Organizational and Institutional Arrangements for e-Government: A Preliminary Report on Contemporary IT Management Approaches in US State Governments

M. Lynne Markus  
Bentley University  
mlmarkus@bentley.edu

Dax D. Jacobson  
California State University  
Channel Islands  
dax.jacobson@csuci.edu

Quang “Neo” Bui  
Bentley University  
bui_quan@bentley.edu

Kevin Mentzer  
Bentley University  
mentzer_kevi@bentley.edu

Olivier Lisein  
Bentley University  
University of Liège  
lisein_oliv@bentley.edu

Abstract

The success of e-government is believed to depend in part on the organizational and institutional arrangements that governments enact for the management of their IT resources. This paper develops the conceptualization of IT management arrangements by considering possible interactions between two dimensions—1) the organization of IT activities and 2) control over decisions about IT activities (also known as governance)—for each of two categories of IT activities—1) IT projects (such as website development) and 2) IT services (such as the operation of networks). In addition, the paper provides preliminary empirical evidence obtained from applying this expanded conceptualization in the context of American state governments. Many states appear to employ centralization of IT activities to offset decentralization of IT control and vice versa. Consequently, neither dimension alone provides a good characterization of governmental IT management arrangements. These findings have the potential to enhance our understanding of the barriers to, and enablers of, e-government success.

1. Introduction

Information technology, especially the Internet, has become a potent tool for government transformation. e-government applications offer opportunities for government enterprises to renew their relations with citizens and organizations and for improved coordination among agencies at all levels of government. Despite many notable successes, the promise of e-government remains unfulfilled, and scholars have sought to identify factors that predict inter-agency coordination, e-government application implementation effectiveness, and achievement of a service orientation [1, 9, 19, 31, 35, 14, 20].

Integration and interoperability—both social and technical—are widely believed to be key enablers of, or barriers to, e-government success [17, 25]. For instance, a number of scholars have discussed the importance of integration for the success of e-government [14, 16, 17, 19, 7], including both vertical integration—coordination among IT initiatives at different government levels (e.g., federal versus local) or between layers of administration in a governmental enterprise—and horizontal integration—coordination of IT initiatives across agencies at a level or within a government enterprise. In addition, Pardo and colleagues [25] included enterprise architecture (organizational design, including the design of IT activities) and governance (mechanisms for decision making and coordination, including those about IT) among the critical social aspects of e-government interoperability. Thus, the arrangements by which government enterprises organize IT personnel and control the delivery of IT projects and services are undoubtedly a major factor in e-government success.

Two independent studies of e-government effectiveness in American state governments offer evidence of the influence of IT management approaches. Tolbert and colleagues [31] found that institutional support for e-government, such as an IT governing board, formal authority for a state Chief Information Officer (CIO) position, and various IT governance processes (e.g., enterprise architecture, e-procurement, etc.) helped explain states’ implementation of innovative e-government features. A study by Gil-Garcia [14] found that various indicators of IT organizational arrangements, such as the outsourcing of website services, the centralization of website services, and the executive authority for a CIO office, were significantly associated with states’ website functionality. These studies suggest the
potential value of more detailed analysis of the organizational and institutional arrangements for IT management in government enterprises.

The purpose of this paper is to build upon prior research on the barriers to and enablers of e-government success by elaborating the concept of IT management arrangements in government enterprises and by providing some preliminary evidence about contemporary IT management arrangements in the American states. E-government barriers and enablers, such as security and privacy regulations, vary across countries; consequently, the empirical findings from a single-context study like ours cannot be generalized to other settings. However, single-context studies can provide valuable insights about theoretical mechanisms by holding constant some of the variation that exists in cross-national comparative studies. The expected long-range contribution of this research is to deepen collective knowledge about what it takes for governments to succeed with IT-enabled transformation and to help explain why some government enterprises fail to progress in e-government maturity.

2. Theoretical Background and Research Questions

In this section we first review how and why we expect IT management arrangement to be a powerful enabler of, or barrier to, e-government success. We then discuss how IT management arrangements have been conceptualized in the past and why we are proposing an expanded conceptualization. Finally, we present the research questions that guide our empirical study.

