**Special Issue**

# Digitizing Government Interactions with Constituents: An Historical Review of E-Government Research in Information Systems

**France Bélanger**
Virginia Tech
belanger@vt.edu

**Lemuria Carter**
North Carolina A&T State University
ldcarte2@ncat.edu

## Abstract

*As information and communication technologies began to support new forms of interaction between governments and their constituents, the concept of e-government emerged as a new domain for Information Systems (IS) researchers. The past decade has seen a variety of e-government themes researched and presented by scholars in IS, public administration, and political science. In order to reflect on the history of the IS discipline, this article provides an historical assessment of electronic government research. In particular, we review highly cited e-government articles and e-government articles published in the AIS Senior Scholars' basket of journals to assess existing publication outlets, theoretical foundations, methodological approaches, sampling, and topic areas. The analysis of the literature reveals significant insights about the metamorphosis of e-government research over time, the assessment of which serves as a basis for recommendations for future research on this global phenomenon.*

*Keywords: E-Government, Electronic Government, Historical Review, Digital Government, Government-to-Constituent.*

# 1. Introduction

The field of information systems research offers numerous opportunities to explore topics at the convergence of technology, people, and processes. This article explores one of these inter-disciplinary research themes, electronic government (or e-government), a phenomenon that has emerged over the last decade as a domain of significant interest to both researchers and practitioners. We define e-government as "the use of information technology to enable and improve the efficiency with which government services are provided to citizens, employees, businesses and agencies" (Carter & Bélanger, 2005, p. 5).

Constituent utilization of e-government initiatives is increasing in diverse ways. Many citizens use the Internet to search for government information, access government services, and promote e-accountability/e-democracy. Regarding the search for information, many citizens and agencies recognize the value of electronic information. According to Smith (2010), 82 percent of Internet users in the United States search for government information or complete government transactions online. In an effort to meet citizen demand and reduce costs, government agencies across the globe are investing in technologies that enable them to provide information electronically. According to the United Nations (UN) E-government Survey 2010, the top five countries on the e-government development index, an index that, in part, assesses a country's use of the Internet to provide information to constituents, are the Republic of Korea, the United States (US), Canada, the United Kingdom (UK), and the Netherlands (United Nations, 2010).

Citizens not only use government information online, but also avail themselves of government services online. Popular online interactions with government agencies include looking for public policy information, downloading government forms, retrieving official government statistics, renewing a driver's license, and retrieving recreational/tourist information, with "nearly one third (31%) of online adults [using] online platforms such as blogs, social networking sites, email, online video or text messaging to get government information" (Smith, 2010, p. 2). In the European Union (EU), the average availability of online public services increased from 69 percent in 2009 to 82 percent in 2010. As part of the Digital Agenda for Europe, the EU's goal is for one out of two citizens and four out of five businesses to utilize e-government services by 2015 (Lörincz, 2010).

In addition to e-services and information, e-accountability/e-democracy is emerging as a viable option for citizens and policy makers. Many citizens now go beyond simple interactions with governments and use the platform to voice their opinions about governmental or societal issues (Smith, 2010). In the United States, "nearly one quarter (23%) of Internet users participate in the online debate around government policies or issues, with much of this discussion occurring outside of official government channels" (Smith, 2010, p. 2). Not only are citizens using the Internet to discuss government policy, but also to cast their official ballots. For instance, the percentage of Internet voting in European elections has risen from two percent in 2005 to more than 24 percent in 2011 (Jamil, 2011).

In light of the numerous advancements in e-government across the globe, this paper provides an extensive historical assessment of the development of electronic government research. This assessment serves as the basis for a discussion of significant insights and trends related to this global phenomenon. Such insights and trends can be helpful in shaping future scholarly pursuits. While e-government has received increasing attention over the last decade [1], few studies have explored the theories, findings, and approaches used to study diverse electronic government services. Thus, there is a need to synthesize and organize extant literature to identify patterns in the published articles and develop a cohesive and comprehensive research agenda to guide researchers worldwide in their quest for a better understanding of e-services.

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[1] One illustration of the increasing popularity of e-government over time is presented in Table A.1 in the Appendix. Notice that before 2006 there were only seven e-government articles published in leading IS journals. However, between 2006 and 2010 there have been 23 e-government publications in these same journals.

Several studies provide an overview of e-government literature (Andersen et al., 2010; Heeks & Bailur, 2007; Yildiz, 2007). This study is unique in that it focuses on a comparison of the most highly cited e-government articles to e-government articles that are published in leading IS journals. We use this comparison to explore the evolution of e-government research from a historical perspective. Exploring e-government using a broad, historical lens is of interest not only to researchers, but also to practitioners striving to implement successful "e" initiatives. Hence, this historical review of e-government research illustrates how the concept has changed over time, from brick-and-mortar-based interactions to Internet, mobile, and even ubiquitous exchanges. This article not only serves as a synopsis of existing research, but also as an identifier of emerging trends, gaps, and areas for future study.

To provide the synopsis and recommendations, we examine two samples of e-government articles: the most highly cited e-government articles according to the ISI Citations Index, and e-government research published in the Association for Information Systems (AIS) Senior Scholars' basket of journals (listed in the next section; henceforth referred to as "leading IS journals"). Our selection of articles from the eight leading IS journals for the review is consistent with articles recently published in top journals where all or some of these eight leading IS journals are used to identify representative literature for the field of information systems (Baskerville and Myers, 2009; Sidorova et al., 2008). We conducted the review to identify publication outlets, theoretical foundations, methodological approaches, sampling, and topic areas for e-government research. The analysis of the sampled papers revealed several significant insights about the research: (1) the most highly cited articles are not from the leading IS journals (with one exception); (2) the most highly cited articles fail to clearly identify a theoretical foundation, whereas articles in leading IS journals do; (3) the most highly cited articles are mostly quantitative or conceptual, whereas articles in the leading IS journals include an almost equal number of qualitative and quantitative studies; (4) articles in the leading IS journals are mostly conducted at the individual level of analysis, whereas the highly cited articles also include several government-level studies; and, (5) the early highly cited literature is mostly from the United States. A discussion of these and other findings serves as a basis for making recommendations for future research, as e-government continues to move from infancy toward maturity.

This article provides several significant contributions, including an in-depth exploration of the e-government literature beyond the field of IS, using and juxtaposing the topic areas, theories, methodologies, and findings used by e-government researchers in IS and non-IS fields. The resulting discussion of gaps, trends, and opportunities for further research provides researchers with a starting point to further explore e-government and other information systems phenomena.

The remainder of this paper is organized as follows: we begin with a historical assessment of e-government that provides a retrospective look toward the future of the field. Then we use our analysis of the top 15 highly cited e-government articles along with e-government publications in leading IS journals to explore e-government publication outlets, theory, methodologies, sampling, and topics. In each of these subsections, we identify trends in the literature and make recommendations for future research.

## 2. A Retrospective Look Toward the Future

This historical assessment of e-government research begins with a retrospective look at the relevant literature. An historical assessment can help expand existing knowledge by investigating change and continuity over time (Jones & Monieson, 1990). While articles discussing the role of technology in government have been published for several decades (e.g., how computing and networking technologies can improve productivity of government workers) (Stenberg, Ayres, & Kettinger, 1983), the concept that technologies can allow governments to interact with citizens and other stakeholders electronically is a more recent one. In discussing the need for a National Information Infrastructure (NII), Weingarten (1994) mentioned the potential that this infrastructure would have for "dissemination of government information and delivery of government services". Soon after, Milward and Snyder (1996) explained how technology could be used to link citizens to government organizations, while Perritt (1996) explored the potential policies and related practices needed for the "'electronic government' of the future". It was in 1998 that Schorr and Stolfo (1998) published an article in

*Communications of the ACM* that presented the results of a workshop sponsored by the U.S. National Science Foundation and other agencies. The artice calls for, among other things, collaborative applied research on electronic government (digital government).

Today, the topic of e-government is receiving increased attention from researchers and practitioners alike. For example, several journals have published special issues on e-government, including the *Information Systems Journal*, the *European Journal of Information Systems*, the *Journal of Strategic Information Systems*, the *Journal of Organizational and End User Computing*, the *Journal of Cases on Information Systems*, and the *DATABASE for Advances in Information Systems*. There are three new journals specifically dedicated to e-government (*International Journal of Electronic Government Research*; *E-government, An International Journal*; and *Electronic Journal of E-government*). In this section, we synthesize the most important findings from e-government research before identifying a plethora of issues yet to be explored and providing specific recommendations to guide future research.

While this *JAIS* special issue focuses on the history of information systems as a research field, a discussion of e-government would not be complete without taking into consideration some of the leading articles published in non-IS research journals, articles that have impacted the work of IS researchers. Therefore, this historical assessment looks at the past using two lenses, first in articles on e-government, electronic government, or digital government that have appeared in leading IS journals (*European Journal of Information Systems*, *Information Systems Journal*, *Information Systems Research*, *Journal of the Association for Information Systems*, *Journal of Information Technology*, *Journal of Management Information Systems*, *Journal of Strategic Information Systems*, and *MIS Quarterly*). Second, we explore cross-disciplinary e-government literature via the lens of the most cited articles on e-government, electronic government, or digital government. We use two sources to identify citations: the ISI Citations Database and the Google Scholar citations. A thorough search of the leading IS journals reveals 30 articles focused specifically on electronic or digital government, which we present in Appendix A.

The search for highly cited articles reveals some inconsistencies between ISI and Google Scholar, but also substantial overlaps. We summarize the top 15 most cited articles based on the ISI Citations Index in Appendix B. As the reader will notice from the appendices, few of the most heavily cited articles are from the leading IS journals, with one exception, Carter and Bélanger (2005)[2]. When a study makes contributions to a field, the number of citations typically increases over time until the findings are less relevant or, perhaps, the main findings are replaced with newer and better findings from another study. Because most of the articles in leading IS journals are fairly recent, it is possible that there has not yet been enough time since their publication for them to garner many citations. The most recent "most cited" articles are Heeks and Bailur (2007) in *Government Information Quarterly*, Carter and Bélanger (2005) in *Information Systems Journal*, Gil-Garcia and Pardo (2005) in *Government Information Quarterly*, and Norris and Moon (2005) in *Public Administration Review*. We discuss these and other findings from the analyses of the articles in the following subsections, which we organize around the main categorizations used in coding the sample of articles: publication outlets, theory, methodologies, sampling, and topics.

Appendix C presents the coding procedures and inter-rater reliabilities for the classification of e-government papers. The coding was performed by both authors, with an inter-rater reliability of 0.91 (Cohen's Kappa). Consistent with other recent reviews of the literature (Bélanger & Crossler, 2011; Smith, Dinev, & Xu, 2011), the unit of analysis included individual, group, organization/government agency, and national/international/society. We also considered websites, tools, and systems. We did not identify any group studies, but found some additional units of analysis such as budgets, comments, and SWOT elements. For theoretical foundation, only articles identifying clearly one or many specific theories were classified as theoretically based, but all literature sources are identified in the appendices. We define other coding categories in depth in Appendix C.

