

## Multi-Method Approaches to Digital Government Research: Value Lessons and Implementation Challenges

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### Abstract

*Digital government is a complex organizational and social phenomenon. It involves technical, organizational, and policy elements, as well as their complex and recursive interactions. Multi-method approaches have been shown as capable of presenting more comprehensive explanations of complex situations. This paper argues that multi-method approaches are valuable alternatives for e-government research. Two case studies involving multi-method approaches to e-government research are presented to illustrate advantages and challenges in both large-scale and small-scale projects.<sup>1</sup> The paper highlights some lessons learned from the two projects and suggests strategies to obtain the benefits and overcome some of the implementation challenges in doing multi-method digital government research.*

### 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 [22]. The first view constructs a concrete definition or a list of elements that contains the main characteristics of what is, or what should be, electronic government [1, 9, 14, 56]. A second approach is to list the different variants or applications of electronic government as a way to clarify this concept [31, 32]. 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 [23, 39, 42, 55].

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 [17, 18, 21]. Single methods (either quantitative or qualitative) are suitable to understand 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 [2, 6, 12, 47]. Multi-method approaches also have the potential to promote the participation of multiple disciplines by creating opportunities for multiple analysis about the same collected data.

This paper argues that multi-disciplinary, multi-method approaches are powerful research alternatives that can improve our understanding of complex social phenomena in general and electronic government in particular. In some cases, digital government scholars are already using multiple methods and interdisciplinary theoretical frameworks. However, in many instances, they need to disaggregate their results in order to publish their findings [15], potentially losing some of the benefits.

In addition, the 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

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and advantages of this combination are identified. Finally, we describe some of the main challenges and present some lessons learned.

## 2. E-government as a complex social phenomenon

E-government has been recognized as capable of promoting change in government settings [7, 29, 38]. Public officials, citizens, and academics are interested in electronic government and its potential effects on government performance. Most citizens want to receive better public services [7], and information technologies seem to be a key component for the necessary improvement [17, 18]. 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 [4, 16, 19, 20, 26].

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 [10, 13, 19]. In fact, the failure rate of these projects is extremely high. Heeks [30] estimates that the failure rate of e-government projects could be as high as 85%. Similarly, one of the latest reports from the United Nations entitled "E-Government at the Crossroads" recognizes the complexity of e-government projects in general and mentions that "a too-grandiose approach may result in failures or expensive white elephants and despite the Internet's reputation for economy of operation, new systems can be costly." [34, 54]. Despite the high rate of failure, government spending in e-government projects has continually increased in the last few years and was estimated to surpass \$6.2 billion in 2005 [20].

E-government is increasingly important and the high rate of failure 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 of the 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 [48]. 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 [35, 37, 46, 49]. Other components can include commitment, training, and policies, among others [36]. This complexity can partially explain the low rate of success of e-government initiatives.

For instance, in *Building the Virtual State*, Jane Fountain [18] 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. In our opinion, 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 [2, 6, 12, 25, 47, 52]. In information systems, Mingers [43, 44] presents several reasons for using a combination of research methods, but noted that such multi-method work is relatively scarce in the IS literature.

Multi-method approaches refer to the use of multiple methods (typically quantitative and qualitative) in conducting research [12]. Other terms used for multi-method approaches are mixed method studies, multimethodology [45], and integrating quantitative and qualitative methods, among others. For some scholars, not all projects that use multiple methods are actually multi-method studies. For instance, Brewer and Hunter [6] 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 nonreactive methods to address their research questions." (p. 28).

### 3.1 Different multi-method approaches

According to Creswell [12] mixed-method studies can follow two different strategies: sequential or concurrent. Sequential strategies use one method first and based on the results, a second method extends or clarifies the findings from the first. Concurrent strategies use several research methods simultaneously to understand a single phenomenon.

Table 1 shows four different strategies that researchers can follow in designing a multi-method study [12]. First, the sequential explanatory design starts with quantitative data collection and analysis and complements this first effort with the collection of qualitative data and their subsequent analysis. The objective is to use the qualitative analysis to interpret and support some of the findings from the qualitative phase. Second, the sequential exploratory design starts with the collection and analysis of qualitative data, and after this phase is completed, quantitative data is collected and analyzed. This design can help to test elements of an emergent theory from the qualitative analysis. Third, the triangulation design involves the use of two or more quantitative and qualitative methods simultaneously. The purpose of triangulation is to corroborate or support findings from different research methods within a single study. Finally, the concurrent nested design refers to studies that use qualitative and quantitative methods. However, in this design either the qualitative or the quantitative analysis is given priority and the other method is nested within the overall design based on the predominant method.

<b>Table 1. Multi-Method Strategies and Designs</b>	
<b>Sequential Strategies</b>	
<u>Explanatory Design:</u>	QUAN => qual
<u>Exploratory Design:</u>	QUAL => quan
<b>Concurrent Strategies</b>	
<u>Triangulation:</u>	QUAN + QUAL
<u>Nested:</u>	QUAN <=> Qual is embedded QUAL <=> Quan is embedded

Source: Adapted from Creswell (2003).

Regardless of the strategy, adopting a multi-method approach to studying e-government presents a variety of advantages to research teams as well as a number of challenges. Six advantages and six challenges, specifically, were identified consistently in a number of articles discussing experiences using

multi-method approaches. This brief review was enriched by a discussion that took place at the 6<sup>th</sup> National Conference on Digital Government Research [24]. The following subsections provide a discussion of these advantages and challenges.

