MULTI-METHOD APPROACHES TO UNDERSTANDING THE COMPLEXITY OF E-GOVERNMENT

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ABSTRACT
Electronic government is a complex phenomenon which involves technical, organizational, institutional and environmental aspects. Researchers from different disciplines are increasingly finding that using multiple methods can help to deal with complexity and obtain more comprehensive explanations. This paper argues that multi-method approaches can be useful for e-government research. A set of advantages and challenges to multi-method approaches are introduced and then used to frame a case analysis. Two case studies involving multi-method approaches to e-government research are presented to illustrate strategies for responding to implementation challenges in both large-scale and small-scale projects. This case analysis contributes to the discussion about multi-method research designs and their role in digital government research. Insights into management strategies specifically designed to respond to the digital government context and the adoption of relevant methodologies drawn from the experiences of the authors are provided.

Keywords: Research Methods, Electronic Government, Multi-Method Approaches, Multi-Disciplinary Lenses, IT Research, Cases.

1. INTRODUCTION

Electronic government or digital government is not a simple or well-defined theoretical construct. It can be understood as anything from online services only to any information and communication technology used by government. At least three different approaches to understanding electronic government exist in the academic literature (Gil-Garcia & Luna-Reyes, 2003, 2006). The first approach constructs a concrete definition or a list of elements that contains the main characteristics of what is, or what should be, electronic government (ASPA, 2001; M. Cook & LaVigne, 2002; UNPAN, 2002). A second approach is to list the different variants or applications of electronic government as a way to clarify this concept (Hiller & Bélanger, 2001; Holmes, 2001). A third conceptual approach to electronic government takes an evolutionary perspective; electronic government is defined by making reference to the different stages that appear to exist in its development (Gil-Garcia & Martinez-Moyano, 2005; Layne & Lee, 2001; Martinez-Moyano & Gil-García, 2003; Reddick, 2004; UN & ASPA, 2002).

Research about electronic government has increased in the last few years, both in the volume of articles, research reports, and other documents and in the various aspects of electronic

government examined. Undoubtedly, e-government is not a uni-dimensional phenomenon and researchers must understand complex and recursive relationships between factors related to technology, management, and policy (Dawes & Pardo, 2002; Fountain, 2001; Gil-Garcia, 2005). Single methods (either quantitative or qualitative) are suitable for understanding specific aspects of e-government and information systems in general. However, authors from different disciplines have identified the desirability of using multiple methods and adding different disciplinary perspectives to the research endeavor (Bennet, 2002; Creswell, 2003; Newman & Benz, 1998).

This paper argues that multi-method approaches can be useful for e-government research. The objective is to understand how the value of multi-method approaches can be realized given the challenges to their effective use. In addition, this paper attempts to show that large-scale, heavily funded research projects are not the only studies that can benefit from the use of multiple methods. Through the description of two very different research initiatives, a well-funded project and a doctoral dissertation, the combination of qualitative and quantitative approaches is highlighted and advantages of this combination are identified. Two case studies involving multi-method approaches to e-government research are presented to illustrate strategies for responding to implementation challenges in both large-scale and small-scale projects. This case analysis contributes to the discussion about multi-method research designs and their role in digital government research. Insights into management strategies specifically designed to respond to the digital government context and the adoption of relevant methodologies drawn from the experiences of the authors are provided.

The paper is organized in six sections including the forgoing introduction. Section two provides a brief overview of e-government as a complex social phenomenon which includes not only the technology, but also important organizational, institutional, and environmental factors. Section three explains some of the advantages and challenges of using multi-method approaches. In section four, two examples of multi-method studies are described with an emphasis on the management structure and the research methods used. Section five discusses how multiple methods were useful for generating more comprehensive explanations in the two examples and highlights some of the methodological and practical challenges of using multi-method approaches in digital government research. Finally, section six presents some concluding remarks.