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[2]  A bias is introduced in this review since we conducted the search for most highly cited articles in the ISI citations database and the Google Scholar website using the English language. There may be very interesting studies of e-government in non-English publications that might be relevant to the field's understanding of the discipline. Unfortunately, these do not appear as highly cited in English-only journals.

## 2.1. Publication Outlets

The review of e-government research in the leading IS journals and most highly cited articles reveals an interesting finding about where e-government research is published. The earlier articles published on e-government, which correspond to most of the highly cited articles, have appeared mostly in non-IS government-related journals such as *Government Information Quarterly* and *Public Administration Review*. Figure 1 graphically depicts the relative number of articles from leading IS journals and non-IS government-related journals in the top 15 most highly cited articles.



**Figure 1. Types of Journals for the 15 Most Highly Cited Articles on E-government**
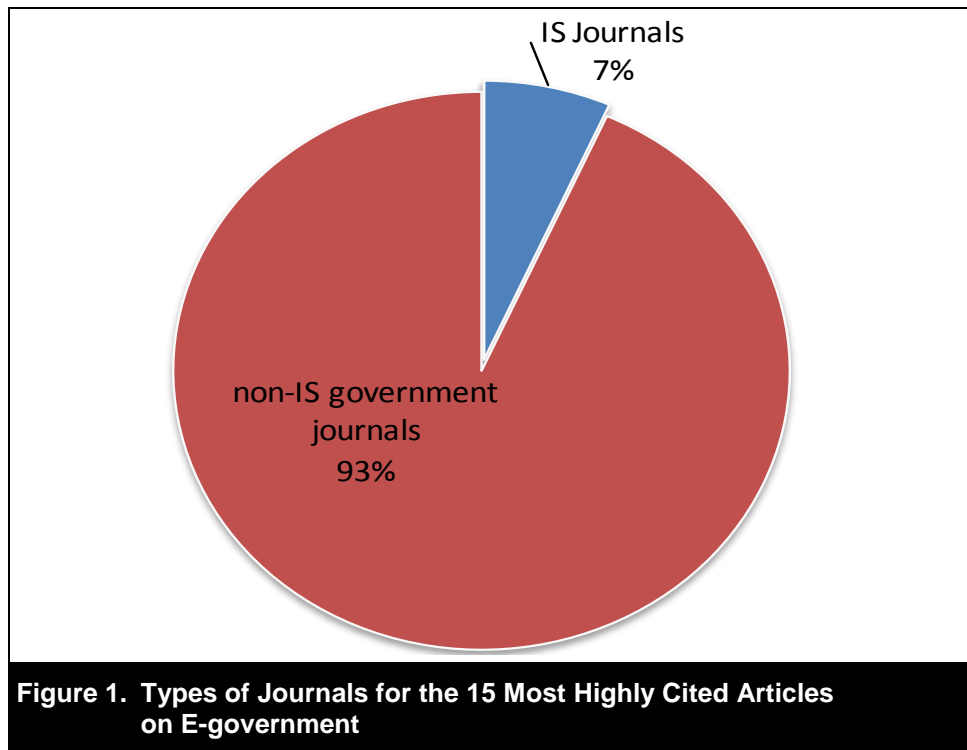
A review of current literature shows that more e-government articles continue to be published in government-related outlets as opposed to IS journals. In fact, *Government Information Quarterly* was one of the first journals to publish academic research on e-government, and remains today one of the most influential in that domain, with more papers published on e-government than in any other journal. A search of the ScienceDirect Database on e-government articles published between 2000 and 2010 in *Government Information Quarterly (GIQ)* indicates that *GIQ* published 142 e-government articles. Conversely, the leading IS journal with the highest number of e-government articles is the *European Journal of Information Systems (EJIS)*, with 10 e-government articles during the same timeframe (refer to Appendix A.1). In fact, if it had not been for special issues in *European Journal of Information Systems*, *Information Systems Journal*, and *Journal of Strategic Information Systems*, there would be few articles on e-government in the leading IS journals, which Appendices A and B demonstrate.

It is not surprising that scholars interested in research related to government issues were the first to pay close attention to the increased use of the Internet and other information and communication technologies in government operations. Researchers publishing in non-IS government-related academic journals, such as those in public administration or political science, were already exploring government issues before the advent of technology-based interactions with constituents, and so this was a logical next step for these disciplines. However, this brings about two important discussion points. First, what should be the role of IS scholars in studying e-government topics? Second, should IS scholars publish their research in leading IS journals or "cross over" and publish in leading public administration, political science, or other government-related academic journals?

The first point represents a recurring theme for IS scholars, since even IS researchers often seek to decide what exactly is in the domain of IS research (e.g., Baskerville & Myers, 2009; Lyytinen & King, 2004; Orlikowski & Iacono, 2001; and Sidorova, Evangelopoulos, Valacich, Ramakrishnan, 2008, to name a few). The discussion has been ongoing about whether IS can serve as a contributing discipline to other disciplines, whether it has a core theoretical legitimacy (e.g., Lyytinen & King, 2004), how IS research needs to refocus on the technology artifact at the center (e.g., Orlikowski & Iacono, 2001), and how it needs to balance rigor versus relevance (e.g., Benbasat & Zmud, 1999; Davenport & Markus, 1999). While this historical assessment is not meant to revisit these ongoing discussions in detail, it can be argued that e-government research is part and parcel of the information systems domain, although it can benefit from multidisciplinary perspectives, and that it is relevant to IS practice.

As can be seen from Appendices A and B, the types of services studied and the main findings of e-government research in leading IS journals (see Table A.2) cover several core areas of information systems, such as technology acceptance, information and communication technology usage, development of e-government systems, management of e-government projects, and e-government marketplaces (e-procurement and auctions). While these topics (discussed in depth later in this section) could be of interest to several fields such as management, public administration, or even finance, they clearly "fit" into the domains of IS research that Sidorova et al. (2008) identify after a semantic analysis of the IS literature. The domains include information technology and organizations, IS development, IT and individuals, IT and markets, and IT and groups (Sidorova et al., 2008).

It can also be argued that e-government research is one of those topics of high relevance to practitioners. Anecdotal evidence supports this view. A search of Google Scholar's most highly cited articles on e-government shows that several practitioner-oriented articles find their way into the most highly cited list. While the first five most highly cited on Google Scholar overlap substantially with the ISI citations ranking in Appendix B, several more practitioner-oriented articles appear in the Google Scholar top ten cited articles, such as a book chapter by Hiller and Bélanger (2001) published by the PriceWaterhouseCoopers Business of Government series and an article in *Electronic Markets* (Warkentin, Gefen, Pavlou, & Rose, 2002). Because these book chapter articles are not indexed and not published in leading journals, they are unlikely to be highly ranked in ISI citations rankings, but are nevertheless read and cited by others as demonstrated by their Google rankings. This is an important point because it highlights the fact that e-government research is one of those domains that is relevant and of interest to practitioners, and offers an opportunity for IS researchers to bridge the gap between research and practices. A recent study of IS research asseverates that IS scholars are not properly informing their audiences, and, more specifically, practitioners (Gill & Bhattacherjee, 2009)[3], and so it can be argued that more could be done here with respect to creating knowledge for practitioners.

The second point, whether IS researchers should consider publishing in non-IS journals, is another recurring theme of IS scholarship; this clearly relates to the promotion and tenure requirements for information systems scholars (Dennis, Valacich, Fuller, & Schneider, 2006). Multidisciplinary research can be fascinating and enlightening, but can at the same time be quite challenging (Hara, Solomon, Kim, & Sonnenwalf, 2003; O'Connor, Rice, Peters, Veryzer, 2003). Some of the challenges that multi-disciplinary research creates for researchers include the fact that publication outlets of one discipline may not be recognized in the other[4]; the writing style required is often different for each discipline[5]; the level of rigor required may differ across disciplines; and the reward systems vary across disciplines[6]. The decision has to be made by individual researchers as to whether they are willing to take a chance and publish in other disciplines. The ideal situation would instead be for e-government articles published by IS scholars to be relevant, interesting, and well founded, so that other disciplines will want to refer to articles published in information systems outlets (Baskerville & Myers, 2002).

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[3] This point, it needs to be recognized, is sharply contended by Myers and Baskerville (2009) and by Straub and Ang (2011).
[4] Hence, creating promotion and tenure challenges.
[5] In legal journals, for example, researchers make extensive use of very long footnotes.
[6] For example, in some fields publishing an article in an IEEE conference proceeding is accepted as an end product for a substantially long project.

### 2.1.1. Recommendations

New and exciting topics are often difficult to publish in the early stages of the phenomena [or fashion waves, as Sidorova et al. (2008) would argue] because few theories exist, there is a limited understanding of the domain, and therefore, most of the research is exploratory and descriptive. This creates difficulties for researchers to publish such research in the most rigorous, leading journals. Furthermore, several research areas in information systems are multi-disciplinary in nature; for example, e-government research applies to information systems, public administration, management, and other domains. Keeping these challenges in mind, and consistent with this historical assessment of published work, we offer the following recommendations regarding future e-government publications.

- Information systems researchers should not be wary of topic areas and publication outlets that span information systems research and other disciplines as long as they can clearly tie their work to the information systems domain. E-government research shows legitimacy as a core research topic in information systems. Lyytinen and King (2004) suggest there are three main drivers for academic legitimacy: salience, strong results, and disciplinary plasticity. As discussed above, e-government research has demonstrated its salience over the last 10 years, with continued interest in this work from both practitioners and researchers alike. While there are issues of theoretical foundations and some issues regarding methodologies in the highly cited (and older) articles (as discussed later in this section), recent e-government research published in leading IS journals provides strong and rigorous results. Finally, the plasticity or adaptability of e-government research has been demonstrated as the research shifted from more general discussions of e-government to more specific applications of e-government in recent years.

- Research on e-government did not get published in leading IS journals until relatively recently, creating a gap for reference material, which explains that highly cited articles are mostly not from the leading IS journals. Chief editors of the most recognized journals have sometimes promoted the publication of forums or special issues where leading edge, emergent topics can be explored. E-government-related topics should be encouraged in such special issues. Contributions can exist in discourse, not just in rigor (e.g., Davenport & Markus, 1999). For example, an issue of *Information Systems Research* celebrating the 20th anniversary of the journal provides a step in this direction. In the call for papers, the editor indicates, "The goal of the special issue is to publish forward-looking commentaries on important topics and phenomena that are likely to frame a high impact research agenda in the next few years" (Sambamurthy, 2010, p. 662). The present *JAIS* forum exploring the history of information systems, and discussing how this history can inform the future, is another prime example of discourses needed in IS scholarship[7].

