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Contrasting Information Systems and Financial Executive Perspectives on Implementing Regulatory Controls

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ABSTRACT

New corporate compliance regulations such as the Sarbanes Oxley (SOX) Act of 2002 contain requirements for the chief executive and financial officers to certify the effectiveness of internal controls and processes leading to financial reporting. An inevitable result of implementing compliance with these regulations is an increased focus on improving systems and greater interdependence between the financial and IS functions. In this paper, we analyse the data collected on implementation of regulatory compliance and present some new empirical insights on the regulatory control implementation process and consequential changes in the institutional properties of IS and the accounting functions within the organization.

Keywords

Implementation, Regulatory compliance, Information systems, and Accounting perspectives.

INTRODUCTION

This exploratory study compares the viewpoints of two key managerial stakeholders – financial executives and information systems (IS) executives – who use the Committee of Sponsoring Organizations of Treadway Commission (COSO) framework to implement internal controls for compliance with new regulatory requirements placed by SOX. In this paper, we analyse the data collected on implementation of regulatory compliance and present some new empirical insights on the regulatory control implementation process and consequential changes in the institutional properties of IS and the accounting functions within the organization. IS executives, along with the financial executives, play an important role in such regulatory compliance initiatives as most modern companies rely on the capabilities of advanced IS, such as enterprise resource planning (ERP) systems, for recording, storing, analyzing, and reporting large amounts of enterprise-wide information – a key requirement for complying with legislation such as SOX.

Management researchers have long predicted that technology will extend and advance capabilities to control and integrate business functions. For example, more than 50 years ago Diebold visualized information technology (IT) as a key means for integrating and controlling business functions (Diebold, 1952). However, the idea was not successfully used until the late 1980s. Further, in much of the IS literature “implementation” and “organizational impacts” are isolated as independent factors of complex cross-functional IS innovations such as ERP systems (e.g., Markus and Tanis, 2000). This can also be

viewed as an indication of difficulties in the socio-technical process within the firm to harness technological and organizational changes. The technology scope in cross-functional initiatives (such as the one in focus for this study – “implementing regulatory controls”) is not restricted to productivity management within a small area of a business. Multiple managers (stakeholders) contribute to the implementation efforts in cross-functional initiatives with differing objectives and, thus, the value added is also subject to several contradicting constraints and requires socio-technical realignment of participating functions (Joshi and Lauer, 1999). Technology only acts as an enabler for achieving the desired ends. The realignment that happens in the firm during the post-implementation phase is a long, tortuous, and fragile process, which is also referred to as a structuration and/or institutionalization process in the literature (e.g., Orlikowski, 1992). In this process, multiple actors and resources try to influence each other to constitute a new socio-technical order, and a number of forces, feedbacks, and self-reinforcing actions are at play (Giddens, 1991; Ciborra, 2000).

A qualitative research methodology was used and data collected through semi-structured in-person and telephone interviews; these were conducted with financial and IS executives of eight large- and medium-sized public companies with major operations in Canada and the US. We found that the IS and accounting executives emphasized different aspects of controls and provided examples from their unique perspectives. In some of the organizations, new hybrid roles were created to coordinate the overlap of functions; in others, functions were brought closer together by creating cross-functional implementation teams. The findings of this study also reveal important insight into the experiences and perspectives of the IS and accounting executives regarding the processes and consequences of regulatory control implementations. These insights can help the financial and IS professionals to improve the existing systems and to implement future systems projects. The next section of the paper provides a brief discussion of the relevant literature to give the theoretical background of this paper. The third section is devoted to describing the methodology. In the fourth section, we present our findings by discussing their implications on the IS and accounting professions, and the last section provides a conclusion to this study.

THEORETICAL BACKGROUND

The increasing complexity of products, services, and business processes along with customer demands and a highly competitive businesses environment make a firm’s quest for controls and integration an unending process (e.g., Dechow and Mouritsen, 2005). If we critically examine new enterprise system technologies, recently implemented by most large organizations, most of the technologies have as one of their main objectives the creation of more advanced controls. As such, advanced IS can effectively record accounting transactions, track key performance measures for evaluating controls, provide responsibility for accounting reports, flag violations for investigation, and provide a platform for benchmarking such information (Damiandes, 2004).