2. E-GOVERNMENT AS A COMPLEX SOCIAL PHENOMENON

E-government has been recognized as capable of promoting change in government settings (Heeks, 1999; Kraemer & King, 2003). Information technologies have the potential not only to improve the quality of services, but also to produce cost savings and make government policies and programs more effective (Bourquard, 2003; Dawes *et al.*, 1999; Garson, 2004; Gartner, 2000). However, scholars and practitioners think information technologies (IT) in general and electronic government in particular have not yet accomplished the promise of a more efficient, effective, and democratic public administration (M. E. Cook *et al.*, 2002; Davies, 2004; Garson, 2004). In fact, the failure rate of these projects is extremely high. Heeks (2003) estimates that the failure rate of e-government projects could be as high as 85%. Despite the high rate of failure, government spending in e-government projects has continually increased in the last few years and is estimated to surpass $5.8 billion in 2009 (Pulliam, 2005).

The high rate of failure of information technology innovation can be interpreted as an indication of its complexity. It seems clear that a more comprehensive and dynamic view of this phenomenon is required. Initially, information technology projects in general, and e-government in particular, were conceptualized as mainly technical. Within this view, most research took a linear perspective and assumed uni-directional causality. For instance, either information technologies were seen to have the capacity to transform organizations and institutions, or organizational characteristics and institutional arrangements were seen as key in shaping the selection, design, and use of information technologies.

The literature emerging today recognizes that there is a dynamic interaction between information technologies and the social structures around them. These more holistic approaches have been called the ensemble view of technology (Orlikowski & Iacono, 2001). The ensemble

view establishes that information technologies are not only the physical artifacts, but also the social relations around those artifacts. The technology is only one component of a more complex socio-technical system (Kling & Lamb, 2000; Kraemer *et al.*, 1980; Mumford, 2000; Pasmore, 1988). Other components can include commitment, training, and policies, among others (Kling & Schacchi, 1982). This complexity can partially explain the low rate of success of e-government initiatives.

For instance, in Building the Virtual State, Fountain (2001) offers a concise statement of one of the most important problems for government: "New information technologies are enacted -- made sense of, designed, and used -- ...through the mediation of existing organizational and institutional arrangements with their own internal logics or tendencies. These multiple logics are embedded in operating routines, performance programs, bureaucratic politics, norms, cultural beliefs, and social networks (p.12)."

All the complexity noted above requires a deep knowledge of both the e-government project itself and the context in which it is embedded. This understanding can best be achieved by adopting multi-method approaches to e-government research.

3. MULTI-METHOD APPROACHES

Multi-method or mixed method approaches are a recurrent topic of debate in academia. Scholars from different disciplines recommend the use of multiple methods to study complex social phenomena (Brewer & Hunter, 1989; Creswell, 2003; Newman & Benz, 1998). In information systems, Mingers (2001, 2003) presents several reasons for using a combination of research methods, but noted that such multi-method work is relatively scarce in the IS literature.

Table 1. Some Advantages of Multi-Method approaches

A more comprehensive approach to the phenomenon	Multi-method approaches help to obtain full answers and increase the robustness of our understanding (Mingers, 2001). Using multiple methods has the potential of gaining knowledge about different aspects of a phenomenon under study, and therefore, an overall better and more complete explanation. Mingers (2001) argues that "different research methods (especially from different paradigms) focus on different aspects of reality and therefore a richer understanding of a research topic will be gained by combining several methods together in a single piece of research or research program." (p. 241).
Triangulate results	Validating interpretations of what is happening in a particular environment is considered a key advantage of multi-method studies (Hammond, 2005; Sammons *et al.*, 2005; Tashakkori & Teddlie, 1998). Triangulation of results can be useful not only at the single study level, but also at the meta-analysis or review level (Harden & Thomas, 2005).
A broader set of questions can be asked (e.g., what, how, why)	Researchers can expand their scope of study and take into consideration other aspects of the phenomenon (Tashakkori & Teddlie, 1998). They can also enrich their understanding of specific situations by having the analytical power of quantitative and qualitative research methods (Plewis & Mason, 2005; Sammons et al., 2005).
Enable discovery	Discovering new or paradoxical factors that could foster future research (Hoyles *et al.*, 2005; Tashakkori & Teddlie, 1998) might be considered the capstone advantage. The opportunity to discover paradoxes, to discover and confirm unexpected outcomes may be the tipping point that drives teams to undertake the cost and complexity of multi-method approaches.

