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INTELLECTUAL FOUNDATIONS AND MAINSTREAM RESEARCH OF E-GOVERNMENT IN PUBLIC ADMINISTRATION

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# Intellectual Foundations and Mainstream Research of e-Government in Public Administration

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<tr>
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<td>Manuscript Type:</td>
<td>Research Paper</td>
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<td>Keywords:</td>
<td>e-government, public administration, bibliometric study, co-citation analysis, bibliographic coupling</td>
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Intellectual foundations and mainstream research of e-government in public administration

INTRODUCTION

Since 1990, research in Public Administration has been conducted to study the reforms made in government agencies to apply management techniques from the private sector (Barzelay, 2001; Boyne, 2002; Gore, 1993; Hood, 1991; Moynihan, 2008; Osborne & Gaebler, 1992; Pollitt & Bouckaert, 2004; Terry, 1998), as well as studies related to privatization (Savas, 2000), and network-focused management (Meier & O’Toole Jr., 2001; O’Toole Jr., 1997). More recently, since 2000, research has been conducted on e-government, including the use of information technology in government operations, and its effects on citizens’ satisfaction and democratic standards (Fountain, 2001; Ho, 2002; Layne & Lee, 2001; Moon, 2002; D. F. Norris & Moon, 2005; Eric W. Welch, Hinnant, & Moon, 2005; West, 2004).

Studies have recently sought to identify trends in terms of the methods used and research opportunities that have emerged in e-government (Alcaide Muñoz & Rodríguez Bolívar, 2015; Rodríguez Bolívar, Alcaide Muñoz, & López Hernández, 2010, 2012). The consensus of these three investigations was that most e-government studies focus on the United States, followed by the United Kingdom. Accordingly, Joseph (2013) found that despite the steady increase in e-government studies, most occur in Europe, North America, and Asia, highlighting the opportunity for more research in regions such as South America. Alcaide Muñoz and Rodriguez Bolivar (2015) affirmed that e-government has penetrated the public sector with a consequent increase in research since 2000, meaning that this field of study is relatively new (Joseph, 2013). As such, e-government research has had limited time to develop its own conceptual foundations (Heeks & Bailur, 2007).

Although the older but most frequently cited articles in the field anchor their work in previous literature, they often tend not to use specific theories, nor do they clearly present core theories as a foundation for study (Belanger & Carter, 2012). In fact, Heeks and Bailur (2007) stated that e-government research is far from developing its own conceptual foundations because research in the field is neither theory-building nor theory-applying, and has not even reached the level of accumulating knowledge on its own models.

Furthermore, initially, e-government was mainly used in the activities of the executive branch of government, taking advantage of the internet to publish information and facilitate administrative transactions (CEJA, 2012). Accordingly, academic research heavily
emphasized the executive branch of government and government in general (Lan & Anders, 2000).

In this context, the analysis of academic publications on e-government implementation becomes interesting to researchers. Identification, organization and synthesis of literature are useful for detecting published articles on the discipline with different perspectives of its issues and evolution (Vogel, 2013) and ascertaining the state of the art in the field (Ferreira, Pinto, & Serra, 2014). For these purposes, bibliometric analyses are of considerable value. Bibliometric analyses help in revealing the interrelations of scholarly works and tracing the development of a field or of certain topics (Hu, Khosa, & Kapucu, 2016).

This paper examines a bibliometric study on e-government issues on Public Administration research, with concern over identifying the foundations on which studies of e-government are built. Hence, the purpose of this article is to pinpoint the influence of the most cited authors in the field, the relationships between authors and the subtopics and trends of research. To this end, we conducted citation, co-citation and bibliographic coupling analyses, through multivariate statistics, applied to a sample of articles published in high-quality journals listed in the 2017 Journal Citation Report (JCR) of the Social Sciences Edition of the ISI Web of Science database.

E-GOVERNMENT

E-government has become a global phenomenon (Jaeger, 2003) and has been defined in many different ways in the literature. We define e-government as the use of IT in government operations, including its effects on public service delivery, citizens’ satisfaction and democratic standards (Dolci, Maçada, & Paiva, 2017; Fountain, 2001; Ho, 2002; Layne & Lee, 2001; Moon, 2002; D. F. Norris & Moon, 2005; Przybylowski, Cunha, & Coelho, 2015; Eric W. Welch et al., 2005; West, 2004). In fact, e-government reflects “how governments are trying to find innovative digital solutions to social, economic, political and other pressures, and how they transform themselves in the process” (Janowski, 2015, p. 221).

Following the trends of change in the provision of public services, e-government research has rapidly moved from the study of website development and stages of growth to improve customer service (Ho, 2002) to the current mainstream topics of open data and smart services and cities, that is, to more general e-services (Ancarani, 2005). In this context, the analysis of academic publications on e-government is compelling.

Previous Reviews on e-government

This research sought to review and synthesize the e-government literature (see Table 1 for an overview of previous reviews). There has been an evolution in the approaches on how
the theme is addressed. Earlier works like those of Scholl (2009) and Dwivedi, Singh, and Williams (2011) aimed to understand the field by identifying the most prolific authors, the kind of journal that is preferred (core or non-core to the field), and by exploitation demographic variables like the author’s country of origin, academic departments of affiliation and gender. Pointing out that e-government research is a new domain, Bélanger and Carter (2012) noted a lack of specific theory underlying the works in question and recommended studies with an in-depth discussion to achieve theoretical unity in the field.

