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Federal Information Technology Management: Federal Policies and Their Effect on Agency Practice

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Introduction

Numerous General Accounting Office (GAO) reports have identified problems with federal information technology (IT) management (Government Accounting Office, 1992).The Internal Revenue Service, the Federal Aviation Administration, the National Weather Service and the Department of Defense each have suffered losses in the hundred million dollar range resulting from mismanagement of major computer-related upgrades (Endosco, 1995; Stanglin & Chetwynd, 1996; Cohen, 1994).

The consequences of IT management failures will become increasingly significant as federal agencies face severe resource constraints due to mounting pressure to balance the federal budget. Federal agencies need to make more effective use of information technology if they hope to maintain their current level of service, let alone face the challenges and responsibilities likely to appear in the coming decades. This research seeks to better understand federal IT management problems and the influence that federal policies have on them.

Background

With publication of the National Performance Review (NPR), the Clinton Administration began an aggressive campaign to improve federal performance by cutting red tape, promoting the creativity and initiative of government bureaucrats, and employing IT more effectively (U.S. Report of the National Performance Review, 1993; Osborne & Gaebler, 1992). The central concern underlying this proposed study is the seeming inconsistency in initiatives that on one hand advocate cutting red tape, while on the other hand prescribing federal IT management policies commonly associated with increasing red tape. These prescriptions -- contained in federal legislation, Office of Management and Budget (OMB) and General Service Administration (GSA) promulgated regulations -- typically call for increasing management coordination, eliminating redundancy and strengthening oversight of federal IT projects.

Federal policy has recently begun emphasizing the employment of "best" private-sector IT management practices within the Federal Government (Government Accounting Office, 1994). The Paperwork Reduction Act of 1995 (PRA; P.L. 104-13), in addition to policy specifically targeted at paperwork reduction, seeks to link information resources management (of which IT management is a part) to program performance and improve agency accountability for IT investments (Plocher, 1996). Recognizing that existing management practices had proven inadequate -- particularly with respect to IT procurement -- Congress passed the Information Technology Management Reform Act (ITMRA; P.L. 104-106). Many of these policy initiatives may prove problematic.

Several factors are converging that should prove significant to the evolution of Federal IT management practice and use: new legislation, tighter budgets and technological advances. This confluence of events provides an ideal opportunity to observe the processes by which federal agencies recreate their IT management practices and enact new IT infrastructures.

Purpose

The purpose of this research is to develop a better understanding of the processes by which an agency manages the adoption and use of information technology. The study will develop a conceptual model that the author hopes can be used to inform the future development of federal IT management policies.

To this end, the primary research questions are:

- **How do government-wide IT policies affect the distribution and effectiveness of IT management functions within federal agencies?** Beachboard & McClure (1996) argued that many of the management prescriptions contained in federal IT policies are aimed at strengthening centralized management of IT resources and appear inconsistent with reinventing government initiatives and the reduction of red tape. The study will attempt to better understand the tradeoffs implicit in deciding whether to centralize or decentralize IT management within a Federal agency.
- **How do IT management alignment decisions influence the distribution of the knowledge and skills required for successful adoption of IT by the agency?** A theory will be presented hypothesizing that increasing the amount of knowledge shared by IT and functional managers will lead to increased adoption of IT. This study will evaluate this hypothesis and also attempt to determine whether IT management alignment decisions influence the amount of shared knowledge.
- **What conditions, other than policy-related factors, influence effective IT management alignment and successful IT adoption and use?** In addition to contingency factors, such as size, resources or industry that have been used in the study of private-sector firms, this study will seek to identify factors particularly relevant to the Federal Government that influence IT management effectiveness and use.

IT management alignment, in this context, refers to the locus of responsibility (or decision-making authority) within an agency and can be discussed in terms of a centralized versus decentralized management dichotomy (Brown & Magill, 1994; King, 1983). This study focuses on IT management alignment, because many researchers have identified management distribution or alignment within organizations as a critical issue for organizations seeking to improve IT performance (Brancheau & Wetherbe, 1987; Dixon & John, 1989; Niederman & Brancheau, 1991; Bertot, 1996). Furthermore, distribution of IT management functions should be actionable within a policy context. That is, federal law, regulations and other policy directives can direct or influence how agencies organize to manage their IT.

Theoretical Framework

This study will attempt to integrate two theoretical frameworks, contingency theory and absorptive capacity theory, to conceptualize the relationship among the numerous factors that can influence an organization's use of IT (Lawrence & Lorsch, 1967; Cohen & Levinthal, 1990). The author uses the term contingency theory generically to focus on the propositions shared by a family of related theories rather than the analytic distinctions that separate them. Contingency theory identifies many contextual factors that may influence organizational IT structure and use. Schoonhoven (1981) described contingency theory as not so much a theory in the conventional sense, but an "orienting strategy or metatheory, suggesting ways in which a phenomenon ought to be conceptualized" (p. 350).

