, analyzing 124 articles published in the proceedings of conferences and in Brazilian journals from 2007 to 2012. The main elements of the analysis were the volume of publications per year, the location of the publications and the conceptual and substantive domains of the studies, the methodological approaches used and the network of cooperation between authors and institutions. One of the findings of the study was that the production of works was prolific, but it was not possible to determine whether studies of electronic government were increasing or in decline because of the non-uniform behavior of the volume of publications. There was also little use of a conceptual domain or a clear position regarding the theoretical domain, with discussions being limited to the substantive domain. Finally, cooperation between authors remains limited to a small number of relationship networks. However, the opposite was true when it came to cooperation between institutions, for which there is a large network and room for other institutions to join.

## ***Keywords***

Electronic government; bibliometric study; sociometric study; Brazil

## **1. Introduction**

Since the 1970s, the Brazilian state has adopted modernization measures for the public sector. These initiatives for the reform and modernization of public administration and the State, gained momentum during the fiscal crisis of the 1980s and mainly as the “result of the decline of the bureaucratic management model and mode of state intervention” (Bresser-Pereira, 2002). This movement became known as the public management reform and its aim was to strive for excellence and guidelines for services to citizens (Bresser-Pereira, 1997), based on “result-driven managerial principles, efficiency, governance and public management guidelines for market practices” (Diniz et al, 2009). These administrative reforms, together with the use of Information and Communication Technology (ICT) enabled federal, state and local governments to offer electronic public services to citizens.

The intense use of ICT aided the new public management model in terms of efficient public administration for providing services to citizens and grew into what is known today as electronic government or e-gov. The term e-gov was coined in the late 1990s and opened up possibilities for the development of academic studies in the field.

Studies on the use and social implications of ICT have grown in academia, configuring a field of scientific production in management in the field of Information Systems (IS) (Cunha & Miranda, 2013). It is especially interesting to observe this phenomenon in developing countries such as Brazil because it broadens the horizons of the field, proposing new themes or attracting attention to dimensions such as national culture and innovation (Avgerou, 2008). It is in this context that it is interesting to study electronic government in Brazil.

However, to develop a certain field of study, researchers have to overcome some challenges such as language, the internationalization of their studies, the use of a conceptual domain to analyze the substantive domain, collaboration between researchers and institutions, the use of clear and defined criteria and respect for diverse and multiple approaches. Therefore, in the wake of this growing interest and highlighting the studies conducted and published in scientific articles on the theme of e-gov, in addition to the challenges of constructing a field of research on the subject, this study conducts a review of publications related to e-gov in Brazil for the purpose of conducting a study of this field. Therefore, the research question is: how is Brazilian research on electronic government structured? To answer this question, Brazilian production and the relationships networks for this field were analyzed, beginning with a consultation of electronic databases of articles published in journals and at events from 2007 to 2012. This study is justified as it contributes to the development of scientific production in Brazil concerning e-gov and public sector investment in IT.

This article is organized into sections. The introduction presents the context and the aim of the study. The second contains a review of the literature, discussing the development of a field of study and the theme of e-gov. The third section presents the methodological aspects used in the study, while the fourth shows and discusses the results. The fifth and final section contains the final considerations of the study.

## **2. The development of a field of study in Information Systems**

Developing countries have attracted worldwide attention for a number of reasons including commercial and political reasons and even their broadening scientific studies. Especially in the field of ICT, there is a growing number of publications aimed at emerging and developing countries, and these are often aimed specifically at the BRIC group (Brazil, Russia, India and China). Focusing on Brazil and referring briefly to scientific production, national and regional conferences and journals in the field of management are spreading and ICT is gaining ground (Avgerou, 2008; Pozzebon, Diniz, 2012).

Furthermore, according to these authors Brazil is becoming one big research laboratory, due to a series of social and business innovations regarding the use of ICT and the singularity of Brazilian culture. Phenomena such as the growing use of cell phones, internet banking, electronic voting in elections and online income tax declarations are just a few of the opportunities for researchers concerned with the organization and social implications of ICT when it comes to developing new

lines of research in the Brazilian context. Moreover, referring particularly to Brazil, the notable areas that have developed innovative uses for ICT are government and public administration, digital inclusion, the use of mobile technology and e-democracy, to name a few.