Scholl (2013) pointed out the increasing interest in e-government in academic research and noticed new research streams linked to digital democracy and management, such as big data, impact on government transparency and governance. Rodríguez-Bolívar, Alcaide-Muñoz, and Hernandez (2014) also noted a lack of theoretical basis on which to model the process. Furthermore, they identified constraints on implantation and popular engagement, and discussed the need for innovation and evolution in e-government processes.

Motivating factors for e-participation are addressed as key elements to the success of an e-government implementation process. It is an error to shape the process with the intention of only acting as an information provider, without exchanging information with citizens (Hansson, Belkacem, and Eckberg, 2015). The model must consider population minorities (e.g., the elderly and women) and public managers need to be concerned with motivational factors, such as transparency and trust, even if they have to sacrifice efficiency to enhance e-engagement (Hansson, et al., 2015; Juliani and Oliveira, 2016).

Alcaide-Muñoz, Rodríguez-Bolívar, Cobo, and Herrera-Viedma (2017) related e-government processes with smart city management and pointed out the demand for new capabilities in the employment of technology and organizational management to achieve acceptance by the population. The reviews listed comprise the evolution of academic research on e-government, ranging from an understanding of the field to the concerns regarding the engagement of citizens. Factors linked to public policies like transparency and trust are identified as motivational issues and technological capabilities and resource availability are currently discussed.
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Summary</th>
<th>Methodology</th>
<th>Our findings</th>
</tr>
</thead>
</table>
| Profiling the EG Research Community and its Core                      | Scholl (2009)                    | 1. The paper describes the profile of the e-government researchers’ community.  
2. It also identifies the preferred outlets between core and non-core journals and conferences.                                           | Research using the Electronic Government Reference Library (EGRL - 2008)                             | 1. We found that most of the paper depicts e-government aspects in the US and Europe. |
| Developing a demographic profile of the scholarly community contributing to Electronic Government | Dwivedi, Singh and Williams (2011) | 1. A systematic review aiming to depict the current literature of electronic government, using papers published in only one journal.  
2. New articles are recommended to engage in an in-depth discussion to create a theory of e-government, to conduct meta-studies to develop a unifying theory and to link with theories of IS. | Literature review (2000 to 2010)                             | 1. We also noticed that the literature has not built theoretical foundations on the theme. |
| Electronic Government Research: Topical Directions and Preferences     | Scholl (2013)                    | 1. Interest in e-government research has increased.  
2. The main topics of research are those related to digital democracy and management organizations.  
3. Novel topics emerged, such as open government and transparency, social media and cloud services and big data.  
4. It is suggested that bibliometric research to compare with this survey-generated data should be conducted. | Web survey with e-government research community          | 1. We found that e-government has been used to promote efficiency through e-services more than to motivate public participation. |
Scientometric Study of the Progress and Development of e-Government Research During the Period 2000–2012

Rodríguez-Bolívar, Alcaide-Muñoz and Hernández (2014)

1. Lack of research that produces theories or models to explain the process of e-government.
2. There are multiple problems affecting the implementation of e-government policies in developing countries.
3. The e-government process promotes economic growth especially in developing economies.

Literature review

1. Research focused particularly on the US.
2. We found there is a need of studies involving developing economies.
3. We also found that innovation adoption in public service has been constrained due to consumption of time and resources.

Forums for electronic government scholars: Insights from a 2012/2013 study

Scholl and Dwivedi (2014)

1. Focus on the preferences for publication in e-government research outlets.
2. Predominance of papers from the United States.

Web survey with e-government research community

1. Our findings showed that institutional factors have a decisive impact on e-government adoption.

Understanding e-government research. A perspective from the information and library science field of knowledge

Alcaide-Muñoz and Rodríguez-Bolívar (2015)

1. Research has increased.
2. Need to focus on accessibility policies (mainly for the elderly and people with disabilities).
3. There is a lack of research into e-participation related to e-democracy.
4. Economic and democratic circumstances impact the innovation process in public administration.
5. Lack of theoretical basis to model the process of public administration regarding the implementation of new technology.

Bibliometric review (2000-2014)

1. We found that e-government is an emerging subfield and challenges NPM issues. There has also been an increase in the number of published papers in the last decade of our research.
2. We also found that research in the field is neither theory-building nor theory-applying, and has not even reached the level of accumulating knowledge on its own models.
3. Our findings showed that contextual and cultural environments play a significant role in the outcomes of e-government.
<table>
<thead>
<tr>
<th>Research Topic</th>
<th>Authors</th>
<th>Methodology</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Government and Democracy: A Research Review</td>
<td>Hansson, Belkacem, and Ekenberg (2015)</td>
<td>Content analysis using 80 articles on e-government.</td>
<td>1. There is a lack of tools in which public desires are addressed. 2. The focus is on transparency and information exchange, ignoring participation and collaboration. 3. There is no consideration of diversified groups (such as minorities or women) in the generalized concept of “public”.</td>
</tr>
<tr>
<td>Analyzing the scientific evolution of e-Government using a science mapping approach</td>
<td>Alcaide-Muñoz, Rodríguez-Bolívar, Cobo, and Herrera-Viedma (2017)</td>
<td>Research using the Electronic Government Reference Library, 2000-2016</td>
<td>1. We found that e-government initiatives broaden the perspectives of social value, due to citizens’ engagement. 1. Our findings showed that there is an emerging stream regarding e-government models, linking it to social engagement and public service transformation. 2. We argue that there is a relationship between innovation and institutional factors moderating the evolution of e-government models. 1. We related the need for institutional and relationship changes in order to foster e-government adoption.</td>
</tr>
</tbody>
</table>
METHOD

