Walking Atop the Cliffs: 
Avoiding Failure and Reducing Risk in Large Scale E-Government Projects

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Abstract

Despite a growing body of descriptive, theoretical and practical knowledge about Information Systems Development (ISD), large-scale information system development and implementation projects still fail in high numbers. The deeper causes of such failures are only partially understood. This study uses an action research approach in which prescriptions and recommendations drawn from research on and practice in ISD are utilized, assessed, and expanded in an ongoing large-scale ISD project. This study is undertaken to address this partial understanding of failure and to add some clarity of understanding of the interdependence of technical, social and behavioral elements of the ISD process. Our preliminary results confirm earlier findings that failure causes are intertwined with technical, social, and behavioral factors. Organizational members’ deviations from a recommended sequence and scope of an ISD roadmap can be predicted and also adjusted to a certain degree. We also see evidence that the action research methodology provides a reflective framework that ties together theory and practice in a more immediate fashion promising faster and more effective feedback between the two.

1. Introduction: The Problem of Large Scale E-Government Project Failure

Few phenomena have been as extensively described as the failure of large-scale information systems (IS) and information technology (IT) projects. However, despite this growing body of descriptive, theoretical, and practical knowledge, organizational practitioners seem unable to sense early failure symptoms or avoid even well known shortcuts to failure. Various theories have been offered without becoming widely accepted. Instead of gradually dropping over time, IS and IT project failure rates remain at high levels. This leads us to assume that the deeper causes are only partially known. Further, our research suggests that these causes are intertwined with social and behavioral factors outside the reach of IT management. The case study discussed here provides preliminary evidence that the enhanced information systems development (ISD) framework presented here takes into account the interdependence of the social, behavioral, and technical factors, results in the avoidance of the typical shortcuts to failure.

An action research design (also referred to as practitioner-driven or reflection-in-action designs [1, 2]) is used for testing and expanding elements of existing and proposed frameworks within a real-world large-scale ISD project. This design seeks to reconcile IS research rigor with IS practice relevance, a balance of research directions that has been found desirable [1]. Action research as a form of applied research is exploratory in nature in that its targets can be moving and some of its frames are shaped during the process. Nevertheless, the approach is grounded in the knowledge of the field and guided by its principles and its methods. Action research, thus, seems to be appropriate (1) where the nature of observable phenomena is assumed complex and nonlinear, (2) where data are heterogeneous and incomplete, and (3) where social and behavioral factors exert a major influence. The method, hence, allows for verifying existing frameworks in a circular (feedback oriented) fashion within an organizational, non-laboratory setting.

We use the case of New York State’s Central Accounting System redesign, an ongoing major IS overhaul project, to illustrate the approach. The proposed enhanced framework provides preliminary evidence that the literature predicts various elements of system failure correctly, while it fails to integrate into a framework of relevant organizational, social, and behavioral elements. Further it provides evidence for the proposition that action research has potential for improving our understanding of the right balance of rigor and relevance in IS research.

First, we present a review of the traditional ISD literature and highlight the treatment of system requirements, user involvement, and user participation. We then focus on proposed criteria, indicators, and factors of system success and failure, and the notorious "dependent variable" of MIS research. We then look at other models of ISD developed in the 1990s in response to ever-higher rates of organizational and technological change, such as IT-enabled business process reengineering. Finally, we look at emerging frameworks of ISD, and how they deal with the technical, social, and behavioral factors.
2. Traditional ISD concepts

Traditional ISD concepts, which as of this writing still seem to prevail in theory and practice, predominantly emphasize the software engineering (SE) and technical administration sides of the undertaking (cf., for example, [3-5]). Experts are to develop and implement "quality" information systems (IS) on time and within budget which also meet user requirements. In essence, ISD, and more specifically SE, are seen as the application of computer science to various "problems." One of the more popular models proposed is Boehm's original waterfall and later (more resilient) spiral models. According to these models system development has to follow consecutive steps from early system conceptualization to operations and maintenance of the final system [6, 7]. The original waterfall model is rigid and linear, and disregards the iterative, nonlinear nature of the technical development process not to mention the organizational dimension.