However, implementing regulatory control requirements often requires significant additional IS design, evaluation, and reporting features (Kumar et al., 2008a, 2008b; Colman, 2006; Damianides, 2004; Chan, 2004). For example, Colman (2006) described the experiences of several SOX implementers who considered new software applications and technical enhancements critical for successful implementation. Even when companies had strong existing controls, the control certification and audit requirements were new and required significant additional design, evaluation, and reporting for all companies subject to SOX. Kumar et al. (2008a, 2008b) discussed the critical role of IS/IT in implementing and maintaining effective regulatory controls in general. Their main propositions also apply to the five control components of the COSO framework. Technical IT features that are impeded in advanced IS allow for automatic operationalization of many internal controls – such as data access, verifications, and reconciliation procedures. Advanced IT solutions can also help companies create and manage documentation and allow for world-wide, real-time access via corporate intranets with a single authentication and security system. Similarly, monitoring controls and the control environment requires IT features capable of verifying and evaluating systemic controls within IS, flagging control violations, and documenting remedial actions. Furthermore, a centralized control database allows companies to effectively document, monitor, maintain,

and report on controls, processes, and control environment. Many IT objectives can be achieved by building control and data integrity features within the financial modules of IS or by integrating an external monitoring system with the financial modules.

On the other hand, the accounting/financial executives are now increasingly required to understand their IS and how controls are implemented in their companies through IS (Kavanagh and Drennan, 2008; Bhimani, 2003). Moreover, modern (fourth generation) IS are built on the premise of enhanced user involvement in systems configuration and day-to-day operations, as they are key enablers of business processes (Davenport, 2000). Before SOX, companies often assigned the responsibility for managing enterprise systems solely to the IS/IT function (Kumar et al., 2003). In the post-SOX era, when companies are required to report on material control weaknesses, senior management can no longer afford to delegate the total systems responsibility to IS/IT managers. Furthermore, as Chief Financial Officers (CFOs) are required to certify the effectiveness of internal controls, they are increasingly taking a more active role in the management of IS. Ahuja et al. (2008) argued that since modern companies are almost completely dependent on IS for driving their business processes, their IT controls are becoming key determinants of their long-term financial success. In a nutshell, the responsibilities of the accounting and IS functions over effective financial control and reporting have become intertwined and integrated, requiring increased collaboration between the two functions (Caglio, 2003; Sacepens and Jazayeri, 2003).

In this paper, we analyze the perspectives of both IS and accounting managers, related to the implementation of regulatory controls required by SOX and similar Canadian regulations, in order to gain further insight into the implementation processes and their implications for both professions. Both SOX and the corresponding Canadian regulations pertinent to the organizations sampled in this study govern the responsibilities of management, auditors, and boards of directors in ensuring effective control over financial reporting by public companies. The main objectives of both regulations are to improve the quality, reliability, and transparency of financial reporting. Although SOX is a US law, non-US companies who trade on the US stock exchanges and foreign subsidiaries of US companies must also comply with it, which brings most large global companies within the scope of this law. The Canadian Securities Administrators (CSA) subsequently developed regulations modeled after SOX that were ratified by each provincial legislature. The main Canadian requirements are articulated in the recently amended and re-named National Instrument (NI) 52-109, effective December 15, 2008 (formerly Multilateral Instrument 52-109). The NI applies to all public Canadian companies in all provinces, except investment funds and companies that comply with SOX (CSA, 2008).

A control framework developed by COSO (1992) has been used almost exclusively as a conceptual foundation for implementing regulatory controls, such as those imposed by SOX (Kumar et al., 2008a, 2008b; COSO, 2004; Damianides, 2004; Brown and Nasuti, 2005). COSO is a voluntary organization consisting of five US financial professional associations formed in 1985; it has representatives from industry, public accounting firms, investment firms, and the New York Stock Exchange. Its mandate is “guiding executive management and governance entities toward the establishment of more effective, efficient, and ethical business operations on a global basis” (COSO Website: <http://www.coso.org>, as of January 7, 2009). The COSO framework represents a major professional initiative to improve the quality of financial reporting well before SOX was enacted, and it forms a solid conceptual platform for designing and implementing regulatory controls (Kumar et al., 2008a). It provides general principles for effective internal controls, but it does not prescribe what controls should be used or what information should be reported. This study uses the COSO framework to collect empirical evidence on the processes related to the implementation of the five control components from the accounting and IS perspectives. The COSO framework identifies the following five control components:

1. Control environment: structures and processes for organizational operations, for example, staff competencies, management style, and organizational structure and norms.
2. Risk assessment: tools for managing operational and environmental risks, for example, environmental scanning and forecasting.

