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Boundary Objects and Internal Control in Outsourced ISD Projects: Results of a Pilot Study

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ABSTRACT

Control of outsourced IT projects is an important topic in several research disciplines. This study brings together two approaches from auditing and IS literature in order to obtain deeper understanding of control mechanisms in complex outsourced IT projects. It is proposed that communication tools, viewed as "boundary objects", are also useful for implementing control functions, such as risk assessment and performance monitoring. To test this proposition, field data will be collected from managers of complex outsourced IT projects through an online survey instrument.

This paper presents the results of pilot survey data analysis. The data suggest that different types of communication tools are suited to support different control objectives. Another observed pattern is that the number of different tools in use and requirements for specific tools in the outsourcing contract are negatively associated with project success.

Keywords

Internal control, COBIT, boundary objects, outsourcing, ISD projects.

INTRODUCTION

Contemporary business practices are increasingly complex and increasingly dependent on the ability of people from different organizations involved to coordinate efforts. The need for effective internal control is especially pertinent in such a complex environment. An internal control environment should encompass all organizational functions, including IT. Moreover, control over IT is especially important and especially challenging since IT is involved with virtually all other processes in an organization, supporting the work of all other departments and enabling cooperation and coordination among them.
The auditing profession has developed several guiding frameworks to help companies establish effective systems of internal control and comply with reporting requirements. These frameworks (e.g., COSO and COBIT) identify detailed control objectives that can be used for developing audit tests. However, industry surveys show that, despite the availability of detailed guidance documents, most IT executives are not aware of their IT control assessment responsibilities (Hall and Liedtka, 2007).

This issue became even more pressing after the big corporate corruption scandals of the early 2000s and the subsequent passage of the Sarbanes-Oxley Act (SOX) in 2002. SOX makes executive management directly responsible for adequate control and sets new and increased requirements for internal control and reporting. Compliance with SOX introduces significant changes to an organization's systems of internal control and, in the long-term, to the whole business culture (Butler and Richardson, 2005). Due to the unique role of IT departments and their involvement in all other business processes, effective internal control of IT is especially critical.

In today's business environment, different IT functions are often outsourced to external vendors. IT outsourcing (ITO) does not eliminate the need to comply with SOX reporting requirements. On the contrary, the importance of effective control is much higher for outsourced functions than for the same functions performed in-house. Relying on the vendor's internal controls is a dangerous strategy. Vendors are not always cooperative in providing information on their control mechanisms (Hall and Liedtka, 2007); worse is that this information may be incorrect or even fraudulent (e.g., Wilson, 2009). Yet, most IT managers have no clear idea of the impact of ITO on SOX compliance. The effect of SOX on corporate IT in either outsourced or in-house form has not attracted much attention from researchers either (Hall and Liedtka, 2007).

At the same time, different aspects of ITO, including the issue of control, has a long history of attention from IS scholars. The IS outsourcing literature of the 1990s argues that control mechanisms should be defined in great detail in a contract and followed throughout the entire project lifecycle. Later evidence has shown that this method of control implementation is too rigid (Gopal and Gosain, 2010) and is not sufficient (Choudhury and Sabherwal, 2003). The system of control of ITO is more effective when it is flexible and can evolve over time (Ibid.).

The purpose of this paper is to investigate the role of different communication tools ("boundary objects") in providing internal control in one type of ITO – outsourced IS development (ISD) projects. It is argued that the ability of well-suited boundary objects to facilitate communication and create shared meaning makes them useful for implementing some control functions, such as risk assessment and performance monitoring, which are particularly important in an outsourcing relationship. Therefore, boundary objects used in ISD outsourcing arrangements are likely to serve purposes of external control as well.

BACKGROUND

Information technology plays an important and unique role in today's organization. It supports the work of most organizational units and facilitates communication and coordination among them. Information systems demand large initial investments and costly maintenance. However, an organization can only benefit from the use of IT when technology is well aligned with the company's processes and governed in accordance with its overall organizational strategy (e.g., Pinsonneault and Rivard, 1998). Managing IT is a complex and ambiguous process. It bears high risks and requires appropriate mechanisms of internal control. The ubiquitous role of IT in an organization and its close involvement with most business processes makes internal control of IT as complex and as critical as is the IT itself.