- Researchers need to find ways to remove dissemination barriers to their external constituents: students, practitioners, and researchers in other disciplines (Baskerville & Myers, 2009). This is one area where e-government research is ahead of many other IS domains. As explained before, practitioners show a high interest in e-government. For example, the IBM Center for the Business of Government supports research efforts that provide "insightful findings and actionable recommendations for government executives and managers", with several strategic areas focused on the use of information and communication technologies (Breul, 2011, p. 3). This center has been recognized by public administration scholars as bridging the gap between research and practice (Bushouse et al., 2011).

- There is a need for publication outlets for IS researchers to publish results of practical studies. E-government researchers are encouraged to use outlets like *MIS Quarterly Executive*, the *Harvard Business Review*, or even *Communications of the ACM* (where it all started for e-government in IS) to publish summarized results of their research. This is

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[7] Given the previously discussed limitation of reviewing English-based e-government literature only, it would be interesting to have a special issue or forum that would publish the most relevant and quality non-English language articles, including a translated version available in print or online.

consistent with Gill and Bhattacherjee's (2009) recommendation for publishing IS research in practitioner-oriented journals as one way to reach out to praxis.
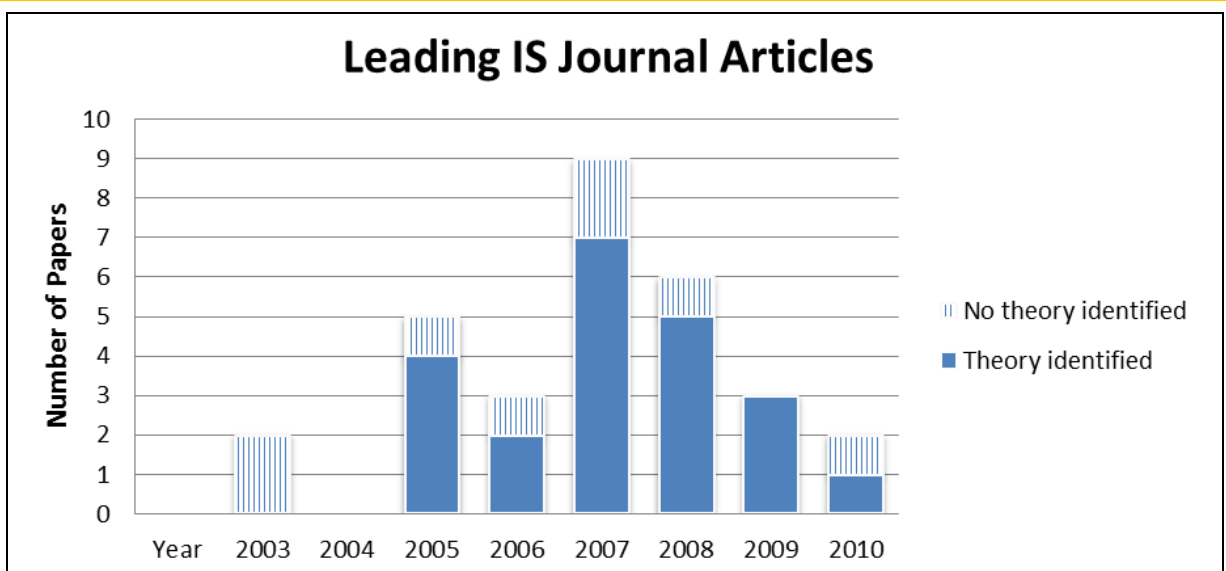
## 2.2. Theoretical Foundations

When articles fail to use strong theoretical foundations or do not clearly provide theoretical contributions, reviewers and editors in leading journals often recommend rejection (Straub, 2009). The analysis of the sampled papers shows that the older but most highly cited articles often tend not to use specific theories, as can be seen in Figure 2. This does not mean that they do not anchor their work in prior literature, but simply that a core theory (or several ones) is not clearly presented as a foundation for the work.



**Figure 2. Papers Mentioning Specific Theories in 15 Most Highly Cited Articles**
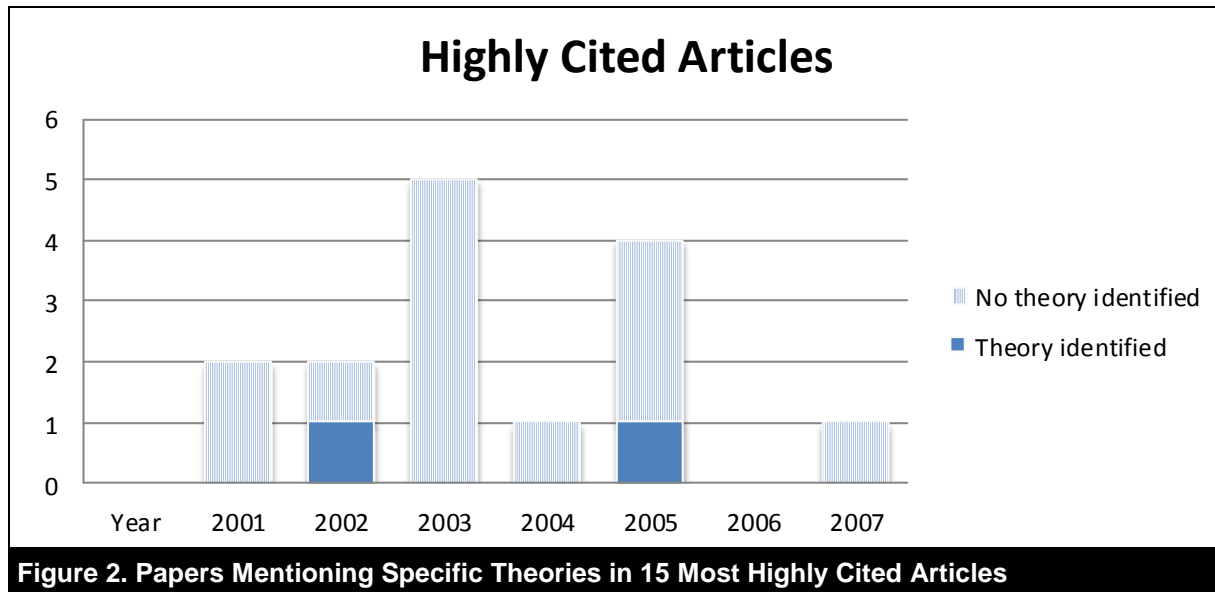
While there have been criticisms about the a-theoretical nature of the early work on e-government (Heeks & Bailur, 2007), it is not unheard of as a core issue for many domains of IS research. In fact, most research areas start with more conceptual analyses and exploratory studies (Gregor, 2006) before evolving to more theoretically-driven work that seeks to explain and predict IS phenomena. For example, reviews of the telecommuting literature conducted 15 to 18 years after the original works were published reveals that few studies had strong theoretical foundations (Bailey & Kurland, 2002; Bélanger & Collins, 1998; McCloskey & Igbaria, 1998). Yet, studies on telecommuting from the 2000-2010 time period rely on much stronger theoretical foundations (and methodological rigor) (Bélanger, Watson-Manheim, & Swan, forthcoming). Similarly, Jasperson, Carter, and Zmud (2005) note that the early information technology adoption literature was a-theoretical and "framed around stage models that represent the decisions and activities associated with the adoption and diffusion of IT applications" (p. 527). Therefore, consistent with the historical development of research in other information systems domains, early literature on e-government tried to organize, or give meaning to the concept of e-government. In fact, four of the 15 most cited articles provide or discuss conceptual frameworks explaining the stages or phases of e-government transformation (Layne & Lee, 2001; Moon, 2002; Norris & Moon, 2005; West, 2004). Subsequent literature then uses these stages as foundation for their work.

Research articles on e-government published in the leading IS journals, however, reverse the trends in reliance on theoretical foundations, with most papers clearly using one or several theories to ground their work, as can be seen in Figure 3. The figure also reveals that there is a peak in publications in 2007 and 2008, due to two special issues in the *European Journal of Information Systems (EJIS)* and the *Journal of Strategic Information Systems (JSIS)*.

**Leading IS Journal Articles**



**Figure 3. Papers Mentioning Specific Theories in Leading IS Journals**

Consistent with the realization that "theory is king" (Straub, 2009, p. vi), leading IS journals tend to accept articles with strong theoretical foundations. E-government research is no exception. In fact, three of the a-theoretical papers identified in leading IS journals discuss the conceptual development of e-government topics (Beynon-Davies & Williams, 2003; Kahraman, Demirel, & Demirel, 2007; Wastell, 2006). One of the early papers published in *EJIS* refers back to the stages of e-government discussed in the most cited articles (Tan & Pan, 2003). This leaves one exploratory paper, a paper using the SERVQUAL instrument to explore service quality of e-government websites (Connolly, Bannister, & Kearney, 2010), and two papers focusing on analyses of research themes and calling for future research on e-government (Irani, Love, & Jones, 2008; Irani, Love, & Montazemi, 2007). All of the other papers use one of many theories, which are summarized in Figure 4.
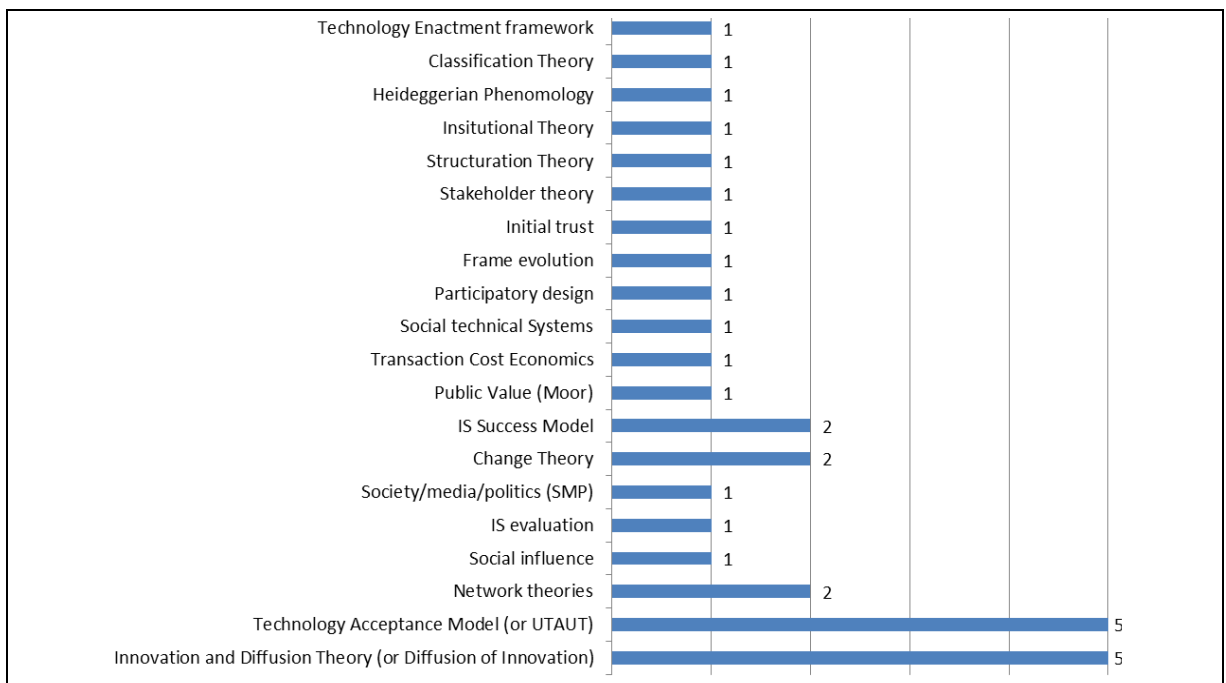


**Figure 4. Theories Used in Our Sample of E-government Literature**

As can be seen from Figure 4, most of the published e-government research employs popular theories in technology adoption and technology diffusion, although a vast array of other theories are also used. Approximately one third (10 of 31) of the theories used in the sampled studies are the technology acceptance model (Davis, 1989), the unified theory of acceptance and use of technology (Venkatesch, Morris, Davis, & Davis, 2003), the diffusion of innovations theory (Rogers, 2003), or its adaptation, the innovation and diffusion theory (Moore & Benbasat, 1991). Of the 20 theories used in the sampled papers, more than half are commonly used across the information systems field. Therefore, it could be useful for future research to consider theories from other fields, such as public administration or management.