3. Control activities: actions and procedures intended to ensure the achievement of organizational objectives, for example, approvals, authorizations, verifications, reconciliations, and security procedures.
4. Communication: tools and processes aimed to ensure that individuals have the information necessary to perform their responsibilities, for example, collecting, analyzing, disseminating, and reporting information.
5. Monitoring: mechanisms designed to ensure ongoing quality of controls, for example, systems monitoring, employee supervision, management reviews, and audits.

METHODOLOGY

An exploratory and qualitative research approach was considered appropriate for a holistic, in-depth study of such broad and complex phenomena in their organizational and environmental contexts (Dube and Pare, 2003; Yin, 2003; Benbasat et al., 1987). This approach has been widely used in IS research (e.g., Dube and Pare, 2003) and also actively promoted for accounting research (e.g., Birnberg et al., 1990; Kaplan, 1993; Otley, 1994; Shields, 1997). Semi-structured in-person and telephone interviews were conducted with financial and systems executives of eight large- and medium-sized public companies with major operations in Canada and the US. The interview questions developed for this study were based on the COSO (1992), guidelines and the previous experience of the researchers. The questions were pretested with four individuals with expertise in this area and refined based on the feedback obtained. They were used as a general guide and structure for the interviews, allowing meaningful and comparable dialogue with the respondents on issues important to both the researchers and the respondents. Before the interviews, some company and industry data were also collected from the company websites and from public securities documents filed by the companies with the CSA in the SEDAR database (<http://www.sedar.com>). The questions asked were slightly modified based on the type of each company and the background of each participant. NVivo (2.0) was used to identify themes and help categorize the responses.

An overall profile of the participating companies and the participants is presented in Table 1 (in the appendix). Four executives interviewed were responsible for accounting and finance and four others for IS, which allows for an examination of relevant control implementation issues from both the financial and IS perspectives. The participants typically held senior positions – such as vice president, director, or senior manager. All participants had been closely involved in implementing and managing internal controls required by SOX and/or by the corresponding Canadian regulations. For reasons of confidentiality, the companies cannot be identified, but are referred to only as Companies A – H. The responses of the participants are also not attributed to specific individuals or companies to protect their anonymity.

FINDINGS

Major results from the interviews are presented in this section. They are organized using the five control components of the COSO framework (COSO, 1992): control environment, risk assessment, control activities, communication and reporting, and monitoring and evaluation.

1. Control Environment

Both the IS and accounting/financial executives raised several organizational issues that can affect the effectiveness of control implementations. The IS executives were more focused on process analysis and project management, although they also discussed control implementation as part of broader management initiatives. The IS executives mentioned various change management and quality improvement initiatives, whereas the financial executives emphasized control implementation as a mechanism to improve corporate governance. The IS executives discussed a more operations-oriented and pragmatic approach to their control implementations. The following are examples of comments by IS executives on control environment:

We have structured ourselves for Sarbanes-Oxley, we have regional teams that are kind of compliance groups. Then within each of the regional teams you have representatives from IT, finance, and operations, and then, at the global level, we have a global representative that is from our group audit services.

Now everything [including SOX controls] has to go to the change management system, and [in] the typical change management system, you get a business requirement, and then go through analyzing it and implementing it.

On the other hand, the financial executives were concerned with proper organizational structure and governance mechanisms as foundations for effective controls. A financial executive commented on the impact of SOX on corporate governance in his company, as follows:

We just changed the structure, the organizational structure...We hired a director of audit services whose sole responsibility, other than just check the internal audit function, is to ensure that we meet certification requirements [of] the SOX and the OSC [Ontario Securities Commission]...We're reviewing our staff needs, making sure we have the right organization in place first.

Governance and organizational issues were also raised by another financial executive:

The reality of SOX is you have to fund the initiative, you have to commit to it as an organization, and it needed the tone at the top and the governance around it...That kind of rigor wasn't in place prior to that...The reporting to the audit committee on a quarterly basis on the progress and the status, and the governance around that, is what gives it [SOX] visibility, so that senior leadership also recognizes that this is something that's required.

The way this project was structured with the sponsorship and the oversight at the front is critical...our [top managers] fortunately were on board, given the direction from the board and the audit committee.