The complexity of internal control of IT has long been recognized by auditors. In 1996, the Information Systems Audit and Control Association (ISACA) issued a detailed control framework for IT organizations - Control Objectives for Information and related Technology (COBIT). COBIT is built in part upon the integrated internal control framework by the Committee of Sponsoring Organizations of the Treadway Commission (COSO), which was first issued in 1992 and expanded in 2004. COBIT's definition of internal control is adapted from that of COSO: "*the policies, procedures, practices, and organizational structures designed to provide reasonable assurance that business objectives will be achieved and that undesired events will be prevented or detected and corrected.*"

The Sarbanes-Oxley Act of 2002 (SOX) introduced revolutionary changes to auditing and reporting legislation and practice. Each audited company is now required to document its significant processes, identify and test the key controls in these processes and present a written assessment of the effectiveness of internal control over financial reporting (PCAOB, 2004). Adoption of COSO framework helps comply with these requirements, and is recommended by the Auditing Standards Board.

SOX affects virtually all business processes and all of an organization's functions. IT departments that are involved with most business processes and have a notable impact on both financial and managerial accounting, also face new requirements for reporting and control (Butler and Richardson, 2005). These requirements are reflected in the COBIT framework which is frequently updated to fit its users' needs. An international team is currently working on COBIT 5.0 edition, scheduled to release in September 2011. All versions of the framework are based on the same underlying structure: thirty-four IT processes are grouped into four broad categories to provide guidance on how IT can affect the overall company's system of internal control.

Although not referenced by the literature on IS development, COBIT's definition of internal control can be easily used to describe its approach to control in project management. Development projects are challenging to manage: on the one hand, participants are usually highly interdependent and their effective coordination requires structure and discipline; on the other hand, flexibility is essential to support the spirit of innovation and motivate people to do high quality work (Clegg et al., 2004).

The project management literature clearly distinguishes between project objectives that are focused on the quality of the final product and those concerned with the development process, and the "structure" and "process" approaches to control respectively. The "process approach" emphasizes control over activities (behavior control), while the "structure approach" suggests using outcome-based control. A balanced combination of these two types of controls preserves an innovative spirit while allowing for effective coordination of efforts and meeting deadlines (Nidumolu and Subramani, 2004)

The balance between control of product quality and control of the development process is dramatically changed when the development project is contracted by an external vendor. A vendor's objectives, management practices, organizational (and often national) culture are very different from those of the client. The client organization should also keep in mind that the vendor may be prone to opportunistic behavior. Outsourced projects therefore require increased client oversight of project management, communication with the vendor and associated modes of control (Levina, 2005). Hall and Liedtka (2007) explain in more detail the difficulties of monitoring a remote vendor. They mention higher costs, the increased risk of not fully understanding the processes on the vendor side and difficulties obtaining a vendor's internal control information.

The outsourcing literature pays significant attention to outsourcing risks and the need for control mechanisms to assess and manage these risks. Control is generally viewed in IS and Management research as "a process of regulation and monitoring

for the achievement of organizational goals" (Das and Teng, 2001, p.258). This approach is conceptually close to definitions by COSO and COBIT; however, it is much less specific and allows for broad, often abstract, interpretations.

It is commonly accepted that outsourcing contracts should include an agreement about control mechanisms (e.g., Ngwenyama and Sullivan, 2007). Moreover, the type of outsourcing contract in some sense underlines the client's approach to control. "Fixed price" contracts are focused on the outcomes; "time and materials" contracts include procedures for behavior based control (Choudhury and Sabherwal, 2003). Although "time and material" contracts are recognized as more flexible and leading to better outcomes, "fixed price" contracts still dominate the industry due to client companies' fear of losing control over the project. Loss of control over the project is a common and very dangerous ITO problem. Moreover, embedding controls in the contract at the beginning of the project does not solve it in full. Development projects may take several years to complete; at the same time, they are highly volatile. Requirements often change during a project and need to be re-negotiated (Gopal and Gosain, 2010). No contract can predict and capture all possible circumstances. Many outsourced projects start with a few simple controls, but later on new controls evolve, and the overall control environment becomes more complex (Choudhury and Sabherwal, 2003; Kirsch, 1997). Even though an outsourced project requires more control over the process than a similar in-house project, it is still important to allow enough flexibility for a vendor's innovativeness. Too tight control encourages the vendor to offer simple tangible solutions instead of a state-of-the art innovative system (Levina and Ross, 2003).

