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# Behavioral research opportunities: Understanding the impact of enterprise systems

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**Abstract**

Over the past ten years, many organizations, both large and small, have implemented enterprise resource planning systems or enterprise systems. The motivation behind these investments is to improve organizational efficiency, effectiveness, and ultimately performance. Underlying the expectation of performance increases is the belief that information can be captured and disseminated throughout the organization more quickly to help individuals do their jobs better by making better decisions. While the return on these investments is certainly expected, understanding how both the organization and individuals within these organizations are affected and how the benefits will actually materialize from an interorganizational perspective has received little attention.

The purpose of this discussion is to highlight the largely ignored behavioral impacts of enterprise systems implementation and integration and to suggest ways to improve the validity and generalizability of field research through method triangulation. This discussion advocates that the contemporary enterprise systems research could learn much from the management accounting research discipline as it searches for greater meaning and rigor in its research approaches. Specifically, this paper suggests that future research on enterprise systems should include (1) experimentation that focuses primarily on judgment and decision making at the individual level and improvements in organizational performance, and (2) triangulation methods that integrate case research, surveys, and cross-sectional field studies.


*Keywords:* Enterprise systems; Enterprise resource planning systems; ERP; Case studies; Field research; Triangulation; Cross-sectional field studies

## 1. Introduction

Over the past ten years, virtually all large multi-national organizations and many small and medium sized organizations have replaced legacy systems and implemented enterprise resource

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planning systems or enterprise systems as they will be referenced here. The old legacy systems often represented applications designed to support specific functions within the organization and were not necessarily integrated with other stand-alone systems. Reconciliation of information between the various legacy systems was manually conducted, generally by accounting personnel, and was time-consuming to complete. Spurred by concerns over the year 2000 issues, the requirements of the Sarbanes Oxley Act in the U.S. for companies to report on the internal controls over information systems, and the need for global competitiveness, all types of companies have found it feasible, if not necessary, to invest in integrated enterprise systems. The primary motivation behind these investments is to improve organizational efficiency, effectiveness, and ultimately performance.

Underlying the expectation of performance increases is the belief that information can be captured and disseminated throughout the organization more quickly to help individuals do their jobs better by making better decisions. This is evidenced at all levels of the organization as individuals are provided with various tools to mine the data and discover organizational secrets that may have heretofore been unknown. Upper level members of management are often provided with tools such as digital dashboards that allow them to monitor all aspects of organizational performance on a continuous basis. While the return on these investments is certainly expected, understanding how both the organization and individuals within these organizations are affected and how the benefits will actually materialize from an interorganizational perspective has received little attention. Additionally, most studies that have focused on benefits and return on investment have taken an economics based focus (c.f. Hunton et al., 2003; Nicolaou, 2004a; Nicolaou and Bhattacharya, 2006-this issue; Poston and Grabski, 2001), while failing to address the underlying issues related to the impact of improved decision making performance, reengineered business processes, and organizational agility.

The purpose of this discussion is to examine the state of the extant research on the impact of enterprise systems, to highlight the largely ignored behavioral impacts of enterprise systems integration, and to identify how future research might improve our understanding of the organizational impacts of implementing those systems. As noted by Kræmmergaard et al. (2005), enterprise systems management, creating and sustaining benefits from enterprise systems, must evolve in order to fully utilize and exploit the capabilities of these new systems. This discussion directly addresses three critical issues in order to advance our understanding of how enterprise systems integration impacts behavior at the individual and organizational levels.

The first issue focuses on the implications of enterprise systems on individual judgment and decision-making. There is almost a complete absence of studies that draw upon the rich literature in judgment and decision making within the accounting research domain as a basis for understanding how enterprise systems (including the varied analysis tools and extension programs) impact individuals' decision-making processes and outcomes.