Multi-method approaches refer to the use of multiple methods (typically quantitative and qualitative) in conducting research (Creswell, 2003). For some scholars, not all projects that use multiple methods are actually multi-method studies. For instance, Brewer and Hunter (1989) say "...actual multimethod projects are… either single studies or more complex programs of continuing

research, which systematically employ various combinations of field, survey, experimental, and non-reactive methods to address their research questions." (p. 28).

Adopting a multi-method approach to studying e-government presents a variety of advantages to research teams as well as a number of challenges. Four advantages and four challenges were identified consistently in a number of articles discussing experiences using multi-method approaches (see tables 1 and 2) This brief review was enriched by a discussion that took place at the 6th National Conference on Digital Government Research (Gil-Garcia & Pardo, 2005).

Table 2. Some Challenges to the Implementation of Multi-Method Approaches

Cost of multi-method studies	Conducting research is an endeavor that demands great amounts of time and resources. Therefore, as a general rule, using multiple methods requires more resources and/or the prioritization of methods and research questions (Blatchford, 2005). It is also important to think about the kind of resources that need to be available to teach future researchers. The goals and the cost of any particular study – both in the training arena and in the design of a particular research protocol are important.
Publication pressures, reputation and tenure	As Mingers (2001) asserts "academics are increasingly under publication pressures and it is certainly much easier to sell clear-cut, well-defined, monomethod work both to funding agencies and to journals." (p. 249). In the case of digital government, for example, some times researchers need to disaggregate their inter-disciplinary research into disciplinary pieces in order to publish their results (Dawes *et al.*, 2004).
Availability of multi-method research knowledge	Some disciplines are inherently interdisciplinary and have been doing multiple method research and integrating results for many years, for example, in geography. It seems clear that it is necessary to train people to think more broadly about research.
Incompatibility between methods	As discussed above, some multi-method approaches systematically combine quantitative and qualitative methods. In some situations this combination presents challenges derived from the perceived differences between these two types of methods (Reichardt & Cook, 1979). Other researchers consider that qualitative and quantitative approaches are compatible and complement each other (Brannen, 2005).

4. TWO EXAMPLES OF MULTI-METHOD RESEARCH PROJECTS

This section presents two research projects with very different characteristics. On one extreme is a large-scale well-funded research project and on the other; a doctoral dissertation. Despite their differences both research projects used a multi-method approach, obtaining similar advantages, but also facing similar challenges. For each project a description of the research is followed by a discussion of the management structure and the multi-method approach used.

4.1. A Large-Scale Research Project - Modeling the Social and Technical Processes of Interorganizational Information Integration (MIII)

The purpose of this ongoing research is to develop and test dynamic models of information integration in multi-organizational government settings. Integrating and sharing information in these settings involves complex interactions within social and technological contexts. Organizations must establish and maintain collaborative relationships in which knowledge sharing is critical to resolving numerous issues relating to data definitions and structures, diverse database designs, highly variable data quality, and incompatible network infrastructure. These integration processes often involve new work processes and significant organizational change. They are also embedded in larger political and institutional environments, which shape their goals and circumscribe their choices.

The research addressed three basic questions: (1) What are the critical factors and processes involved in integrating information across levels and agencies in government? In particular, how do IT and social factors interact to influence the effectiveness of interorganizational information integration; (2) How do the factors and processes vary for different types and degrees of integration?; and (3) Can the processes of integration be modeled in ways that improve understanding of information system development and of interorganizational collaboration? Do these models contribute to new theoretical insights for developing and implementing advanced information technology?

Interorganizational information integration was chosen as the focus for this research because of its central place in the design and implementation of many advanced information technologies, such as data mining, visualization, and GIS. It also involves phenomena and theoretical frameworks in several disciplines, and is a linchpin of IT use in many critical egovernment areas. The research setting recognizes that governments at all levels are centrally important actors in the social transformations taking place with, and because of, growing computational and information sharing capabilities. This work is intended to improve understanding of how information integration and sharing; a complex, dynamic, and poorly understood social phenomena, can be developed and implemented in the public sector as well as in other sectors of society.

