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Repeating Failure in Large-scale Government IT Projects: A Taxing Story

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ABSTRACT

Large-scale information technology (IT) projects experience higher failure rates than smaller IT projects. When these projects fail in government agencies, they represent significant costs to both the agencies and society. This paper reports the results of a study on large-scale government IT projects that failed over multiple iterations. Data was gathered on the modernization efforts at the Internal Revenue Service (IRS) from publicly available documents spanning over 30 years of project history. The inductive techniques used both confirm and extend prior literature to suggest that while existing theories can help explain cyclical patterns of escalating and withdrawing commitment, there are clear organizational determinants that play a role in this process. In particular we discuss the role of strategic factors, emerging project characteristics, and organizational capabilities for project management and systems development in government IT projects.

Keywords

Public sector information systems, project management, escalation.

INTRODUCTION

Each year organizations around the world, both public and private, spend a combined total of billions to trillions of dollars implementing information systems. Large-scale IT projects are notoriously difficult to control, with reported failure rates that exceed 50 to 75 percent (CSTB, 2000; Standish Group, 1994). These high failure rates are of concern in public sector organizations because government agencies are increasingly pursuing large-scale IT projects as seen by the increase in data warehousing, e-government, and system integration projects over the past decade. Unfortunately, our understanding of the challenges facing large-scale IT projects, or how to resolve them, is somewhat limited as the research on large-scale systems is insufficiently broad, both in theoretical understanding and methodological approaches (CSTB, 2000). From the high failure rate of these projects, we can identify the need to develop theories and frameworks that address issues specific to the management of large-scale IT projects.

While IT projects are more likely to escalate than other projects in general (Keil and Mann, 1997), because large-scale projects require significant resource commitment and are driven by a strategic need, they are perhaps more likely to escalate than other IT projects. Drawing from evidence provided by Newman and Sabherwal (1996) and Drummond (1994), we believe that a common characteristic of many of these failed large-scale IT projects is that they tend to experience multiple cycles of escalating and de-escalating commitment, and then due to the persistence of organizational factors are redirected, only to escalate again. However, there are still unanswered questions regarding some of the dynamics involved among the determinants of escalation over time as they relate to large-scale IT projects.

The purpose of this paper is to explore the emergence of organizational determinants of escalation and identify if and how they influence large-scale government IT projects to repeatedly fail. To address these questions this paper uses a longitudinal field study based upon historical data from the modernization efforts at the United States Internal Revenue Service (IRS). The IRS modernization efforts and similar projects in other federal agencies provide rare opportunities to study large-scale IT projects over time as they are accompanied by substantive documentation and analysis available for public review. Over the 30-year period examined, the IRS efforts to modernize failed repeatedly. These attempts at modernization experienced multiple cycles of escalation, de-escalation, redirection and re-escalation even though individual actors changed. These characteristics of the IRS case allow us learn about why and how redirected large-scale projects persist and re-escalate through multiple iterations. The case characteristics also provide the opportunity to identify organizational determinants of escalation.

BACKGROUND

When discussing large-scale systems implementation, there are a variety of definitions for “large-scale.” This variety stems from the difficulty in establishing a single variable or limited set of variables that define “largeness” in general (Brussard, 1992; Zmud, 1980). Zmud (1980:15) defined a large-scale system “to be one that requires more than one management level to coordinate the development effort, and more than a six month development period.” Sundgren (1986) suggested that largeness could be measured by the amount of information that is available in the system and the amount of information processing that is going on in the system. The Standish Group (1994) suggests that any system development project costing over \$10 million is large-scale. Combining these approaches, we define large-scale systems by the degree of complexity involved in terms of the size of the information sets and machine programs, and the amount of management resources required to implement the system.

Escalation, De-escalation, and Re-escalation

The processes of escalation and de-escalation of commitment present a useful theoretical perspective from which to study large-scale IT project failure (Keil, 1995); particularly since IT projects may be more susceptible to these phenomena than other types of projects (Keil and Mann, 1997; Zmud, 1980). Traditionally, escalation theory focuses on the continued commitment to a previously chosen course of action in spite of negative feedback concerning the viability of that course of action (Keil, Mann and Rai, 2000), whereas de-escalation theory focuses on the factors or processes by which commitment to a previous course of action is reduced (Keil and Robey, 1999). There are several documented cases of escalation occurring in large-scale IT projects (see, for example, Montealegre and Keil, 2000, Newman and Sabherwal, 1996; Flowers, 1996). Most of these studies examined only the escalation process (e.g., Keil, Mixon, Saarinen and Tuunainen, 1994-1995) or the de-escalation process (e.g., Garland, 1990; Montealegre and Keil, 2000). A notable exception is the longitudinal analysis of a large-scale IT project at Centco that repeatedly failed (Newman and Sabherwal, 1996). That study demonstrated that cycles of escalation and de-escalation can occur repeatedly over the lifetime of a project. In doing so, they found the dynamics among escalation determinants to be different from much of the prior research.