Risk and control are popular subjects in the IT outsourcing literature; however, they are not viewed in terms of an internal control environment, reporting and compliance. In a somewhat similar manner, there are publications in the accounting literature that address the implications of SOX on IT-related internal control, but the role of internal control in ITO is overlooked almost completely (Gopal and Gosain, 2010). The volatile nature of development projects and the importance of flexibility and partnering relationships between a client and a vendor suggest that effective internal control should also be flexible and adaptable to changing situations. To be efficient and cost-effective, it should be an integral part of existing processes - "built in versus bolted on", in the words of Gelinas and Dull (2007, p.218). Gopal and Gosain (2010) emphasize the key role of "liaisons, boundary objects, and interaction processes at the interface between client and vendor organizations on an ongoing basis to make sure that control is finely tuned to the unfolding contextual conditions" (p.19). Their quantitative model confirms the important moderating role of boundary spanning activities in the relationship between control mechanisms and project performance.

This study draws on outsourcing, project management and auditing literatures and applies boundary spanning theoretical approach to explore how internal control is being incorporated into existing practices of managing outsourced ISD projects. The next section briefly presents the theory and the research questions. The research methodology and findings from a pilot survey are reported next. A plan for full data collection and analysis and expected findings conclude the paper.

BOUNDARY OBJECTS AND CONTROL IN ISD OUTSOURCING ENVIRONMENT

The interaction between an outsourcing client and vendor can be viewed through different theoretical lenses. The boundary spanning conceptual approach focuses on the process of communication ("boundary spanning") and on the tools and artifacts ("boundary objects", or BOs) which help people with different backgrounds work together in situations that require active knowledge creation and exchange. Being "plastic enough to adapt to local needs and constraints" (Star, 1989, p.46), boundary objects provide concrete means for individuals across a boundary to learn about their differences and dependencies, and facilitate the process of knowledge transfer (Carlile, 2002). Such diverse artifacts as sales presentations (Levina, 2005), design review sessions (Gopal and Gosain, 2010) or system prototypes (Carlile, 2002) may serve as boundary objects in different situations. Unfortunately, the scope of this paper does not allow for a more detailed discussion of diverse artifacts that, according to the extant literature, may serve as boundary objects in complex and knowledge intensive contexts.

The usefulness of an object as a boundary object is not inherent in its properties but depends on the way it is enacted (Levina, 2005; Levina and Vaast, 2005). Not every nominated object fits the context of a specific organization or specific project. To become a BO in use, an artifact should be locally useful and have a common identity across the fields it bridges (Ibid.). Potential users may ignore a proposed BO, adopt it as is ("add") or "challenge" it – reflect on its usefulness and alter it to fit their local needs. Only "challenged" objects are capable of representing the user's knowledge at the boundary and becoming a "BO in practice" (Levina, 2005). Therefore, an adequate assessment of boundary spanning between two organizations should address not only the number of BOs and frequency of their use, but also their acceptance as BOs in practice.

Gopal and Gosain (2010) included boundary spanning as a moderator when modeling the relationship between control mechanisms and project performance. They argue that most BOs serve as behavioral controls and show that boundary spanning between a client and a vendor improves the effectiveness of the vendor's internal controls. This reasoning suggests

that BOs may play an important role in internal control applied by a client organization due to their flexibility and ability to serve as liaisons and create shared meanings between the two participants in the project.

The focus of this study is on testing a broad proposition that BOs can be successfully used for purposes of internal control in outsourced ISD projects, or, in other words, to figure out if BOs can be viewed as *"policies, procedures, practices, and organizational structures designed to provide reasonable assurance that business objectives will be achieved and that undesired events will be prevented or detected and corrected"* (COBIT definition of internal control).