Traditional models primarily link the ISD process to the real-world organization at two distinct occasions: the requirements' specification phase in early system design and the acceptance test phase of the finished product. The traditional approach still assumes that requirements remain static or need to be frozen at a certain point in time. Consequently, the degree of user involvement has mostly been an area of peripheral rather than fundamental concern even though there is evidence that system usage and user satisfaction are positively associated with user involvement into the ISD process [8-10]. Barki and Hartwick maintain that the term "user involvement" is too all-encompassing and has to be distinguished from (active) "user participation" in ISD [11]. Few studies systematically incorporate the ISD process into the overall organizational process (for example, [12]), and even fewer into the process of change and development. Studies on the social impacts of ISD driven change and their repercussions on the ISD process itself are also rare [13].

The discourse regarding criteria, indicators, and factors of IS success (or failure) as the final result of the ISD process has permeated the IS literature since its early days. Ackoff's provoking paper Management Misinformation Systems may be one of the earliest examples of this discourse on success or failure of IS coming to the attention of a broader audience [14]. Ackoff questions some of the fundamental assumptions ("myths") that seemingly underlie the ISD process which then almost consequently lead to IS problems, if not outright failure. Among these assumptions are (1) managers lack information, (2) managers need the information that they want, (3) providing the desired information improves performance. Since these assumptions are not supported by reality, IS and MIS in particular must go astray.

In a comprehensive review of the literature, Lyytinen analyzes the responses of the field to the difficulties it encounters in organizational practice [15]. He uses Ives et al.'s MIS research framework [16] in which the research field is divided into three "environments" - user, ISD, and IS operations (ISO). As major failure factors in the ISD process, and the SDLC approach in particular, he finds "poor, undisciplined, and incomplete development practices" in which "75 percent of all system development undertaken was never completed or, if completed, not used" (p. 9). Lyytinen acknowledges that "though IS problems are strongly interdependent" and related to (organizational) context components, "no extensive empirical studies have been done on this subject (ibid.). Moreover, resembling classical economic theory ISD research seems to assume completely rational behavior on behalf of the system designer on the basis of complete control over design options and outcomes. This perspective disregards organizational ambiguity and ISD reality. In contrast, evolutionary and organizational change process models emphasize "social learning" and orchestrated organizational change according to Lyytinen. Various approaches improving the interactions between IS and their environments have been proposed. Lyytinen classifies these as information system architecture, information need, success factor, socio-technical, and evaluation models (p. 22). The socio-technical approaches consider the social implications of ISD and attempt to align the organizational players on a consensus basis throughout the process. The coherence and collaboration of the two distinct tracks involved into a socio-technical design (the technical and the non-technical) Lyytinen maintains is not sufficiently understood. According to the author, the traditional technically oriented perspective on IS and ISD has been confronted, augmented, and complemented by theories such as socio-technical theory. Lyytinen concludes that there is a "critical shortage of empirical studies on IS problems" (p. 37) incorporating the broader context and relevant theories from outside the field. In another paper co-authored with Rudy Hirschheim, Lyytinen presents similar results [17].

In their widely recognized and cited paper Information Systems Success: The Quest for the Dependent Variable, DeLone and McLean present another review of the literature dedicated to IS success factors. Based on a review of 180 articles the authors derive six categories or constructs of IS success: (1) system quality, (2) information quality, (3) use, (4) user satisfaction, (5) individual impact, and (6) organizational impact [18]. DeLone and McLean find a multitude of measures across all six categories indicating a lack of a consistent framework. Most measures presented reflect technical aspects. They propose a success model in which system quality and information quality jointly influence system use and user (information) satisfaction the latter of which exert a reciprocal influence on each other.
the individual impact that, in turn, influences the organizational impact. The two authors acknowledge that this framework (the D&M framework) should be considered in the context of other contingency variables such as organizational strategy, structure, size etc. However, they do not elaborate on this context.

Seddon introduces four new variables (expectations, consequences, perceived usefulness, and net benefits to society) to a re-specified and extended D&M framework. His extension of the D&M framework regarding expectations on IS under development is likewise supported by a number of studies (cf. [19-21]).