Management structure. Understanding and supporting information integration is a multidisciplinary undertaking. The project therefore combined perspectives from multiple disciplines including public administration, organizational behavior, computer and information science, and political science.
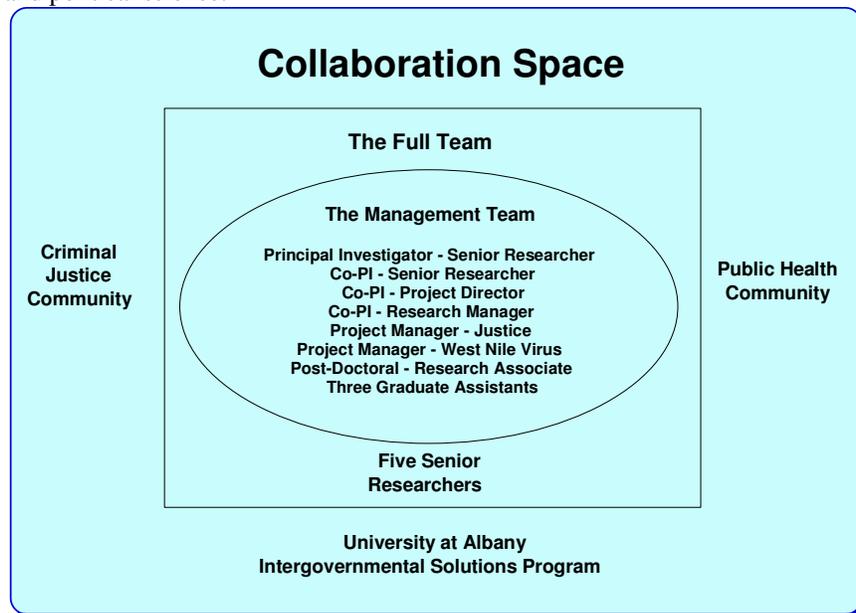

Figure 1. Management Structure and Collaboration Space

The two-year research program concentrates on integration activities in two critical policy areas: law enforcement and public health, since they include a full range of functions across all three levels of government. These are also areas in which significant integration initiatives are underway and available for study. Federal and state government agencies are collaborating in the research, as are organizations of government professionals concerned with information technology.

A unique collaboration space was created to support this large-scale study. The study required space for the management for the study, per se, as well as ongoing interaction among senior researchers contributing to but not responsible for the direction and management of the study. Further, the relationships between the full team and the practitioners within the two domain areas are part of this collaboration space and are critical to the success of the study. Because the

relationship with the government participants stretched beyond a single interaction for data collection to an intensive engagement through a variety of data collection and analytical methodologies, success of the study rests on understanding of the "world" of government practitioners and the ability to adjust to shifting priorities within that world as necessary.

This collaboration space was used to explore the relationships between and among the "methodologies of choice" of each of the senior researchers. Each of these methods was examined and opportunities for connecting them in various ways in order to provide a more robust outcome was explored. The final design for the multi-method study, essentially, two forms of modeling, emerged from these discussions and this design, the full team believed would produce robust and holistic models of the social and technical interactions influencing effective interorganizational information integration. Two sub-teams were formed within the full-team; one to focus on each type of modeling. A number of individual members of the full team participated in both sub-teams. The collaboration among modeling teams was carefully coordinated.

Multi-method approach. The two forms of modeling in use in this project are system dynamics modeling that emphasizes the temporal and feedback aspects of the process, and social process modeling that emphasizes the way collaboration and shared meanings are developed. These methods build on prior work of the investigators in interorganizational knowledge sharing, collaboration, and government technology innovation. The result will be new models of interorganizational information integration processes that can support e-government system development, and lead to further research and education in the related disciplines.