All these ICT-related phenomena, added to Brazilian organizational complexity in a diversified and multifaceted economy, offer opportunities to researchers to contribute to the development of theories and improve the practice of a diversity of fields, including opening a window of opportunity to establish what could be called a Brazilian school of IS research (Pozzebon, Diniz & Reinhard, 2011; Bertero et al, 2013). Even so, despite many innovative changes in ICT having been studied, analyzed, published, discussed and contested and the opening of this window of opportunity in Brazil for the development of a field of IS research, these have not become well-known in the international community (Pozzebon & Diniz, 2012). For this to happen, some barriers have to be overcome.

According to Pozzebon, Diniz and Reinhard (2011), the first barrier is language. The second factor is that Brazilian researchers are rarely active in the main academic networks or on editorial teams of international journals, especially those with the highest profile. The third challenge for the internationalization of Brazilian research is the lack of a theory or clear position regarding the theoretical domain. Another challenge pointed out by authors is the need to combine scientific rigor and relevance. Rigor implies theoretical and conceptual construction, observing methodologies, whether qualitative or quantitative, while practical relevance has to do with a social consensus regarding the importance and pertinence of the problems under study (Bakshi & Krishna, 2007; Bertero et al, 2013), making research interesting for both the academic and professional public.

In the words of Paulo Goes, editor in chief of the MIS Quarterly at the Conf-IRM of 2013, the field of IS can conduct research and produce knowledge concerning “the effective and efficient use of ICT by individuals, groups, organizations, society and nations to improve economic and social welfare”. Goes (2013) goes on to say that in general some of the main characteristics of IS research involve shifting phenomena, with this being due to technological advances. The interdisciplinary nature of the field is another of these characteristics, involving a diversity of theories from different fields of knowledge. Finally, this is a field within the applied social sciences, which makes it possible not only to produce theories but also to find practical applications for the studies that are conducted. If on the one hand these characteristics can fragment the field in question (Bakshi & Krishna, 2007), on the other hand IS researchers have the opportunity to catch an early glimpse of these waves of change. IS research has also greatly matured, with more high-level quality specialists conducting the studies that have been published, and these studies have had solid results (Goes, 2013).

One of the fields of study in management and IS that have made innovative use of ICT is e-gov. Here there is an opportunity to conduct a quality study, provided that the challenges outlined above have been overcome.

### **3. Electronic Government**

In a developing country, the Government’s strategy regarding the use of information technology – or the lack of such strategy – may have relevant social impacts. The legal framework in place,

the current policies aimed at promoting innovation and technology development, the adoption of national and international standards and compliance mechanisms, in addition to the intensity of IT use by its different levels of government – these are factors that shape and foster the particular Information Society that such Government wants to build. These factors also determine how that country will relate to other societies with greater and lesser use of technology. This context sets the field of e-gov as academically interesting and socially relevant to researchers in all Latin America.

The field of e-gov arose in the late 1990s with the internet boom and the use of ICT as a lever for a new model of public management. Since that time, the field has grown considerably in terms of size and content. This has led to a number of scientific conferences being held and the appearance of specialist journals to discuss the theme (Abramson & Morin, 2003; Grönlund & Horan, 2004). Some authors define the term e-gov as the use of ICT by different government agencies, enabling improved relationships with citizens, companies and other government units. This leads to improved services, more efficient public administration, empowerment of citizens and more democratic access to government information (Grönlund & Horan, 2004; Cunha, 2010; Cunha & Miranda, 2013).

At first, the concept of e-gov was restricted to electronic service provision, usually through internet portals. More wide-ranging definitions were then outlined, including several topics such as improved, more efficient and more effective public administration processes, drafting and monitoring of public policies, integration between governments, provision of services and electronic democracy, which means transparency, participation and accountability (Cunha & Miranda, 2013). The e-gov concept can also include a perspective for improving public management in governance, public policies and the integration of different levels of government through ICT. The efforts of governments to establish e-gov are mostly citizen oriented, offering means of accessing information and services, organizing information in government agencies, exchanging information between one sphere of government and another and supporting operations within the government. The implementation of e-gov generally involves a three-stage evolution: providing basic information on the internet; capacity for transaction for individuals and companies and integrated formation and transactions with collaboration between different agencies (Silva Filho, 2004; Santos & Reinhard, 2011). However, e-gov should not be seen only as an outlet for government services online, but also as a means of enabling a wide range of possibilities for participation and interaction between the government and society and a commitment to transparency on the part of governments (Pinho, 2008). According to this author, “ICT has great democratic potential provided there is a set policy for popular participation and transparency”.