The first proposition therefore is that outsourcing clients that use BOs for communication with a vendor adopt them for purposes of internal control as well.

Proposition 1. Boundary objects in outsourced ISD project that are used for communication purposes are also useful for purposes of internal control.

By the definition above, internal control must provide reasonable assurance that business objectives will be achieved. In the case of an outsourced ISD project, the main business objective is project success. Therefore, the use of BOs for control purposes is expected to be positively associated with project outcomes. Project outcomes can be measured in terms of the final product's quality and functionality and in terms of project efficiency, reflected by schedule and budgets overruns (Gopal and Gosain, 2010).

Proposition 2. ISD projects where BOs are used for communication and control purposes are more successful.

The study research methodology and the current project status are described in the following section.

RESEARCH METHODOLOGY

The data collection is a part of a larger study on different types of boundary spanning practices in outsourced ISD projects. An outsourced ISD project is the unit of analysis in this study. A field survey has been developed to collect post-hoc perceptual data from project managers on recently completed or close to completion outsourced ISD projects. Study participants are recruited through professional communities of IT project managers, and offered an online questionnaire developed with Qualtrics survey software.
For Proposition 1, the relationship between the variables representing boundary objects and variables representing their use for control purposes will be tested. For Proposition 2, a similar analysis will be performed on variables measuring project success and variables assessing the use of boundary objects for control purposes.

The process of instrument development and operationalisation of constructs is briefly summarized below.

Measuring the use of boundary objects

As discussed in the previous section, an adequate assessment of the extent of BOs' use should address not only the number of the objects, but also their enactment as BOs in practice.

With very few exceptions, boundary spanning scholarship relies on qualitative research methods. Except for the work of Gopal and Gosain (2010), the use of boundary objects has never been operationalized. Consequently, findings and recommendations from qualitative studies were used to develop quantifiable measures for the intensity and quality of BOs' use. After a thorough examination of boundary objects mentioned in previous studies, a short list of BOs' categories was developed. These categories are summarized in Table 1.

Category	Examples
Standards and documents	Specifications, use cases, business rules, client's "wish list"
Visual aids	Drawings, charts, presentations, UML diagrams
Project management (PM) tools	Gantt charts, PM software, change requests tracking tools
Systems	Legacy systems, Beta versions, prototypes
Web 2.0 and groupware	Virtual social networks, Wikis, forums, blogs

Table 1. Five categories of Boundary Objects used in this study

Measuring control in terms of COBIT control objectives

Control in outsourced projects is well discussed in the IS literature. Some of these discussions have approached control as rather an abstract concept (e.g., Das and Teng, 2001). Others include control variables in quantitative models, using recommendations from project management literature for operationalisation of control constructs (e.g., Gopal and Gosain, 2010). At the same time, the auditing literature offers a comprehensive and well structured framework specifically designed to support IT governance efforts in general and internal control of IT in particular – COBIT (ITGI, 2007). COBIT was developed using best control practices and provides an internally consistent conceptual model for assessment of IT related control (Tuttle and Vandervelde, 2007). It is frequently referenced in IS audit guidelines published by ISACA (Information Systems Audit and Control Association), and widely used by the community of IT audit practitioners. COBIT's control objectives are used in this study to assess if boundary objects in outsourced ISD projects are useful for the purposes of internal control.

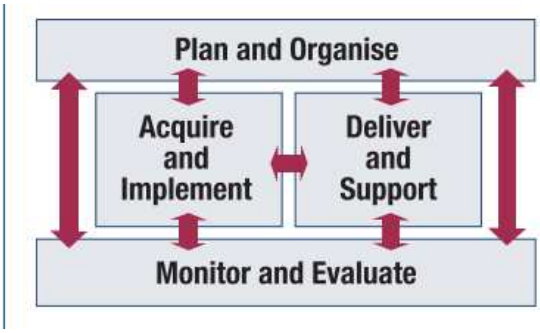

Figure 1. Four broad IT control domains (ITGI, 2007)

Figure 1 illustrates COBIT's classification of IT related control objectives into four broad interrelated domains: Plan and Organize (PO), Acquire and Implement (AI), Deliver and Support (DS) and Monitor and Evaluate (ME). COBIT further identifies control objectives for each domain, thirty-four in total. Readers are referred to publications of the Institute of IT Governance (ITGI) for the full list and description of COBIT control objectives (ITGI, 2007).

