1. Introduction to the *Research Handbook on E-Government*

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1. INTRODUCTION

E-government research is the study of information, communication and data-intensive technologies that influence the vision, reflection, design, practice and evolution of government and governing. It is a wide-ranging field based traditionally in public administration, but with important connections to other disciplines including organization studies, information sciences, policy and political science, business administration, psychology and behavioral science, communications, science and technology studies and other scholarly areas. It is pervasive across sectors such as public safety, emergency response, transportation, and education. E-government research examines the digital dimension of many of the business activities of government including service production, procurement, human resources, budgeting and finance, planning and management. It also externally facing, encompassing interactions with individuals, non-profits and private sector organizations.

In recent years, e-government research and practice have moved from what has been primarily a US and EU focus to a recognition that many of the technologies and applications are global in nature and, though underreported in the literature, are being implemented extensively in developing countries. An explosion of new technologies, applications, and data have resulted in new challenges and opportunities for e-government research and practice. New sources of data and methods of data collection and analysis are providing opportunities for further advance of e-government research. Because e-government directly or indirectly impacts individuals, groups, networks, organizations and governments across the globe, it is critical to continue to generate collections that not only provide a snapshot of current research but also identify new pathways and research areas for future scholarly work.

This handbook advances the field of e-government by investigating the advent and implications of new technologies for government. It structures the content around core topics of management and service, citizens and governance, new technologies and global perspectives. To recognize the diversity of e-government scholarship, this volume invited numerous contributors from multiple institutions and countries. More than half of the contributions are from researchers outside of the US including Brazil, South Africa and Hong Kong.

While the overall aims of the book are to challenge the field and stimulate inquiry, the book approaches the subject of e-government with scholarly care recognizing that technological change is often accompanied by overly optimistic prognosis and limited evidence. All chapters address the eternally competing goals of effectiveness, efficiency and equity, even though authors apply different approaches, theoretical frames, or methods of analysis. As most scholars and practitioners know, it is virtually impossible to cover all angles and topics of

e-government research in one volume. Instead, the book engages a diverse groups of scholars to address one or more of the following questions:

- What are the new technological frontiers for e-government? What opportunities and challenges do they present?
- How are e-services produced and consumed? What new models exist and what are the impacts of e-services on convenience, efficiency and quality?
- In what ways does government use information and communication technologies to manage projects and conduct its work?
- What is government's experience with using information and communication technologies (ICT) for managing highly complex activities such as regulation, emergencies and disasters?
- How does government employ information and communication technologies to communicate with, engage and include citizens and other stakeholders in discussion, decision and action? Who is included and who is excluded and to what effect?
- In what contexts do we see e-government having a significant role in the future? How are developing countries integrating ICTs for service, management and deliberation? What futures does the smart city movement bring to e-government?
- What are the promising avenues for research? Are there gaps that should be addressed? What does the book suggest for practitioners? Citizens and stakeholders?

This first chapter provides a brief summary to the intellectual foundations of the field of e-government, takes stock of its current status and suggests potential future directions for research. Of course, it also introduces the organization and content that follows.

2. THE ROOTS AND EVOLUTION OF THE FIELD

What are the intellectual foundations of the field of e-government? How can we make sense of the explosion of research and writings on e-government in the last two decades? In fact, the roots of the field of e-government are deeper than is generally realized or acknowledged. As with many topics in public administration, the entrée to e-government is the Nobel laureate Herbert Simon. His approach integrated insights from economics, psychology and computer science to understanding the cognitive bases of decision making and the implications for behavior. In his book, *Administrative Behavior* (1947), Simon identified several opportunities for connecting computing, information search, cognitive limitations and decision making in organizations including the use of computational tools for analyzing organizational complexity and as decision aids.