### 2.2.1. Recommendations

E-government research has clearly transitioned from a mostly a-theoretical domain of research where exploratory studies analyzed the phenomenon to a theoretically-based field of research. Yet, one hesitates to label this a necessary transition. When researchers start to explore a new topic, it would serve the field well to dedicate studies to developing possible theoretical foundations that can be labeled as such. To facilitate this discussion, we offer the following recommendations regarding the theoretical foundations of e-government (and other) future research.

- Early research on e-government, focusing on stages of transformation, clearly serve as a foundation for much of the later research, as indicated by the high citations these articles have received (see Appendix B). Therefore, while the stages of government transformation models have not been labeled as theoretical models, more in-depth discussion and analyses of the stages could have resulted in theory development. In her discussion of theories in information systems, Gregor (2006) identifies fives types of theories: analyzing, explaining, predicting, explaining and predicting, and design and action. She argues that when researchers identify the types of theories used within their research area, they can gain significant insights into that domain. If this lens were applied to research on e-government, many of the papers listed in Appendix B (highly cited journals) contribute analyzing theories (describing the state of e-government or discussing the need for e-government research) and explaining theories (explaining what is occurring in the realm of e-government but not providing testable predictions). On the other hand, many predicting and explaining theories are found in the leading IS journal articles and some of the highly cited articles, providing explanations and predictions regarding e-government (most often via adoption or diffusion theories). In summary, this recommendation is meant to encourage researchers to go more in depth in their conceptualizations when developing stage or phase models. This would allow these models to provide stronger theoretical foundations for future work. To accomplish this, researchers should more clearly explain their theoretical contributions when developing theoretical models, labeling their findings as theories where appropriate.

- Similar to the findings by Gregor (2006) and Hevner, March, Park, & Ram (2004), we identified few design and action theories (providing a tool for e-government or a framework to evaluate e-government tools) in the published e-government research. Given the interest of practitioners in the domain of e-government, future research should consider more design and action work, or design science work, as an area ripe for research. Examples of design and action theories for e-government include the design and evaluation of a tool for citizens to vote on local initiatives, an evaluation framework for e-government websites, or the design and evaluation of new automated services tools for e-government services.

- In order to facilitate the work of other researchers, it would be useful to develop a repository of e-government theories that researchers could use in future work, similar to what is done by the "Theories used in IS research" wiki (http://www.fsc.yorku.ca/york/istheory/wiki/). As this article is being written, the list would include a very large number of applied theories, but no native e-government theory. The field would be served better if e-government researchers added to this knowledge base with their own native theories.

- As Straub (2009) suggests, research rarely develops new theory but instead focuses on adapting or refining existing theories. Clearly, it is difficult to do this when no theory exists within a particular domain. What can be done to remedy this? Theory can be borrowed from other research areas or even disciplines; however, it would be beneficial to devote efforts to theory development early in the exploration of a new topic area. At this point, e-government research has proposed and tested a number of theoretical frameworks. A qualitative meta-analysis would be useful in developing a coherent summary of the main findings, possibly leading to a theory of e-government evolution. Based on the number of adoption studies, there is probably also a theory of e-government adoption that could be identified, since there is currently no unifying e-government theory. Future research could use a growth model, such as Nolan's (1979) stages of growth model, to illustrate the progression of e-government services. Nolan's (1973, 1979) stages of growth model identifies six phases that illustrate the changing role of information technology in business[8]. A similar e-government model could help explore concepts relevant to technology diffusion in the public sector, illustrating the transformation and diffusion of e-government services and information. This approach has been used in diverse IS studies, including end user computing (Huff, Munro, & Martin, 1988) and e-commerce (Chan, 2004). A theory of e-government evolution would require that researchers take into consideration some of the key idiosyncrasies of e-government studies, one of which is the role of e-government in participatory democracy. Allowing citizens to exercise their democratic rights via electronic means is likely to offer great opportunities and yet great challenges, a key difference between e-government and other fields of study.

## 2.3. Methodological Approaches

A history, however brief, of e-government research would not be complete without an exploration of the methodological choices made by e-government researchers. Appendices A and B provide some interesting insights about selected research approaches, units of analysis, samples, and types of governments under scrutiny. In this section, some of the most interesting trends identified with respect to research approaches and units of analysis are presented. Differences exist between the articles published in the highly cited sample and those in the leading IS journals. One of these interesting facts is that highly cited articles are all of a quantitative or conceptual nature. There are no qualitative studies, as can be seen in Figure 5.

Figure 5 also shows that there are an almost equal number of studies conducted at the individual unit of analysis as at the government (or organizational) unit of analysis. We defined the unit of analysis as the entity analyzed in the study, or in other words, the entity about which inferences are made. (This can be different from the unit of measurement from which data is collected.) The fact that there are an equal number of studies at the individual and government units of analysis is interesting because many recent reviews of the literature show that IS research is most often conducted at the individual level, even in domains that involve potential multiple levels of analysis, such as information privacy (Bélanger & Crossler, 2011; Smith et al., 2011), IS success (Petter, Delone, & McLean, 2008), and telecommuting (Samia & Richard, 2006). Since the highly cited articles were mostly published in non-IS journals with an interest in research on governments, it could explain their greater emphasis on the organizational level of analysis, since their interests are often focused on government agencies.

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[8] The model posits that use and growth of IT in organizations begins slowly in Stage I, referred to as the "initiation" stage. This stage does not focus on user awareness, but instead on reducing costs. Stage II, also known as the "contagion" stage, includes continued growth in available applications, challenges, and opportunities. During Stage III a need for "control" arises. Centralized controls are implemented, and the focus shifts from management of computers (and related technologies) to management of data resources. Next, in Stage IV, there is an "integration" of diverse technological solutions. As a result of the new data management focus, organizations can enhance IT development without increasing IT purchases. Finally, in Stage VI, known as "maturity", high control is exercised by utilizing insights and information gained from the previous stages (Nolan, 1973; Nolan, 1979).
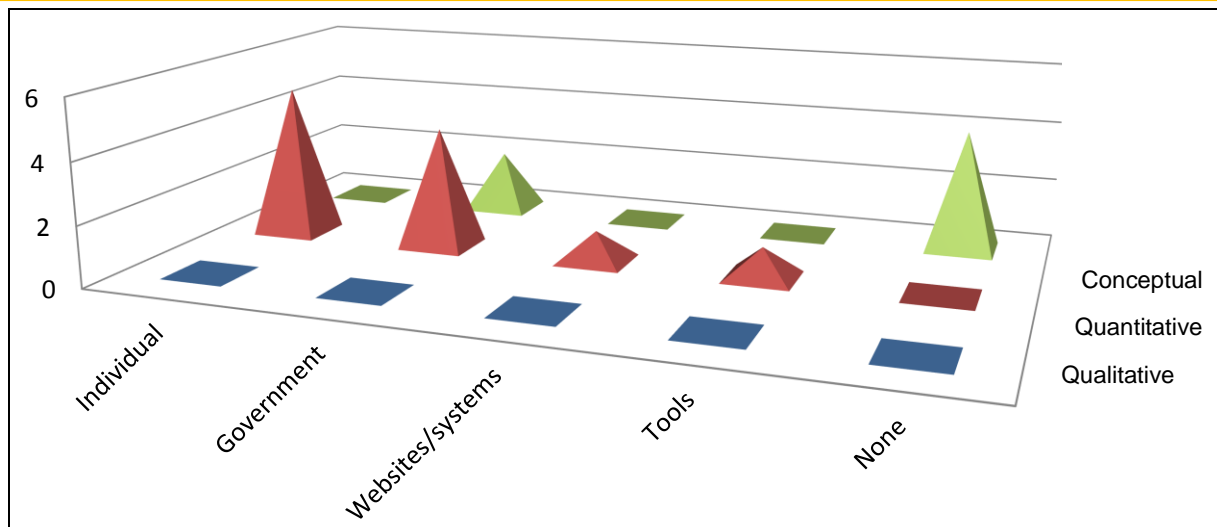
**Figure 5. Research Approach and Unit of Analysis in Highly Cited Articles**

Figure 6 presents the same analysis as Figure 5 but for leading IS journals. The actual number of articles can be misleading because the comparison includes the top 15 highly cited articles and the 30 articles identified in the leading IS journals. However, the figure clearly shows how the relative numbers compare. For articles published in leading IS journals, there is an almost equal number of quantitative studies as there are qualitative studies (Recall that there are no qualitative studies in highly cited journals). Furthermore, there are a significantly higher number of studies conducted at the individual level of analysis in leading IS journals than there are in highly cited articles.
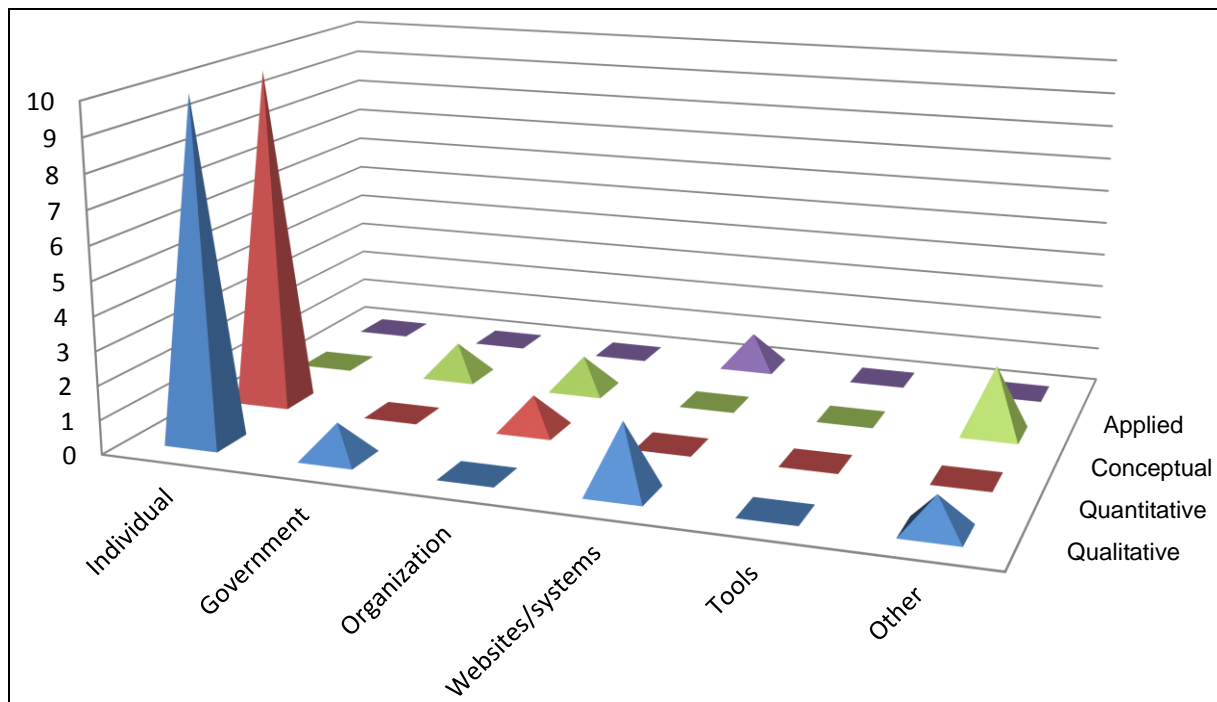