The second issue relates to the generalizability of the research to date. While there have been many case studies evaluating the impact of enterprise systems on specific organizations and their business processes, very little generalizable research has examined the impact of enterprise systems on organizational performance. The research on organizational impacts desperately needs to evolve into a broader view of the impact across organizations and may well necessitate the development of new theory that helps explain the variations in the impact of such systems.

Finally, a third related issue is the need to step back and rethink the methodologies that are being applied in contemporary enterprise systems research. While case studies provide insights into the impact of enterprise systems in specific situations, the lack of generalizability has hampered the development of theory or an overarching framework for interpreting and framing

research applicable across organizations and understanding why some implementations garner improvements while others lead to problems and escalating costs. This discussion advocates that the contemporary enterprise systems research could learn much from the management accounting research discipline as it searches for greater meaning and rigor in its research approaches. Specifically, this paper suggests that future research on enterprise systems should include (1) experimentation that focuses primarily on judgment and decision making at the individual level and improvements in organizational performance, and (2) triangulation methods that integrate case research, surveys, and cross-sectional field studies. Utilizing triangulation methods can help to achieve generalizability and validity levels beyond that that can be attained using any of the method individually.

## 2. Background and prior research

Research on enterprise systems has primarily examined the experiences of specific organizations that implemented enterprise systems (Shanks et al., 2003). These studies were typically completed through case research that chronicled the implementation process in a single organization. Case studies are designed to discover the relations and interactions among variables in real-life, contemporary settings (Kerlinger and Lee, 2000; Yin, 2003b), are based on one or a few cases, and generally fall into one of three different categories: exploratory, descriptive, or explanatory (Yin, 2003a). The purpose of an exploratory case study is to discover variables and lay the groundwork for systematically and rigorously testing hypotheses in subsequent studies. A descriptive case describes a phenomenon as it exists in a contextually rich environment, and an explanatory case study is designed to identify cause-effect relations and explain *how* and *why* phenomena occur (Kerlinger and Lee, 2000; Yin, 2003a).

In the enterprise systems literature, researchers have used case studies to explicate the various issues that organizations face during the implementation process, the changes that occurred throughout each organization, the impact of those changes on the activities of various actors within the organization, and the causes of both success and failure (Grabski et al., 2001; Murray and Coffin, 2001; Rikhardsson and Kræmmergaard, 2005; Ross and Vitale, 2000; Scapens and Jazayeri, 2003; Scott and Vessey, 2000; Soh et al., 2000; Stephanou, 2000). In summarizing the findings of much of this research, Nicolaou (2004b) identified various factors that are critical for successful implementation of an enterprise system. These factors include the following: (1) support and commitment of top management, (2) alignment of people, process, and technology, (3) identification of expected benefits from the implementation project, (4) motivation behind the implementation (i.e., whether the project was system-led or business-led) and (5) scope of user training. All of these factors suggest that there are behavioral implications associated with the changes that occur as a result of implementation and that those changes impact both the organization as a whole and the individuals operating within the organization.

While this case research provides a strong basis for understanding the impact of the implementation process in specific organizations and identifying the factors that affect successful implementation, it does not provide a basic understanding of the long-term impact on individual or organizational behavior resulting from the fundamental changes in the organization and its processes. On the other hand, case research provides a good indication that changes occur within the organization (i.e., changes in business processes) as a result of enterprise system implementations and those changes profoundly affect various aspects of organizational behavior.

Kræmmergaard et al. (2005) argue that the next step is to extend both research and practice by focusing research on second-generation issues-enterprise system management. The critical issues

Table 1
Critical issues in enterprise system management

| | |
|---|---|
| Performance measurement, accounting and control | An enterprise system impacts the way managers account for and evaluate corporate performance, meet objectives and execute plans |
| Human resources | Enterprise systems create a dynamic work environment in which employees must change the way they work and continually develop new competencies |
| Business processes | Enterprise systems are a central component in business processes and management must carefully consider the system in redefining any business processes |
| Organization and culture | An enterprise system demands different capabilities and competencies and involves new ways of working and organizing |
| Business strategy | An enterprise system impacts the strategic development and changes the way organizations collaborate |
| Enterprise system technology | The enterprise system technology is continually evolving with each new release initiating new changes that impact performance and decision making |