Cunha and Miranda (2013) proposed, within this field of study, a model for researching phenomena related to electronic governance, divided into three sub-areas: electronic public administration, electronic public services and electronic democracy. Electronic administration can focus on projects being developed in Brazil related to public policies supported by ICT, such as e-education, e-health, e-public safety, e-environment and e-work. E-public services has to do with providing services using ICT, which includes internet portals, call centers and other electronic media made available by the state to provide services to its citizens. Finally, e-democracy, aims to make the relationship between State and citizen more democratic. This

includes electronic voting, public consultations, participation in public budgets and e-legislation. However, the authors make it clear that these guidelines for research on e-governance do not impose limits. Other aspects can emerge such as digital inclusion for projects of digital cities, ICT governance of a range of government agencies, economic and political action in ICT industry and public policies for ICT infrastructure. A consensus has yet to be reached concerning the definition of e-gov. The fact is that “e-gov is a recent phenomenon and our understanding of the development of electronic government policy in Brazil remains extremely limited as a result of there being few in-depth studies in this field” (Capella, 2010).

#### **4. Methodological Procedures**

To answer the question of how a field of studies of e-gov is structured in Brazil, a bibliometric and sociometric study was conducted. According to Macias-Chapula (1998), a bibliometric study aims to “study the quantitative aspects of the production, dissemination and use of registered information”. A sociometric study, or method for measuring social relationships, looks at the matrix of relationships between social actors (Galaskiewicz; Wasserman, 1994), understood in this study as authors and institutions.

Bibliometrics is a technique that centers on measuring indexes regarding the production and dissemination of scientific knowledge (Fonseca, 1986). The most commonly used definition of bibliometrics is that of Pritchard (1969): “Bibliometrics is all processes that seek to quantify processes of written communication”, i.e., it is a statistical tool that was developed to enable different indicators to handle the management of information and knowledge, especially using technological information and communications systems based on scientific premises in order to pinpoint productivity indexes, which are necessary for planning, evaluating and managing scientific production in a specific community (Guegues & Borschiver, 1995). These indicators enable an analysis of a given scientific field in order to identify characteristics such as the chronological growth of scientific production, the productivity of authors and institutions, collaboration between researchers and institutions and the spread of scientific production between different sources (Bufrem & Prates, 2005).

The data were collected in the first half of 2013. The electronic databases of EnANPAD, EnADI EnAPG and CONTECSI were consulted. Searches were also made of electronic sites of the journals classified by CAPES (Brazilian federal agency for the support and evaluation of graduate education) in 2012 with a B2 grading, totaling 13, a B1 with 21 and an A2, with 13 publications in the field of management. Finally, the RESI (Electronic Journal of Information Systems) had a B3 grading, but had published a special edition on e-gov. the sample period was 2007 to 2012 . The keywords used in the search, based on a review of the literature, were: electronic government, e-government, e-gov, electronic democracy, e-democracy, electronic services, e-services, electronic governance, e-governance, electronic participation, e-participation, m-gov, m-government, digital exclusion, digital inclusion, e-public policies, e-public administration, digital literacy, electronic engagement, open government. One hundred and twenty-eight articles were located, of which the abstracts were read to verify whether they really focused on electronic government. Of these, four did not focus on e-gov and were excluded, leaving 124 articles.

The articles were tabulated on an electronic spreadsheet with the following information: title of the study, names of authors and co-authors, institution and country of the authors and co-authors, location of publication, name of journal/event, year of publication, key words, theme of the article, theoretical approach, methodological approach, method and aim of the study. The abstracts of the studies were read and analyzed in order to classify the theme of each article. For the analysis of the production concerning the theme during the period in question, descriptive statistics were used. A matrix of authors and co-authors was then assembled and a matrix of institutions to verify the relationship network. For this, UCINET® 6 software was used.

## **5. Analysis and Discussion of Results**

The publication of articles on e-government was bigger in 2008 and 2010, accounting for 54 of the 124 articles published. However, over the six-year period in question it was not possible to identify how much studies on e-gov were increasing or falling because there was non-uniform behavior, although production was considerably prolific. The year of 2011 was the pinnacle of publications in journals (11 articles). This was the year when the RESI published a special edition one-gov, which aroused the interest even of international authors, and the RAE opened a discussion forum for research in the field of IS. At events, the years with most publications was 2010 (22 articles).