This research was conducted using bibliometric techniques. A bibliometric analysis can complement existing reviews and pinpoint future research opportunities. This type of analysis is useful for identifying influential works and examining research patterns and trends and the intellectual structure of a field (McCain 1990; Ramos-Rodriguez and Ruiz-Navarro 2004). We used complementary bibliometric methods, citation count, co-citation and bibliographic coupling. The results were treated through multivariate statistics.

Citation analysis is based on a count of how frequently a certain work is referenced by others in their own papers. The core assumption is that by delving into the references cited more frequently on a given field we can understand the knowledge base on that field (Vogel and Güttel, 2013). Citation analysis is conducted on the references, i.e., it refers to what the papers in our sample have cited.

A co-citation analysis measures how frequently two articles are jointly cited (McCain, 1990; Small, 1973), representing in a sample the intellectual roots of a field (Zupic & Čater, 2015). Bibliographic coupling measures the frequency with which two documents in a sample have at least one reference in common. This represents the research trends (Vogel & Güttel, 2013), as it considers the overlap of their bibliographies (Kessler, 1963; Zupic & Čater, 2015). The schematic representation of the two techniques is shown in Figure 1.

Data collection procedures and sample

The data analyzed in this study were collected from 37 top public administration journals with an impact factor greater than 0.8, listed in the 2017 Journal Citation Report (JCR) of the Social Sciences Edition of ISI Web of Science database (Table 2). We chose the Web of Science (www.webofknowledge.com) as it contains the Social Science Citation Index®, providing wide coverage of social science publications with the indexation of respected periodicals (Vogel, & Güttel, 2013). From the 37 journals examined, 21 published e-government research articles.
were identified. For further refining, one of the authors read the title, abstract and introduction of each document to validate the sample, reducing the sample to 161 documents. Public Administration Review was the journal with most articles on e-government, accounting for 23% of the 161 selected articles.

Table 2. **Journals and sample**

<table>
<thead>
<tr>
<th>Journal</th>
<th>JCR - 2017 Impact factor</th>
<th>Papers collected</th>
<th>Final sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Administration Review</td>
<td>4.591</td>
<td>37</td>
<td>33</td>
</tr>
<tr>
<td>American Review of Public Administration</td>
<td>2.466</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>Public Management Review</td>
<td>3.152</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>International Review of Administrative Sciences</td>
<td>1.988</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td>Local Government Studies</td>
<td>1.440</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>Administration &amp; Society</td>
<td>1.761</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Journal of Public Administration Research and Theory</td>
<td>3.907</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Public Administration</td>
<td>2.870</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Public Administration and Development</td>
<td>1.250</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Public Performance &amp; Management Review</td>
<td>1.197</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Australian Journal of Public Administration</td>
<td>1.066</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Policy and Politics</td>
<td>1.250</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Environment and Planning C-Government and Policy</td>
<td>1.864</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>International Public Management Journal</td>
<td>2.739</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Review of Public Personnel Administration</td>
<td>2.444</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Lex Localis-Journal of Local Self-Government</td>
<td>0.822</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Governance-An International Journal of Policy</td>
<td>3.833</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Administration and Institutions</td>
<td>1.250</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Social Policy and Administration</td>
<td>1.418</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Public Money &amp; Management</td>
<td>0.881</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Journal of Comparative Policy Analysis</td>
<td>1.862</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Journal of Policy Analysis and Management</td>
<td>3.444</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Journal of European Public Policy</td>
<td>2.994</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Regulation &amp; Governance</td>
<td>2.735</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Climate Policy</td>
<td>3.832</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Policy Studies Journal</td>
<td>2.830</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Journal of Public Policy</td>
<td>1.262</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Policy Sciences</td>
<td>3.023</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Journal of European Social Policy</td>
<td>1.542</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Science and Public Policy</td>
<td>1.368</td>
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<tr>
<td>Public Policy and Administration</td>
<td>2.438</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Journal of Social Policy</td>
<td>2.261</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Journal of Accounting and Public Policy</td>
<td>1.796</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nonprofit Management &amp; Leadership</td>
<td>1.633</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Policy and Society</td>
<td>1.440</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Public Personnel Management</td>
<td>1.364</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Contemporary Economic Policy</td>
<td>0.960</td>
<td>0</td>
<td>0</td>
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</table>
To collect a sample of articles from the selected journals, a keyword search was conducted using "e-government*" in the Topic field of the database. The subsequent "*" was used to capture possible variations of the wording. We collected the works available in the field of Business and Management up to August 2017.

The 161 papers in the final sample were published over the last 15 years, from 2002 to September/2017 (Figure 2). Figure 2 shows the evolution of publications in the dataset denoting a considerable rise from 2007, with a certain stability in the number of published works from that date. Due to the nature of the e-government and internet phenomenon, the theme does not appear to have been widely addressed prior to 2002.