The study began with two parallel tracks of examination. The first was an action research engagement with the NYS justice community. The research team worked with the justice community throughout a nine month period to develop a set of recommendations for a governance body that would guide cross-boundary information sharing in the justice community. The effort involved participant and non-participant observations throughout and was followed up with 1.5 hour interviews of selected participants. The second examination was a retrospective case study of New York State's response to the WNV. Specifically, the case study focuses on how IT and social factors interacted in the use of information and information technology in planning for reemergence of WNV in the 2001-2002 season. Following the action research effort and the case studies with the NYS integration initiatives, site visits to interview both justice and health professionals were conducted in five other states. The data captured during these interviews is being used to inform and support the development of social process models grounded in the New York State cases.

In parallel with the field site visits the research team began engaging in group model building sessions. The goal of the group model building was an empirically grounded theory of the social and technical processes observed in the work of the interagency team. The plan was to develop that theory using the tools of system dynamics to represent the processes of interest, forming the basis for substantive theory. Therefore, the group engaged in the model building had to bring together knowledge of what would constitute relevant theory with understanding of modeling and sufficient data about the process to be modeled. The data about the processes to be modeled was available in the notes, recording, and memories of the research team. Both the social process modeling sub-team and the system dynamics modeling sub-team brought knowledge about relevant theory to the modeling. It was decided not to include members of the interagency team in the initial modeling sessions, since they were not equipped with relevant theory or modeling knowledge to participate. They would instead be asked to review and comment on the modeling work at later stages.

The NYS criminal justice information integration case provided the team with an excellent opportunity to study how IT and social factors interact to influence the effectiveness of interorganizational information integration. Prior to their work with the CJIT group, the researchers hypothesized that there was a structure to the social and technical processes of interaction for information integration. Drawing on preliminary process models from the team's work the CJIT group, the researchers' approached the group model building effort with an interest in exploring this hypothesis further.

Moreover, from the team's action research with the CJIT group, the researchers had observed group interaction that was comprised of a set of social processes that formed and

reformed technical artifacts. The research team further hypothesized that the effectiveness of interorganizational information integration hinged on the interaction of this set of social processes with the technical artifacts produced (Luna-Reyes *et al.*, 2004).

The group modeling effort spanned a six-month period and consisted of five separate model-building sessions. Results of the theory construction process were shared with a panel of information professionals who were involved in system development at all six of the research sites. The refined models will be tested in a national survey of public health and justice practitioners scheduled for summer of 2007.
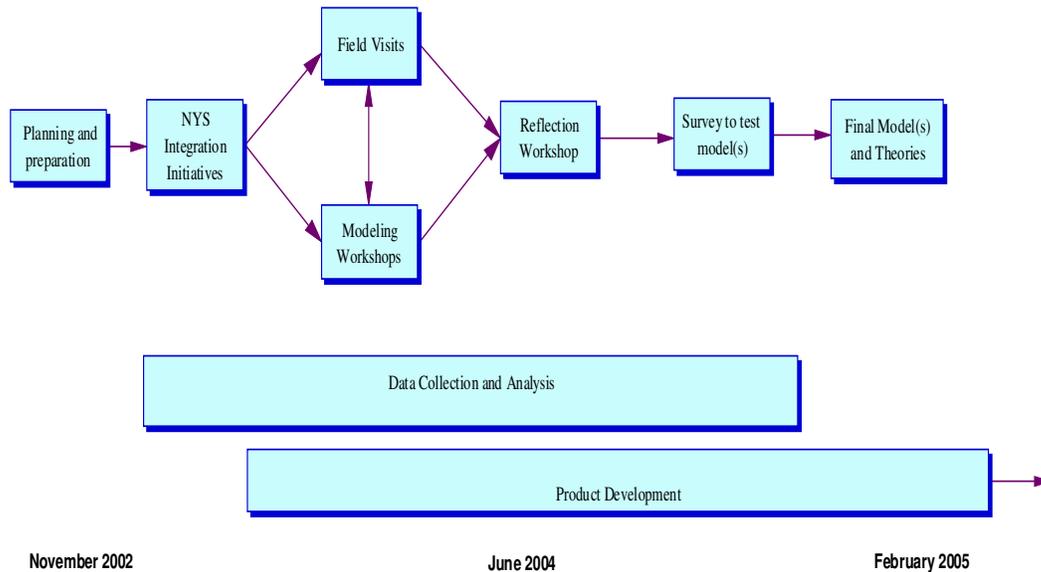
Figure 2. Simplified Flow of Activities