When long-term, large-scale IT projects that involve high levels of investment are redirected, conditions exist that may produce multiple cycles of escalation and de-escalation (Montealegre and Keil, 2000). Supporting this notion, Drummond (1994) found that escalation of commitment is different in situations where individuals inherit unsuccessful and long-running projects, and that such situations experience a cyclical escalation effect. However, Drummond’s study was not conducted in an IT-project context. Newman and Sabherwal (1996) provide perhaps the best evidence as to what happens to these projects over multiple decision points. In their study they used data from Centco to demonstrate how determinants of commitment among individuals shift from escalation to withdrawal of commitment and back over time. These latter two studies demonstrated that escalation and withdrawal of commitment share a more complicated and dynamic relationship over time and provide the theoretical underpinning for the concept of re-escalation cycles used in this paper.

Organizational versus Individual Determinants

The literature has now evolved to the point where we must seriously consider the possibility that escalation results from the combination of many different interacting factors, which includes the role of organizational factors (Staw, 1997). There are actions and decisions made by organizations that can not be attributed to specific individuals because they result from interactions among individuals and may represent factors institutionalized or embedded in an organization. Increasingly decisions in organizations are made by multiple individuals in order to reduce biases or risks inherent in individual decision making (Applebaum and Batt, 1994; Cianni and Wnuck, 1997). Top managers rarely act alone and many decisions are typically made in team structures (Hambrick and Mason, 1984). This makes it difficult to attach the failure of long-term, large-scale projects to the decisions of specific individuals. In fact, the pressures to escalate in long-term established projects, including those that were previously unsuccessful, make those projects potentially more escalatory than others even when key individual decision makers change (Drummond, 1994). Further examination of the organizational determinants of escalation may help explain repeating failure phenomena and thus holds similar promise for explaining cycles of escalation and withdrawal of commitment over time in large-scale IT projects.

The examination of organizational determinants of escalation is virtually non-existent in the general escalation literature (Staw, 1997). Most existing literature on the escalation of commitment to a failing course of action focuses on escalation as an individual decision. Individual differences and determinants have an undoubtedly important affect on escalation of commitment (Whyte, Saks and Hook, 1997). However, the almost exclusive orientation on individuals has produced a wide range of variables and theories regarding the causes of escalation, none of which are sufficiently explanatory (Staw, 1997). This bias is probably driven by the traditionally heavy focus of escalation research on experimental methods that focus on individuals. It leads to the need for more studies focused on organizational-level explanations of escalating commitment. Linking to organizational research concepts like inertia and strategic momentum Meyer and Zucker (1989) posit that over

time self-reinforcing patterns of behavior emerge in organizations that supercede the role of individuals in the failure process. In situations where projects experience multiple cycles of escalating and de-escalating commitment, previously identified individual determinants of escalation take on different roles in redirected projects than they do in projects that escalate and are terminated or abandoned (Newman and Sabherwal, 1996; Drummond, 1994). However, the long-term persistence of these factors and how they result in organizational determinants of escalation have not been carefully examined.

Escalation Cycles in Public versus Private Organization

Although the case selected is a U.S. government agency, evidence suggests that similar escalation behaviors exist internationally and in both government and business organizations (Keil, Tan, Wei, Saarinen, Tuunainen and Wassenaar, 2000; Keil, Mann and Rai, 2000; Keil, et al., 1994-1995; Staw, 1981, Staw 1976). The only other long-term longitudinal study of IT project escalation utilized a private sector case (Newman and Sabherwal, 1996). However, there are differences in public versus private sector systems implementation (Rocheleau and Wu, 2002; Bozeman and Bretschneider, 1986). Thus while escalation of commitment may occur in both public and private organizations, due to differences in the IT project environment it may not unfold in the same way. Meyer and Zucker (1989) posit that the motivation to terminate or alter existing courses of action tied to poor performance is lower in public organizations than private organizations. This increases the likelihood of escalating commitment to failing courses of action in the public sector context. In the absence of long-term studies of large-scale IT project escalation cycles in the public sector we can not confirm if the process by which escalation cycles emerge is the same or different from private sector organizations.