2.1. IT Management Arrangements and e-Government Success

The effective integration of e-government initiatives appears to be crucial to the ability of governments to develop efficient online services [17]. Integration is recognized to have two dimensions: vertical integration and horizontal integration [16, 19, 9]. Vertical integration has been defined as coordination among local, regional, and federal e-government initiatives; horizontal integration refers to crossing traditional bureaucratic boundaries between government units [31]. At the same time, the concepts of vertical and horizontal integration can equally apply within any one level of government or within a single government enterprise. For instance, in the United States, each State’s executive branch of government includes multiple Agencies (e.g., Health, Public Safety, Transportation) under the authority of the State’s Governor. The relationship between the Governor’s office and the State’s agencies can be characterized in terms of vertical integration, whereas direct cross-agency collaboration within the State is an instance of horizontal integration.

Both types of integration are needed for government enterprises to work together on joint projects and to offer citizens and businesses the opportunity for “one-stop shopping” [19, 1]. However, vertical integration, such as “a coordinating body overlooking the overall status of information technology across agencies” [18] (p. 144) may be especially important for e-government success. In this study, the particular focus is on vertical integration (Governor’s office with State agencies) on IT-related issues in US State government enterprises.

Horizontal and vertical integration are known to have both technical and social (including organizational and institutional) dimensions [14, 25]. Technical imperatives include the establishment of an appropriate enterprise architecture and of common IT standards to support e-government initiatives [27] in order to promote the exchange of data among agencies [10] and enhance the development of value-added public services [8].

In addition to these technological considerations, integration also has strategic and organizational aspects. Scholars have noted the need for a centralized and coordinated strategic planning process [25] that combines open communication and effective participation of agencies [6] with effective prioritization of actions, coordination of initiatives, and monitoring of their implementation [15]. Evolution of the “institutional arrangements” for managing IT has been observed to enable movement from ad hoc and informal processes to institutionalized structures that are able to respond more adequately to the challenges of developing e-government [15].

Because organizational and institutional arrangements have been argued to play an important role in e-government success, it is useful to examine how these arrangements have been conceptualized and measured in prior research—the topic of the next section.

2.2. Conceptualizing IT Management Arrangements

Empirical studies of e-government initiatives and success have predominantly involved single in-depth cases, see for example [7], which allow for many aspects of the organizational and institutional environment to be described in detail. Although these studies provide great insight into the dynamics of
specific cases, they are understandably limited in their ability to identify which is general to many cases [13]. When e-government researchers attempt to address that limitation by comparing or surveying multiple cases, they naturally have to limit the number of variables they examine and ignore some cross-context variation. Thus, the previously cited studies of e-government in the American states [14, 31] have characterized IT management arrangements by means of a handful of plausible indicators, such as the presence of an IT governing board, existence of a legislative committee devoted to IT issues, and so forth. This approach is excellent for establishing whether IT management arrangements are related to e-government success, but they are less useful for explaining how and why they interact and may be related to success [13].

Now that evidence of a relationship has been found [14, 32], it is useful to analyze IT management arrangements in a manner that combines some of the depth of case studies with the generality of surveys. Such an enhanced conceptualization can contribute to theory development and provide a stronger basis for practical recommendations for government practitioners. Consequently, we propose to explore how IT management arrangements are better conceptualized theoretically.

The concept of IT management relationships refers to the organization and control of IT activities such as application systems development (e.g., website design, project management) and IT operational services (e.g., website hosting, user support). IT management arrangements are the subject of extensive research in the Information Systems (IS) field, but much of the theory supporting that research comes from the fields of organizational theory and behavior on the one hand and organizational economics and strategic management on the other. Historically, organizational theory and behavior has focused on design characteristics inside organizations—such as the basis for grouping activities into organizational units (e.g., by task, technology, or customer) and the means of achieving coordination across units for cross-cutting processes and services (cf. [12].) Organizational economics and strategic management originally focused on decisions about organizational boundaries: whether certain activities should be done inside the organization (thus managed via hierarchical authority) or outsourced to another entity (and controlled by means of market coordination mechanisms, such as contracts) [34].