**Figure 6. Research Approach and Unit of Analysis in Leading IS Journal Articles**

Without being overly simplistic, it appears that articles published in leading IS journals use a variety of methodological approaches, with equal numbers of quantitative and qualitative studies, and mostly use

the individual level of analysis; whereas, highly cited articles use mostly quantitative studies (with some conceptual studies mixed in), and an almost equal number of studies use the individual level of analysis and the organizational level of analysis. What inferences can be made from this? Recalling the prior discussion of rigor, we can note that leading IS journals require large sample sizes to ensure statistical validity. Large samples are easier to obtain for individual level analyses than for organizational levels. This argumentation also holds true for case studies and other qualitative research approaches that make use of key informants in organizations. Although qualitative research is popular in the IS community, within the sub-domain of e-government, readers may find it less citable.

A few additional findings need to be mentioned. First, there are three longitudinal studies in leading IS journals (on 30 studies: 10 percent) and two in highly cited journals (on 15 studies; 13 percent). It might have been expected that more of the studies developing stages of transformation of e-government would have used longitudinal approaches in order to better explore the transitions from stage to stage. It is possible that no such study was conducted because it was too early in the field to consider the long-term transformation of e-government. However, this should not be an issue today. One final finding of interest is that some units of analysis used in the sampled papers are non-traditional: tools, websites, contents, applications, and cases. However, there are so few such studies that no comparisons can be made across studies.

### 2.3.1. Recommendations

Most of the issues identified in the methodological approaches used by e-government researchers are not likely to be specific to e-government research. Therefore, we provide the following recommendations with the caveat that they might be applicable beyond the e-government research domain.

- Articles in the highly cited sample do not include qualitative studies. The depth of insights that can be gained from qualitative studies is important to the field. IS researchers should continue to conduct both quantitative and qualitative studies, as has been shown in the leading IS journal articles.

- IS studies seem to focus mostly on the individual level of analysis, whereas non-IS highly cited articles offer a more diverse sample with respect to levels of analysis. IS researchers should pursue more research at the government level. While obtaining a proper sample size is more challenging when comparing agencies, the insights would be quite valuable to the field.

- Research on e-government still refers to the stages of evolution models. Therefore, it would be useful to the field to conduct longitudinal studies that develop process models of e-government evolution (the theory of e-government evolution).

- We identified several newer units of analysis in e-government studies (e.g., tools, websites, applications, etc.). The field would benefit from future e-government studies conducted with similar units to allow researchers to compare findings across studies.

## 2.4. Sampling

Sampling poses interesting opportunities and challenges in social science research. Given e-government's international nature, let us examine the sampling within the leading IS journals and the highly cited papers. Of the highly cited papers, a majority (67 percent) use US-centric samples. Interestingly, this trend reverses in later studies (published after 2003), where only 20 percent of the articles in the leading IS journals are conducted with U.S. participants. This shift could be due, in part, to the aforementioned special issues sponsored by the two European journals. It is also possible that the interest is consistent with the fact that government practitioners in Europe, Australia, and other areas outside the US are very involved in implementing e-government (United Nations, 2010).

One of the major, and somewhat disturbing, trends in early e-government research relates to the limited discussion of sample characteristics in many papers. Contrary to other areas of IS research, several studies in both the leading IS journals and the highly cited papers do not discuss sample size. In fact, it is not always clear how many subjects participated in the study, and what was the level of analysis. This omission represents an important issue for the e-government community, since it is difficult to assess the validity and generalizability of the study without appropriate information about its research participants.

An additional trend identified in our analysis is that the level of government explored differs between the leading IS journals and the most highly cited articles. While both groups include all levels of government, the number of studies is more evenly distributed among the most highly cited papers, as can be seen in Figure 7.



**Figure 7. Levels of Government Studied in Sampled Papers[9]**
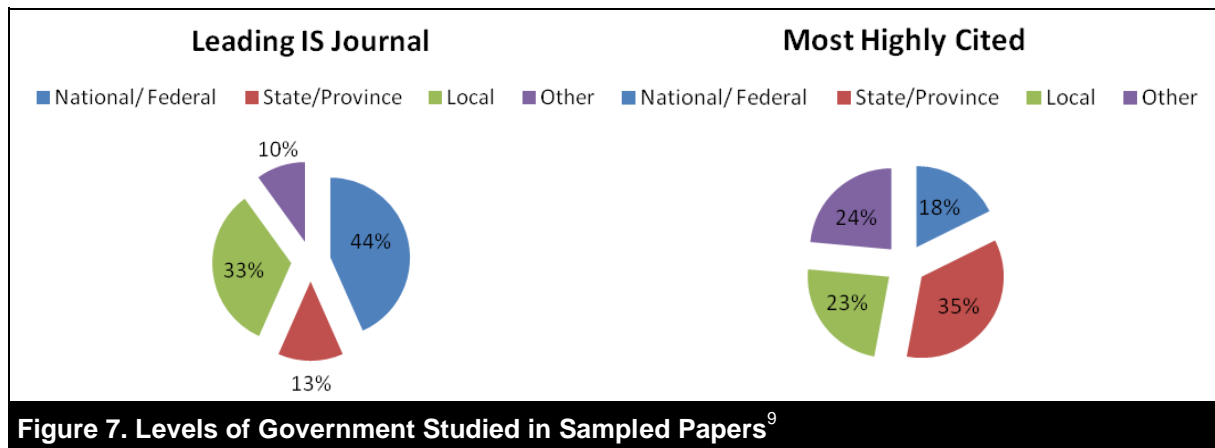
As illustrated in the figure, there is a good mix of local, state/province, and national/federal studies in the highly cited articles. However, there does not seem to be a link between the level of government and the topic explored. This may be due, in part, to the fact that many of the services explored are applicable at multiple levels (e.g., citizens may pay taxes at the national/federal and state/province level). In fact, several studies explored both the national/federal and state/province government levels concurrently (see Appendices A and B).

### 2.4.1. Recommendations

Since sampling has major implications for research findings and conclusions, we present several recommendations for improving the recruitment and discussion of e-government participants below.

- As aforementioned, a majority of the early "highly-cited" e-government articles sample US citizens. This trend has been reversed. Hence, researchers are encouraged to continue to explore diverse constituents from across the globe. One way to continue to diversify the sample used in e-government studies is to take advantage of the varied resources available to e-government researchers. For instance, e-government research centers have numerous human and financial resources that may enable researchers to reach diverse citizens. For instance, prominent centers include the Postdam eGovernment Competence Center in Germany and the APEC e-government Research center at Waseda University in Japan. (In the US, the University of Massachusetts-Amherst has the National Center for Digital Government, which "seeks to build global research capacity, to advance practice, and to strengthen the network of researchers and practitioners engaged in building and using technology in government" (NCDG, 2012)). The use of international research centers may also result in more cross-cultural partnerships and projects that would help to develop an international perspective and understanding of e-government research.

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[9] Other includes generic studies and studies where level was not applicable.

- Statistical validity is not a function only of sample size, but also of the representativeness that the sample offers for the population under study. However, our findings show that several e-government researchers do not clearly demonstrate how their samples are representative of the population to which they are trying to generalize. While editors need to focus on representativeness as opposed to sheer quantity in evaluating the validity of a study sampling frame, this can only be accomplished if this information is made available. As indicated in the Appendices, many studies provide sparse information about sample recruitment and composition. To advance the field, future studies should clearly indicate the sample size and type for all empirical studies. Given the low levels of information about sampling in many of the articles reviewed (as noted above), it would also be highly desirable to promote more accurate disclosure of sampling techniques.

- As indicated in Figure 7, many researchers focus on e-government initiatives at the national level. E-government researchers should consider conducting more studies that explore the role of e-government at other levels of government. When compared to the top IS journals, the highly-cited publications are more evenly distributed among diverse levels of government. The high citation of e-government research at all levels of government indicates the demand and value of this diversification. Hence, researchers should be encouraged to continue to explore local and state/province e-government initiatives, in addition to federal/national initiatives.

## 2.5. Topic Areas

As a research community, IS researchers have made great strides in improving both e-government research and practice. E-government research explores everything from technology adoption to government-to-government information sharing. Yet, there are still a plethora of topics and avenues that need to be explored. When comparing the most frequent topics explored in the leading IS journals to the topics frequently explored in the highly cited articles, the leading IS journals seem to focus primarily on specific e-government services (e-reverse auctions, GIS, online license renewal, mobile data services, and so forth) while the highly cited articles typically refer to the e-government phenomenon in general, which can be seen from Figures 8 and 9.