RESEARCH APPROACH

This research utilized an in-depth case study that allowed us to study the processes of escalation and de-escalation in a more natural setting. An in-depth case study is an appropriate technique for an exploratory study of this nature where the focus is on theory-building (Benbasat, Goldstein, and Mead, 1987). While future stages of this research will employ replication sampling to a greater number of cases, the current study concentrated on a single case of recurring failure with evidence of cyclical escalatory patterns. We posit that the single in-depth case study selected contributes new understanding of the organizational determinants and processes involved in the escalation of large-scale IT projects.

The IRS modernization effort is a good project to select for studying large-scale IT projects that fail. The IRS is a particularly interesting example because the IRS is considered to be a very well-managed agency (Bozeman, 2002). The IRS engaged in four distinct major attempts to modernize since the late 1960s, the first three of which clearly failed at a combined cost over US\$4 billion: the Tax Administration System Project from 1969 to 1977; the Service Center Replacement System and Tax Systems Redesign projects from 1978 to 1986; and the Tax Systems Modernization project from 1987 to 1997. The fourth attempt, the Business Systems Modernization Project, began with the Blueprint Project around 1998 and is still underway with an estimated cost in excess of \$10 billion (Varon, 2001). The various iterations of the IRS modernization effort received wide-scale attention in the media, in oversight organizations, and within the agency itself. The ease in acquiring longitudinal data on the project at a relatively low cost, and the nature of the IT project itself, made this an ideal case to study to learn more about escalation and de-escalation processes in large-scale IT projects.

Our initial research question focused on understanding the nature of organizational determinants of escalating and withdrawing commitment in large-scale IT projects among government agencies. We selected an initial set of “potentially important” variables from a set of existing escalation and de-escalation theories in an effort to understand if and how these variables persist over multiple cycles of escalation. The purpose of selecting variables from multiple theories was to achieve Eisenhardt’s (1989:536) suggestion that in this type of exploratory research one try to come “as close as possible to the ideal of no theory under consideration and no hypotheses to test.” We applied the initially selected variables to a collection of over 750 historical documents, including audits, reports, memos, project documentation, media documents, congressional testimony and other studies. The data analysis process adhered to the case study research procedures suggested by Yin (1994) and Eisenhardt (1989) using the grounded theory techniques compiled by Strauss and Corbin (1990). It is from this stage that our findings began to emerge as we searched for patterns, or what Yin (1989:14) called a “chain of evidence,” among the variables over time. From this analysis we observed several factors that persisted over time and contributed to repeating cycles of escalation and failure.

CORE FINDINGS

The IRS case provides new insight into the dynamics of commitment in large-scale IT projects. These insights can be best explained by comparing them to the Centco case developed by Newman and Sabherwal (1996). The key contribution of the Centco case was a process model of the repetitive escalation and withdrawal of commitment to failing IT projects over time. Like Centco, the long time span covered by the IRS case allowed us to see persistent conditions in the organization that

continued despite changes among individual actors. Indeed, the IRS Commissioner changed no fewer than 12 times over the modernization efforts. The top IT leaders changed at least as frequently. A more short-term study might have obscured our ability to see organizational determinants of commitment as separate from individual factors. The IRS project went through multiple cycles of shifting commitment, including multiple terminations and redirections, and reconfirmed Newman and Sabherwal's (1996) observations of this phenomenon. Unlike the Centco case, the IRS modernization effort provides a situation where the decision to remain committed cannot be tied to any one individual or small set of individuals. Therefore, looking at organizational conditions influencing the shifting commitment and the decisions to redirect were very helpful. Through the longitudinal and organizational focus of this study, we observed two capability gaps that emerged in the project at the organizational level: a gap between required system capabilities and delivered system capabilities; and a gap between emerging project characteristics and existing project management and systems development capabilities.

The Strategic Needs Gap

Organizations are not going to engage in multi-year, multi-billion dollar IT initiatives without involving multiple people in the decision and having a clear strategic need. The strategic need is defined by the performance gap that exists between (a) the system capabilities required for the organization to fulfill its mission and respond to emerging strategic issues, and (b) the ability of currently delivered system capabilities to meet the organizational requirements. In the IRS case the required system capabilities are defined by the goals of modernization (faster access, current technology, better integrated information, automating inefficient processes) and emerging strategic issues facing the agency (desire to improve service to taxpayers, requirement to improve financial management, requirement to reduce the tax gap, and requirements to minimize opportunities for fraud and security violations). In the IRS case we see that as the modernization efforts fail to significantly improve delivered capabilities the required capabilities do not remain stagnant. In fact, while the fundamental goals remain the same, the emerging strategic issues facing the agency result in the system capabilities required by the organization to increase as well.