More recent literature on IS/ISD success and failure factors can be categorized in two major strands: (1) the predominantly technical orientation and (2) the integrative (reflecting the direct and continuous interplay between technical ISD and organizational/administrative processes and change). Examples for the first strand are Ahiituv’s et al. proposal for subordinating the IS function and the allegedly waterfall-type ISD processes under tight-fisted control by non-technical senior management as adequate means for securing system success. In a similar vein, Mahoney and Lederer expect ISD projects with better planning and better estimation, smaller project sizes and shorter requirement lists, clearer requirements, and less cutting-edge technology involved as lower risk for running away [22]. They agree with Ahiituv et al. that poor monitoring and control as well as low senior management involvement paves the path to ISD process and product failure. Other recent research is more reflective of the organizational, psychological, and behavioral aspects among other socio-technical dimensions such as conflicting stakeholder interests, inadequate project team composition etc. (for example, [23-26]). Once ISD projects become troubled, a tendency exists to escalate rather than abandon such projects leading to high failure rates [27]. Permanent stakeholder involvement and a socially (not only technically) skilled project leadership is necessary for ISD and implementation success [28]. However, the lack of “lower-level” support can hamper any organizational and cultural change including those initiated by ISD [29, 30]. ISD efforts, in general, and those directed to reusable program architectures, have to be tailored to the individual organization’s need and culture in order to be successful [31, 32]. They have to match with the organizational ends and also with the social and physical environment [33]. Among critical ISD success factors for large-scale projects, ongoing senior management involvement, user involvement, user-reskilling, project-team excellence, and access to and use of external expertise is found in almost all of seven industrial case studies [34].

3. ISD frameworks and Emerging Models of ISD

Hirschheim and Klein are among the first to point out that from a philosophy of science perspective the various approaches to ISD and their underlying assumptions rest on markedly different and even opposing frames of reference [35]. According to the authors, the perspectives these frameworks provide for dealing with reality and the knowledge thereof lead to the different ISD approaches observed. They apply Burrell and Morgan’s framework of (1) functionalism, (2) social relativism, (3) radical structuralism, and (4) neo-humanism defined in the two-dimensional space between the continua of objectivism/subjectivism and order/conflict (cf. [36]) to the ISD process. They argue that this framework helps uncover and better understand hidden assumptions and beliefs in ISD projects and IS research with the majority of current IS research dedicated to functionalist research in a rather narrow way. Orlikowski and Gash also argue that with the frames of reference properly defined, differences in interpretation and expected outcomes become explainable [37]. In their view, incongruent frames among organizational players lead to difficulties and conflict in the ISD process making it necessary to elicit, address, and possibly eliminate such differences between stakeholder assumptions, expectations, and knowledge. Robey and Newman maintain that the (social) process view of ISD has attracted considerably less research than the factor-oriented variance approach [38]. The patterns were mainly ones “of social action” (p. 61). Among other recent authors Lloyd and Whitehead, Siviter et al., Herbsleb and Grinter, and Sauer et.al. share this perspective [39-41]. Wastell notes that “ISD is a process of organizational change in which IT systems are designed and deployed to enable more effective operational practices” [42, 582]. Consequently, insights from the vast organizational and psychological literature on change and learning apply. Recent functionalist research tries to break up the problem into its “socio-technical” component parts. Lytyinen et al., for example, present a model of ISD which incorporates four interdependent elements of (1) actors, (2) structure, (3) technology, and (4) task. ISD risks consequently, they argue, must be seen within these interdependencies. The authors discuss four different risk management approaches in light of their model leading them to a list of items (or factors) for which they propose various remedies [43]. Yet another study attempts a further revision of the D&M taxonomy and incorporates stakeholder theory into its proposal [44]. Since stakeholders’ interests differ, the conclusions they draw when evaluating ISD outcomes also differ.

In the face of unchanged high ISD failure rates, the traditional (functionalist) ISD literature increasingly acknowledges and incorporates concept elements from a number of social sciences for better understanding. However, they continue to avoid sacrificing the classical positivist positions and clear-cut proposals for success.
Over the years this is likely to result in a more moderate, post-positivist view as encountered before in other disciplines. Examples for more radical, even constructivist approaches in ISD also exist (cf., [45]).

Emerging models build on more recent understanding of the non-technical factors that influence information systems success. Bikson and Gutek conducted a study of over 2000 U.S. firms reporting that only 40% of new information systems achieve satisfactory results. In most cases the unsatisfactory outcomes were due to non-technical factors, specifically, only 10% of the failures were due to technical factors [46]. More alarming figures were found in two studies in Canada [47] and Malaysia [48] with 70% and 60% of failures, respectively, found to have human factors as the major culprit.