4.2. A Doctoral Dissertation - Enacting State Websites: A Mixed Method Study Exploring E-Government Success in Multi-Organizational Settings

Web applications are increasingly used for different purposes in government. Applications of Internet technologies in government are now more pervasive but only a few have been implemented as widely as government websites. In addition, government-wide websites are interorganizational efforts and normally include a great variety of web applications from information display to transactional services and restricted applications. These inter-agency websites are particularly interesting because they require both operational and institutional change, and consequently they represent substantial difficulty in their design and implementation. At the lower end of the continuum, individual agency websites are initiatives that require low operational and institutional change. At the upper end, information integration among multiple government agencies can be achieved only by performing many changes in the operational processes and the institutional framework.

In addition, the literature emerging today recognizes that there is a dynamic interaction between social structures and information technologies. However, little research has attempted to study information technology in government from this more comprehensive perspective. Using a nested research design, this study explores the complex relationships among the relative success of state websites and certain organizational, institutional, and contextual factors. Thus, this research is guided by two interrelated questions: (1) To what extent are state e-government websites shaped by different organizational, institutional, and contextual factors? and (2) To what extent are organizational, institutional, and contextual factors affected by the existence and characteristics of state e-government websites?

Management structure. As some other research projects, doctoral dissertations have a simple management structure in which a single researcher works on a project with the advice and

guidance of a small group of experienced researchers. The coordination is relatively easy and few general meetings are necessary.

Multi-method approach. This study uses a nested research design to better understand the complex relationships among the functionality of state e-government websites and different organizational, institutional, and contextual factors. Nested analysis is a sequential explanatory mixed method approach that encompasses statistical tests and thick analysis research (Collier *et al.*, 2003; Coppedge, 2001; Lieberman, 2003). The objective was to gain the benefits from both types of research and to avoid some of the weaknesses of individual methods.

The study began with a statistical analysis using organizational, institutional and contextual factors as independent variables. An overall score representing the functionality of the state websites is the dependent variable. Second, using the statistical results, two cases were selected based on their relative fitness to the model (residuals) and their position in the general ranking of website functionality (which includes four different measures). In order to complement the results of the statistical analysis, case studies were developed for two selected states (New York and Indiana), using semi-structured interviews and document analysis.
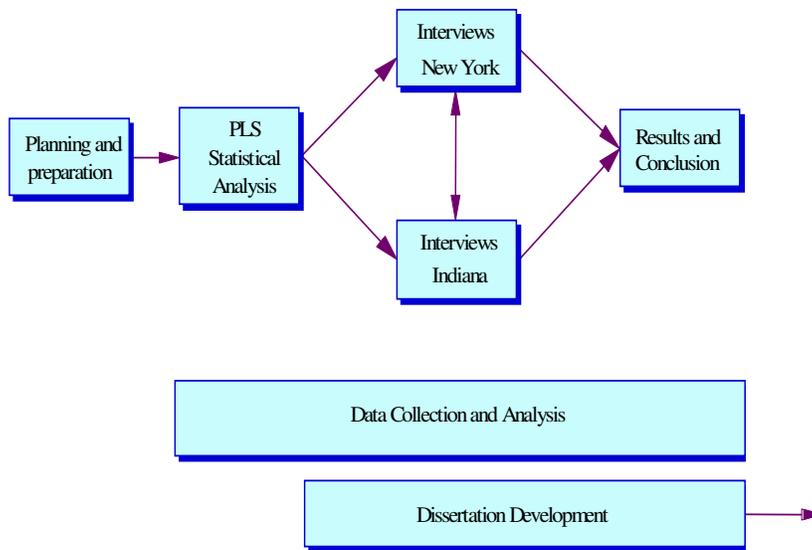

Figure 3. Simplified Flow of Activities

5. DISCUSSION

This section considers the two research projects in terms of the advantages and challenges presented above. It also shares some lessons learned about obtaining the benefits and overcoming some of the challenges of using multi-method approaches in digital government research.