This study does not aim to test the applicability of the entire COBIT framework, but rather uses it as a tool to determine if boundary objects in outsourcing projects are employed for control purposes. Due to the internal conceptual consistency of the COBIT framework (Tuttle and Vandervelde, 2007), representation of all four control domains provides a sufficiently balanced assessment of the quality of control. Therefore, four control objectives were selected to represent the four broad control domains. These control objectives were chosen because they are recognized as important in the outsourcing and project management literature, and also are mentioned in the boundary spanning literature as processes in which boundary objects are especially useful. Table 2 summarized the four control objectives used in this study.

CobiT domain	Control Objective	Description
Plan and Organize (PO)	PO6	Communicate management aims and directions
Acquire and Implement (AI)	AI6	Manage changes
Deliver and Support (DS)	DS10	Manage problems
Monitor and Evaluate (ME)	ME1	Monitor and evaluate performance

Table 2. The four control objectives selected for this study

Measuring success of an outsourced project and other variables

Prior literature offers several theoretically supported and empirically tested frameworks for measuring the success of outsourcing arrangements (e.g., Kim and Chung, 2003). The operationalisation of Gopal and Gosain (2010) was adopted as

the basis for this study, since their work was focused on issues of control. The project success is measured with five items: two process based (meeting time and budget constraints), two outcome based (satisfaction with the quality and functionality of the final product), and a general one on overall satisfaction with the project results. These items are measured on a 7-point Likert scale, with 4 meaning that the project matches the expectations, and 1 and 7 indicating much worse and much better outcomes respectively.

The survey captures additional information about the client organization (industry, outsourcing experience in general and with the specific vendor in particular), project characteristics (contract type, offshoring involved) and the survey participants (gender, age, education, working experience).

PILOT STUDY RESULTS

A pilot survey was administered to a sample of 26 respondents. Clients and vendors of outsourcing projects were equally represented in the sample. Formal job titles ranged from IT manager to CIO. The projects varied in length from several months to several years. Almost 70% of them involved offshoring.
For each category of tools and artifacts that can serve as BOs in outsourced projects (Table 1), the participants indicated if they use this type of BO, if this BO is mentioned in the contract, and how useful is this BO for achieving each of the four control objectives.

Initial analysis shows that use of many different tools and including the tools in the contract are negatively associated with project outcomes. Table 3 presents correlations between the number of different BO types and different measures of project success.

	Budget	Schedule	Product Quality	Product Functionality	Overall
Num of different BOs types	-.053	-.403	-.358	-.405	-.560
Sig. (2-tailed)	.802	.041	.072	.040	.003

Table 3. Correlations between the number of different types of BOs in use and project success variables

	Budget	Schedule	Product Quality	Product Functionality	Overall
No BOs in contract (N=11)	3.60	3.45	4.18	4.36	4.36
Some BOs in contract (N=11)	3.55	3.00	3.73	3.82	4.09
All BOs in contract are used (N=4)	3.75	2.75	3.50	3.25	3.75
Not all BOs in contract are used (N=7)	3.43	3.14	3.86	4.14	4.29
Total (N=22)	3.57	3.23	3.95	4.09	4.23

Table 4. Average satisfaction with the project results

Table 4 compares the outcomes of projects with and without contractual requirements to the usage of certain BOs. Project managers who are not required to use specific BOs are more satisfied with the project results; those who ignored or abandoned the prescribed BOs are doing better than those who did not.