Addressing the criticality of human factors in an ISD process, understanding how and when to balance between the technology and work practices remains the challenge. Those researchers identified as social constructionists seek to explain how the interest and perspectives of individuals and groups shape the design and meaning of technical systems [49-51]. The prescription for success typically recommends directly involving these individuals and groups, especially end users [52].

Managing the pendulum swing from technology development as a discrete and scientific process to technology development as a wholly social process, or what Kling calls “relentless” social constructionism, which is to “obsessively deconstruct at the expense of all other forms of analysis [53, 355] is the challenge faced by those involved in ISD today (cf. also [51] and [54]). The balance must be adjusted over time as contingencies arise and as the focus on technical and social shifts throughout the dynamic process of ISD.

4. The Enhanced Framework for ISD

The enhanced framework is presented not as a replacement for what has come before it, but as an integration of many of the elements which have been identified throughout the literature and in our own research as contributing to the success or failure of ISD. The framework includes an enhanced system development & maintenance cycle, the typical shortcuts to failure and provides guidance, grounded in a sociotechnical approach, to avoid the these shortcuts.

Greater attention to stakeholders’ needs and pre-studies of current and best practices as well as of the relevant business processes are some of the critical additions to the system development cycle. The cycle, described below, has been enhanced to reflect new knowledge about critical elements of ISD (see Figure 1):
- Identifying and working with stakeholders to identify needs up front and working with them throughout the process is critical for many reasons including developing an appropriate focus for the effort at the outset, adapting focus as needs change or evolve over time, and establishing and maintaining support for the effort.
- A pre-study of business processes and workflows, along with best and current practice research is mandatory.
- Careful and detailed analysis of workflows and data structures using adequate tools (pre-study results do not make up for a detailed analysis).
- Data structures must be built or rebuilt on the basis of the careful and detailed analysis.
- Streamlined business processes and workflows depend on solid, possibly newly designed data structures.

The cycle is further enhanced through the identification of elements that impact success. These elements include:
- User involvement is mandatory throughout the whole analysis and design effort; prototyping of system elements with users ensures required functionality and acceptance
- The implementation and evaluation of a system is a collaborative process with designers, developers, users, managers, and organizational leadership.
- Pressure from the environment will increase the temptation to skip necessary building block steps in the cycle.
- Internal project team impatience for action (defined as procurement, development, and implementation) can result in the temptation to skip necessary building block steps in the cycle.

Not attending to these elements can result in “shortcuts to failure.” The shortcuts were derived from primarily from our own research in ISD. The prescriptions provide guidance to researchers and practitioners in applying the enhanced ISD cycle and the link between the technical and social and behavioral aspects of ISD.

The case study presented here is part of an ongoing action research effort. The project is in the pre-study of business processes and of current and best practices phase. A set of propositions related to the characterizations of efforts that take the identified shortcuts was developed (see Table 1). These propositions, linked to shortcuts s1 and s2, are used to present the insights from the application of the enhanced framework to the case. Each proposition identifies a particular decision or process likely to result in a shortcut to failure. The challenge to the Center as action researchers was to look for incidents or behaviors that have explanatory value in terms of failure factors while working with the team to counterbalance the affect of those incidents or behaviors. The Center developed this set of propositions in order to both guide observations, and to have contingency plans in the event that the project...
team would need to be directed away from particular shortcuts.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Shortcut to Failure Propositions</th>
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<tr>
<td><strong>Propositions related to Shortcut S1</strong></td>
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<tr>
<td>1</td>
<td>Will conduct a cursory stakeholder identification process.</td>
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<tr>
<td>2</td>
<td>Will not seek serious partnerships or ongoing information collection with stakeholders, key or otherwise.</td>
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<tr>
<td>3</td>
<td>Will curtail the breadth and depth of the feedback collected from stakeholders.</td>
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<tr>
<td>4</td>
<td>Will follow a pre-determined path for the project and not develop a plan based on stakeholder feedback.</td>
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<tr>
<td><strong>Propositions related to Shortcut S2</strong></td>
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<td>6</td>
<td>Will revert to traditional analysis methods in response to environmental pressure for an answer.</td>
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<tr>
<td>7</td>
<td>Will adopt the results of the pre-study of business processes rather than invest in comprehensive investigation and documentation necessary.</td>
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**Enhanced System Development & Maintenance Cycle**

![Critical Success Factors (CSF): Stakeholder Involvement & Prototyping](image)

5. **Use of the Case Study**

This study looks at the application of the enhanced framework to a large-scale IT effort in a government agency and draws insights from the experience of an organization that selected the so-called socio-technical approach to ISD and worked with the Center for Technology in Government to implement this approach. The case fits the criteria described by Yin in which "case studies are the preferred strategy when ‘how’ or ‘why’ questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context" [55, 13]. Using a case study reflects the need to capture the longitudinal complexities involved in both process and structure, in response to an original set of questions arising from innovation efforts [36].