Regarding the publications, the ones that stand out are the CONTECSI (International Conference on Information Systems and Technology Management), with a specific focus on e-gov, with 56 articles during the period under study, and Informação e Sociedade, with 8 articles. Most of the articles were published at events, 90 in total. The remaining 34 were published in journals.

The most wide-ranging theme of e-gov was the one that received the most attention from researchers, with publications peaking in 2008 and 2010. There was also interest in e-administration, digital inclusion, e-governance and e-participation. However, there was less regularity regarding the other topics, as shown in Table 1. This indicates the diversity of themes that can be dealt with in studies of the implications of ICT in society and how dynamic the field is due to the rapid technological changes and the new uses given to these technologies.

The analysis shows that Brazilian articles mostly tend not to use specific theories, with 81% not using them. This does not mean that they are not grounded in the literature, but simply that a core theory (or other) is not clearly presented as the basis of the study. This remains a challenge to be overcome by researchers. The lack of a theory or clear stance regarding the theoretical domain and methodological criteria weakens the development of a field of study (Pozzebon, Diniz & Reinhard, 2011; Hoppen, 1998; Bertero, Caldas & Wood Jr, 1999; Bertero et al, 2013). This appears to be a chronic problem among researchers in the field of management in Brazil (Bertero et al, 2013) and is also the case in the field of IS. To develop a field of studies, it is essential for it to be supported by base theories that back up any arguments that are made.

Even so, among the few works that present a conceptual domain, the creativity of the authors can be seen through multiplicity of approaches that they use. Of the 20 works, 18 employed distinct approaches, also indicating the possibility of using a number of theories from other fields to research IS and e-gov. This finding is in line with what Goes (2013) has to say about the interdisciplinarity of the field of IS that can enrich research findings

Theme	Year						Total
	2007	2008	2009	2010	2011	2012	
Electronic government	3	8	9	5	5	3	33
e-administration	1	7	2	11	2	2	25
Digital inclusion	1	2	4	5	3	3	18
e-governance	1	2	1	3	2		9
e-participation		2	1	2	2	1	8
e-service	1	2	1		2	1	7
e-democracy	1	1			1	3	6
m-gov			1		3	1	5
Digital literacy		2	1			1	4
e-health			1	1	2		4
Open government					1	1	2
Economic activity		1	1				2
Gov 2.0						1	1
Total	8	27	22	27	23	17	124

**Table 1:** Themes of the publications by year

Although journals tend to prefer articles with strong theoretical bases, Brazilian texts tend to concentrate on discussing the conceptual development of e-gov topics, such as Diniz et al. (2009), who presents a historical perspective of electronic government in the Brazilian public sector. There is also the work of Cunha and Miranda (2008), with a proposed agenda for e-gov, and Pinho (2011), with an essay on politics, internet and democracy in the Brazilian reality, and many others. One of the various theories was identified in 20 articles, as shown in Table 2.

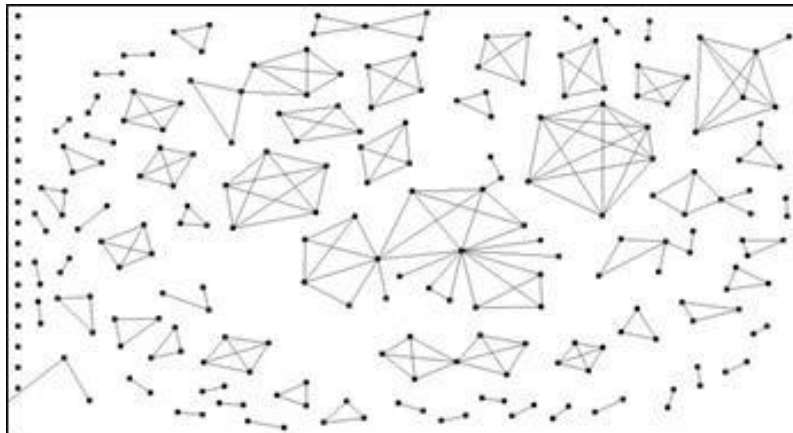
The qualitative approach was used in 94 articles, with the case study being used in 45. In the 24 works using the quantitative approach, the survey method was used in 13 cases. In three of the articles, the methodological approach that was employed was not identified, and in three others a mixed approach was used.