Today, these two bodies of theory have considerably converged. Scholars recognize that a class of organizational activities (such as IT projects or IT services) may be internally managed, externally managed (outsourced), or split between internal and external provision. Further, the management of internally provided activities spans a range of possibilities. (See [4] for a review). In a common arrangement often referred to as decentralized, each major organizational division (e.g., a business unit of a corporation or a government agency) manages its own IT projects and services (possibly contracting with outside entities). In an arrangement usually called centralized, IT projects and services are managed at the enterprise level for individual business units or agencies. Some organizations enact what is often called hybrid or federated arrangements, in which business units or agencies have authority over certain IT activities (often projects), whereas the enterprise level has authority over other activities (e.g., providing infrastructural services such as running data centers and networks, and supporting enterprise systems like accounting and “desktop” services like email).

Researchers have found diversity in organizations’ choices among these three major alternatives (decentralized, centralized, and hybrid) for organizing IT activities internally. They also observed that approaches to organizing IT activities have changed over time, apparently in conjunction with developments in technology. Thus, the introduction of minicomputers and microcomputers appeared to support a decentralizing trend. With the diffusion of enterprise systems, hybrid organizational models became more popular. Recently, with the emergence of cloud computing and a rise in the popularity of outsourcing (in a climate of economic woes), trends toward centralization and outsourcing have been observed.

With the growth of IT outsourcing, IS scholars’ interest in the internal organization of IT activities waned, and some scholars focused on the coordination of external providers of IT services (outsourcers), for example, through the use of contracts. Others scholars continued to examine internal arrangements, but shifted their focus away from the organization of IT activities toward the distribution of control over IT-related decisions. One particular emphasis was on the relationships between corporate IT units and major business units (or government agencies) and their respective IT subunits [33]. Researchers have documented an innovation in IT management arrangements in which “quasi-market” mechanisms are used to coordinate the internal provision of IT services between a central IT unit and the business units it supports. In what is called a “shared services” arrangement [28], IT activities for business units or agencies are centralized under a single enterprise authority, but the business units “control” the central provider by means of mechanisms such as service

2092
catalogs, service level agreements, and (usually fixed) service prices. (Use of these quasi-market mechanisms sharply differentiates “shared services” arrangements from traditional centralization of IT activities.) These three recent foci of research on IT management arrangements (coordination with outsourcers, the distribution of internal IT decision-making authority, and the use of lateral coordination mechanisms for IT projects or services) are subsumed under the term “governance”.

Today’s heavy research emphasis on IT governance and relative neglect of the organization of IT activities gives the impression that the latter topic is no longer important—or else that the organization of IT activities is so closely aligned with IT governance that only governance arrangements need to be considered. We believe to the contrary that privileging governance over organization may result in incorrect characterizations of IT management arrangements in government enterprises, and that better classifications require explicitly considering the relationship between IT governance and IT activity organization in any government enterprise.

Support for our belief comes from an important study of Research and Development subunits by Argyres and Silverman [2]. Those authors proposed that the centralization of R&D activity (decoupling research activities from the business units) would result in a different kind of research (research that crosses technological domains and has a bigger impact inside and outside the company) than allowing research activity to be performed by business units. At the same time, Argyres and Silverman noted that decision authority (governance), particularly related to the funding of R&D activity, was also likely to have an important effect on the kinds of research that organizations do. Both the organization of R&D activities and the governance of R&D funding decisions can be centralized or decentralized, and either strategy has advantages and disadvantages when considered on its own. But, the authors argued, the two dimensions may interact. One possibility is that the dimensions may be substitutes, such that an organization can achieve the same result either by centralizing R&D activities under a single manager or by centralizing R&D funding decisions while leaving the activities decentralized under the management of business units. However, Argyres and Silverman found empirical research for a complementary relationship between the dimensions, such that centralization of funding decisions reinforced the effects of centralizing R&D activities under a single hierarchical authority.