Adapted from Kræmmergaard, Rikhardsson and Møller (2005).

associated with enterprise systems management are generally issues that relate to both organizational and individual performance and behavior. These issues include performance measurement and control, human resources, business processes, business strategy, organizational culture, and advances in technology (see Table 1). Based on the findings of case research, each of these areas seem to be affected and changed to various degrees as a result of enterprise systems implementations, yet there is a paucity of research on the impact of that change on performance. Consistent with Kræmmergaard et al. (2005), this paper identifies various behavioral research opportunities that may provide insight into these issues and suggests additional methodologies for further research in enterprise system management.

Scapens and Jazayeri (2003) provide an excellent discussion of a case study that offers insight into some of the organizational changes and behavioral issues that emerge as a result of an enterprise system implementation. Their research reports the results of a longitudinal study of an organization and provides an extensive discussion of the various changes within the company over a 10 year period. While the focus of their research is on management accounting, the reader can readily deduce from their discussion that significant changes occurred at the operational level of the organization as a result of the enterprise system implementation; the reader can also discern that changes at the mid-levels of the organization have seemingly taken place. On the other hand, the results also show that the impact of the move to an enterprise system driven organization on

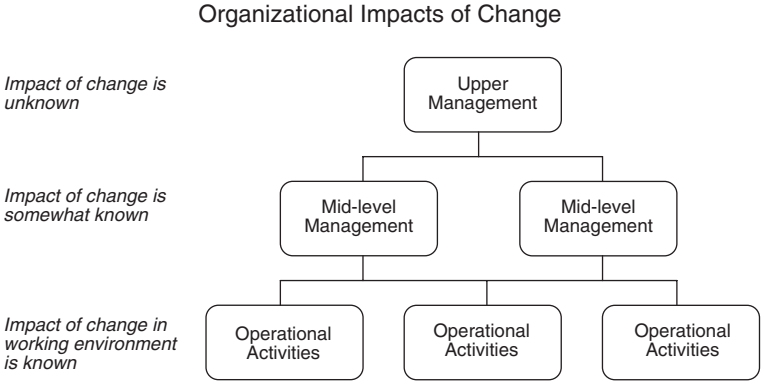


Fig. 1. Organizational impacts of change.

upper management is unknown. Importantly, as noted by Scapens and Jazayeri (2003), the enterprise system was not the driver of the changes that occurred in the organization, but the integration, standardization, routinization, and centralization that resulted from the implementation opened up opportunities and facilitated changes within the organization. The following discussion will rely heavily on the impacts (shown in Fig. 1) identified in Scapens and Jazayeri (2003) to highlight future opportunities for behavioral research related to organizational changes and individuals within those organizations.

## 3. Behavioral research opportunities

The implementation of an enterprise system consists of the installation of standardized software that can be customized to some degree to fit the organization. While customization is possible, all enterprise systems are build around the concept of standard business processes (Scapens and Jazayeri, 2003; Rikhardsson and Kræmmergaard, 2005). As a result, organizational change is inevitable and individuals who work in those organizations are affected. In some cases, the business processes are redesigned prior to the implementation begins; but in most instances, the business processes change because of the system implementation and can cause massive upheaval in the organization (Kock, 1996).

Scapens and Jazayeri (2003) describe many of the operational changes that occur in the organization they studied. As the implementation of the system went live, many employees were required to interact with the system to complete their job duties and their focus had to be on the business. These were employees who (1) previously focused on production, (2) operated on a tightly designed schedule and plan that was provided to them, and (3) did not have to interact with the information system to perform their job. The changeover required that they utilize the system to initiate, plan, and complete the production process and enter all relevant information throughout the process. Interacting with the system was not optional, because their job could not be performed without that interaction. While this may not seem monumental, just the process of mouse-clicking, much less entering and retrieving data using a terminal through the production process, was difficult for many individuals.