A common responsibility of planning units, not always explicitly recognized in the definition of their function, is early recognition of problems. One mechanism for problem recognition is to build computational models of the system of interest and use them to make predictions. (Simon, 1947, p. 124)

Between 1950 and 1970, research either pursued the development of computational tools to aid work processes or assessed the impact of computing on the workplace, such as on how computing displaced workers. Kling (1980) describes these early efforts as split between technically applied or societally speculative. It was not until the 1970s that social science research

started to build an empirical foundation for understanding the role of computing in decision making and the impact of computers and computing on organizations (Kling 1980). Given the types of technologies and applications that existed at the time, research focused substantially on decision making, management and planning within the organization, or on the implications of computing and centralized information storage and processing on privacy, accountability and social control. Because the revolution in personal computer technology had not yet begun, much of the empirical work focused on public and private organizations that had adopted computer systems for large-scale applications (Kraemer and King, 1986), many of which facilitated work automation (Kling, 1980).

By the mid-1980s computing and information management in public organizations was a small but recognized sub-field of public administration. Kraemer and King's 1986 review article entitled "Computing in public organizations" in *Public Administration Review* was one clear benchmark of the field (Kraemer and King, 1986). That article, which seems to build on Kling's earlier review, synthesized about 15 years of research undertaken primarily by the URBIS (Urban Information Systems) project located at University of California Irvine, integrating findings around the impacts of computing on organization structure, politics, employment, work life, organizational politics and management. About ten years after his first review article, Kraemer teamed up with Dedrick to revisit the literature on computers in public administration (Kraemer and Dedrick, 1997). Substantively, they found that while many of the research areas covered a decade earlier still remained, the range of topics under investigation had expanded. New areas of research included theoretical work in public management information systems research (PMIS) (Bozeman and Bretschneider, 1986; Bretschneider, 1990) as well as topics such as technology diffusion, the structure of information systems in organizations and goal-oriented application and effective management of information technology.

In reviewing these earlier summaries of the field, one is struck by four similarities (Kling, 1980; Kraemer and Dedrick, 1997; Kraemer and King, 1986). First, the focus was internal, mainly on ways in which computing was integrated and affected organizations, employees, management and decision making. Although there were many efforts to understand the role of computing on society more broadly, the earlier years of e-government research were really about the myriad ways computers affected the work context. Second, all three reviews voiced similar observations that much of the research in the field took a normatively optimistic approach to new technology. They noticed a good deal of descriptive writings about the promise and potential of new computer applications, including the Internet. Third, each decadal review voiced similar criticisms of the field: despite their observations that the field was increasing in breadth of topics and research effort, all lamented a general lack of theoretical development. In the last review, Kraemer and Dedrick (1997) also noted a movement away from strong empirical work on the management of computing or the impacts of computing. In combining these last two observations, the authors were lamenting that the field was chasing the promise of technology rather than understanding it as a fundamental component of social life. Last, all authors recognized the smallness of the field. Across the early decades, particularly in public administration, there were only about two dozen researchers focused on social science research on computing.

3. THE TRANSITION

Since the late 1990s and early 2000s, the e-government research community has increased in size and scope, filling an expansive research agenda. In part, the expansion in scope was due to the twin radical technological innovations of the Internet and the World Wide Web. Development and integration of these technological innovations in government began to take off just as the New Public Management (NPM) movement reached its peak (Andrews and Van de Walle, 2013; Dunleavy et al., 2006). The new digital era offered unprecedented potential for use within government and, perhaps more importantly, between government and citizens. The Internet age promised to improve government's ability to deliver services more effectively and efficiently, but also to foster a more democratic and accountable government through greater transparency and engagement (Scholl, 2020).

In the field of public administration, the publication of several books on e-government in 2005 and 2006 marked the maturity of technology in the field. As Bruce Rocheleau noted in his review: "information technology has become part of the infrastructure of public organizations and e-government has achieved high visibility" (2007, p. 584). Nevertheless, while this decade witnessed a modest increase in publications on e-government in public administration journals generally, very few articles in this area were published in flagship public administration journals such as *Public Administration Review* and *Journal of Public Administration Research and Theory* (Gil-Garcia et al., 2018). Instead, publications in the two specialty journals *Information Polity* and *Government Information Quarterly* increased dramatically during the decade (Scholl, 2020). While annual public administration research conferences provided opportunities for e-government tracks, specialty conferences were beginning to dominate as research outlets for e-government research. A more extensive review of these changes is covered by Bannister and Grönlund (2017).