Clearly, we found evidence of structural changes in both IS and accounting functions to accommodate the regulatory controls implementation process. These changes also reflected a shift in the institutional properties of accounting and IS functions in the organization. For example, now any changes in controls were required to go through an approval process managed by a global coordination team or equivalent whereas before these changes were managed by the functions independently. These structural changes were brought forward acknowledging the new needs for cross-functional collaboration. However, the approaches differed significantly across organizations.

2. Risk Assessment

All participants agreed that the main objective of controls is to manage risk through preventing or minimizing opportunities for failure and mitigating the effects of failure. However, the descriptions of types of risk and failure varied among the respondents. The risk concerns expressed by the IS executives tended to be more technical, particularly those related to systems security and the potential for data manipulation. The following excerpts are examples of comments made by IS executives:

Unless you have the terminology all the same, [data in central reporting systems] are not going to necessarily line up similarly for sharing of data and the ability to change data, and [can cause] risk around security...We've caught [systems] change requests that just didn't make sense and would have put the business at risk.

If [managers] dropped something or changed the number that can be identified [by IT controls]...the [proof for] fraud goes back to how you interpret the accounting rules.

On the other hand, the financial executives focused on risk of inaccurate and fraudulent financial reporting, whereas the IS executives spoke of risk related to technical systems deficiencies and failure. A financial executive expressed his views on the relationship between control and risk management, as follows:

The benefit that SOX brought was that it did identify areas of potential weakness that we could track down and improve...It allowed us to determine what our key controls are. If you look at all the processes that we have, [we can identify] where the key areas of risk are in terms of our financial reporting.

Another financial executive explained risk assessment processes in his company, as follows:

We compiled a list of controls that was used to determine what the risk factor was. In other words, if all these controls were operating effectively, could we say [whether] we were SOX compliant or not [compliant] And the other side to it is: What are the risks of any of these controls actually not operating?

The differences in risk perceptions here could be attributed to differences in the professions. The IS executives, being closer to the technological side, perceived risks more in terms of technology, whereas the financial executive view was more in terms of the business risks of reporting and compliance.

3. Control Activities

All participants described a number of control activities in their regulatory control implementations. They typically agreed on the need for analyzing processes and controls, extensive documentation of controls, and, in some cases, the need for developing and implementing a significant number of new controls. In terms of maintaining effective controls, both the financial and IS executives spoke of the need for automating controls, ongoing testing, updating, and systems development. Differences occurred in the emphasis on various types of controls and control processes. The IS executives emphasized control over data access, for example, password management; however, the financial executives focused more on control principles in general and considered identifying key controls the critical first step.

Identifying Key Controls: The financial executives emphasized the identification of key controls and control principles, particularly those over financial reporting. These were controls that, should they fail, have a potentially significant impact on the reliability of financial reporting. The IS executives took their cues from the financial executives, and they were primarily concerned with the technical implementation of such key controls, once they had been identified. However, there appeared some ambiguity and frustration among the IS executives, at least initially, regarding the process of identifying key controls. In the words of two IS executives:

We found that even for [name of accounting firm] it was difficult, because the rules were still changing...You are trying to get it [SOX] implemented, because there [are] deadlines, but the authorities still haven't ... totally defined what they are looking for.

These [auditors] are the same people that are redefining [controls]...I sat in the meeting with the CFO, and they all recognize it. Even the internal auditors aren't clear what has to happen.

One financial executive emphasized the need for key controls, and another the need for fundamental control principles in effective control systems in the following manner:

If there's anything that is a problem in the [control implementation] process, it's identifying key controls that really drive your control over financial reporting. Those are the ones that you really

got to focus on. You could get yourself buried in...thousands of controls, but we've got it to a level that that makes a lot of sense.

At the end of the day, there are really some basic fundamentals...You [have] got to have proper segregation of duties, some authorization levels, and management review and involvement in all the transactions at the appropriate level.

We found that, while the IS executive role in this process was more to operationalize implementation through available software solutions, the role of accounting/finance executives was more deeply involved in simultaneously interpreting the laws with whatever information was available.