At the operational level, these changes represent fundamental changes in the way people do their job. While an outside observer might note that a mundane task has been transformed into a more enhanced, satisfying job, the process of change, particularly change that is forced by the implementation of an enterprise system, is not necessarily welcome and may be resisted. Over time, the affected employees might welcome that change, but alternatively may choose to change jobs, which can be very costly to the organization. Behavioral research examining issues such as role ambiguity, job turnover and job satisfaction of employees after the system implementation is needed to determine the longer-term effects on employees and the type of action that might be taken if these issues are problematic. On the other hand, operational employees may ultimately benefit from the changes imposed by the system and exhibit improved job performance. Research examining these issues would provide significant insight into organizational benefits or cost associated with the performance of these employees and ultimately insight into enhanced organizational performance.

While the direct impact that changes in business processes had on operational level employees is fairly evident, the impact on mid-level managers is not quite as clear. Traditionally, the role of mid-level management was to implement and meet the goals that had been set for their functional area. Subsequent to the implementation, these individuals had "...to develop a network of cooperative relationships, which means that they must learn how to identify shared goals, share

information, reach consensus and promote the trust necessary for developing and sustaining such relationships" (Scapens and Jazayeri, 2003, 217). In other words, the system forced them to share information particularly since most information had to be input into the system, creating a centralized repository of information. Whether the behavioral changes that are needed to effectively use the system actually occur is a topic for future research. This research should not only focus on whether these behavioral changes occurred, but whether implementation of these systems has affected professional commitment and organizational commitment, along with job satisfaction and turnover issues.

Another change Scapens and Jazayeri (2003) identify relates to the responsibilities of mid-level managers to monitor their own performance on an on-going basis. Because information contained in the systems is captured on a real-time basis and immediately available, managers have continuous access to budget information including variances along with forecasts for future performance. As a result, managers, rather than accountants, prepare and review their own cost reports. Research should examine whether managers are actually reacting to this information and making changes that result in improved organizational performance.

The availability and transparency of information contained in the system also suggests that much of the research on the impact of budget participation and budgetary slack may now be out of date and in need of replication. The bulk of this research was conducted in an environment where managers can keep much of their information private and act upon that information in the budgetary process. In an environment supported by an enterprise system, there may be much less private information leading to an improved budgetary process.

With the implementation of enterprise systems, organizations have captured an enormous amount of operational, as well as financial, information that can be used by management at all levels of the organization. Tools for querying that data (or data mining) and using it to improve decision making are generally implemented along with the system (or available for implementation). Unfortunately, whether individuals can use the tools or whether organizations are actually using information derived from those tools to improve decision making has received little attention in the extant research. Initial research examining individuals' ability to appropriately use querying tools in an educational setting reveals that they are not particularly adept at developing queries and that individual characteristics often impact their behaviors in this regard (Borthick et al., 2001; Bowen et al., 2003). Similarly, research has shown that the conceptual understanding of the underlying schema for organizing the data in an enterprise database can affect proficiency with accessing necessary data for job performance (Dunn and Gerard, 2001; Dunn and Grabski, 2000, 2001; Poels et al., 2005). Other research has demonstrated, however, that data mining techniques can be used to identify patterns in historical data, such as fraud indicators, that could be vitally important in organizational decision making (Kirkos et al., 2005).[1]

While these findings provide some implications for the use of data mining tools, future research should examine whether experienced users in an enterprise systems environment can effectively mine data from a database and whether the use of the information gleaned from using those tools improves or enhances the decision making process. The enhancement of decision quality could focus on either timelier or better decisions or both, particularly since the objectives of implementing an enterprise system generally include both efficiency and effectiveness improvements.