Case studies on boundary spanning argue that a true BO is useful for all communication participants; they "challenge" the BO before accepting it and reflect on its use (Carlile, 2002; Levina and Vaast, 2005; Lyytinen and Robey, 1999; Star, 1989). The importance of a good fit to specific project's needs may underlie the counter-intuitive findings reported in Table 3. Levina (2005) describes in detail how numerous proposed BOs are ignored and abandoned until the one most useful for all is finally found. Many respondents in this study also report that they tried tools that were not then adopted. A requirement to use a specific tool, therefore, may impede the project success.

The usefulness of BOs in meeting the four control objectives was measured with a 3-point scale, where 0 means "not useful at all", 1 – "somewhat useful" and 2 – "very useful". The mean values are presented in Table 5. According to this table, each

control objective is best supported by a different type of BO (for example, AI objective is best supported by visual aids). Content-rich Web 2.0 environments turn out to be the least helpful for all four control objectives.

Type of boundary object and N (out of 26)		Standards, documents (14)	Visual aids (21)	Systems (12)	PM tools (14)	Web 2.0 (8)
How useful are these tools for…	…communicating the client's strategic goals and directions to the vendor? (PO)	1.36	1.62	1.67	1.43	1.00
	…introducing and negotiating changes in requirements and procedures? (AI)	1.43	1.52	1.00	1.29	0.63
	…resolving conflict situations and misunderstandings between the client and the vendor? (DS)	1.57	1.33	1.17	0.71	0.25
	…monitoring the project progress by the client? (ME)	1.21	1.14	.92	1.79	0.63

Table 5. Mean values for usefulness of boundary objects for achieving control objectives

The "usefulness scores" reported in Table 6 are computed as a sum of four variables reflecting the usefulness of each BO across four control domains. It can be noticed that "simple" artifacts such as documents and visual aids are more helpful overall than systems and advanced Web tools.

Category	N	Range	Mean	Std. Dev.
Standards and documents	14	3.00-8.00	5.57	1.697
Visual aids	21	.00-8.00	5.62	1.936
Project management tools	12	1.00-8.00	4.75	2.221
Systems	14	1.00-8.00	5.21	2.045
Web 2.0 and groupware	8	.00-6.00	2.50	2.449

Table 6. "Usefulness scores" for different BOs categories

Finally, Table 7 reports on "average control scores", computed for each control domain as the mean usefulness of all BOs in this domain. Not all control domains are supported by the BOs to the same extent, with the "Plan and Organize" domain benefitting the most from the use of BOs.

Control domain	Range	Mean	Std. Dev.
Plan and Organize (PO)	0.67-2.00	1.50	0.465
Acquire and Implement (AI)	0.67-2.00	1.30	0.434
Deliver and Support (DS)	0.00-2.00	1.15	0.576
Monitor and Evaluate (ME)	0.00-2.00	1.20	0.549

Table 7. "Average control score" for four control domains

DISCUSSION AND FURTHER DATA ANALYSIS

The preliminary analysis of 26 completed surveys shows that communication tools in outsourced development projects are also used for purposes of control. Different tools categories are suited to support different control objectives. Some tools are more universal, and can be instrumental across control domains (such as visual aids), others are more specific (such as systems' prototypes and beta versions). The data also suggest that using many different tools and defining specific tools in the contract are negatively correlated with project success. These findings may appear counterintuitive, however, they are in accordance with previous boundary spanning research, which emphasizes the importance of tools acceptance and enactment by all intended users and recognizes that not every proposed BO becomes a BO in practice. The survey also contains several questions on BOs acceptance and enactment. These variables will be included in the analysis of the full data set.

The full survey will be administered to project managers recruited through professional organizations and online communities. Confirmation of patterns observed in the pilot data is one purpose of the full data analysis. Special attention will be also paid to BOs enactment. The role of project characteristics such as complexity, contract type, and offshoring will also be investigated. Finally, following findings from prior literature and initial analysis of the pilot data, client and vendor perceptions of communication quality and project success will be compared.

Applying a boundary spanning approach to analysis of internal control in outsourced IT projects deepens our understanding of internal control implementation in complex interorganizational environments. Preliminary analysis of pilot data suggests a relationship between the choice of communication and control tools in outsourced ISD projects and the outcomes of these projects.

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