Changes in institutionalization can also be seen in the shift in emphasis in the professional association NASPAA (National Association for Schools of Public Affairs and Administration). In 1998 NASPAA included "Information, including computer literacy and applications" as a component of its Management of Public Service Organizations accreditation standards. By 2000, it had established a technology committee and conducted an association-wide survey to assess how NASPAA programs were addressing information technology. Possibly in response to this study the standards changed in 2003 to read "Information management, technology applications, and policy" (collected using the Wayback Machine, <https://web.archive.org/>, accessed on Dec. 20, 2020). But by the middle of the decade the standards process moved away from identifying specific competencies – including information technology – toward a more flexible approach (Piskulich and Mandell, 2007).

Simultaneously, other fields began to invest more in understanding the internet from disciplinary and interdisciplinary perspectives. For example, the field of communication established several journals including *New Media and Society* established in 1999 and *Journal of Computer Mediated Communication* established in 1995. The Oxford Internet Institute, which was established in 2001, has offered graduate degrees since 2006, first with the DPhil in Information, Communication and the Social Sciences and more recently the MSc in Social Science of the Internet. This decade also saw the rise of Information schools (or iSchools), beginning with the one at the University of Michigan in 1996 and growing in number to over 100 worldwide today; these schools integrate programs on library and information science, computer science and informatics (Cronin, 2005).

While it is not accurate to say that the field of public administration has moved away from e-government, it is true that institutionally, there was a shift in research outlets and even in the emphasis given to the subfield by NASPAA between 2000 and 2010. In some ways, the shift has pushed public administration research on technology into a more interdisciplinary realm, and de-emphasized technology as a core component of the field.

4. WHAT COMPRISES THE FIELD NOW?

In the last 20 years the field has grown such that it can now boast four or five major annual conferences, a dozen or so journals and a community that spans Europe, Asia and many other parts of the world. Yet the core of the research field is much smaller and the contours narrower than are usually given credit. For example, of the journals identified in Bannister and Grönlund's 2017 article, only three have impact factors above 1.0: *Government Information Quarterly* (GIQ, 5.01 in 2019), *Journal of Information Technology and Politics* (2.51 in 2019) and *Information Polity* (1.71 in 2018). In 2020 each of these produced four issues and a total of about 130 research articles, with GIQ publishing over three times the number of articles (80) as each of the other two (24).

Journal research content is difficult to summarize in a short review. It is safe to say that the community now produces about one thousand manuscripts per year, which is sizeable. Yet it is important to understand the quality of the research production over time. To assess change quality of e-government research, we can examine GIQ for one or two indicators of rigor of its publications. Although there are many ways in which rigor might be measured, articles that either deductively develop formal hypotheses or propositions for testing or inductively develop causal reasoning as a result of exploratory research provide some basis for judging quality (aside from impact factor). Figure 1.1 plots annual data between 1996 and 2020 taken from a search on the *Government Information Quarterly*'s website showing total number of articles, number of articles with hypotheses, propositions, both hypotheses and propositions, and the proportion of total articles with either hypotheses or propositions.

The graph shows that the proportion of articles with either hypotheses or propositions has risen over time, indicating that the work is increasingly aiming to design falsifiable experimental or quasi-experimental research and is aiming to develop propositions for further study. Similar analysis shows that the percentage of articles in GIQ that are designated as research articles has risen continuously since 1996 (27%) to 2020 (94%). From these, albeit crude measures, it is possible to see a steady rise in commitment by the field to improve the quality of the e-government research.

Another way to capture the status of the research in the field of e-government is to examine the content of the various different conferences. Although there are many different e-government research conferences (Bannister and Grönlund, 2017), three of the most prominent are the International Conference on Theory and Practice of Electronic Governance (ICEGOV), the Digital Government Organization (DGO) conference, and the Digital Government track of the Hawaiian International Conference on System Sciences. Looking across the content of calls for proposal from 2020 shows areas of some similarity but also significant differences.