Documenting Controls: For all organizations, documenting controls (existing, new, and modified) was perhaps the most time-consuming activity, and this activity was discussed by all participants. Although a large number of new controls were necessary in some companies, only some fine-tuning and documentation was required in others. The IS executives viewed documentation as a discrete activity or process that occurred primarily at the initial implementation stage, while the financial executives tended to emphasize the ongoing nature of documentation activities and documentation as a form of control in itself for auditing reasons. Two IS executives specifically noted that this process was more about legitimizing controls than implementing new controls. As expressed by one IS executive:

A lot of it is formalizing what you already do...What we are doing right now is a matter of documentation, and getting approval...[the company] hired [name of accounting firm] to come in and document all our controls for us.

Another IS executive, whose company was more advanced in the implementation, emphasized the need for ongoing testing and centralized documentation, as follows:

One of our objectives was not just [to] do the process documentations, but actually test and provide artifacts that prove that step or that process was a good control...Now we are going through the second audit. The ones that failed previously aren't failing, and other ones that may have passed have failed, because of the rigor we identified...It [process documentation] is all on one system, so all countries can see it and...leverage it.

Financial executives on the other hand expressed their experiences with documentation, as follows:

Our SOX team documented the processes, documented controls we had in place, identified where there were potential deficiencies, and then we went through the process of implementing controls and procedures.

Another financial executive described the necessary changes to documentation, as follows:

There were some procedural changes over documentation of approvals, of changes in access and that kind of thing. We did a fair amount of work in kind of the backbone systems area with passwording, and having passwords expire...It wasn't really new software, it was just again documentation and procedures.

A lot of ... complaint[s] really didn't have to do with doing things differently, because they are good managers. It had to do with documenting a number of controls that existed that had never been documented before.

Apparently, as IS tools were used to manage and maintain the documentation IS managers viewed documentation as a discrete activity. We also found that finance and accounting function was cognitively

ahead of IS function as recording, reporting and legislative compliance has been a part of the function since long.

Automating Controls: While many control procedures were traditionally implemented by accountants in manual and low-technology systems, advanced IT has allowed their automation and facilitated their cost-effective management. The financial executives agreed that IT has provided great opportunities for efficiencies, and the IS executives provided more detailed examples of how they were achieved through technical enhancements. An IS executive described how the company developed an integrated control approach for its global operations as follows:

We defined top level control objectives, then sub-objectives, and then within sub-objectives we have steps. The top level objective and the sub-level objective are the same worldwide. We have a tool that captures those levels, [as well as] each country's step level.

However, another IS executive noted some technical challenges related to implementing new processes in the ERP system, such as vendor management, as follows:

Everyone of us has...implemented these controls and processes around ERP. Some [processes] were very hard [even] for simple vendor management...Where was SAP in order to have an easy flow of simple vendor creation or a bank payment? What is it that they could [provide to] make our life a little easier [instead of] putting so many restrictions on the form going to the field?

All financial executives were involved in at least some control automation initiatives. The following are some examples provided by the financial executives:

We did tighten some controls, we automated a number of controls, like PO [purchase order] authorization.

[One of the] key things we had to bring in was automated document management systems. In terms of our transactions systems, we didn't have to make any modifications, but what we did have to do was to clear out any systems that may not have complied with SOX.

As it was a technologically intensive activity, IS executives played a larger role in automating controls. However, active finance and accounting executives involvement and participation was important for its success of this initiative as they provided the subject matter expertise and experience primed recognition on whether the automation will work in practise.

Segregating Duties: Segregating duties is one of the fundamental accounting internal control principles. It is one of the SOX requirements, brought to the immediate attention of both the financial and IS executives. Both groups of executives discussed issues related to the segregation of duties, but the IS executives did so more extensively. Both the financial and IS executives described it being problematic in smaller organizations or units that may not have a sufficient number of employees for establishing the requisite division of duties. In addition, the IS executives cited some technical and behavioral challenges in implementing the segregation of duties in their systems.

One IS executive spoke of the segregation of duties as an important systems security feature with technical solutions, but considered it still to be quite difficult to implement in smaller divisions with limited staff:

We have [in some smaller units] one clerk [responsible for] AP/AR [accounts payable and accounts receivable], and we need both accesses. It was a matter of them going through which has the higher potential risk...There are mitigating controls we can supplement, if that clean cut segregation wasn't allowed.

Another IS executive described some technical difficulties and negative behavioral effects associated with tighter control through the segregation of duties, as follows:

Within SAP, even a simple segregation of duties is not that easy...unless you do so much customization behind the screen.