The findings reported here are preliminary results of a longitudinal case study of large-scale IT project in New York State. The research data are collected as part of an in-vivo examination of an actual public sector innovation project as it is being developed. The Center's staff collaborates with the government agencies in planning and developing the innovation project. This level of access allows for intensive participant observation as well as interviews with individuals and groups, related field observations, surveys of participants, and examination of policy and project documents.

A key method is the use of long-term participant observation to collect data on important processes, sequences of events and their context, as well as participants’ understandings and the construction of meaning [55, 57]. Center staff members were active participants who developed long-term working relationships with the research subjects. This provides opportunity to observe closely how project participants perceive, interpret, and react to the factors that impinge on their ability to implement the enhanced framework.

6. **The Case: The New York State Central Accounting System Redesign Project**

The Central Accounting System (CAS) for New York State is operated and maintained by the Office of the State Comptroller (OSC). OSC is responsible for all disbursements of state funds, maintaining state accounts, managing investments in the employees retirement system, and generally supervising financial management in state agencies.

The current central accounting system, launched in 1982, provides financial service to all State agencies in budgetary controls, accounting, and reporting. Solid maintenance and enhancement of CAS over time has allowed the CAS to keep pace with changes in key areas and current users attest to the reliability and usability of functions the CAS was designed to perform. However, there is an increasing gap between what the CAS can do and the current accounting and financial management needs of State agencies. OSC leaders recognize that the defined. We use this term with caution since it may cloud the crucial dynamics of social, organizational, and psychological processes in ISD projects by means of a mere “technical” interpretation.

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1 The term “socio-technical” has been used in the literature for more than a decade. To the best of our knowledge it has never been properly defined. We use this term with caution since it may cloud the crucial dynamics of social, organizational, and psychological processes in ISD projects by means of a mere “technical” interpretation.
20-year-old mainframe-based CAS is insufficient to support agency accounting and financial management needs. Despite its limitations this mission-critical, statewide system issues 15,000 payments daily, tracks 80,000 State contracts, and processes 17.5 million transactions annually. Clearly, the CAS is still the workhorse and backbone of New York State’s financial structure.

The original design of CAS did not support agency access to and manipulation of detail data. Over time, however, agencies have come under pressure to provide cost-based performance measures that depend on this access.

OSC’s main business focus is the administrative “enterprise” of state government. The staff responsible for the central accounting system is very experienced and well aware of the central and pervasive role that CAS plays in state and local government operations. To guide this effort, OSC developed a partnership with the Center for Technology in Government (CTG).

7. The Challenge of Change: Implementing the new approach to ISD

OSC ISD practice was traditionally technically oriented. However, the Agency leadership, in part because of some previously existing and building appreciation of the need for a new approach, came to CTG for assistance. They sought a strategy that would allow for more broad-based and ongoing external input and influence over the project. Agency leadership was committed to a rigorous, open, and systematic analysis of CAS, the business environment, and emerging technologies. The challenge to the agency was could this new vision and commitment be effectively shared with and adopted by those who would carry out the effort, and could it sustain over time. In general, the early efforts benefited from the enthusiasm for a new, right way of doing systems, for excitement about being involved in something different. Over time this enthusiasm was challenged by traditional and familiar approaches and by searches for easy and acceptable answers.

The propositions, which represent the likely pitfalls for ISD efforts are used to present the story of how OSC responded to the challenges to their new approach to ISD.

P1: Will conduct a cursory stakeholder identification process.