5.1. Understanding e-government as a complex social phenomena through multi-method approaches

For the large-scale study of interorganizational information integration, the use of multiple methods enabled the team to acquire new understanding of the interaction of technical and social factors in the complex process of interorganizational information integration. Through the use of action research and observations the team identified key processes and began to model the interaction of technical and social factors within these processes. The use of multiple methodologies enabled the development of cause and effect models grounded in both extended action research and retrospective case studies. Dynamic models of the interactions were made

possible through the use of system dynamics. These methods enabled the team to acquire understanding of the factors influencing information integration and the nature of that influence on effective interorganizational information integration.

Including system dynamics as one of the theory-building methodologies delivered a number of benefits in the project. The group had an opportunity to observe and express the project-related issues through a dynamic analytical lens, capturing the story at a different level of analysis. Prior to the group model building sessions, the research team had developed a set of propositions from their preliminary research data. These propositions formed a foundation from which the team was able to explore the interaction of social processes and technical artifacts through a systems thinking approach. The graphical representations of the model proved useful to facilitate conversation and promote new insights into the already rich thinking of the team (Luna-Reyes et al., 2004).

Formulating the diagrammed theory in mathematical terms also brought some advantages. The mathematical formulation of every relationship and feedback process eliminated any ambiguity associated with them, facilitating conversations about their nature, and the appropriateness of each of them. The group used the group process to decide if the math appropriately represented the observed phenomenon or if it needed to be reformulated in a way more consistent to their observations. In addition, the reflection on the dynamic models generated new and more informed propositions about factors and their influences on the process.

In the case of the doctoral dissertation, the study provided knowledge about e-government success taking into consideration important organizational and institutional complexities. Findings went from exploring and establishing relationships between state website functionality and multiple types of factors (quantitative) to providing initial explanations of the mechanisms and dynamics found in different contexts (qualitative). Through a partial least squares (PLS) analysis using all 50 states, general organizational factors, web management practices, and availability of resources were found to be statistically significant factors of state website functionality. However, it seems clear that there is no one path to e-government success. The two case studies included in this research had very different histories, managerial approaches, and division of labor among actors. They were embedded in different institutional frameworks, and were influenced by different economic, social, and political factors. However, both states managed to develop highly functional websites that provide good information and a great number of electronic services.

In addition, due to its multi-method nature, this study uncovered several instances of parallel stories, in which actors from the two case studies mentioned the same factors as important but for different reasons. For instance, marketing of the website was considered a very important factor in both cases. However, for the New York State website marketing was solely a way to communicate to potential users the existence of the website and make them aware of the information and services already available. For Indiana, marketing was an important element of their overall strategy and was used to understand their market of potential users. Through marketing, Indiana Interactive staff has been able to identify information and services that citizens, businesses, or other stakeholders need (Gil-Garcia, 2005).

This study further provides evidence of the influence of different organizational, institutional, and contextual factors on the success of e-government. The combination of methods enabled the researcher to identify that the relative impact of these factors may be different according to specific initiatives and environmental conditions. However, looking at the overall results, it seems to be clear that their interrelationships are very important and studying them in isolation may lead to limited understanding of the overall situation.

5.2. Implementation challenges: Some lessons learned

A more comprehensive understanding of a phenomenon and the validation of that understanding present both notable benefits and real challenges to a research team. The comparative case analysis highlights connections between and among the benefits and the challenges and the subsequent difficulty of treating any as an independent factor in multi-method research design. The cases show, for example, that one challenge to achieving the desired benefits is the cost of building the knowledge necessary to design such a study. The paper has shown how

two research teams worked to achieve both the benefits of multi-method study while carefully managing the challenges to those efforts; essentially exploring the "trade-offs" and making design and analysis decisions accordingly. The following sections highlight lessons learned by the authors as participants in these two studies relative to three challenges in particular.