In the IT context also, we believe, the organization of IT activities and the control of IT activities (or the distribution of IT decision rights) are likely to interact. Shared IT services provide an example. In both traditional centralization of IT activities and in shared services arrangements, the authority to manage IT personnel is decoupled from business units or agencies and assigned to an enterprise-wide entity. But in traditional centralization, decision authority rests with the center, whereas, with shared services, agencies retain at least some autonomy, for instance to decide which services to acquire and the level of service quality for which they are willing to pay. At the same time, the autonomy of agencies with respect to IT in a shared services arrangement is quite limited in comparison with an organizational structure in which the agencies directly manage their own IT personnel. Thus, characterizing government IT management arrangements solely on the dimension of decisional governance (or solely on the dimension of organization of the activities) is likely to be misleading: both dimensions are required for accurate classification of IT management arrangements.

An important consideration when characterizing IT management arrangements is the differences in two key types of IT activities, projects and services. IT projects (e.g., website development) are time-bounded, one-off, “engineering”-like activities; whereas IT services are routine, recurrent, and generally more standardized “production”-like activities. According to organization theory, these two activity types require different management strategies and can (if not should) be managed separately [30]. In a similar vein, Weill and Ross [33] argued that each of 5 major IT decisions (“how much should we spend?”, “which projects should we pursue?” etc.) can be differently governed, but we limit our focus in this paper to the two major areas of IT activities: projects and services (also called operations).

To recap, we argued in this section that accurate characterization of IT management arrangements in government enterprises involves two dimensions (the organization of IT activities and the control of IT activities) for each of two major categories of activities: IT projects and IT services. The relationship between the two dimensions (activities and control) is an empirical question, but there is a strong possibility of potential interactions between them, possibly reinforcing. In addition, because the two major categories of IT activities (projects and services) have different task characteristics, government enterprises may choose to organize and/or to control them differently. Finally, we noted that approaches to organizing and controlling IT activities are not eternal, but have changed over time, at least in part because of changes in the nature of IT itself and possibly also because of managerial fads and fashions.
2.3. Research Questions

Our concern in this paper is with contemporary IT management arrangements within American State government enterprises. Specifically, we inquire:

Research Question 1: How are American State governments currently making decisions about (or governing) a) IT projects and b) IT services? (That is, do States’ central IT units exert 1) tighter or 2) looser central control over the IT projects and/or IT services that support State agencies?)

Research Question 2: How are American State governments currently organizing a) IT project activities and b) IT services activities? (That is, are the IT project and/or services activities that support State agencies 1) decentralized—performed or outsourced by individual agencies, 2) centralized—performed or outsourced by a State central IT unit—or 3) shared— partially performed or outsourced by both State central unit and agencies?)

Research Question 3: What is the relationship between a) control of IT activities (projects and services) and b) organization of IT activities (projects and services) in American State governments at the present time?

3. Method

To answer our research questions, we take an enterprise-wide approach to examine IT management arrangements of US State governments. The focus on US State governments provides us with a medium-sized known population of organizations having very similar tasks but yet with considerable diversity in size, orientation, power arrangements, history, etc. Therefore we would expect to find considerable variation in IT management arrangements across States, making the population worthwhile to study.

Historically, IT management arrangements in the American States followed the general trajectory of technology and institutional developments in the public sector. In most States, IT management was decentralized, with each agency acting autonomously; until quite recently, many States lacked enterprise-wide (cross-agency) IT management to any appreciable extent. Recent institutional pressures, including fiscal crises and consolidation trends, have resulted in many US government enterprises adopting some degree of IT management reform [27]. Like public sector companies, US government enterprises struggle to choose organizational and institutional arrangements that can promote coordination of IT decisions and activities across government functions [15].

3.1. Data Collection

The aim of our study is to employ a theoretically derived observational approach to classifying IT management arrangements rather than relying on self-reporting by State informants. Data were gathered from publicly available sources such as Governor’s office websites, State websites, and public reports (e.g., NASCIO publications and The Book of the States annuals). An iterative process of working back and forth between theory and collected data was utilized to enhance conceptual development. We assigned “experts” within the research team to develop deep knowledge for particular States, and we continuously triangulated and checked our data to ensure stability and consistency of coding and classification.