The agency avoided the first shortcut to failure by both investing in a full analysis of stakeholders and by not compromising on their efforts. They launched a review of the academic literature on stakeholder theory [21] and engaged in multiple information and discussion sessions to explore the application of the lessons from the literature and from the experiences of Center staff. The team worked hard to identify primary and secondary stakeholders and to understand the nature of each stakeholder’s relationship to the project. A list of over 400 stakeholders was initially developed. Organizing schemas were used to assist the team in considering the 400+ stakeholders. The enhanced framework was influential in focusing the efforts of the OSC team. In addition, recent knowledge of other large-scale IT failures also weighed heavily on the minds of OSC. Two high visibility failures had been diagnosed as falling down on this very first step and building significant systems that were not reflective of stakeholder needs.

P2: Will not seek serious partnerships or ongoing information collection with stakeholders, key or otherwise.

The second likely opportunity for a shortcut to failure is not engaging in serious partnerships with key stakeholders and not continuing to capture and use information from stakeholders. Rather than stopping after the identification and categorization of stakeholders, OSC moved forward on a plan to respond to the analysis from the stakeholder identification process. When the analysis was complete two things became clear: Stakeholders were not uniform in their interests or influence and dealing directly with over 100 organizations and thousands of individuals would not be practical. The team identified a smaller group of partners and selected 40 organizations to work with based on percentages of transactions and dollar value of transactions.

The first group of very influential stakeholders was named “strategic partners.” Strategic partners have the authority to exert a powerful, make-or-break influence on the project, as well as have uniquely important needs to be addressed by the system. The group comprised of OSC’s internal leadership, the Division of the Budget, the State’s Office for Technology and both houses of the State legislature. The team organized a series of meetings where significant aspects of the project were discussed before being carried out and also agreed that the full engagement of strategic partners, while representing additional work in the short run, represented potential opportunity for long-run payoffs in terms of support for the effort. These meetings established transparency and opportunity to influence the process as it was being devised.

OSC worked with the Center to develop a systematic and rigorous approach to collecting stakeholder needs. Significant effort was invested to identify logical ways to divide up the 40 agencies so that data could be collected in a manageable and usable way. Each workshop focused on stakeholders that had some common characteristics. For example, those agencies that used in-house financial management system formed one group, those that rely entirely on CAS for financial information formed another. In this way agencies could hear from agencies with comparable environments, and the project team could compare needs across the environment to determine any
Participants were skeptical that in fact OSC was actually wasn’t really already written for the new CAS?”

number of times throughout the workshops if the “RFP this analysis would truly reflect the needs as identified by stakeholders. Both OSC and Center staff were asked a

very cognizant of the new role of strategic partners and of the design of the stakeholder analysis. OSC leadership was

during this phase of the effort that the team illustrated their commitment to a full and comprehensive stakeholder analysis. The final elicitation questions reflected a compromise of approach. The question asked participants to think in terms of an overall ideal design, but focused specifically on an ideal design for an “accounting system”. As a result, each of the over 200 participants in the 13 workshops conducted was asked to answer two broad “complete-the-sentence” questions – An accounting system designed to meet the…

• …informational and information access needs for my agency would ideally . . .

• …transactional needs for my agency would ideally . . .

The 13 workshops generated more than 1,100 individual proposals for ideal systems. The participants themselves grouped their proposals into clusters of similar ideas. Finally, the workshop participants ranked the clusters in order of importance. The data analysis then focused on the clusters and the participant-defined rankings rather than the frequencies of similar proposals.

The top five clusters for both transactional and informational needs generated in each workshop were consolidated into six “dominant themes”. Data access and manipulation capabilities emerged as a high priority item in every workshop; real time workflow support, improvement in basic financial processes, support for e-business, and better usability were high priority themes in half to two-thirds of the workshops.

P4: Will follow a pre-determined path for the project and not develop a plan based on stakeholder feedback.

In the initial meetings between OSC and the Center, OSC expressed concern that they might be perceived as having preconceived notions of the evolution of CAS and that the stakeholder needs analysis was lip service to those who lobbied for more stakeholder-inclusive system development. This concern continued to influence the design of the stakeholder analysis. OSC leadership was very cognizant of the new role of strategic partners and of the criticality of their comfort that the conclusions from this analysis would truly reflect the needs as identified by stakeholders. Both OSC and Center staff were asked a number of times throughout the workshops if the “RFP wasn’t really already written for the new CAS?” Participants were skeptical that in fact OSC was actually collecting information from stakeholders that would be used in formulating a plan for the replacement CAS.