![Figure 2. Evolution of publications](image)

### Analysis procedures

The sample used over 6000 references, with around 7500 citations. For this article, we considered references with up to 8 citations, reducing the sample to 41 references and 631 citations (10.21% of the citations from the total sample)\(^1\) (Nath, & Jackson, 1991). Bibexcel software (Person, Danell, & Schneider, 2009) was used to retrieve relevant bibliometric information from the sample, such as authors, title, keywords, references, year and journal. To analyze these data, as mentioned above, three procedures were used: citation, co-citation and bibliographic coupling, associated with exploratory factor analysis.

\(^1\) This is in accordance with Lotka’s law of bibliometrics, which states that very few articles (approximately 5%) are representative of the field.
Citation analysis was the first procedure, based on counting how often works are cited in a field or research stream, assuming that authors cite works relevant to their research, with the most cited authors having the greatest influence on the theme. This provides evidence of the knowledge base of a field and measures the influence of publications (Zupic, & Čater, 2015).

We extracted a co-citation matrix using Bibexcel (Person et al., 2009), further converted into a Pearson correlation matrix during the factor analysis procedure. Exploratory factor analysis (EFA) is the most common clustering method in bibliometrics (McCain, 1990; Zupic, & Čater, 2015). We extracted the factors using the principal components method, with Varimax rotation (Lin, & Cheng, 2010) and Kaiser Normalization in SPSS (version 20). The documents with a factor loading greater than or equal to 0.40 were retained (Shafique, 2013). We attributed the documents with cross-loadings to the factor in which its loading was greater, but we also analyzed their relatedness with other factors (Vogel, & Güttel, 2013). The underlying principle of EFA is that articles with related conceptual aspects compose the same factor (Lin, & Cheng, 2010), meaning that structural knowledge sub-fields can be distinguished (White, 2011).

Bibliographic coupling is used to identify works citing publications in the knowledge base, representing the research front of a field (Price, 1965). For the bibliographic coupling, we considered articles with at least 4 couplings (ties≥4) and at least one document (node≥1), reducing to a matrix with 79 articles. We then conducted a similar factor analysis for the bibliometric coupling co-occurrence matrix. The final factor analysis resulted in 63 articles with factor loading greater than or equal to 0.4. For both co-citation and coupling, we named the factors after a detailed analysis of the content of each work.

RESULTS

Citation analysis

Table 3 shows the most cited works in e-government literature. It is worth noting that around 75% of the works, as well as the number of times these works were cited, occurred in the last 15 years, denoting how young research on e-government is and the lack of a robust theory to support the theme.

<table>
<thead>
<tr>
<th>References</th>
<th>Frequency</th>
<th>%</th>
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<tbody>
<tr>
<td>Moon (2002)</td>
<td>40</td>
<td>24.8</td>
</tr>
<tr>
<td>Fountain (2001)</td>
<td>32</td>
<td>19.9</td>
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</table>
Co-citation analysis

The factor analysis used a co-citation matrix of the 41 most cited documents. A total of 3 factors was extracted, which jointly explains 60.8% of the variance. Table 4 shows the
results of classifying the works into the factor on which they loaded highest, with the themes of each factor being the outcome of their designation by the authors.

Table 4. Co-citation factor analysis

<table>
<thead>
<tr>
<th>E-government models and evolution (CC1)</th>
<th>E-government implementation factors (CC2)</th>
<th>E-government adoption constraints (CC3)</th>
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<td>Ho (2002)</td>
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<tr>
<td>Layne and Lee (2001)</td>
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<tr>
<td>West (2005)</td>
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<td>Osborne and Gaebler (1992)</td>
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<tr>
<td>Lipsky (1980)</td>
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Factor CC1 (with 21 articles) was named E-government models and evolution. The articles and books in this factor are concerned with the potential of e-government, e-government models, their status, evolution, and improvements. New Public Management (NPM), implemented mainly in Great Britain and the USA, is challenged due to the impact of the internet and ICTs (Dunleavy et al., 2005). E-government, representing the potential of the use of technology in public service management and delivery, was one of the possibilities to improve the effectiveness of public service (Osborne & Gaebler, 1992). Despite this possibility, e-government implementation poses many challenges (Fountain, 2001). A point in question is the human and political features that influence public service quality, at the discretion of public officers2 (Lipsky, 1980).

Considering the potential and challenges of e-government, stage or maturity models were proposed. Stage models are similar in that they propose that e-government initiatives should be developed through sequential and predicted stages (Coursey & Norris, 2008). This usually begins with the online publishing of content and web pages, progressing to more mature stages that consider interactions, transactions and finally social transformation (Layne and Lee 2001; Moon 2002; Norris and Moon 2005).

Since the 1990s, several e-government initiatives have been implemented, initially in developed countries. Their progress has been monitored and criticized, with their proliferation through countries (West, 2005), states and municipalities (West, 2000). Moon (2002), the most cited article, surveying municipal e-government maturity, found that organization size and e-government size are important factors for IT adoption (Norris and Moon 2005). Other works,

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2 Discretion is related to the freedom of choice of the public officer within the limits of his power to choose a specific action (Davis, 1969).
such as Scott (2006), consider that medium-sized cities, contrary to the previous study, provide more opportunities for public involvement.