A financial executive spoke of the segregation of duties and related control principles, as follows:

The Oracle components were not really modified...What did change was some of the manual procedures around input to those systems, and also perhaps things like the segregation of duties, and authority over changing master files and data within those systems.

Another financial executive discussed some difficulties with the segregation of duties in a medium-sized company, as follows:

One of the difficulties we were having prior to our expansion was segregation of duties...Because when you are a small shop, I got involved with doing multiple things...We had one individual doing fixed assets and another, and the same individual, doing consolidations...We split it up the best way we could, so that we could maintain segregation of duties.

Managerial comments on and around control activities in the firm provided in several instances evidence of re-alignment of functions. The changes made to the organization were both technological and administrative and demonstrated how these changes were complimentary.

4. Communication and Reporting

The IS executives described reporting processes and their obstacles in more detail. After all, it was their major responsibility to overcome any technical challenges for implementing the new financial reporting requirements. The financial executives focused more on communicating and reporting financial information to external parties, such as external auditors, regulators, and shareholders. To both, advanced information technology was of great importance in these activities. Following are a few examples of experiences from the perspective of one IS executive regarding reporting systems changes in a large, recently merged global company:

We had in the US...a lot of 'bolt-on' systems that were also outside the management of your typical IT/IS area...They are bringing reports back through another reporting system into the Oracle system [causing potential security risks].

We were reporting separately previously in Canada and the US and, when we merged, [we] still had two [ERP] systems...We did make a decision to move away from Oracle and go to SAP...We actually created a new type of report on SAP...at the database level, as well as at the transactional level, and we identified key transactions within the ERP system that would line up against typical user accounts.

On the other hand, the financial executives described a shift in emphasis towards internal management reporting. In the words of two financial executives:

The initial building of financial statement information into Calix [add on to ERP system] was done in order to facilitate external reporting, but it was designed with a view of having meaningful data available for internal performance reporting... reporting on the business lines, comparing the performance to plans, various plans, and forecasts.

We're now beginning to look at KPIs [key performance indicators]...and trying to enhance our systems and our reporting.

All financial executives spoke of the benefits of centralized accounting systems and integrated ERP systems. The following are examples of comments by the financial executives:

We have a distributed financial team that works with the operations to support the operations. They deal with all the revenue recognition and operational financial reports in a decentralized manner. However, we're only using one general ledger, one AR system, and so on.

We provide central 'back-office services'. Through SAP we will provide...management reports and management information, but also accounts payable, receivables, payroll, and basic cash [reports]. Treasury functions are all centralized, too, at [name of city] head office...We use Canadian GAAP [generally accepted accounting principles] and just provide a reconciliation to US GAAP for US reporting purposes.

Again, differences in perspectives were indicative of professional responsibilities and roles of the executives in the implementation process.

5. Monitoring and Evaluation

Ongoing monitoring and evaluation was important to all participants, although the IS executives discussed these issues more extensively. The related activities included regular testing and assessment of systems, processes, and controls in order to ensure that they continue to be up-to-date, effective, and properly documented. The IS executives described some monitoring technologies implemented in their companies. The following are examples of comments by IS executives:

We had a number of things that were implemented mostly around security: easy way to identify segregation of duty activities was key, also sniffing and monitoring of our systems, more stringent controls around where the data are going and what is coming in to our systems, and how they are being accessed in terms of password control.

[The company] has been putting a lot of these sniffing things on the servers, host intrusion protection systems, and stuff like that. They also had everyone sign off, or managers sign off, on people who had VPN [accounts for] remote access.

Right now in SAP, if someone goes in and updates [data], we know through the authorization who is capable of doing it, and it might be easy to identify through an audit trail.

On the other hand, a financial executive described the role of the newly founded internal control department, as follows:

Their job is to monitor controls and test them to make sure they are SOX compliant.

Another financial executive cited his experiences with and learning from monitoring and evaluation activities as follows:

We tested far fewer controls...we streamlined the compliance process quite a lot. 2006 was actually fairly painful, and it was a lot of testing of controls that we determined that we didn't have to test for in 2007. We relied on compensating controls [in 2007]...to cut down on a number of tests... It is just that before we did too much [testing].

To the IS executives, monitoring and evaluation entailed ensuring adequate systems efficiency and security. On the other hand, the financial executives were concerned with the effective operation of internal controls and the reliability of financial reporting. They recognized that the achievement of these objectives is facilitated to a great extent by advanced IT.