For example, all of the conferences included tracks or mini-tracks on smart cities, security and privacy, policy and governance, and research (theory, methods or measurement). All three also included technology specific tracks or mini-tracks on artificial intelligence, internet of

Note: *2020 data includes articles published online.

Figure 1.1 Use of hypotheses and propositions in Government Information Quarterly Articles, 1996–2020

things, social media or blockchain. The ICEGOV and DGO conferences also proposed tracks on open data. The real differences are in the overall approach to the field. Aside from the areas of commonality, the HICSS conference appears to be more governance and policy oriented, and it has a more recent private sector dimensions of e-government, while the DGO conference has more room for research on organizations, public management and government services.

Looking over time at the HICSS conference’s track on digital government provides some understanding of the continuity and change of topics over time. Topics that have been continuously offered each year for the past five years are on disasters, smart cities, policy and cybersecurity. Some topics, such as ICTs for development, services and open data, were halted in 2019, while other topics such as defense and business are more recent. In 2021 a slate of mini-tracks saw a shift out of management and services and into democracy and governance.

A third way to describe the field is by considering the people who make up the leadership and the institutions in which they reside. Editorial boards of the top three journals comprise a long list of faculty and professionals located in multiple countries and coming from a wide range of disciplinary backgrounds. In 1997, Kraemer and Dedrick noted that the primary universities conducting research on information technology and government were Syracuse and University of California Irvine. Today, there are many more institutions in the US (e.g. SUNY Albany, University of Maryland College Park, Arizona State University and Florida State University and University of Nebraska), Europe (e.g. Utrecht University, Delft University and Trinity College), Asia (e.g. Yonsei University and Seoul National University) as well as other parts of the world. The authors that make up this volume represent a portion of that diversity.

This simple analysis shows some relative consistency in the field over time, which tends to support the notion that the field is increasingly mature. Yet despite the increase in people, institutions and output, the field still faces substantial challenges. For example, there continues to be a strong focus on new technologies, descriptive observational accounts and a somewhat scattered identity. One recent conference call for papers that was not reviewed above –

EGOV-CeDEM-ePart 2021 – identifies 152 different potential topics organized under eight tracks. This raises some concern that the field is a kilometer wide and a centimeter deep.

Similarly, the field continues to be challenged by criticism that it is inadequately informed by social science theory and methodologies, and has not produced substantial contribution to knowledge. For example, a recent article by Bannister and Connolly (2020) examines the accuracy of research predictions about the evolution of e-government. The authors find significant levels of error – defined as the inaccuracy e-government and e-democracy forecasts – over the last 25 years. They attribute the error to the same set of limitations that have been stated about the field of e-government since the 1960s: excessive techno-optimism, insufficient consideration of institutional and organizational factors, limited understanding of technology and technological processes and insufficient consideration of human psychological and behavioral factors. Given these different sides of the story, it is worth asking how should the field meet these challenges and what might be some ways forward?

5. WHAT ARE THE POTENTIAL WAYS FORWARD FOR E-GOVERNMENT RESEARCH?

The advance of the field of e-government is important as the potential impacts of technology on government and society are extensive. There are four potential ways forward.

5.1 Balance Good Questions with Stronger Theory-based Inquiry

E-government researchers are already asking good “why” and “how” based research questions. Why does this technology work under these contexts, but not those? What causes technology some impacts but not others? How and why do technology impacts change over time? Why do people in government use technologies in intended and unintended ways, and to what ends? How does technology change the institutions that justify decisions and action? How do organizations and institutions alter the technology used by government or for governance?