### 3.2. 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 [43] 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 – in a sense to triangulate results – is considered a key advantage of multi-method studies. [27, 52, 53]. Triangulation of results can be useful not only at the single study level, but also at the meta-analysis or review level [28].

Validating methods. Weaknesses of individual methods are identified and partially solved by using multiple methods within a single study. Multi-method approaches take into consideration that doing research is a process, some methods “tend to be more useful in relation to some phases than others...” [43, p. 244]. Creswell [12] recognizes that all methods have limitations, and sees multi-method approaches as enabling biases inherent in any single method to “neutralize or cancel the biases of other methods.” (p. 15).

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 [53]. They can also enrich their understanding of specific situations by having the analytical power of quantitative and qualitative research methods [50, 52].

Integration of results among disciplines. Another advantage is the potential for better integration of contributions from multiple disciplines, as well as the opportunity to feed back more directly into the disciplines themselves [33].

Enable discovery. Discovering new or paradoxical factors that could foster future research [53] [33] 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.

### 3.3. 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. “The sheer volume of work involved in transcribing, analyzing, and integrating data within and across methods inevitably meant that priorities had to be set and some areas of investigation received more attention than others.” [3]. 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 [43] 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 [15].

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 and Cook [51] mention that “treating the method-types as incompatible obviously encourages researchers to use only one or the other when it may be a combination of the two that is best suited to research needs.” (p. 11). In contrast, other researchers consider that qualitative to quantitative approaches are compatible and complement each other [5]. For instance, Newman & Benz [47] mention “we believe that conceptualizing the dichotomy (using separate and distinct categories of *qualitative* and *quantitative* research) is not consistent with a coherent philosophy of science and, further; that the notion of a continuum is the only

construct that fits what we know in a scientific sense.” (p. 9).

Is more better? The strength of multi-method research is potentially a weakness in terms of its adoption as a strategy. Not everyone wants to know everything that is actually happening – so some may not be receptive to such a strategy. Having a full understanding as a result of triangulation of methods thereby validating those methods, and the resulting data, might in fact be considered a detraction from a particular design for certain decision makers [24]. This area in particular requires further study as we move forward with multiple method approaches in e-government. In particular, for those studies done on behalf of or in direct collaboration with practitioners.

## 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)

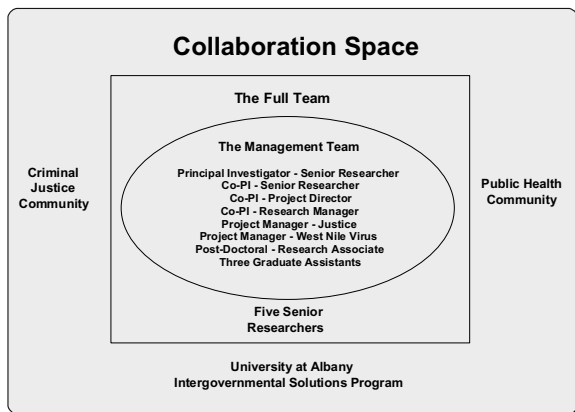
The purpose of this ongoing research is to develop and test dynamic models of information integration in multi-organizational government settings. Integrating and sharing information in these settings involves complex interactions within social and technological contexts. Organizations must establish 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 e-government 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.

**4.1.1. 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. Collaboration Space**

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.

**4.1.2. 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.

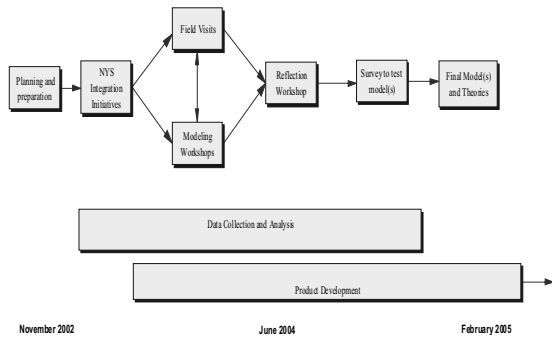


Figure 2. Simplified Flow of Activities

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 [41].

The group modeling effort spanned a six-month period and consisted of five separate. 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 fall of 2005.

#### 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 the United States all fifty states have developed statewide websites, which allows a comparative study of this type of initiative across different settings.

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. In addition, there is limited understanding of the factors affecting how government uses information technologies, and how information technologies affect the way government works. 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?

**4.2.1. 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.

**4.2.2. 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 [8, 11, 40]. The objective is 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 both selected states (New York and Indiana), using semi-structured interviews and document analysis.

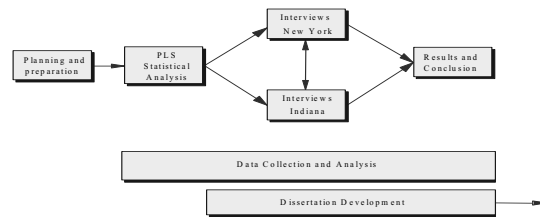


Figure 3. Simplified Flow of Activities

## 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 that are influencing information integration, the nature of their influence on effective interorganizational information integration as well as they dynamic influence on each other as part of a system.

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 [41].

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 many 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). 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. In addition, they have gathered useful information for the design and content of specific online services.

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 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. The lessons learned through these cases about managing the challenges and ensuring the realization of benefits of multi-method studies are presented as input into the development of future studies. Using these lessons learned to design studies that are both multi-method to respond to the complexity of a social phenomena and appropriate in scale to respond to the research context can contribute greatly to a comprehensive understanding of digital government.

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