CONCLUSIONS

Our data suggested management control in an advanced IS and post SOX environment is not a property of the accounting or IS function but a collective affair. In this exploratory study, we have found a need to look at the new required interactions between the IS/IT function and the core business functions, such as financial accounting, in implementing regulatory controls. In these initiatives, driven by recent regulations such as SOX, Chief Executive Officers and CFOs shoulder the core responsibility for implementing new controls or strengthening existing ones within the organization; IT/IS managers have an important role in figuring out the ways to deliver them effectively through the use of IT/IS means. We find that the senior financial and IS managers have a fundamental difference in their outlook towards control implementation initiatives. While the financial executives placed more stress on problems, structures, and design issues, IS executives were more focused on solutions and issues in extension and enhancement of existing infrastructure to implement those solutions. We found that the requirements placed by the process of implementing compliance with the new regulations have profound implications for both IS and accounting professionals and could result in changing the institutional properties of both professions within the organization.

Eventhough limited by a small sample size, our findings can help the financial and IS professionals to improve the existing systems and to implement future systems projects. They can also help the accounting and IS researchers to develop and refine integrated control theory and frameworks. Both fields are becoming increasingly specialized and complex. Accounting has to implement the frequent and new accounting rules, regulations, and standards; IS has to deal with the ongoing technological innovations. It is critical to increase the collaboration between these two groups of professionals. Therefore, further research in this field calls for interdisciplinary research between accounting and IS researchers.

REFERENCES

1. Ahuja, M., Kuhn, R and Mueller, J. M. (2008) IT control weakness and company financial health. Available online at <http://ssrn.com/abstract=1304125>, retrieved January 28, 2009.
2. Benbasat, I., Goldstein, D. K. and Mead, M. (1987) The case study research strategy in studies of information systems, *MIS Quarterly*, 11, 3, 369-385.
3. Bhimani, A. (2003) *Management Accounting in the Digital Economy*, Oxford University Press.
4. Birnberg, J. G., Shields, M. D. and Young, S. M. (1990) The case for multiple methods in empirical management accounting research (with an illustration from budget setting), *Journal of Management Accounting Research*, 2, Sept, 33-66.
5. Brown, W. and Nasuti, F. (2005) What ERP systems can tell about Sarbanes-Oxley, *Information Management and Computer Security*, 13, 4, 311-327.
6. Caglio, A. (2003) Enterprise Resource Planning systems and accountants: towards hybridization? *European Accounting Review*, 12, 1, 123-153.
7. Committee of Sponsoring Organizations of Treadway Commission (COSO). (1992) Internal control: Integrated framework (executive summary). Available online at