But there continues to be concern in the field about the limited use of social science theory to guide inquiry and the limited contributions of e-government research to theory. Evident from the long line of review articles assessing the state of the field (Bannister and Connolly, 2020; Kling, 1980; Kraemer and Dedrick, 1997; Kraemer and King, 1986), this is not a recent concern. One approach is simply to insist that theory be a fundamental component of all research and to demand that journal articles demonstrate contribution to theoretical understanding. To some extent this is already evident from the analysis of GIQ articles above. Another approach is to be less concerned about “e-government theory” and more comfortable with borrowing theory (Bannister and Connolly, 2020). A further step would be to develop a resource for the field, such as a set of volumes focused on theoretical contributions in the field, or even a symposium in a theory focused journal such as *Perspectives on Public Management and Governance* or *Academy of Management Review*. As one example, Monge and Contractor’s (2003) book on the application of social science theories for network research provided an excellent resource for communication scholars interested in using network methods and approaches. Such a resource could be helpful for the e-government field.

5.2 Graduate Student Training

Second, the field of public administration should engage graduate students in stronger technology-relevant social science training. A first step would be to better integrate the social science literature on innovation and technological change into curricula or learning. Strong literatures exist in areas such as technology processes, technology in organizations, technological systems, institutional change and technology adoption, diffusion and transfer, to name a few. A second step would be to connect graduate students with literature in allied fields such as communication (e.g. Graber, 2002). Last, the field of management science has much to offer e-government for theory development, yet most PhD and Masters students interested in technology are either unaware of these literatures or back into them.

5.3 Bring Organizations, Institutions and Public Management Back In

A third potential way forward is to re-emphasize the institutional and behavioral context of technology and technological change. Since 2000, scholars have increasingly focused on the ways in which information and communication technologies enable external communication, stakeholder participation, citizen engagement, openness and transparency and other dimensions of governance, collaboration and co-production. The relative de-emphasis in the field of e-government on organizations, management and government institutions contrasts with the renewed emphasis on behavioral public administration. Behavioral public administration aims to reconnect with the decision-making roots of public administration, and to apply theories from psychology and experimental design (Grimmelikhuijsen et al., 2017; Hassan and Wright, 2020). Surprisingly, there is little research in information technology in the behavioral public administration literature, even though much of Herbert Simons' work occurred at the confluence of information technology, psychology and organizations. Hence, the benefits of bringing public management back into e-government would bring value to both fields.

5.4 Deepen Interdisciplinarity for Next Generation Global e-Government

The problem orientation of e-government research is one of the excellent features of the e-government field, yet the focus of this research continues to be on the e-government audience. A fourth way forward would be to increase the societal relevance of e-government research by increasing collaboration with science, engineering and policy researchers to solve major global social problems. There is an enormous opportunity for the field of e-government to contribute knowledge to address climate and disaster resilience, human health and safety. Additionally, e-government research and knowledge can be applied to enhance access to government services including education in nations across the world. Such work would benefit from the organization and institutional approaches in public administration, but also from traditional recognition of the need to address privacy, ethical and uneven capacity issues across governments. For research, the global context also enables a comparative approach to understanding the impacts of ICTs on society.

6. OUTLINE OF THE BOOK

This edited volume separates the various contributions into five parts, each of which focuses on critical dimensions of e-government research. To some extent these parts are a means of convenience, an organizing mechanism to provide structure to the book. It is entirely possible to configure the chapters differently. For example, there could have been one part on management, another on governance, a third on new technologies, and so on. But these traditional categories are too broad and not particularly meaningful by themselves. Alternatively, the chapters could have been split up by methodology; it is after all a book on research. In the end, I chose this structure because it is thematically meaningful and because it links well with parts of the current e-government research agenda discussed above.

Before providing a brief introduction to the parts and chapters, it is important to highlight some overall observations about the contributions. First and foremost, this is an excellent and diverse group of authors. They include highly recognized e-government researchers, productive early career faculty and promising doctoral students. They come from different disciplinary backgrounds and corners of the world, including North and South America, Europe, Africa and Asia. As such the researchers who contributed to this volume comprise a good representative cross-section of the e-government research community.