In this paper, we report on analyses of data for 35 US State governments, focusing on structural arrangements and decision making processes for IT projects and IT services. In order to clarify the relationship between each State’s central IT unit (in the Governor’s administration) and the IT units in State executive branch agencies (e.g., Health, Education, etc.), we also inspected the IT functions of one agency in each State—Health and Human Services (HHS). For instance, large numbers of IT personnel in a State’s HHS agency provided support for the conclusion that IT activities in the State as a whole were decentralized.

We choose HHS agencies for this purpose, because they are large, important agencies with significant IT needs and are likely to be similar in IT management relationships to those of most other agencies in their States. (By contrast, the IT arrangements in two other important State-level agencies, Public Safety and Transportation, have historically been strongly shaped by US federal government priorities.)

3.2. Data Analysis

As presented in the theory section, IT management arrangements in US State governments can be conceptualized along two dimensions, organization of IT activities and control of IT activities, for each of two major categories of IT activities, projects and services. This creates a 2x2 framework of IT management arrangements. (See Table 1.)

Coding for the Control dimension. Control (or governance) refers to how decisions about IT projects and IT services are made, such as who has the power to define and approve the projects that will be undertaken or how IT services are carried out (e.g., approval process, technical standards) [33]. Prior research on IT control has distinguished between IT project control (e.g., prioritization processes, schedule and budget
The organization of IT project or service activities in support of agencies was coded as Shared, if both the central IT unit and the agencies performed the activities to some extent (e.g., if the central unit managed or outsourced administrative systems and the agencies managed systems unique to their mission).

Table 3 provides examples of the coding.

4. Findings

In this section, we present the answers to our research questions for the 35 states we have coded and analyzed thus far.

4.1. Research Question 1: How Do States Control IT Projects and Services?

Our first research question concerns the IT management dimension of control, also commonly referred to as coordination or governance, understood as the exercise of non-hierarchical authority by a Central IT unit over agency behavior through such mechanisms as formal rules, processes, procedures, or standards, as well as by informal norms and social relationships. As mentioned earlier, we coded the control regimes in states as either relatively looser, in which a state’s central IT unit may engage in supportive or consultative processes for the agencies (via setting technical standards, providing general oversight and reporting of performance data, or pursuing consolidated purchasing agreements), or as relatively tighter, in which a State’s central IT unit has formal authority to review and approve or decline the agencies’ projects and/or procurements.

As shown in Table 4, 26 out of 35 states exert tighter central control over agencies’ IT activities—both projects and services—by means of formal review and approval authority. Only 5 out of 35 States have looser central control regimes. This finding is surprising in view of the fact that most States had looser central control regimes as recently as the late 1990s. Another interesting observation is that only 4 States have mixed control regimes, where one type of activity (projects or services) is tightly centrally controlled and the other activity is loosely centrally controlled. This finding is surprising in light of IT governance theory [33], which recommends that enterprises make separate decisions about how to govern each major category of IT decision (e.g., funding levels, project prioritization, etc.). States appear to approach control of IT projects and services holistically.
4.2. Research Question 2: How Do States Organize IT Projects and Services?

Our second research question concerns locus of activity, or hierarchical authority for the IT personnel who perform (or outsource) IT project and/or service activities in support of the agencies. The options we coded were: Decentralized (agencies perform or outsource); Centralized (central IT unit performs or outsources); and Shared (performance or management is split between agencies and a central IT unit).

As shown in Table 5, the States tend to centralize (and sometimes also to outsource) IT service activities for agencies under the authority of a central IT unit, that is, Centralized as we coded it (18 out of 35 States). However, fewer States have centralized IT project activities (only 9 out of 35 States). The significant differences in how States organize projects and services are not unexpected given differences in the nature of these two kinds of activities. Projects are time-bounded activities with an engineering-like character; they do not present obvious economies of scale of the sort that characterize routine and recurrent IT services. (Consider how inexpensively providers like IBM, Microsoft and Google can provide website hosting services; the same level of economies does not obtain for IT projects.) Although differences in the organization of States’ IT project activities relative to States’ IT service activities are to be expected, there is a marked contrast between Table 4 and Table 5. Whereas only 4 States have mixed IT control regimes, 15 States have mixed IT activity regimes. This finding suggests that our two dimensions of IT management arrangements—control or governance and organization of activity—are at least partially independent—an impression reinforced by the distribution of States across these categories as we discuss below.