Considering public involvement, there has been growing interest in social capital (Putnam, 2000) as an important source of contribution to better public service delivery. In this case, the internet is a promising resource to avoid the erosion of social capital. However, some authors are skeptical of this potential. Studies have demonstrated that internet users show no difference in civic engagement compared to non-users. There is also concern that ICTs will give wealthy and political people the power to influence public services, with the possible significant alienation of socially disadvantaged people (Norris 2001; Thomas and Streib 2003). E-government initiatives in countries like Great Britain and other European countries did not stimulate public participation and reinforced managerialism3 (Chadwick & May, 2003).

Empirical works have identified many challenges to overcome due to traditional public administration ignoring the vaunted potential of e-government emphasizing users’ needs and satisfaction (Ho, 2002).

E-government initiatives may help to improve the two visions of public management, the efficiency of public organizations and public participation, i.e., irrespective of philosophical choices (la Porte et al., 2002). E-government is especially a way for public agencies, to gain legitimacy and trust (Tolbert & Mossberger, 2006; Eric W. Welch et al., 2005), for example, to show transparency (la Porte et al., 2002). The integration of e-government and social media appears to be an important means of improving transparency and avoiding corruption (Bertot et al., 2010; Bonsón et al., 2012).

E-government implementation factors. Factor CC2 (with 12 articles), considers e-government implementation influenced by institutional factors and resource capacity. Previous studies showed that e-government implementation varies greatly in terms of what it offers and its focus and performance (Stowers, 1999; Tolbert et al., 2008). E-government innovation is usually examined with regard to its adoption time. However, another possibility is to consider its implementation, which faces institutional pressures and resource limitations that could influence decisions and results (Tolbert et al., 2008). For example, a larger population may apply pressure because of citizens’ expectations concerning services, meaning a positive relationship for e-government development (Brudney & Selden, 1995;

3 Managerialism is related to belief in the value of professional managers and their methods and practices, i.e., the application of managerial practices in organizations in a drive for efficiency. Managerialism is also related to the New Public Management idea of a “businesslike” way of managing public organizations (Heckscher & Donnellon, 1994).
Holden et al., 2003; Musso et al., 2000; Weare et al., 1999). The population’s access to technology is also an important factor for successful e-government implementation but also leads to pressure from citizens for more and better services (Edmiston, 2003; Moon & Norris, 2005) and perceived trustworthiness (Carter & Bélanger, 2005). Conversely, public managers’ leadership vision of e-government appears to make a difference (Edmiston, 2003; Ho & Ni, 2004).

The presence of the work of DiMaggio and Powell (1983) indicates that isomorphic pressures are present in e-government implementation actions and decisions. Formal and informal institutions are important and also shape public policy for e-government implementation. Not only the internet, but also government structure (Tolbert et al., 2008), imposes coercive pressures on e-government initiatives. Moreover, mimetic pressures are imposed by successful peer practices or experience (Holden et al., 2003; Reddick, 2004), for example, from regional neighbors or through national exchanges of experience.

**Factor CC3 (7 articles)** was named e-government adoption. Innovation adoption is complex, and software adoption, in particular, consumes time and resources (Wirtz, Mory, & Ulrich, 2012). This is no different when it comes to e-government. Despite the promise and importance of e-government adoption (OECD, 2003), IT solutions appear to have been unable to innovate government, merely reinforcing existing structures and power relationships of the public sector (Davis, 1989; Kraemer & King, 2006). E-government absorption time is considered slow and difficult in the eyes of public managers, who perceive it as a complex project to undertake (Kraemer & King, 2006). E-government involves technical and business process implementation, as well as institutional and relationship changes (Dunleavy, Margetts, Bastow, & Tinkler, 2006) and acceptance of technology (Venkatesh, Morris, Davis, & Davis, 2003). The references in this factor indicate a focus on governance, innovation in public service delivery, adoption and implementation, demonstrating that the adoption of e-government is more informational than transactional (Reddick, 2005).

**Bibliographic coupling factor analysis**

With the same method used for the co-citation analysis, we conducted factor analysis for the bibliographic coupling of 63 of the total sample of documents. Again, a total of 3 factors was extracted, jointly explaining 55.8% of the variance. Table 5 shows the factor on which they loaded highest. While co-citation shows the intellectual basis of e-government, bibliographic coupling is intended to show the mainstream lines of research.
Table 5. Bibliographic coupling factor analysis

<table>
<thead>
<tr>
<th>E-government adoption contextual and technological factors (BC1)</th>
<th>E-government evolution status and implementation (BC2)</th>
<th>E-government and social capital (BC3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tolbert and Mossberger (2006) .671</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ahn and Bretschneider (2011) .655</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Factor BC2 (18 articles) is composed of works concerned with understanding the current situation of e-government evolution status and implementation. Despite the inter-relation of the co-cited articles, this factor is influenced by e-government evolution (Factor CC1) and implementation factors (Factor CC2). Two articles included in the previous factors are also in the composition of Factor BC2: Thomas and Streib (2003) from Factor CC1 and Ho and Ni (2004) from Factor CC2. The articles generally evaluate, test or question the potential benefits of e-government promises and the expected e-government revolution (Streib & Navarro, 2006).