These figures illustrate that 12 of the 15 highly cited articles are generic e-government studies that do not explore a specific service. These generic studies present benefits and challenges. They may be easier to implement, since they do not have to be tethered to a particular agency. In addition, the results are not limited to the culture and processes of a specific government agency. However, with a generic concept, subjects may have diverse perceptions and experiences when providing responses to survey questions, which could confound the results.
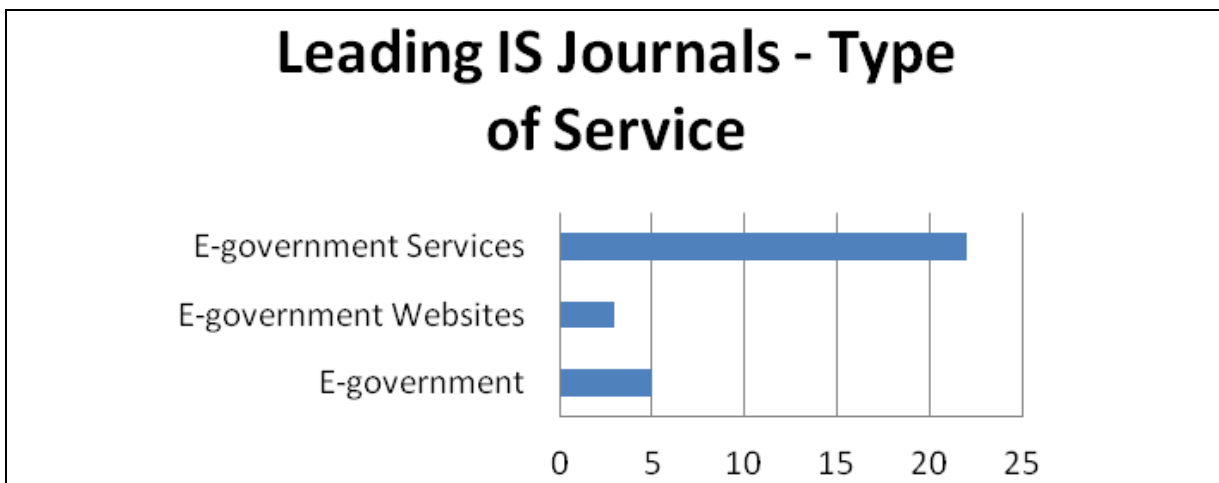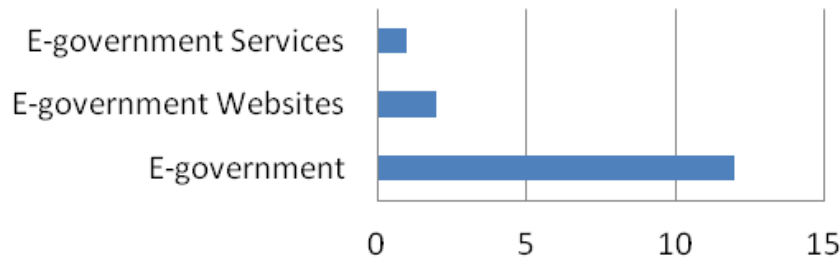


**Figure 8. Types of Services in Leading IS Journals**

**Figure 9. Types of Services in Highly Cited Articles**

### 2.5.1. Recommendations

The review of the existing e-government topics reveals several opportunities for future research. Hence, much of this section will focus on our recommendations for enhancing the breadth and depth of topics for the e-government community to explore.

- As a community, e-government researchers should broaden the research questions they explore, since e-government is an interesting application of information systems that crosses disciplines. Given the current state of e-government research, many interesting questions remain: for instance, what is or should be the purpose of e-government research? Arguably, it depends on the researcher's home discipline (or perspective). For a computer scientist, perhaps the purpose is to develop better algorithms that result in faster and more efficient e-government systems. For a political scientist, the purpose is perhaps to engage the citizenry to provide more meaningful, representative government services.  Unlike other disciplines (e.g., philosophy), researchers should not only study e-government simply to understand the phenomenon, but also to improve efficiency and transparency in the public sector. Now that e-government is maturing, the field can move from technology adoption studies to value-based studies. What is the value of e-government to citizens and agencies? Researchers need to understand how e-government links to all constituents, including other communities. Researchers should determine what constitutes e-government success or failure from both the government's and citizen's perspectives. In doing so, researchers can help inform practice by helping agencies avoid failure. Finally, future research on e-government needs to continue to demonstrate plasticity by focusing on newer key interactions with constituents, such as finding ways to create new participatory governance (for example, with Web 2.0 technologies and transformational-government). Transformational-government, or t-government, refers to ICT initiatives in the public sector that use lessons learned from e-government to promote seamless and effective electronic services (Irani et al., 2008).

- In addition to more diverse research questions, e-government researchers should also identify additional dependent variables of interest. Currently, many researchers explore intentions to use and e-government utilization; other variables such as success, attitudes, and satisfaction need e-government researchers' attention. E-government researchers should incorporate a variety of stakeholders and contexts in their research. For example, culture might have a significant impact on e-government implementation success.

# 3. Summary and Conclusions

This historical review of e-government publication outlets, theoretical foundations, methodological approaches, sampling, and topic areas hopefully provides both researchers and practitioners with a useful assessment and agenda for the continued development of the domain. In Table 1, we summarize the main recommendations for e-government and information systems research discussed in the article. Clearly, our recommendations for e-government research can also apply to other sub-disciplines in information systems. The recommendations, therefore, are meant to enable new discussions for the future of research on both e-government and IS in general.

| Table 1. Summary of Recommendations for Future Research | | |
|---|---|---|
| | **Recommendations for E-government Research** | **Recommendations for Information Systems Research** |
| **Publication Outlets** | • Focus on newer key interactions with constituents, such as finding ways to create new participatory governance (for example with Web 2.0 technologies). <br> • Publish practical aspects of e-government research in outlets as *MIS Quarterly Executive*, the *Harvard Business Review*, or *Communications of the ACM*. <br> • Publish a special issue or forum to include the most relevant and quality non-English language articles on e-government, with a translated version available in print or online. | • Find ways to remove dissemination barriers to external constituents: students, practitioners, and researchers in other disciplines. <br> • Consider publication of more forums or special issues where leading edge, emergent topics can be explored. |
| **Theoretical Foundations and Contributions** | • Perform in-depth discussions and analyses of the stages of government transformation to create a Theory of E-government Evolution. <br> • Perform qualitative meta-analyses of e-government frameworks and adoption studies to develop a unifying Theory of E-government Adoption. <br> • Consider creating design and action, or design science, research efforts in e-government (providing tools for e-government or frameworks to evaluate e-government tools). <br> • Add theories for e-government to the knowledge base of theories used in information systems research. | • Conceptualize theory in a broader sense, recognizing the value of not only explaining and predicting or design and action theories, but also analyzing, explaining, or predicting theories (Gregor, 2006). <br> • Continue to facilitate the work of IS researchers by providing repositories of theories that researchers can use in information systems. |
| **Methodological Approaches** | • Continue to conduct both qualitative and quantitative studies. <br> • Pursue more research at the government level of analysis. <br> • Conduct more longitudinal studies to develop process models of e-government evolution (The Theory of E-government Evolution). <br> • Explore new units of analysis and conduct studies with similar units to allow researchers to compare findings across studies. | • Consider the representativeness as opposed to sheer quantity in evaluating the validity of a study's sampling frame. |
| **Sampling** | • Continue to solicit responses from diverse samples in terms of origin and type of respondent. <br> • Demonstrate more clearly how samples used in e-government research are representative of the population to which researchers are trying to generalize. <br> • Conduct research at different levels of government. | • Clearly indicate the sample size and type of sample for all empirical studies. |
| **Topic Areas** | • Broaden the research questions explored by e-government researchers. <br> • Identify additional dependent variables of interest in e-government research. | • Consider topic areas and publication outlets that span information systems research and other disciplines, as long as they can clearly identify their work within the information systems domain. |

E-government has proven to be an important topic, as demonstrated by the voluminous work of IS researchers over the last decade. Interestingly, this historical review has identified issues to those of other sub-disciplines of IS. In a retrospective analysis of the IT implementation and innovation literatures, Lucas, Swanson, and Zmud (2007) suggest that the literature: 1) failed to identify a unifying theory, 2) failed to learn from the process studies that emerged, 3) focused primarily on individual as opposed to organization use of technology, and 4) failed to recognize the context or nature of the technology studied. All of these points apply equally well to e-government research. This makes electronic government an excellent Petri dish to study how research topics in information systems mature over time. Concurrently, this review highlights tremendous possibilities with respect to future research in electronic government. Researchers are encouraged to explore these topics more in-depth. Furthermore, e-government is one of those topics that draws involvement from practitioners, resulting in immense practical relevance, and e-government researchers should take advantage of this opportunity.

It is important to acknowledge the diverse schools of thought within the IS community. While we focused this review on e-government studies, it does not claim that e-government is different from information systems, in general, but rather that it is one of the domains within the field of information systems of relevance to other fields such as public administration.

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# Appendices

## Appendix A: E-government Papers in the Leading IS Journals

**Table A-1. Methodological Approaches and Sampling for E-government Articles in the Eight Leading IS Journals Ordered by Date**

| Authors | Year | Journal | Approach | Method | Time | Unit of Analysis | Sample | Origin | Government Type |
|---|---|---|---|---|---|---|---|---|---|
| Tan & Pan | 2003 | EJIS | Qualitative | Case study | Cross sectional | Individual | taxpayers, managers, developers (number unknown) | Singapore | National |
| Beynon-Davies & Williams | 2003 | JIT | Conceptual | n/a | n/a | Government | 22 government agencies | UK | Local |
| Tung & Rieck | 2005 | JSIS | Quantitative | Survey | Cross sectional | Organization | 128 firms | Singapore | Generic |
| Carter & Bélanger | 2005 | ISJ | Quantitative | Survey | Cross sectional | Individual | 105 citizens | USA | State/Province |
| Irani et al. | 2005 | ISJ | Qualitative | Case study | Cross sectional | Government | 2 cases of citizens (number unknown) | UK | Local |
| Mahrer & Krimmer | 2005 | ISJ | Qualitative | Case study | Cross sectional | Individual | 201 members of parliament | Austria | National |
| Moon & Norris | 2005 | ISJ | Quantitative | Survey | Cross sectional | Individual | 1471 administration | USA | Local |
| Wastell | 2006 | JSIS | Conceptual | Case | n/a | Organization | 2 cases | UK | Local |
| Hong & Tam | 2006 | ISR | Quantitative | Survey | Cross sectional | Individual | 808 citizens | Hong Kong | National |
| Pan et al. | 2006 | ISJ | Qualitative | Case study | Cross sectional | Individual | 17 project stakeholders | UK | Local |
| Gil-Garcia et al. | 2007 | EJIS | Quantitative | Survey | Cross sectional | Individual | 478 project managers and users | USA | State/Province |
| Grimsley & Meehan | 2007 | EJIS | Qualitative | Case study | Cross sectional | Individual | 2 org with developers and users (number unknown) | UK | Local |
| Hackney et al. | 2007 | EJIS | Quantitative Qualitative | Survey & Case study | Cross sectional | Individual | 56 public sector buyers (survey); interviews (number unknown) | UK | Local |
| Heeks & Stanforth | 2007 | EJIS | Qualitative | Case study | Longitudinal – 5 years | Individual | project stakeholders (number unknown) | Sri Lanka | National |
| Huang | 2007 | EJIS | Qualitative | Content analysis | Cross sectional | Websites | 3099 websites examined; 1744 portals | USA | Local |