- http://www.coso.org/publications/executive_summary_integrated_framework.htm, retrieved April 2, 2006.
8. Chan, S. (2004) Sarbanes-Oxley: The IT dimension, *Internal Auditor*, February, 31-33.
 9. Ciborra, C. (2000) From control to drift: The dynamics of corporate information infrastructures, Oxford University Press.
 10. Colman, R. (2006) Sarbanes-Oxley in review, *CMA Management*, March, 20-25.
 11. Committee of Sponsoring Organizations of Treadway Commission (COSO). 1992. Internal control: Integrated framework (executive summary). Available online at http://www.coso.org/publications/executive_summary_integrated_framework.htm, retrieved April 2, 2006.
 12. Damianides, M. (2004) How does SOX change IT?, *Journal of Corporate Accounting and Finance*, 15, 6, 35-41.
 13. Davenport, T. H. (2000) Mission Critical: Realizing the Promise of Enterprise Systems, Harvard Business School Press, Boston.
 14. Dechow, N. and Mouritsen, J. (2005) Enterprise resource planning systems, management control and the quest for integration, *Accounting, Organizations and Society*, 30, 7-8, 691-733.
 15. Diebold, J. (1952) Automation: the advent of the automatic factory, Van Nostrand.
 16. Dube, L. and Pare, P. (2003) Rigor in information systems positivist case research: Current practices, trends, and recommendations, *MIS Quarterly*, 27, 4, 597-637.
 17. Giddens, A. (1991) Modernity and self-identity: Self and society in the late modern age, Stanford University Press.
 18. Joshi, K. and Lauer, T. W. (1999) Transition and change during the implementation of a computer-based manufacturing process planning system: an analysis using the equity implementation model, *IEEE Transactions on Engineering Management*, 46, 4, 407-416.
 19. Kaplan, Robert S. (1993) Research opportunities in management accounting, *Journal of Management Accounting Research*, 5, Fall, 1-14.
 20. Kavanagh, M. H. and Drennan, L. (2008) What skills and attributes does an accounting graduate need? Evidence from student perceptions and employer expectations, *Accounting and Finance*, 48, 2, 279-300.
 21. Kumar, V., Maheshwari, B. and Kumar, U. (2003) An investigation of critical management issues in ERP implementation: Empirical evidence from Canadian organizations, *Technovation*, 23, 9, 793-807.
 22. Kumar, V., Pollanen, R. and Maheshwari, B. (2008)a Challenges in enhancing ERP systems for compliance with Sarbanes-Oxley Act and analogous Canadian legislations, *Management Research News*, 31, 10, 758-773.
 23. Kumar, V., Pollanen, R. and Maheshwari, B. (2008)b ERP systems effectiveness in implementing internal controls in global organizations, in C. Ferran and R. Salim (Eds.) *Enterprise Resource Planning for Global Economies: Managerial Issues and Challenges*, IGI Global, Hershey, 227-250.
 24. Markus, M.L. and Tanis, C. (2000) The Enterprise Systems Experience - From Adoption to Success, in R. W. Zmud (Eds.) *Framing the Domains of IT Research: Glimpsing the Future Through the Past*, Pinnaflex Educational Resources, Cincinnati.
 25. Orlikowski, W. J. (1992) The duality of technology: Rethinking the concept of technology in organizations, *Organization science*, 3, 3, 398-427.

26. Otley, D. (1994) Management control in contemporary organizations: Towards a wider framework, *Management Accounting Research*, 5, 3-4, 289-299.
27. Scapens, R. W. and Jazayeri, M. (2003) ERP systems and management accounting change: opportunities or impacts? A research note, *European Accounting Review*, 12, 1, 201-233.
28. Shields, M. D. (1997) Research in management accounting by North Americans in the 1990s., *Journal of Management Accounting Research*, 9, 3-61.
29. Yin, R. K. (2003) *Case Study Research: Design and Methods*, 3rd ed. Sage, Beverly Hills.

TABLE 1

Profile of organizations and respondents

<i>Company</i>	<i>Stock Exchange</i>	<i>Industry</i>	<i>Major Products/Services</i>	<i>Operating Regions</i>	<i>Sales (Millions of Can. \$)¹</i>	<i>No. of Employees²</i>	<i>Enterprise System</i>	<i>Position of Interviewee</i>
Company A	TSX and NYSE	Utilities	Gas distribution	Canada and US	2,950	1,600	Oracle and specialized applications	Vice President, Finance and IT
Company B	TSX and NYSE	Construction and Technical Services	Planning, engineering and managing of infrastructure projects	Canada, US, and Caribbean	960	9,000	Oracle	Vice President, Finance and Treasury
Company C	TSX and NYSE	Gas and oil	Management of oil and gas properties and infrastructure assets	Canada and US	2,620	700	JD Edwards, Qbyte, Calix	Vice President and Controller
Company D	TSX	Transportation and Environmental Services	Transportation and management of hazardous materials	Canada and US	290	500	SAP	Director, Finance
Company E	TSX	Paper and Forest Products	Lumber, plywood, pulp and paper	Canada and US	3,280	9,500 ³	Oracle	IT Project Manager
Company F	NYSE and Euronext Paris ⁴	Communications	Voice, data, and video communication technologies and services	Canada, US, Europe, Asia, Middle East, Africa	28,400	77,000	SAP and Oracle	ERP Program Manager
Company G	TSX	Technical and Professional Services	Systems engineering and business technology services	Canada, US, and Europe	190	2,000	SAP	Director, Information Systems
Company H	TSX and NYSE	Telecommunications	Voice, enterprise, broadband and wireless technologies	Canada, US, Europe, and Asia	190	700	SAP	Manager, Information Systems

¹For the latest year reported, typically for 2007, rounded to the nearest 10 million Canadian dollars. ²Rounded to the nearest 100 employees.

³Includes contract workers widely used in this industry for some core operations. ⁴The company has a major Canadian subsidiary.