The works emphasize the importance of institutional factors regarding the implementation of e-government initiatives (Ahn, 2011), as well as possible mimetic isomorphic behavior (Pina et al., 2007). Economic development, including population size, population growth and standard of living favors e-government adoption and implementation (Ahn, 2011; Rodríguez Domínguez et al., 2011; Serrano-Cinca et al., 2009), as well as the public’s political awareness and demands (Ahn, 2011).
Some studies were concerned with the digital divide argument, that wealthier, better educated and younger citizens are more likely to use online services (Thomas & Streib, 2003). However, the assessment of demographic groups and their acceptance of the internet suggests that the gulf between them is not so wide. Streib and Navarro (2006), working on a similar population as the work of Thomas and Streib (2003), found that education had a stronger influence on online e-government services than race or income. However, the authors also found that, at the time, half of the population investigated still believed that non-digital government services (p-government) were more effective than digital (e-government). They also suggested that the type of service would have an influence on affluence.

Previous works on e-government implementation considered that, from an administrative viewpoint, it would improve organizational effectiveness, and from an innovation adoption perspective, it would influence resource allocation (Justice et al., 2006). The latter perspective is concerned with the influence of organizational factors on e-government implementation (Bekkers, 2007; Nasi et al., 2011), such as the influence and role of political leadership regarding a consistent vision and direction (Ho & Ni, 2004) and administrative discretion (Reddick et al., 2011).

Despite the possibilities of potential benefits and organizational initiatives, it seems that e-government initiatives are lagging regarding the proposed implementation stages (Justice et al., 2006; O’Neill, 2009). There is concern over the utility of maturational models when considering the potential benefits of individual organizations (Brown, 2007). For instance, in the personal view of public servants, the gains are efficiency rather than in transforming public service (Baldwin et al., 2012), as they seem not to be aware of the magnitude of the potential gains (Rodríguez Bolívar et al., 2007).

E-government adoption contextual and technological factors (Factor BC1) is mainly influenced by co-citation factors for e-government evolution (Factor CC1) and implementation factors (Factor CC2). Only one of the references from Factor CC3, Rogers (1962, p. 5), considers innovation diffusion as a process “by which an innovation is communicated through certain channels over time among the members of a social system”. To the author, there are four main elements in the innovation diffusion process: the type of innovation, communication channels, time and the social system.

As mentioned above, this factor is influenced by e-government evolution (Factor CC1). Three articles are also in the co-citation factor: Moon (2002), Welch, Hinmant and Moon (2005), and Tolbert and Mossberger (2006). Considering co-citation, Factor CC2 shares the article of Tolbert, Mossberger and McNeal (2008). Moon (2002) suggested e-
government in stages or types: e-services, e-participation, and e-democracy. These different stages and types are related to different contexts, goals and tools (Chen & Thurmaier, 2008; Wang & Feeney, 2016). Some authors consider the distinction between e-government and e-democracy, and consider e-governance as the combination of both (Lee, Chang, and Berry 2011). It should be noted that the institutional dimensions of e-government implementation pose the question of why similar initiatives implemented by different [contexts] produce different outcomes (Eom, 2013, p. 875).

E-government is especially a way for public agencies to improve its interactions with citizens and perceptions of responsiveness (Welch, Hinnant, and Moon 2005; Tolbert and Mossberger 2006; Morgeson, VanAmburg, and Mithas 2011). The offer and delivery of e-government service, from the customer’s perspective, has the potential to increase trust and confidence in government through transparency (Welch, Hinnant, and Moon 2005; Tolbert and Mossberger 2006). Past studies seemed to focus on the “supply-side”, regarding e-government’s potential to improve service delivery capacity (Norris and Moon 2005; Ahn and Bretschneider 2011; Park, Choi, and Bok 2013). However, there is a lack of studies regarding the customer side, or “demand-side” perspective of e-government (Jun et al., 2014; Manoharan, 2013). There are also ethical dilemmas involved (Roman, 2015).

Despite the adoption, previous studies claimed that, with e-government, adopting web-based features and tools, even unsophisticated ones, is a slow process (Norris and Moon 2005), with few examples of effective implementation (Wang & Feeney, 2016). Previous studies stated that despite the importance of citizens’ participation, recognition, information and service delivery are prevalent in e-government initiatives (Norris and Moon 2005). Internal organizational features and orientation are also important (Lim & Tang, 2006; Manoharan, 2013; Wood et al., 2009), as is managerial orientation regarding innovation (Norris and Moon 2005).

The diffusion of e-government, considering the importance of citizen adoption and participation, appears to be influenced by institutional factors (Homburg et al., 2014) such as income, living in an urban area, level of education and age (Norris and Moon 2005; Tolbert, Mossberger, and McNeal 2008; Sobaci and Eryigit 2015; Ruano de la Fuente 2014). Despite

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4 E-governance considers the impact of IT on the public sector through the combination of e-government and e-democracy. E-government is related to the implementation of the internet in government operations. E-democracy is related to the use of internet tools to allow and encourage interaction between government and citizens and government and businesses (Backus, 2001).

5 We substituted “nations” in the original question for [contexts], regarding our interpretation for the articles’ content.
the predominant focus on a single tool, usually the website, there is a need to understand the
different impacts and characteristics of other tools and multiple web functions (Chen &
Thurmaier, 2008; Ganapati, 2011; Moynihan, 2004; Tolbert et al., 2008). Adoption may be
influenced by the function of the technology that is used, for instance, if it is internal and
restricted, like an intranet, or e-services (Wang & Feeney, 2016). It would also be different if
adopting the technology considered e-services or communication technologies (Li & Feeney,
2014).