**Table A-1. Methodological Approaches and Sampling for E-government Articles in the Eight Leading IS Journals Ordered by Date (cont.)**

| Authors | Year | Journal | Methodology | | | | Sample | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Approach | Method | Time | Unit of Analysis | Sample | Origin | Government Type |
| Irani et al. | 2007 | EJIS | Qualitative | Content analysis | Cross sectional | Comments | 5 groups; 115 comments from e-gov practitioners | UK | National |
| Kahrama et al. | 2007 | EJIS | Conceptual (SWOT analysis) | n/a | n/a | SWOT elements | n/a | Turkey | National |
| Yao & Murphy | 2007 | EJIS | Quantitative | Survey | Cross sectional | Individual | 453 citizens | USA | Generic - remote |
| Olphert & Damodara | 2007 | JAIS | Conceptual | Content analysis | n/a | Government | 20 case studies | n/a | n/a |
| Azad & Faraj | 2008 | JSIS | Qualitative | Case study | Longitudinal – 2 years | Individual | 29 interviews - 16 stakeholders | Mediterranean country | Local |
| Bélanger & Carter | 2008 | JSIS | Quantitative | Survey | Cross sectional | Individual | 214 citizens | USA | State/Province |
| Chan & Pan | 2008 | JSIS | Qualitative | Case study | Cross sectional | Individual | 2 cases; 24 developers, operations, users | Singapore | National |
| Gupta et al. | 2008 | JSIS | Quantitative | Survey | Cross sectional | Individual | 102 employees | India | National |
| Irani et al. | 2008 | JSIS | Qualitative | Case study | Cross sectional | Individual | 3 cases; users (number unknown) | UK | Local |
| Phang et al. | 2008 | JSIS | Qualitative | Case study | Cross sectional | Individual | 10 stakeholders | Singapore | National |
| Mosse & Whitley | 2009 | ISJ | Applied | Benchmark | Cross sectional | Website | 2 government websites | UK | State/Province |
| Sutanto et al. | 2008-9 | JMIS | Qualitative | Case study | Cross sectional | Individual | 296 commuters | Singapore | National |
| Teo et al. | 2008-9 | JMIS | Quantitative | Survey | Cross sectional | Individual | 214 students | Singapore | National |
| Connoly et al. | 2010 | EJIS | Quantitative | Survey | Cross sectional | Individual | 6661 citizens | Ireland | National |
| Cordella & Iannacci | 2010 | JSIS | Qualitative | Case study | Longitudinal – 15 months | System | 2 focus groups, 20 practitioners | Europe | National |

**Table A-2. Theories, Services, and Findings for E-government Articles in the Eight Leading IS Journals Ordered by Date**

| Authors | Theories Identified and Literature Referenced | Type of Service | Topics or Findings |
|---|---|---|---|
| Tan and Pan (2003) | None (organizational transformation) | E-filing | Identifies six phases exist for e-filing implementation. |
| Beynon-Davies and Williams (2003) | None (ICT use literature) | ICT use in government | Presents a model of local e-government where ICT is an enabler for organizational change related to service delivery to key stakeholders (customers, suppliers and employees). |
| Tung and Rieck (2005) | IDT, network externalities, social influence | E-government | Perceived benefits, external pressure, and social influence positively impact firms' decision to adopt e-Government services. |
| Carter and Bélanger (2005) | TAM, DOI | E-filing, Online licence renewal | Perceived ease of use, compatibility and trustworthiness positively impact citizens' intention to use e-government services. |
| Irani et al. (2005) | IS Evaluation | E-government | Presents a framework to evaluate e-government. |
| Mahrer and Krimmer (2005) | Society/media/politics (SMP) model | E-democracy, E-administration | Politicians explicitly and implicitly foster all activities of e-administration, but otherwise interfere explicitly and implicitly in advancement of e-democracy. |
| Moon and Norris (2005) | None (exploratory) | E-government services | Managerial innovativeness orientation and city size are most compelling determinants of municipal e-government adoption. Different e-government adoption levels may yield different outcomes. |
| Wastell (2006) | None | GIS | Highlights practical potential of GIS to support strategic decision-making in context of multi-agency collaboration. |
| Hong and Tam (2006) | TAM, IDT | Mobile data services | Perceived enjoyment, perceived monetary value, and social influence positively impact adoption intentions. Perceived service availability positively impacts perceived usefulness and perceived ease of use. |
| Pan et al. (2006) | Lewin's change theory | E-procurement | Discusses how actors may give up previous failing course of action and accept an alternative course of action. |
| Gil-Garcia et al. (2007) | IS Success model (decision making literature) | E-government information sharing projects | Expected benefits are an important reason for starting collaborative e-Government initiatives. However, the perception of benefits is clearly affected by impediments and prior experiences. |
| Grimsley and Meehan (2007) | Moor's concept of public value | E-government projects | Provides a design framework for e-government projects. |
| Hackney et al. (2007) | Transaction Cost Economics; (ICT literature) | E-reverse auctions | Effective communication and information dissemination impact context and process, which affect degree of uncertainty and ultimately efficiency of e-RA. |
| Heeks and Stanforth (2007) | Actor-network theory | E-government projects | Trajectories of e-Government projects are a function of the mobilisation of a global network of actors that resource the projects; the mobilisation of local network of actors that implement the projects and the imposition of the project as a single connection between these networks. |
| Huang (2007) | IDT | E-government portals | Explores U.S. counties' adoption of e-Government and functionalities of their portals associated with socioeconomic factors (ethnicity, education, population, housing, income). |

**Table A-2. Theories, Services, and Findings for E-government Articles in the Eight Leading IS Journals Ordered by Date (cont.)**

| Authors | Theories Identified and Literature Referenced | Type of Service | Topics or Findings |
|---|---|---|---|
| Irani et al. (2007) | None | E-government research | Identifies e-government research themes: 1) multi-disciplinary research on e-Government, 2) understanding of how to create flexible systems, 3)coordination needed for research and development activities, e-Government policy-making process and exploitation of results, and 4) understanding of factors that affect participation and strategies that can produce significant internal and external changes. |
| Kahraman et al. (2007) | None | E-government | Provides a framework for analyzing the priorities of e-government strategies. |
| Yao and Murphy (2007) | TAM, UTAUT | I-voting | Privacy, ease of use, mobility, and accuracy are important correlates of remote voting participation intention. Availability only correlates for women. |
| Olphert and Damodaran (2007) | STS; participatory design | E-government | E-government development is currently characterised by a technocentric approach with minimal engagement of citizens. |
| Azad and Faraj (2008) | Frame evolution | E-government implementation | After starting with different technology frames and defending their perspectives, stakeholders adopt a frame that reflects some commonalities in beliefs, interests, technology evaluation routines and artifact characteristics. Frame evolution processes identified: frame differentiation, frame adaptation and frame stabilization. |
| Bélanger and Carter (2008) | Initial trust | E-filing, Online license renewal | Disposition to trust positively affects trust of Internet and government, which in turn affect intentions to use an e-government service. Trust of government also affects negatively perceived risk, which affects use intentions as well. |
| Chan and Pan (2008) | Stakeholder theory | immigration and visa services | Describes the need for user engagement in e-government as well as salient intermediaries for convergence of interests, enhanced user acceptance and success. |
| Gupta et al. (2008) | UTAUT, TAM | Government-to-employees Government-to-government | Performance and effort expectancy, social influence and facilitating conditions all positively impact use of ICT got government relationships (G2E and G2G). |
| Irani et al. (2008) | None | E-government | Calls for decision makers to engage with the eGovernment agenda and for eGovernment evaluation. |
| Phang et al. (2008) | Structuration theory, institutional theory, (politics, culture, learning literatures) | Integrated system for HR and finance (HRFIS) at National Library Board | Constructs a structurational framework of IT-related organizational learning that takes into consideration organizational culture, politics, and institutional theory, and their inter-relationships. Framework explains why there was limited resistance to implementation of HRFIS despite radical changes introduced. |
| Mosse and Whitley (2009) | Heideggerian phenomenology; classification theory | E-government websites | Shows use of website benchmarking in government for design and development of e-government websites. |
| Sutanto et al. (2008) | Change management | Transportation Smart Cards | Senior management communication and cooperation with affected organizations can help overcome resistance to implementation (change). While comprehensive publicity could initiate change in the public, a critical mass is needed for public change by coopting public |

**Table A-2. Theories, Services, and Findings for E-government Articles in the Eight Leading IS Journals Ordered by Date (cont.)**

| Authors | Theories Identified and Literature Referenced | Type of Service | Topics or Findings |
|---|---|---|---|
| Teo et al. (2008) | IS Success Model | E-government websites | Perceptions of e-government website quality are affected by trust in e-government website. Online trust partly affected by offline trust in government. |
| Connolly et al. (2010) | None (SERVQUAL) | E-filing | Two dimensions of website service quality, efficiency and ease of completion, influence most users' perceptions of value, convenience, and intentions to use and recommend the |
| Cordella and Iannacci (2010) | Technology Enactment Framework | Crown Prosecution Service | Proposes the e-Government enactment framework as theoretical and analytical approach to understand and study complexity of e-Government and policies. |

# Appendix B: Most Highly Cited E-government Articles

**Table B-1. Methodological Approaches and Sampling for Most Highly Cited E-government Articles Ordered by Reverse Citation Count (ISI)**

| Authors | Year | Journal | Citations as of February 2011 | | Methodology | | | | Sample | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | ISI | Google Scholar | Approach | Method | Time | Unit of Analysis | Sample | Origin | Government Type |
| Layne & Lee | 2001 | GIQ | 205 | 772 | Conceptual | --- | Cross sectional | --- | --- | USA | Generic |
| Moon | 2002 | PAR | 138 | 583 | Quantitative | Survey | Cross sectional | Government | 1471 municipal agencies | International | Local |
| Ho | 2002 | PAR | 98 | 439 | Quantitative | Survey | Cross sectional | Individual | 31 city web masters | USA | Local |
| West | 2004 | PAR | 89 | 304 | Quantitative | Archival | Longitudinal - 3 years | Several (budgets, websites, citizens) | Budgets of 50 states; 3493 websites; 1003 citizens | USA | National & state |
| Cater & Bélanger | 2005 | ISJ | 75 | 263 | Quantitative | Survey | Cross sectional | Individual | 105 citizens | USA | State/Province |
| Gupta & Jana | 2003 | GIQ | 54 | 127 | Conceptual | Case | Cross sectional | Government | 1 municipal corporation | India | Local |
| Kaylor et al. | 2001 | GIQ | 53 | 163 | Quantitative | Benchmark | Cross sectional | Government | 38 local agency websites | USA | Local |
| Gil-Garcia & Pardo | 2005 | GIQ | 50 | 140 | Quantitative | Gap analysis | --- | Tools | e-government tools (number unknown n) | USA & Canada | National & State |
| Norris & Moon | 2005 | PAR | 50 | 154 | Quantitative | Survey | Longitudinal - 2 yrs | Government | 1882 municipal agencies in survey 1; 4126 in survey 2 | USA | Local |
| Jaeger & Thompson | 2003 | GIQ | 47 | 102 | Conceptual | --- | --- | --- | --- | International | Generic |
| Chadwick & May | 2003 | Gov | 45 | 230 | Conceptual | Case | Cross sectional | Government | 3 state agencies | USA, Britain, EU | State |
| Thomas & Streib | 2003 | JPART | 45 | 155 | Quantitative | Survey | Cross sectional | Individual | 827 citizens | USA-Georgia | State |
| Heeks & Bailur | 2007 | GIQ | 43 | 136 | Quantitative | Content analysis | --- | --- | 84 papers | International | Generic |
| Jaeger | 2003 | GIQ | 39 | 103 | Conceptual | --- | --- | --- | --- | International | Generic |
| Welch et al. | 2005 | JPART | 35 | 120 | Quantitative | Survey | Cross sectional | Individual | 806 citizens | USA | National & state |