4.3. Research Question 3: How Are IT Control and IT Organization Related?

We now address our third research question about the relationship between the control (or governance) of the two areas of IT activity and the organization (or hierarchical authority over performance) of that activity. Table 6 shows the distribution of States across control versus organization for IT projects, and Table 7 shows the distribution of States across control versus organization for IT services.

In Table 6, we observe that 3 of 7 States with relatively looser central control of IT project have a shared activity model, in which the central IT unit performs at least some project work for agencies, thus possibly lessening agency autonomy. In States with relatively tighter central control, only 9 States reinforce this control regime by centralizing the performance of all project work. The other 19 States have less centralization than their control scores suggest, because the Central IT unit does not have hierarchical authority over the people who perform project work for the agencies. Put differently, although there is a trend toward increased central control over IT projects across States, agencies continue to perform at least some project activity, which may soften the effect of increased central control.

Table 7 suggests a similar weakening of the central control regime for IT services at both the looser and tighter ends of the control spectrum. Of 7 States with looser central control over agencies’ IT services, 5 States have centralized at least some IT services activities. Of 28 States coded as having higher central control over agencies’ IT services, 10 States share and one State decentralizes the performances of agencies IT services, rather than reinforcing control by centralizing service activities. This implies that the States’ IT services control scores do not tell the whole story of their IT management arrangements—the overall degree of IT services centralization is neither as low nor as high as one might expect by their control classification alone.

Altogether, only 2 of 35 States (Hawaii and South Carolina) can be said to be highly decentralized, combining both looser central control with agency performance of both IT project and service activities. And only 9 States (AR, GA, IN, ME, MS, MO, SD, UT, and VA) can be said to be highly centralized, combining tight central control and central IT unit performance of both IT project and IT service activities. In the remaining States, decisions about how loosely or tightly to control IT projects or services have been softened by a contrasting distribution of hierarchical authority over the people who perform those tasks.

4.4. Summary and Interpretation of Findings

In short, in answer to our first research question, we found that States generally (but not invariably) use the same approach to control (govern) IT projects as they do to control IT services. Most States exert tighter central control (e.g., via review and approval
procedures) rather than looser central control (e.g., via standards and guidelines) over both activities. That so many States exert tighter central control is surprising given the legacy of decentralization, but it is not terribly surprising in light of institutional and economic trends. That most States used the same control approach for both projects and services is unexpected in light of prior organization theory and conventional IT management wisdom.

Regarding our second research question, we found that many States (18 of 35) have centralized the production or management of IT services, but far fewer (9 of 35) have centralized the production or management of IT projects. This finding is consistent with theory about differences in the two kinds of IT activities.

Our third research question concerned the relationship between the control and the organization of IT activities. This question is important because the concepts are not always clearly differentiated. If control and organization are identical or are always correlated, the distinction may not matter; but some prior research [2] in a different context has suggested that control and organization are mutually reinforcing in their consequences, which means that the distinction could matter a great deal.

We found that States did not always exert central control over an IT-related activity (projects or services) in a way consistent with (reinforcing of) the way they hierarchically organized and managed the activity. Instead, the combination of control and organization seemed to have a countervailing effect, weakening centralization or strengthening decentralization. This dampening effect was observed for both IT projects and for IT services, but it seemed to be more pronounced for IT projects. For example, whereas 17 of 28 States had reinforced tighter central control with centralization of activities in the area of IT projects; only 9 of 28 States had done so for IT services.

This finding has potentially important theoretical as well as practical implications. Much of the writing on centralization in both government and the private sector emphasizes the disadvantages of centralization: such as non-responsiveness to local needs and reduced opportunities for participation. However, some analysts emphasize tradeoffs between centralization and decentralization. For example, centralization reduces costs at the expense of responsiveness and innovation, whereas decentralization improves local innovation at the expense of global impact. Our findings of a countervailing relationship between control and organization may mean that States are seeking (and possibly finding) ways to gain the advantages or minimize the disadvantages of both approaches simultaneously.

Finally, the total pattern of findings in this study broadly supports our enhanced conceptualization of IT management arrangements by means of two dimensions: a projects versus services dimension and a control versus organization dimension.