Availability of multi-method research knowledge. Multi-method designs are rarely been used in digital government research. However, there are other disciplines that are more prolific in multi-method work and who invest in the necessary training of researchers. In the large-scale project it was necessary to invest in the development of knowledge about multi-method approaches within the team. Although a number of the more junior researchers and doctoral students had received training in multi-method work additional training was still required. Individual members of the team, even those with some multi-method experience, had to invest in the development of new knowledge in order to engage with the particular integration of methods used in this project. Building the individual understanding and developing the shared understanding necessary to work effectively required a real belief in the advisability from a methodological perspective and in the benefits to be realized. All those involved in the full team had signed on to the project with the expectation that it would be a multi-method study – so to an extent they believed that it would an effort worth undertaking. However, building the knowledge necessary and retaining the belief in the value of this approach was required and took time and effort.

In the dissertation, the effort to ensure that the multi-method research knowledge was available was different. A multi-method approach was chosen by the student, drawing on other disciplines, and a committee sensitive to and knowledgeable about multi-method approaches was selected. The challenge remained for dissertation committees to address questions such as those raised by the publication, reputation, and tenure processes. Primarily, would the use of a multi-method approach increase or decrease acceptance of results? would it open or close doors in terms of appointment opportunities?

Cost of multi-method studies. Both studies provided some lessons learned about managing the cost of multi-method studies. For example, in the MIII study working within the multi-disciplinary research team seeking alignment of data needs and using this new understanding to design data collection strategies that supported the fullest range of analytical needs as possible allowed the team to optimize its investments.

Developing knowledge development about multi-method efforts the MIII was costly, as it required the team to spend time sharing their individual perspectives on particular methods. The implementation of that strategy was equally costly. To maximize investments in data collection the full team spent a number of early planning meetings focusing on the specific data collection strategies each member of the research team typically used in their research. These meetings allowed to team to highlight the commonalties and differences and make selections in terms of the approaches that would provide the most leverage. This strategy also emerged from the discussion at dg.o 2005 as one that allows a team to manage the cost of multi-method studies through the optimization of investment in data gathering. The alignment of needs – essentially identifying the data needed to support a range of analytical methods was seen as one way to deal with the cost associated with multi-method studies. This process made more time and money available for the integration of findings.

For small-scale projects, selecting the research methods to be used can significantly impact the cost, but keeping some of the benefits of multi-method approaches. For example, using available published resources for statistical analysis instead of conducting a survey can potentially reduce the cost of a multi-method dissertation research.

Incompatibility between methods. Integrating results from quantitative and qualitative methods can be an important challenge in multi-method studies. For instance, the full potential of semi-structured interviews is difficult to achieve if the results have to be incorporated to the findings from a survey or statistical analysis. When combining methods, researchers are challenged to explore real and perceived incompatibilities. In both projects researchers were required to go beyond their unstated assumptions about methods and speak in highly specific language. These requirements resulted in both increased knowledge about various methods and new understanding about where incompatibilities were real and where they were perceived.

Exploring incompatibilities also required researchers to think differently about and ask different questions. For example, to what extent do results need to be integrated into a single model? How can different methods enrich and complement the explanation of the phenomenon without being necessarily integrated in a traditional design? Assumptions about relationships between and among methods were explored and in some cases validated and in others invalidated.

6. CONCLUDING REMARKS

This case analysis, comparing a large-scale and small-scale approach to digital government research, contributes to the discussion about multi-method research designs and their role in digital government research. It provides insight into how the challenges to multi-method approaches to e-government research can be addressed through management strategies specifically designed to respond to the context within which the e-government research takes place and the methodologies adopted to ensure the fullest understanding of the phenomena.

Additional research into the advantages of multi-method approaches and the challenges to those studies will provide opportunity for more extensive examination of these cases as well as produce a framework for analysis of additional cases. A multi-method research design framework will provide e-government researchers, as well as researchers interested in other complex social phenomena, with insights into determining the best research design given a specific context.

7. ACKNOWLEDGEMENTS

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