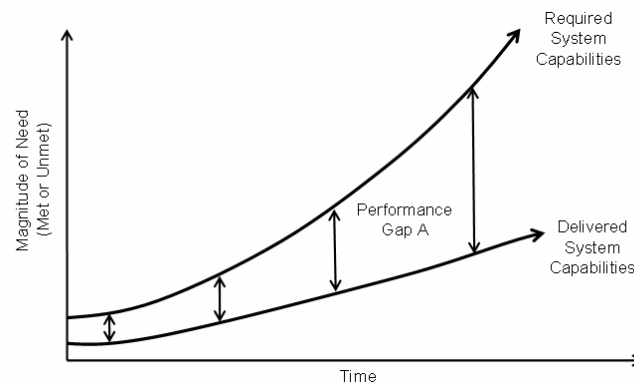


Figure 1. The Strategic Needs Gap

As the gap between delivered and required system capabilities grows (Gap A in Figure 1) organizational level commitment to undertaking a project increases. The need to meet the required system capabilities leads to the initial organizational decision to commit to a large-scale IT project, as well as to subsequent decisions to commit to redirected projects. Gap A has a direct affect on the emerging project characteristics of perceived project importance, project size and project complexity. As Gap A grows, the perceived project importance increases, making it increasingly difficult for the organization to not make a commitment to redirect the project upon failure or withdraw commitment from a project in progress. In the IRS case, as Gap A grew it created an environment where “failure is not an option.” Such an environment is likely to influence the psychological factors associated with individual commitment, in addition to maintaining or escalating the organization’s commitment to a large-scale IT project. As Gap A increases, the size and complexity of the project also increases. These emerging project characteristics will further influence organizational level commitment when compared to development capabilities.

The Development Capabilities Gap

The second performance gap (Gap B) shown in Figure 2 represents the risk involved in a large-scale IT project. The figure illustrates the difference between the size, complexity and importance of the project (emerging characteristics) as compared to the sophistication of the project management and system development capabilities of the organization. The

existing project capabilities must meet or exceed the capabilities required to complete a project of a particular size and complexity. If current project capabilities fall below that level, the risk to project success increases.

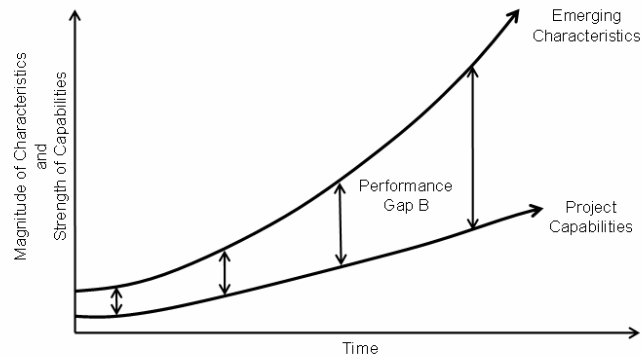


Figure 2. The Development Capabilities Gap

The persistence of Gap B throughout the lifespan of the IRS project has a direct effect on the likelihood that the project will succeed or fail, and influences both the escalation and de-escalation of the project in each cycle. The smaller the gap, or the absence of a gap, would suggest that the organization has the project management and system development capabilities required to successfully complete a project of a given size, complexity and level of importance. As the gap gets larger, the likelihood of failure increases. In the IRS case the presence of Gap B translated into an inability to successfully control the modernization efforts. Even as the IRS improved its development capabilities, the emerging project characteristics grew at a faster pace. Indeed, in the fourth modernization cycle the IRS achieved its first substantive increase in project capabilities as the agency moved from CMM Level 1 to Level 2 early in the project. This had a substantive impact on the agency's ability to control the pace at which the organization became committed to new project components and improved the agency's ability to withdraw commitment as components fell behind schedule and ran over budget. However, by the fourth modernization cycle the project has grown to such a size, complexity and importance, that the improved project capabilities are still insufficient to keep the project from falling substantively behind schedule and over budget or warrant its removal from the GAO's list of high-risk projects.