5. Implications and Conclusion

The findings reported here are clearly preliminary, based as they are on an analysis of only 35 states. More importantly, they are purely descriptive at this point: we have not yet examined how well our expanded conceptualization of IT management arrangements helps to explain e-government success. That is a key task for the next phase of our research. We are currently evaluating alternative metrics of e-government success, including the maturity measures employed in prior e-government research, reputational measures of States’ management effectiveness (as in the “Grading the States’ studies), and indicators of IT innovation and management effectiveness [21, 11, 29], such as data center consolidation, etc.

Although much work remains, we believe our findings offer promising lines for future theoretical development and empirical research on e-government success. In particular, our preliminary findings about interactions between the organization of IT activities in American States and States’ IT control regimes suggest the potential contribution of future configuration-oriented research on IT management arrangements in government enterprises.

Many organization design theorists today acknowledge that organizational attributes occur in non-linear combinations called configurations or archetypes [22, 23, 24], where the effects of one design attribute may be modified by the value of some other organizational characteristic. Configuration theorists argue that a potent predictor of organizational effectiveness is the consistency or fit among organization design characteristics. Thus, an attribute known to lead to success in some enterprises (e.g., a legislative committee concerned with IT matters) may not promote success in another enterprise where it is not reinforced by other attributes (such as centralization of IT activities to give a Chief Information Officer enough clout to ensure e-government coordination among different agencies). An implication of the configuration hypothesis is that scholars interested in the relationship between organizational and institutional arrangements and e-government success may obtain misleading results if they choose isolated indicators of those arrangements without close regard to potential interactions.

A second promising opportunity for future development lies in our observation that the
A third opportunity for future research involves the temporal progression of changes in IT management arrangements—something we have coded in the American States since the middle 1990s, but not yet analyzed. Changes in organization design, such as increased control over IT decision making or increased centralization of IT activities may lead to important improvements in e-government success, but they are not likely to do so overnight. In addition, in many cases, changes in organization design [3] occur as a series of incremental changes over time rather than a revolutionary shift. Consequently, the link between changes in IT management arrangements and e-government success may depend on an accumulation of changes rather than a single event.

A fourth opportunity for future research involves expanding the scope of analysis to include collaborative IT initiatives across US States, interactions between the States and local or federal government enterprises, interactions with the private sector (particularly IT services providers), and cross-country analysis. Each of these expansions would require greater analysis of the barriers to and facilitators of e-government success, which would in turn enhance our understanding of the tradeoffs in IT management arrangements.

In short, although knowledge about the relationship between IT management arrangements and e-government success has progressed in recent years, much additional research and theoretical development are required. We hope our early efforts will point the way to future insights.

6. Acknowledgement

This research is supported by the National Science Foundation, under grant number SES-0964909.

7. References


Table 1: Dimensions of State IT Management Arrangements

<table>
<thead>
<tr>
<th>Control</th>
<th>IT Projects</th>
<th>How are IT Projects controlled within States?</th>
<th>Is there <strong>Looser</strong> or <strong>Tighter Central Control</strong> over Agencies’ IT Projects?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity Organization</td>
<td>IT Services</td>
<td>How are IT Services controlled within States?</td>
<td>Is there <strong>Looser</strong> or <strong>Tighter Central Control</strong> over Agencies’ IT Services?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coding</th>
<th>State</th>
<th>Description</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Looser Central Control</strong></td>
<td>SC</td>
<td>Agencies are able to pursue IT projects in an autonomous manner, provided that they remain within existing budgets.</td>
<td>AL</td>
<td>Agencies maintain a comprehensive IT staffs; the central IT unit sets technical guidelines and standards for agencies.</td>
</tr>
<tr>
<td><strong>Tighter Central Control</strong></td>
<td>WA</td>
<td>The State’s central IT unit prioritizes, approves, and sets project standards (e.g., through portfolio planning) for agencies’ projects.</td>
<td>UT</td>
<td>The State’s central IT unit sets technical standards for operational services in support of agencies, and reviews and approves all IT fixed asset purchases over $50,000.</td>
</tr>
</tbody>
</table>
### Table 3: Examples of Coding for the Activity Dimension