E-government should also consider the potential use of ICTs a tool for relationships
between networks, regarding data sharing between organizations (Graham et al., 2016),
communication between organizations (Hu & Kapucu, 2016), and intra-organizational
networks (Lee 2013), such as the intranet (Welch and Pandey 2007; Wang and Feeney 2016).

Factor BC3 (16 articles) was named **E-government and social capital.** Evolution of
e-government (Factor CC1) shows the necessary public involvement and growing interest in
social capital, and the possibility of e-government avoiding social erosion, as pointed out by

Public involvement was researched considering engagement and participation. With the
advent of the internet, and especially real-time communication and user-generated content, the
use of social media\(^6\) is seen as a way of improving citizen engagement, participation,
collaboration and influence (Agostino & Arnaboldi, 2016). The evaluation of engagement
through social media tools is intended to quantify the interaction and relationship with citizens,
using social media specific metrics (Bonsón et al., 2017). It is also important to understand the
contexts of citizens’ participation abandonment (Yetano & Royo, 2017) and the contextual
experience in emergent and transitional economies (Milosavljevic et al., 2017). However, social
media technologies do not only enable connection, but also the co-creation of information
(Ingrams, 2016).

Social media introduces an important and challenging dimension, becoming an e-
government tool or strategy, as it poses opportunities, but also risks to public management
(Bonsón et al., 2017). The more citizens spend time online, the more they seem to lose trust in
government. However, this relationship is moderated by e-government, which has the potential
to improve perceptions of the government’s trustworthiness (Im et al., 2014).

\(^6\)**Social media** is “a set of online tools that are designed for and centered around social interaction” (Bertot, Jaeger, and Hansen 2012, 30).
The relationship between e-government and trust remains unclear (Porumbescu 2016b; Morgeson, VanAmburg, and Mithas 2011; Nam 2012). Studies have shown that e-government websites seem to have a negative influence on citizens’ perceived trust in government. However, on the contrary, social media has a positive effect (Grimmelikhuijsen & Meijer, 2015; Porumbescu, 2016b, 2016a, 2017). It has shown that it has the potential to improve trust in government, but this effect may be mediated by government transparency (Song & Lee, 2016), usually delivered by traditional e-government initiatives. This is an apparent concern and a specific challenge in the perception of public managers (Ganapati & Reddick, 2014), especially considering the complexity regarding relationships with citizens (Hetling et al., 2014) and their experiences (Heflin et al., 2013).

DISCUSSION

We conducted this study to conduct a close examination of the existing literature on e-government. For this purpose, we conducted a bibliometric study of e-government in the public sector. Using a sample of 162 articles published in journals classified in the ISI Web of Knowledge, from 2002 to 2017, we applied bibliometric techniques such as citation, co-citation and bibliographic coupling analysis. We identified the works that have had a greater impact on the field, their conceptual approaches and the main research trends.

E-government appears to be an emerging subfield of research that is reasonably different from the other traditional streams in public management research. It seems promising in that it challenges NPM and managerialism issues. It studies the use of Information Technology and the internet in government operations and public service. As acknowledged by Alcaide Muñoz & Rodríguez Bolívar (2015), e-government has penetrated the public sector and research on it increased from 2000 to 2014. This indicates that the subfield is relatively new and is aligned with Rodriguéz-Bolívar et al. (2014) and Bélanger and Carter (2012).

Figure 3 shows the findings of our bibliometric review about the overlap of the origins of e-government, represented by the co-citation research, and its impact on the different streams of research that emerge from these initial works, from the bibliographic coupling. The results show that there are conceptual overlaps between the three co-citation factors. Factor CC1 includes articles concerned with the potential and possibilities of e-government and considers possible maturity staged models. Despite the possibilities and the promised effects and citizen participation, e-government has been used more to promote efficiency through e-services. Adoption has been slow and resource consuming, not resulting in
innovation or public service transformation, according to Factor CC3. This serves as an alert for future works to consider the constraints regarding the diffusion of innovation processes. Considering the constraints, the initial research on implementation (Factor CC3) showed that institutional factors have an important effect on e-government adoption, with the need for further investigation of decisions and the impact of organizational factors.

Figure 3. Intellectual structure and mainstream e-government research since 2002

The prior research in e-government models and evolution and the factor for e-government implementation are impacting the current mainstream research agenda. Indeed, it continues as a line of research of the status of e-government evolution and implementation. This shows the predominance of demographic factors such as population size and growth, standard of living and education impacting the evolution and status of e-government. The results showed the existence of the threat of a “digital divide”. However, technological affluence and other external and organizational factors should moderate that threat. Future research should consider longitudinal studies, not only in developed countries but also comparing the evolution to emergent and underdeveloped countries (the latter are also impacted by digital services through telephone companies).

Previous research on e-government also influenced a stream related to e-government adoption regarding contextual and technological factors, representing investigations on the impact of specific contexts and tools. It is concerned with how institutional factors would impact service decisions and diffusion processes, as well as the equilibrium of e-governance, considering e-government and e-democracy, i.e., respectively, striving for efficiency or
citizen participation. It recognizes the contextual differences regarding locations, tools and the supply and demand side perceptions of decisions and challenges involving government relations with other governments and organizations, with citizens and intra-organizational relationships. There are several possibilities for future research, but we must emphasize the question posed by Eom (2013): “Why do similar initiatives implemented in different [contexts] produce different outcomes?” Research should focus on comparative case studies of successful e-government implementations, either considering traditional e-government or e-democracy. As mentioned, there are several possibilities regarding the use of different tools and contexts. All these works should also consider different institutional environments and cultural influence, which is already a tradition in international business studies, for example.