The effect of this regularly voiced concern was notable. The OSC staff developed an early and strong commitment to the development of a plan that was fully and soundly based on stakeholder feedback. OSC invested heavily in a series of presentations on the findings and the resulting plan. These presentations shared data summaries and the resulting plan and provided both OSC other agency colleagues, as well as strategic partners to question and comment on the process and the outcome.

P5: Will revert to traditional analysis methods in response to environmental pressure for an answer.

The New York State Central Accounting System Stakeholder Needs Analysis [58] concluded that prior to moving forward with the implementation of the next generation accounting system for the state, OSC was to learn more about the fragmentation in existing business processes and standards. As the report states, this fragmentation has “resulted in the unnecessary complexity that prohibits the kind of querying and use that agencies need to make of their data.” The recommendation called for a comprehensive effort that would begin with a pre-study of the eleven financial management processes and of current and best practice in other states.

Analyzing core business processes, according to the enhanced ISD framework starts with a pre-study of business processes and ends with the analysis of data structures. To launch the team on this effort, a pre-study covering two broad areas was conducted.

• Research into current and best practices in overhauling large-scale IT systems, and, in particular, Central Accounting Systems

• Increase understanding of the fragmentation in existing work processes within and adjacent to the Central Accounting System

OSC launched the current and best practices research effort by speaking at length with representatives from many states about their efforts to replace legacy accounting systems. The team received over 30 sample Requests for Information (RFI) and Requests for Proposals (RFP). This data collection effort was undertaken initially as a mechanism for orienting the team to the practices in place in other states to minimize the learning curve and to build on the experiences of others. However, relatively early on the effort began to take on new weight. In studying the sample RFIs and RFPs the team discovered the sets of user requirements used by these states as part of their RFI and RFP processes. These user requirements were originally considered to be background information for the team. Through a turn of events, these user requirements began to represent a golden nugget for the OSC team that would allow them, they believed, to skip the intensive effort of analyzing and
improving business processes and developing specific user requirements from those improved processes. Significant investments were made into capturing these requirements from the 30+ RFIs and RFPs, integrating them and preparing them for review by agencies. Lists of user requirements were presented to agencies for their review and comment. Although the OSC team continued in their efforts to do the pre-study of selected business processes, they began to question the need for it, given the availability of the user requirements from other states’ efforts.

A further element which contributed to the likelihood that the team would take a shortcut to failure here was increasing pressure from the environment to produce a “deliverable” that showed progress toward the goal of selecting a strategy for replacement of the CAS. In the interest of moving the project along, the project sponsor began setting deadlines for the delivery of a user requirements document based on the findings of the current and best practices research. The Center worked with the team to discuss the implications of abandoning their efforts to conduct both the pre-study and the more comprehensive analysis and move to their more traditional methods. Such a pre-study – it was envisioned – would enable OSC to make informed decisions regarding the course of action necessary to prepare for a full-scale analysis of business processes and data structures. Conversations with leadership were held to discuss the focus on the user requirements document. It was discovered that the agency leader had gleaned from the project team presentations that the current and best practices research was providing insights into user requirements and he picked up the enthusiasm for these findings from the team and assumed that this would be the critical deliverable. After discussions with him, it became clear that his focus was on a deliverable and a deadline. Regardless of this discovery, the team had developed an investment in the production of this set of user requirements. The leader agreed that it was critical for them to learn agency business processes to determine where real complexity exists and where complexity created through differently developing environments and solutions strategies exist. Although the team agreed with the criticality of learning about agency business processes, they relatively quickly adopted an approach that reflected a different, more efficiency oriented perspective.

The project team began to feel the pressure to produce deliverables that would move the effort closer to the RFP stage. The project team and its leadership began to feel both personal and organization unrest about taking “so long” to decide “what to buy.” The project had been underway for one year. At one point in the process the OSC team proposed the strategy that they continue work on the requirements documents, and that the Center could continue the pre-study of the business processes and then prove to the agency which approach was better. The early commitment to systematic and rigorous analysis had been chipped away by inadvertent focus on a background deliverable and by pressures to revert to more answer oriented than discovery strategies.

P6: Will adopt the results of the pre-study of business processes rather than invest in comprehensive investigation and documentation necessary to support a build or buy decision.