<table>
<thead>
<tr>
<th>Coding</th>
<th>Performance of IT Project Activities</th>
<th>Performance of IT Service Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decentralized</td>
<td>HI: The Department of Health has an IT department with a sizeable budget and many employees to carry out IT projects and system maintenance.</td>
<td>ID: The Department of Health and Welfare has a Division of Information and Technology Services providing IT infrastructure and computer support for department initiatives.</td>
</tr>
<tr>
<td></td>
<td>NY: The central IT unit offers project services (using SLAs and PMBok), but their use is not mandatory, and agencies also do their own IT projects.</td>
<td>NM: Central unit provides some IT infrastructure and enterprise services, but the Department of Health also does operations.</td>
</tr>
<tr>
<td>Shared</td>
<td>VA: The State currently outsources essentially all IT to Northrup-Grumman (with a central IT unit oversee the arrangements). A 10 year contract was signed in 2005, which recently extended to 2019.</td>
<td>GA: The State currently outsources IT services (with a central IT unit in charge of the outsourcing arrangement). For example, in 2009 outsourcing contracts were given to IBM for IT infrastructure and to AT&amp;T for network and phone operations.</td>
</tr>
</tbody>
</table>

### Table 4: Control of IT Projects by Control of IT Services (35 States)

<table>
<thead>
<tr>
<th>Control of IT Services</th>
<th>Control of IT Projects</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Looser Central Control</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Tighter Central Control</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>

### Table 5: Organization of IT Project Activities by Organization of IT Service Activities (35 States)

<table>
<thead>
<tr>
<th>Organization of IT Service Activities</th>
<th>Decentralized</th>
<th>Shared</th>
<th>Centralized</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decentralized</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Shared</td>
<td>6</td>
<td>8</td>
<td>-</td>
<td>14</td>
</tr>
<tr>
<td>Centralized</td>
<td>5</td>
<td>4</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>12</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

### Table 6: Control of IT Projects by Organization of IT Project Activities (35 States)

<table>
<thead>
<tr>
<th>Control of IT Projects</th>
<th>Organization of IT Project Activities</th>
<th># States</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Decentralized</td>
<td>4</td>
<td>FL, HI, IL, SC</td>
</tr>
<tr>
<td></td>
<td>Shared</td>
<td>3</td>
<td>AL, KY, MA</td>
</tr>
<tr>
<td></td>
<td>Centralized</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Tighter Central Control</td>
<td>Decentralized</td>
<td>10</td>
<td>AK, AZ, CA, ID, MT, NV, OR, TN, WA, WY</td>
</tr>
<tr>
<td></td>
<td>Shared</td>
<td>9</td>
<td>CO, KS, LA, NE, NM, NY, NC, ND, WV</td>
</tr>
<tr>
<td></td>
<td>Centralized</td>
<td>9</td>
<td>AR, GA, IN, ME, MS, MO, SD, UT, VA</td>
</tr>
</tbody>
</table>

### Table 7: Control of IT Services by Organization of IT Service Activities (35 States)

<table>
<thead>
<tr>
<th>Control of IT Services</th>
<th>Organization of IT Service Activities</th>
<th># States</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Decentralized</td>
<td>2</td>
<td>HI, SC</td>
</tr>
<tr>
<td></td>
<td>Shared</td>
<td>4</td>
<td>AL, AZ, KY, CA</td>
</tr>
<tr>
<td></td>
<td>Centralized</td>
<td>1</td>
<td>FL</td>
</tr>
<tr>
<td>Tighter Central Control</td>
<td>Decentralized</td>
<td>1</td>
<td>ID</td>
</tr>
<tr>
<td></td>
<td>Shared</td>
<td>10</td>
<td>AK, KS, LA, MT, NE, NV, NM, NC, WV, WV, WY</td>
</tr>
<tr>
<td></td>
<td>Centralized</td>
<td>17</td>
<td>AR, CO, GA, IL, IN, ME, MA, MS, MO, NY, ND, OR, SD, TN, UT, VA, WA</td>
</tr>
</tbody>
</table>

2100