Gap Evolution Over Time

The two gaps are directly related to each other and influence the long-term escalation of organizational level commitment. As Gap A increases, the emerging characteristics component of Gap B (project size, complexity and importance) also increases. Similarly, the persistence of Gap B influences the organization's ability to improve the delivered system capabilities in relation to the required capabilities. As Gap B increases, it will be less able to improve upon the delivered capabilities and therefore, it will not be able to reduce the rate at which Gap A grows. Because the two gaps have a positive direct relationship with one another, unless sufficient system capabilities can be delivered to reduce Gap A, or project capabilities can be sufficiently improved to reduce Gap B, the organization will likely become trapped in an unending cycle of re-escalating commitment. Furthermore, one could expect that, as we see in the IRS case, as the two gaps grow the anticipated cost, schedule and organizational level commitment of resources required to successfully complete the project will increase with each new project cycle.

INDICATIONS FOR FUTURE RESEARCH

This study contributes to our existing knowledge by looking for determinants of organizational level commitment to a failing course of action, which is a previously understudied area (Staw, 1997). The IRS case provides an example where decisions to persist or commit were the result of collaborative decisions at the organizational level over long periods of time. The factors contributing to the two performance gaps identified play a critical role in shifting commitment at the organizational level as a large-scale IT project continues. The findings from this study point to the need to conduct additional research that identifies other organizational determinants of escalating and withdrawing commitment and the associated processes by which organizations become committed to failing courses of action.

The IRS case reconfirms that looking at large-scale IT projects over an extended period of time can yield new perspectives on escalation that have not been seen in shorter-term studies. Further research should consider comparative longitudinal studies to control for conditions such as a high versus low degree of turnover among key executives, IT versus non-IT projects, project size and complexity, perceived project importance, and the sophistication of project management and

system development capabilities. Through better understanding of the factors and processes involved with repeating cycles of escalating and withdrawing commitment, we may come to better understand escalation phenomena in general.

One way in which this study differs from prior research is that it considers the effect of systems development capability on the escalation of commitment. The IRS, while being a well-managed agency with experienced and quality managers, does not see its expertise and experience extend to its systems development capabilities. Prior studies (Newman and Sabherwal, 1996; Beath, 1991) suggest that further research is needed on the role of specific software development methodologies and their contribution to escalation of commitment. The results of this study suggest that sophistication of an organization's software development capabilities plays a direct role in the escalation of commitment. Further research should consider both of these issues and examine the combination of software development methodologies used and the sophistication of the software development capabilities.

INDICATIONS FOR PRACTICE

The "high risk" series of projects monitored by the U.S. General Accounting Office quickly yields a list of troubled projects at a wide-range of government agencies. The high rate of failure among large-scale IT projects results in significant financial losses for both public and private sector organizations. In addition to financial losses, these failures can cause public relations problems and potentially threaten the survival of the organization. The IRS case illustrates the importance of using good project management techniques and software development practices. In early attempts at large-scale projects, organizations should focus on developing strong project management and systems development skills and experience to minimize their effect on escalation. Because of the size of the prior lost investment and the increasing importance of strategic imperatives over time, managers of large-scale IT projects must be more aware of organizational drivers of escalating commitment in subsequent iterations of a project. Awareness of these issues allows them to be managed and for project managers to employ de-escalation strategies and techniques at signs of trouble.

This study highlights how important it is for managers of large-scale IT projects to be aware of the persistence of factors that may increase organizational-level commitment to a failing project. Many of the problems and the degree of escalation encountered at the IRS might have been overcome if issues presented by Gap B were resolved sooner. Managers of large-scale projects should carefully consider alternatives to achieving strategic imperatives and the consequences of not achieving those imperatives. If the project fails and the strategic imperatives remain, what will be the effect on the future of the project and the future of the organization? At a minimum, this research suggests that the likelihood of escalation in the next iteration is very high if not inevitable unless managers find a way to manage the consequences of the two identified gaps.

SUMMARY OBSERVATIONS

This study represents a contribution to research in that it explores new ground related to information systems implementation. The most significant contribution is the empirical evidence of organizational determinants of escalating and withdrawing commitment. Such organizational determinants are more likely to be present in large-scale IT projects which by their size, complexity and importance will likely require the decision to proceed be made by a larger organizational contingent rather than an individual decision maker or small group of decision makers. In addition, given the increased likelihood that IT projects will escalate in general, evidence that large-scale projects may escalate repeatedly opens a range of interesting questions with implications for escalation theory, knowledge management and large-scale systems implementation. This study extends prior research in each of these directions. In doing so, the existing research streams in this area are both supported and extended to reconfirm prior observations of repeating cycles of escalating and withdrawing commitment and to introduce new avenues of inquiry on these phenomena.

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