The sociometric study, or social relationship analysis, explores the relationship network of the social actors (Galaskiewicz & Wasserman, 1994), understood in this study as authors and institutions. The relationship network of the authors was analyzed, as shown in Figure 2. The authors who work on e-gov associate very little with one another. The analysis shows that the researchers are widespread, with only one network being formed, and many authors publishing in closed groups. The development of a field of study requires a relationship between its researchers (Pfeffer, 1993). The degree of centrality of the authors within their networks was also analyzed. In the main network, there is one author with a great deal of influence, followed by another two who could establish connections, as shown in Figure 3.

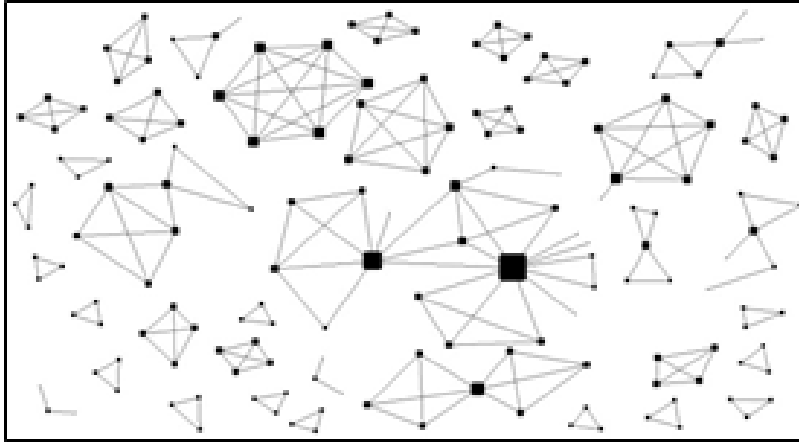


Theoretical Approach	Quantity
Contingency approach	1
Socio-Technical Approach	1
Stages of Virtualization	1
Digital Inclusion Project Analysis Matrix	1
Absorption Costing	1
Mason's Historical Method	1
Data mining	1
Technology Acceptance Model (TAM)	1
Model for providing electronic services	1
Information and Knowledge Organization	1
Complex Systems and Products	1
Actor-Network Theory	1
Theory of Structuration	1
Theory of Hospitality	1
Modernization Theory	1
Social Representations Theory	1
Intellectual Capital Theory	2
Institutional Theory	2
General Total	20