Going directly from preliminary analysis to a build or buy decision is a very common and expensive shortcut to failure. Avoiding this shortcut is really the foundation of the strategy that was adopted by the agency. The bias toward design and development rather than analysis and review provided the most challenge to their commitment. The ISD strategy they adopted sought to address the social and behavioral elements of IS as well as the technical. Continuing to fully involve stakeholders, keeping strategic partners informed, exploring and documenting work processes and organizational conditions that influence work and continually adapting to new information is a challenge in any effort, but was particularly so here.

Results from the current and best practices research provided insight into the criticality of a comprehensive investigation of current processes and environments. A number of the states interviewed reported that their new systems provided significantly less functionality and service than their previous systems. One state reported “sure we have the latest technology, but we’ve gone back 10 years in the capacity of the system to support the work we do and how we do it.” Others reported having to manually complete work that they had been using the old system to do for years. They lamented their quick moves to solutions rather than investment in comprehensive analysis of current environments and practices. This information directly supports the strategy developed by OSC to understand the nature of the current efforts and systems prior to moving forward. Regardless of the insights gained from the experiences of others the team continued to wane in their commitment to this strategy.

The early strategy called for a 3-year timeline prior to a build or buy decision. The agency supported this strategy, presented it as its own, and invested it in. However, the pressures to move to conclusions, the discomfort with lengthy analysis, with the burden of external participation, and the attraction of being committed to an approach and in the “development” stage may be greater than the team can bear. At this point in time, it seems unlikely that the team will revert to the original plan.

8. Project-specific Conclusions

Due to the awareness of the risky nature of the project the organization followed the prescribed path in the early stages contrary to our first four propositions (P1 to P4).
We maintain that different outcomes will result and at least partially confirm our propositions also for the early project stage once no intervention from participant observers occurs. Our view is supported by the outcomes of the subsequent project phase (P5 and P6) in which the research team played still a participant observer role but only on the sidelines while the organization took over the project lead. In this phase the outcomes confirmed our propositions: Managerial pressures to quickly produce visible results accompanied by a lowered top management involvement in the project soon led to the expected shortcut orientation and action. Once top management (both IT and non-IT) de-emphasizes the criticality of its pursuit, lower hierarchy project team members (even if fully cognizant of the risks) will not follow through with the prescriptive framework. Technical rather than socio-technical elements begin to dominate the project, and also linear and single-handed action rather than iterative and stakeholder-inclusive patterns of action begin to prevail.

The literature has stressed the importance of top management involvement as a critical success factor in ISD projects over decades. Our study confirms this insight again, however, we add that the kind of involvement needs to be well informed in the socio-technical sense. Such informed and involved top management nevertheless needs to resist the temptations of using shortcuts in large-scale ISD projects.

9. General Conclusions

Over many years and through deliberate academic efforts, IS research has limited itself to problems addressable with methodological rigor in a rather positivist sense (cf. [1]). This has led to unsatisfactory predictions and incomplete prescriptions regarding the “dependent variable,” that is, IS success. IS research for this reason it has been said has contributed in a limited way to addressing problems relevant to IS practice. Consistently high IS failure rates have underscored this point over time. For some time, the field has discussed the rigor versus relevance question as a trade-off issue. With an equal footing in both the IS research tradition and practical ISD involvement, we do not subscribe to the trade-off view. We rather see the IS research literature as a source which should be drawn from in ISD projects and which should be fed back into from such projects expanding our understanding on both ends. This study makes a case that IS research can be more successful and relevant when it incorporates perspectives related to other than just technical themes. When considerations of IS are embedded in an organizational context non-technical elements begin to play a major role. This is when—as social scientists painfully have noticed before—the building of positivist tenets begins to look less solid and less promising in search of enhanced understanding of highly ambiguous and dynamic contexts. Applied research in the form of action research approaches has the capacity to bridge the gap between the rigorous models and what we find in practical projects, with large-scale ISD projects being the case in point.

Our enhanced framework is preliminary and subject to iterative change. It marks a milestone of understanding. Its generalizability is not easily tested. Large-scale ISD projects are seen to be path-dependent. However, with carefully collecting project related information, a perspective evolves that not only reflects on a higher plane while the projects is still underway, but it also feeds back on the models and frameworks that were used from the literature. The more results from such action research projects become available, the more we will enjoy a deeper understanding of both the independent and the dependent variables.

10. References