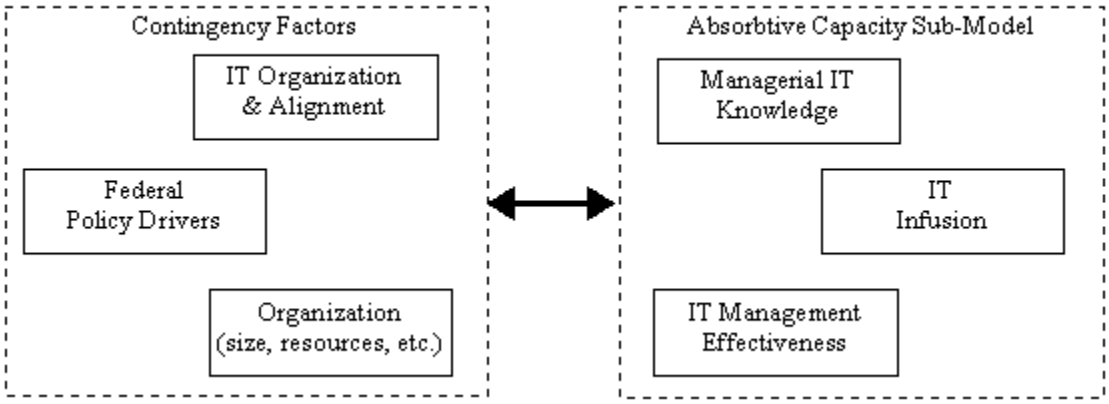
Absorptive capacity theory focuses on organizational knowledge and its influence on the ability of organizations to effectively employ innovations once they become aware of them (Cohen et al., 1990). Absorptive capacity theory is based on a research stream that attempts to employ the concepts of cognitive psychology in organizational settings.

Each theoretical perspective provides a partial view of factors that influence organizational IT adoption and use. Contingency theories identify many factors but provide little explanatory power. Absorptive capacity theory probes more deeply into an organization's technology adoption processes but is weak on identifying the conditions that contribute to or hinder the development of an organization's absorptive capacity. A model that successfully combines these two perspectives should provide a richer and more complete understanding of the factors and processes influencing IT adoption and use, and should serve as a basis for conceptualizing how to improve federal IT management policies.

A Preliminary Integrated Model

This research will be guided by a preliminary conceptual model (see Figure 1) that combines elements of the previously discussed theories. The contingency portion of the conceptual model is adapted from a study by Brown and Magill (1994). Their model provided a conceptual framework for categorizing contingency factors. Federal IT management policy drivers are specifically included to ensure that their influence on the distribution of IT management functions be assessed. IT management alignment, which was identified as the dependent variable in the Brown & Magill model, is incorporated within the IT organization component of the model.

Figure 1. *Preliminary Conceptual Model*



The absorbtive capacity component of the model is adapted from a conceptual model used by Boynton, Jacobs and Zmud (1995). IT management knowledge and IT management process effectiveness components are viewed as factors that moderate the influence of the overall organizational environment on the extent and the effectiveness of the agency's IT use. IT infusion is identified as the dependent variable of interest. IT infusion refers to the final process of IT implementation where not only is the organization using the new technology but the technology is contributing to increased organizational effectiveness (Cooper & Zmud, 1990).

Although the cited studies provide some indication of the relationships to be expected among these constructs, arrows depicting causal relationships have been intentionally omitted from the preliminary model. The researcher finds insufficient theoretical or empirical evidence to adequately hypothesize the nature of the inter-relationships and additionally believes that a better understanding of the constructs is required before such hypotheses can be offered.

Methodology

While a preliminary conceptual model has been identified, the study is exploratory in the sense that the researcher recognizes the tentative nature of the initial conceptualization and intends to remain open to the identification and exploration of new constructs and relationships should they appear in the data. The researcher proposes to use a multiple-case embedded research design that will employ quantitative and qualitative data collection and analysis techniques (Yin, 1994). Kaplan & Duchon (1988) advocate the use of multimethod research strategies, arguing that most IT research treats important constructs as static while neglecting the cultural environment and social interaction that can influence the effective use of information systems. Kling (1987) refers to this static view as a "discrete entity model" and suggests that studies employing such a view risk ignoring real organizational and environmental constraints that adversely affect system development and use.

Yin (1993, 1994) specifically advises that the use of a case study research methodology is appropriate when it is difficult to distinguish between contextual elements and elements of the phenomenon under study. This problem is likely to occur given the difficulties anticipated in maintaining the distinction between IT

management effectiveness and the IT organization. Additionally, federal IT management policies both produce and are a product of the organizational and political environments of the various Executive Branch agencies.

Conclusion

The Clinton Administration is counting heavily on the use of IT to improve the performance of the Federal Government. Yet, while Government expenditures on information technology exceed $27 billion annually (Office of Management and Budget, 1995), problems with federal acquisition, implementation and use continue.

These findings are not new. Over the years there have been numerous problems reported and many attempts made to improve federal IT management. Many of the rules and regulations appear very reasonable. Yet as dramatized by the Senator Cohen's (1994) report, the results have not been uniformly satisfactory. The result, as reported by Kling (1987), is that government staff and contractors are continually accused of failing "to do what they are supposed to do by legislative and administrative mandate because they are incompetent, insubordinate or otherwise irascible" (p. 323). Kling argues that these accusations ignore the very real environmental and organizational constraints faced by federal agencies.

Many of the current policy issues appear to represent minor adjustments to policies which have failed in the past. Clearly there will be some benefits to reforming IT procurement practices. However, as Endosco (1995) argued, procurement is not the only IT management problem. Government agencies face an environment with unique challenges that do not necessarily correspond to those faced in the private sector (Bozeman & Bretschneider, 1986; Bretschneider & Wittmer, 1993).

This study seeks to better understand not simply the content of federal IT management policies but their consequences. This study seeks to better understand the processes by which agencies adopt and employ information technology, and the constraints they face. Ultimately, the researcher intends that the knowledge gained should prove useful to policy analysts formulating federal IT policies and assist federal personnel to more effectively manage IT adoption and use within their agencies.

References available from author upon request.