GIQ - *Government Information Quarterly*; PAR – *Public Administration Review*; ISJ – *Information Systems Journal*; Gov – *Governance*; JPART – *Journal of Public Administration Research and Theory*

**Table B-2. Theories, Services, and Findings for Most Highly Cited E-government Articles Ordered by Reverse Citation Count (ISI)**

| Authors | Theories Identified & Literature Referenced | Type of service | Topics or Findings |
|---|---|---|---|
| Layne and Lee (2001) | None (stages of growth model) | E-government | Proposes four stages of e-government development (catalogue, transaction, vertical integration, horizontal integration); suggest organizational and technical challenges. |
| Moon (2002) | IDT | E-government | E-government has been adopted by many municipal governments, but it is still at an early stage; has not obtained many expected outcomes (cost savings, downsizing, etc.). |
| Ho (2002) | None (web development) | E-government | The new e-government paradigm, which emphasizes coordinated network building, external collaboration, and one-stop customer services, contradicts traditional bureaucratic paradigm, which emphasizes standardization, departmentalization, and division of labor. |
| West (2004) | None (stages of e-government) | E-government | Digital government can transform delivery of services to citizens; few government websites are integrated; better cooperation needed for one-stop portals; agencies need to publicize portals; paying for e-government infrastructure is a challenge. |
| Carter and Bélanger (2005) | TAM/DOI | E-filing; Online license renewal | Perceived ease of use, compatibility and trustworthiness positively impact citizens' intention to use e-government services. |
| Gupta and Jana (2003) | none (benchmarking) | E-government | To have a proper evaluation of tangible and intangible benefits of e-government, projects should be in a mature stage with proper information systems in place. |
| Kaylor et al. (2001) | None (Web attribute evaluation system) | E-government websites | Develops a rubric for evaluating local e-government websites. |
| Gil-García and Pardo (2005) | None | E-government | Analyzes success factors and tools for e-government efforts; identifies gaps between research and practice. |
| Norris and Moon (2005) | None (IT in public administration) | E-government | E-government adoption progressing rapidly (if measured by deployment of websites). Integrated and transactional e-government is progressing much more slowly. |
| Jaeger and Thompson (2003) | None | E-government | Presents lessons, challenges and future directions for e-government research. |
| Chadwick and May (2003) | None | E-government | Analyzes policy statements; suggests that democratic potential of the Internet has been marginalized as a result of the ways in which government use of such technology. |
| Thomas and Streib (2003) | None | E-government | Citizens want the ability to engage in important interactions on the Web; governments should work with other actors to accelerate the bridging of the digital divide. |
| Heeks and Bailur (2007) | None | E-government | Studies recognize contextual factors beyond technology; research draws from weak or confused positivism; research dominated by over-optimistic, a-theoretical work that has done little to accumulate knowledge or practical guidance for e-government; there is a lack of clarity and rigor |
| Jaeger (2003) | None | E-government | Discusses e-government from different international perspectives; many challenges should be corrected internationally for effective implementation of this concept. |
| Welch et al. (2005) | None (trust, satisfaction) | E-government & e-government websites | Government website use is positively associated with e-government satisfaction and website satisfaction; e-government satisfaction is positively associated with trust in government. Citizens are generally satisfied with provision of information (transparency), but there is some dissatisfaction with transaction and interactivity of Web sites. |

# Appendix C: Coding Procedures and Categories

In order to provide an historical assessment of the e-government domain of research, we examined literature from information systems and other fields. Below, we explain the sample of papers and coding procedures in more detail.

## Sample of Papers

While this special issue focuses on the history of the information systems field, it is important to provide some comparison points with other fields when considering an historical assessment of e-government research. As a result, we used two lenses: one for identifying the leading articles on e-government in information systems, and one for identifying leading articles on e-government in any field.

- For the identification of e-government articles in leading information systems journals, we used the list of eight journals identified by the senior AIS scholars, similar to the reviews conducted by Sidorova et al. (2008) and Baskerville and Myers (2009). These journals include: *European Journal of Information Systems, Information Systems Journal, Information Systems Research, Journal of the Association for Information Systems, Journal of Information Technology, Journal of Management Information Systems, Journal of Strategic Information Systems,* and *MIS Quarterly*. To perform the search, we used various combinations of "e-government", "electronic government", and "digital government" keywords. The search had no start date but had an end date of September 2011. We also looked through references of identified papers to see if other articles from the above list of journals had been missed in our search.

- We identified leading e-government articles in other fields using the same keywords: e-government, electronic government, or digital government. We used two sources to identify the most highly cited papers: the ISI Citations Database and the Google Scholar citations, although the ISI citations database is used for ranking articles. Some articles found in Google Scholar but not identified in the ISI citations database were, therefore, not included, as discussed in the paper. In this search, we were interested in "any" journal that would publish e-government research, not limiting the field of study. However, we did not include opinion pieces, editorials, or papers where e-government was only mentioned. We were only interested in research articles.

## Coding Categories

Consistent with other recent reviews of the literature (Bélanger and Crossler, 2011; Smith et al., 2011), we coded papers along the following categories: publication outlets, theory, methodologies, sampling, and topics.

1. **Publication outlets:** Outlets were identified based on the name of the journal (see Sample section above). Leading IS journals were from the AIS Senior Scholars' list, as explained above. For categorizing papers as IS or non-IS for the highly cited articles, we used the AIS MIS journals list, available at http://ais.affiniscape.com/displaycommon.cfm?an=1&sub articlen br=432.

2. **Theory:** Articles were coded to include all of the theories specifically identified by the authors. When literature was used, but not a specific theory, we identified the literature base that was referenced in the paper. For example, if the authors looked at decision making literature but did not specify a theory (and did not use other theories), we classified the paper as a-theoretical but indicated in Tables A.2 or B.2 this literature in parentheses.

3. **Methodologies:** Articles were examined for the research approach, method, time, and unit of analysis.

   a. **Research approach:** coded as qualitative, quantitative, conceptual, or applied.

   b. **Method:** coded for the data collection approach. These included case studies, surveys, and content analyses (of documents or cases), as well as one study using archival data, two studies conducting benchmarks, and one conducting a gap analysis. These latter three sections were added to the original coding template.

    c. **Time:** coded as cross-sectional for one-time surveys to longitudinal when the study was conducted over time. Conceptual studies were coded as not applicable.

    d. **Unit of analysis:** coded for the unit of analysis. We defined the unit of analysis as the entity analyzed in the study (e.g., the entity about which inferences are made). In Figures 5 and 6, some studies may be counted twice or more if they studied several units of analysis). Consistent with other recent reviews of the literature (Bélanger and Crossler, 2011; Smith et al., 2011), the unit of analysis on the coding template included individual, group, organization/government agency, and national/international/society. We also included websites/systems, and tools, since we were aware of a number of such studies. We did not identify any group studies, but found some additional units of analysis such as cases, comments, budgets, and SWOT elements. The units were defined as follows:

- **Individual**: when inferences are made about individuals' perceptions, interactions, or outcomes related to e-government.

- **Government**: when inferences are made about government agencies' perceptions, development, implementation, or outcomes related to e-government.

- **Organization**: when inferences are made about non-government organizations' perceptions, development, implementation, or outcomes related to e-government.

- **Websites/systems**: when inferences are made about e-government websites or systems.

- **Tools**: when inferences are made about tools that can be used for e-government.

Some of the non-traditional units identified and included as "other" in the analyses are defined as follows:

- **SWOT elements**: when inferences are made on the generic strengths, weaknesses, opportunities, and threats for e-government in general.

- **Budgets**: when inferences are made about the budgets necessary for e-government.

- **Papers**: when inferences are made about e-government research papers

    e. **Samples**: coded for the actual number and type of subjects when available (e.g., 5 employees; 201 members of parliament, and so forth), their origin by country or region of available, as well as the level of e-government service (local, provincial/state, national/federal, or other).

4. **Type of service:** coded for the e-government service studied (e.g., e-filing or e-procurement). When the studies were generic and no particular service was evaluated, they were coded as e-government.

5. **Topics and findings**: coded for the constructs studied or the findings obtained by the study as described in the papers.

### Coding Procedures

Once the research team agreed on the coding categories, the two authors each coded separately a paper from the highly cited sample of papers (Moon and Norris, 2005). We compared the results and calculated an inter-rater reliability using Cohen's Kappa. Kappa was 0.83 for this article, which is considered a very high level of agreement. After the authors discussed the coding, they then coded an article from the leading IS journal list (Gil-Garcia et al., 2007), which resulted in a Cohen's Kappa of 0.91. Given the very high levels of agreement, we then each coded half of the articles from each of the samples. These coded results are shown in Appendices A and B.

## About the Authors

**France BÉLANGER** is Tom & Daisy Byrd Senior Faculty Fellow and Professor in the department of Accounting and Information Systems at Virginia Tech. Her research focuses on the use of communication technologies, in particular for technology mediated work and e-business/e-government, and on information privacy and security. Her award-winning work has been published in leading IS journals, including *Information Systems Research, MIS Quarterly, Journal of Strategic Information Systems, Information Systems Journal, various IEEE Transactions,* and many others. She received the 2008 IEEE Education Society Research Award and the 2008 Hoeber Research Excellence Award. Dr. Bélanger co-authored three books. She is or has been Guest Senior Editor and Associate Editor for *MIS Quarterly,* Associate Editor *for Information Systems Research,* and other journals. Her work has been funded by several agencies, corporations, and research centers, including the National Science Foundation. She was named Fulbright Distinguished Chair in 2006 (Portugal) and Erskine Visiting Fellow in 2009 (New Zealand).

**Lemuria CARTER** is an Assistant Professor at North Carolina Agricultural and Technical State University. Her research interests include technology adoption, electronic government, online trust, cyber security, and social media utilization in the public sector. She has published in several top-tier information journals, including the *Journal of Strategic Information Systems, Information Systems Journal, Communications of the ACM, Computers in Human Behavior, DATA BASE for Advances in Information Systems,* and *Information Systems Frontiers.* Dr. Carter has served as track and mini-track chair for the Americas Conference on Information Systems and the Hawaii International Conference on System Sciences. She has served as a guest editor of eServices Journal and currently serves as an associate editor of the *International Journal of E-government Research.* Her research has been funded by the Institute for Homeland Security Solutions and the IBM Center for the Business of Government.