**Table 2:** Theoretical approaches used in publications

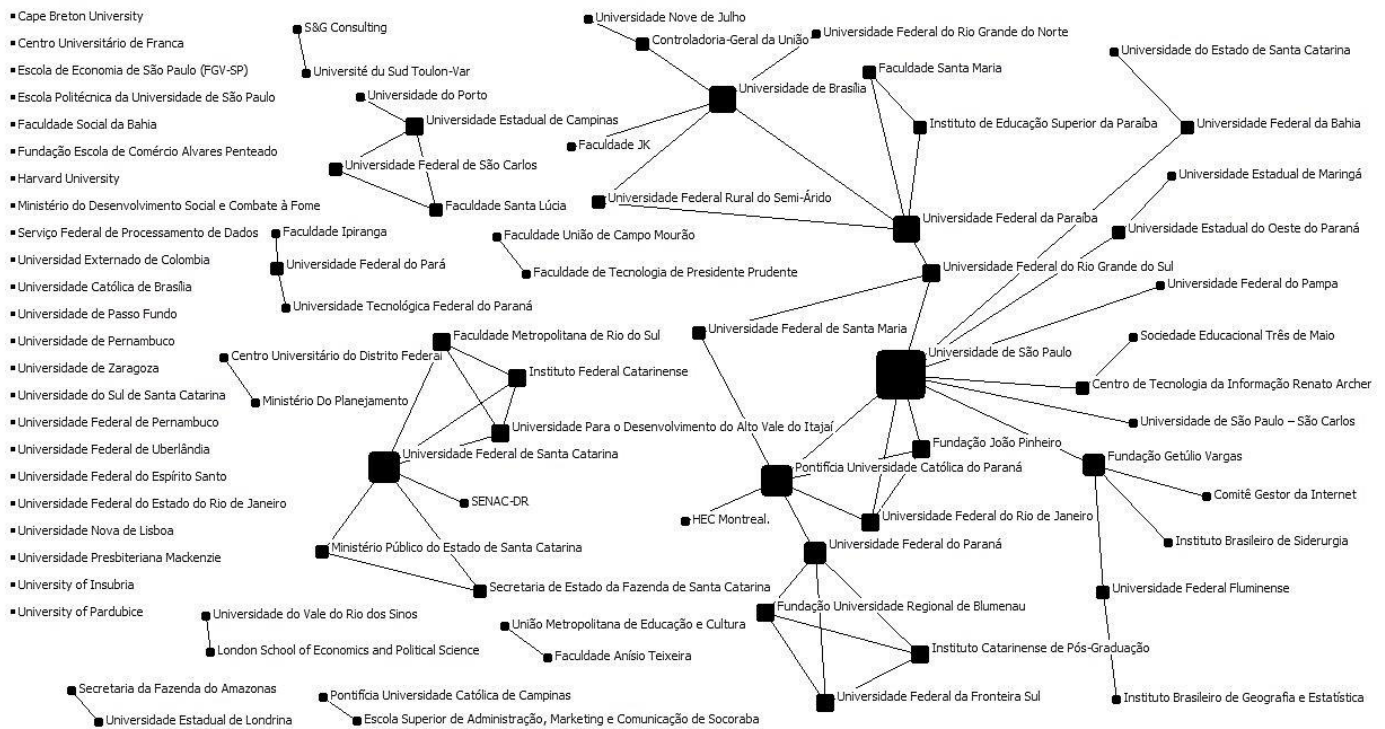


**Figure 2:** Relationships between authors



**Figure 3:** Degree of centrality in network

Finally, an analysis was conducted of the relationships between institutions. The centrality of the institutions network is heavily concentrated at the University of São Paulo (USP). A relatively high number of institutions remain isolated, as shown in Figure 4.



**Figure 4:** Relationship network and degree of centrality of institutions

## 6. Final Considerations

This study sought to identify how the field of studies on e-gov is being structured in Brazil. As the Brazilian researchers of eGovernment aim to be part of the international community, it is relevant as a first step to understand the national production in the field.

For this purpose, the studies published between 2007 and 2012 were identified. It is not possible to say at this time which direction the field is taking because production for the period in question was inconstant. Most studies were published at events, and many are never published in journals.

Within the general theme of electronic government, subthemes were identified, especially e-administration, digital inclusion, e-participation and e-governance. This is likely due to a characteristic of the field in question but this can also be viewed as an opportunity for researchers in IS to catch an early glimpse of the changing trends within the reality in which the use of ICT is increasingly intense, being present in several aspects of society.

Concerning the theoretical approach used by the authors, only 16% of the articles clearly showed the use of a conceptual domain for the analysis of the substantive domain. The Brazilian researchers prefer to discuss eGov topics instead of observe the phenomenon under a theoretical lens.

By identifying the authors and institutions, it was possible to view the structure of the relationship network. The authors have few connections and little interaction with one another and there are many closed networks. This can pose a problem when it comes to conducting studies of e-gov. The authors of the present study decided not to disclose the names of the authors who constitute these networks because the focus of this study is not to discuss who published more articles or who has a better relationship within the networks; rather, the study focuses on how these networks are structured. However, the relationship network for institutions is more closely knit, with a large network centered around the University of São Paulo. Other institutions are also important elements in the network, including PUCPR, UFPR, FGV, UFPB and UNB, and there is room for many others. Another network is led by UFSC and is interesting because even though it is geographically close to the institutions of the south and south-east, its researchers have very little contact with the institutions of the region. Encouraging greater integration of researchers and institutions could help to create joint research agendas, sharing of knowledge and information and result in more solid studies of e-gov.

Some challenges have yet to be faced, such as the drive for greater interaction between researchers in the field, the use of theories on which to base arguments and findings, greater efforts to see articles published in high-level international journals and methodological rigor. Finally, this is a field within that of applied social sciences, which enables not only the generation of theories and explanations but also practical applications for the studies that are conducted.

This study helps to identify how the field is structured, and paves the way for possible future studies. However, there are some drawbacks for the researchers to overcome. One of the limitations is that the sample period of six years is not sufficient to identify the direction that studies of electronic government are taking. The authors suggest that future studies should cover at least double this length of time and be broken down into sub-periods. A study could also be conducted at the international level and compared with the findings of this research project to identify the similarities, differences and the gaps to be bridged in future studies of electronic

government. To understand why the Brazilian researchers tend to concentrate on discussing the conceptual development of e-Gov topics, to find out why there are few authors having connections and little interaction with one another and why there are many closed networks, in addition to the geographic feature,

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