Additionally, the various chapters employ diverse theoretical and empirical approaches. The authors demonstrate facility with the development, application and integration of a wide range of theoretical approaches. Across the book, the reader will see the use of qualitative data as well as different types of quantitative data from surveys, institutional, administrative and social media data. Methods include case studies, action-based research, simulation, regression analysis, content analysis and historical analysis. Some chapters undertake systematic literature reviews to organize and distill contributions in various topical areas of e-government research, while all chapters address some dimension of the technological landscape. Additionally, the research is conducted at different levels of analysis – individual, organizational, event – and different units of government, including local, regional and national. I have made a special effort to integrate perspectives from less well-known parts of the world. Though not exhaustive in any sense, the contributions are strong and cover a good deal of the e-government research territory.

The first part focuses on collaboration, coordination and data sharing. It includes three chapters on different management challenges for realizing greater digital integration. This is an obvious and increasingly important topic of study, given the purported promise of new technologies for addressing perennial problems of government and governance. The first chapter by Erna Ruijer and colleagues (Chapter 2) uses a collaborative learning approach to show how the use and usability of open data depends on complex dimensions of access, capacity and facilitation. The contribution by Dr. Yildiz and colleagues (Chapter 3) conducts a meta-analysis to gain insights about the use of ICTs in emergency management. Much of that literature addresses some of the most complex coordination efforts undertaken by government together with non-government actors. This section concludes with a chapter by Dr. Fusi (Chapter 4), who uses survey data to understand how institutions and competing interests affect data sharing in local government.

The second part includes a set of chapters examining citizens and governance. ICTs have created opportunities for greater citizen engagement in services, governance and politics. Yet technologies alone do not fulfill hopeful promise. Dr. Ho and colleagues (Chapter 5) take

a big data analytics approach to generating insights into citizen concerns and values. The next chapter, written by Drs. Clark and Brudney (Chapter 6), looks at the coproduction of services to identify characteristics and representativeness of high volume coproducers, which the authors call “frequent flyers”. Chapter 7, by Dr. Morris and coauthors, examines the importance of ICTs for self-governance of Tribal Nations in the US, but also the institutional and infrastructural inequalities that challenge realization of the potential. The final chapter in this part, by Dr. Wong (Chapter 8), investigates the Umbrella movement in Hong Kong, showing the ways in which social media technology simultaneously individualizes and personizes political participation and establishes information divides in society between social media users and non-users.

The third part of this volume takes a closer look at trust, security and surveillance. The leading chapter by Dr. Luna-Reyes (Chapter 9), uses a qualitative case study, a systems dynamics approach and simulation experiments to model trust behavior among individuals as members of different organizations. Fittingly, it is followed by two chapters that address factors that affect trust in the workplace. Chapter 10 by Heyjie Jung applies theories of equity and justice to understand the conditions in which blockchain technology would impact different concepts of trust. This part is rounded out with Chapter 11 by Robin Li which covers surveillance in the workplace as well as information security issues in public organizations.

The fourth part includes three chapters that explore different technological and institutional contexts of e-government. Chapter 12, written by Amal Ben Rjab and others, proposes a barriers approach to explaining adoption of artificial intelligence (AI) in smart cities. It is followed by a data-intensive case study by Drs. Chen and Knepper (Chapter 13), on the development of cyberinfrastructure in the US science system. It uses a systems dynamics approach to reveal the factors that constrain and enable increased analytic power for research. The last chapter in this section, written by Dr. Crumbly (Chapter 14), examines the potential for radio-frequency identification (RFID) and blockchain technologies to enable vertical and horizontal governance in global supply chains.

The final part of the book includes four chapters from contributors from parts of the world rarely covered in the literature. Chapter 15 by Drs. Palen and Soden develops the idea of ‘infrastructuring’ as a creative process to support the use of ICTs for disaster relief in Nepal. It is followed by Chapter 16 from Mziwoxolo Mayedwa and Dr. Van Belle that examines e-portal development in South Africa municipalities and theorizes about why implementation is limited. Research by Dr. Oliveira and Alexandre Gomes in Chapter 17 provides a concise history of e-government in Brazil, while the last chapter (Chapter 18) by Dr. Yildiz and Prof. Dr. Sağsan examines the challenges for government in small island nations around the world.

In general, these chapters represent only a sampling of the e-government research now underway around the world. It is the sincere hope that the reader finds the contents of this book both interesting and stimulating.

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