There is a specific stream of research that emerged from the E-government models and evolution considering e-government and Social Capital. It is an emerging stream that is intended to respond to a criticism of existing e-government initiatives. It is concerned with social engagement and public service transformation. It considers transparency and trust as central, and some specific challenges such as impact of social media on citizens and population, as well as the political and power side of e-government. This, in our view, is an emergent subfield of study in e-government. It is related to e-democracy and also opens up many possibilities considering the institutional environment, power, and political issues.

This bibliometric analysis contributes to e-government research in different ways. First, it shows the impact of the initial research on e-government and it points out implications for public policy and future research directions (Table 6), extracted from current research streams. Compared to earlier review works, that were more descriptive and concerned with presenting the topics of the theme, our findings show three main streams of research, two of which are related and strongly impacted by the initial research (Figure 3). These two streams are concerned with the factors that influence or impact the implementation of e-government, and with the implementation process and evolution. Additionally, it also reveals an emerging stream that responds to criticisms to broaden the perspective and social value of e-government initiatives, considering social engagement and the real transformation of public service.

**Table 6. Insights for future research and implications for public policies**

<table>
<thead>
<tr>
<th>Points to consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the role of institutional constraints such as contextual and cultural environments in the adoption of e-government innovation processes?</td>
</tr>
<tr>
<td>How must public policies on e-democracy be shaped to motivate public participation?</td>
</tr>
</tbody>
</table>

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7 We substituted “nations” in the original question with [contexts], regarding our interpretation for the articles’ content.
There is a need for a better understanding of the factors impacting the evolving implementation of e-government models:

a. factors conditioned to technological capabilities and available resources;

b. demographic factors such as population size and growth, standard of living and educational level.

Case studies should be conducted on e-government implementation in developing economies to confirm earlier findings that it promotes economic growth.

Is there a trade off in e-government and e-democracy processes involving governance efficiency and citizen participation?

How does government social capital, such as transparency and trust, shape public service transformation leading to social engagement in e-government processes?

e-government frameworks lack quantitative models that point out key performance indicators to evaluate results, efficiency and needs with regard to evolution.

The results also emphasize the contextual impact of e-government and the need to develop conceptual frameworks. Rodríguez-Bolívar, Alcaide-Muñoz, and Hernandez (2014) and Alcaide Muñoz and Rodríguez Bolívar (2015) highlighted the need to develop conceptual frameworks, including quantitative models that allow their efficiency to be measured, evaluating results and adopting reforms to the environment in which they are applied. We found, that despite the steady increase in e-government studies, most of them are conducted in Europe, North America and Asia. This highlights the opportunity for more research in regions such as South America. There are some bibliometric reviews of e-government researches in these countries, such as in Brazil (Juliani and Oliveira, 2017). Nevertheless, these reviews are mainly descriptive, serving as a starting point to understand the research opportunities with regard to our findings.

This study attempts to reflect on e-government research focusing on the public administration context and to further examine the intellectual foundations and mainstream research in the field. This work helps e-government students and researchers to understand the mainstream research in the field and present the references on each stream, based on a comprehensive framework, as presented in Figure 3. Additionally, it has public policy implications, pointing out antecedents and consequents factors related to the e-government process. The paper also makes a methodological contribution by showing the possibility of integrating co-citation and bibliographic coupling in mapping knowledge complementing each other and broadening understanding of e-government research development (Scholl and Dwivedi, 2014).
This study has limitations that are inherent to bibliometric studies, such as the selection of journals, which do not cover all the published research. It is beyond the scope of a bibliometric study to exhaust all literature, but future works may include nonpublic administration journals that publish information system or information technology research related to public organizational contexts (Hu et al., 2016). Although the findings assessed the impact of books that were cited by the articles in the sample, future research can include knowledge from a wider variety of sources, such as monographs and conference proceedings. Moreover, the selection of journals can be expanded by including those specializing in other areas, such as Computer Science, Communication or Information and Library Sciences. Additional databases can be used to collect articles from different regions of the world, such as Scopus or SciELO for Latin American studies.

The second limitation is the need to choose keywords to obtain the sample. Although they seem a reasonable method for inferring document topics, they are actually an imperfect proxy. This article, despite having captured a significant number of publications, does not consider all the articles related to e-government.

In addition to the proposals for further research introduced in response to the limitations described above, forthcoming studies may extend the findings of this paper by conducting a bibliometric study on one of the identified subfields of research. Furthermore, according to the findings, it would be relevant to replicate this study using journals included in other databases, as well as in the national databases of emerging countries.

CONCLUDING REMARKS

The findings of this study present existing knowledge on e-government research and provide a categorization in terms of research subfields. The relationship of the intellectual structure and current mainstream research highlights research gaps that need development to advance theory building in the field. In emerging countries, there seems to be a need to conduct e-government research that will make a considerable impact on the field. This study may help researchers to focus on the literature that must be reviewed in their quest to make new contributions to the field and propose a future research agenda to guide them. It could also help government and academic institutions in the allocation of resources for research.

REFERENCES