[1] See also Dunn and Grabski, 2002 for additional behavioral research in this area.

At the upper levels of management, the impact of change is much less evident from the case research. Enterprise systems provide operating data and key performance indicators on a continuous basis for executives to use in decision making. As previously noted, new tools for data mining are available and digital dashboards can be tailored to provide both strategic and operational data on a continuous basis. While prior empirical research has examined the factors necessary to implement successful data-mining technologies (Nemati and Barko, 2003), other researchers have questioned whether this type of technology actually improves or changes organizational decision making (Schrage, 2004; Anonymous, 2005). This raises several issues for top management decision making (Schrage, 2004). Can executives appropriately use the data mining tools to extract accurate and timely information for decision making? Does continuous, real-time information result in better decisions, more quickly? Does easy access to unlimited information lead to information overload? Do executives make decisions differently now than they did prior to implementation of sophisticated enterprise systems? In the past executives maintained close contact with key management personnel and relied on them to monitor operations and provide input into the decision making process. Has the advent of sophisticated systems changed that decision making environment or the management culture of organizations?

While the research opportunities identified above have focused on the behavior of individuals within the organization, many of those issues also have implications for organizational performance. One of the reasons often cited for adopting and implementing an enterprise system is to increase the organization's ability to respond quickly to consumer demands, to improve service, to enhance product quality, to improve efficiency and to maintain competitiveness. Recent studies using archival data indicate that enterprise systems adopters show positive financial performance (Nicolaou and Bhattacharya, 2006-this issue; Romero et al., 2005). In addition, adopters that enhance their systems with add-ons or upgrades show superior financial performance (Nicolaou and Bhattacharya, 2006-this issue). Future research should focus on why those improvements occur; specifically what aspect of organizational performance may improve as a result of implementing an enterprise system and under what circumstances?

## 4. Triangulation of field study methods

Case studies provide an excellent opportunity to explore new areas such as enterprise system implementations and provide preliminary input into a variety of issues. Much of our understanding to date regarding enterprise systems implementations has been gleaned from case studies (qualitative research) that have been reported in the literature. Unfortunately, the conclusions are often challenged in the academic environment because of the lack of generalizability to other organizations.

Alternatively, surveys can be used to examine the relative incidence, distribution, and interrelations of specific variables. Researchers can use surveys (quantitative research) to randomly sample numerous individuals across a variety of organizations regarding their perceptions of the enterprise system implementation and the subsequent changes that occur within the surveyed organization and test the theories set forth in case studies. The drawback to survey research is that it often lacks internal, external, and/or construct validity and may not be theory driven (Modell, 2005).

While case studies provide a richer, holistic understanding of a particular phenomenon, survey research helps to explain how often phenomenon occurs. In the management accounting research domain, both the case study and survey methods have been used extensively, but the validity issues associated with each have long been recognized. In order to overcome the weaknesses

associated with using either method, many management accounting researchers have called for triangulation between the case study and survey methods (Ferreira and Merchant, 1992; Ittner and Larcker, 2001; Modell, 2005; Shields, 1997).

Triangulation is achieved by using a recursive approach between the case study and survey methods. First the case study is completed and the theory derived therefrom is used to inform and provide a basis for the constructs examined in the survey. In essence, the case study provides a basis for developing testable hypotheses and identifying dependent and independent variables. The survey then operationalizes those variables and enables hypotheses testing. Any findings for which there is inconclusive evidence can then be further examined in a limited case study environment to examine alternative explanations or refine the theory that was initially set forth and further survey data can be collected to test those refinements. (Modell, 2005 reviews several examples of published research relying on triangulation between case study and survey methods.)

By combining qualitative and quantitative methods, external, internal, and construct validity are all enhanced (Jick, 1979). Subsequently, the results are generalizable and the overall contribution of the work is much greater. Future research on the impact of enterprise systems should focus on incorporating triangulation between these two methods to overcome the limitations of each of these separate methodologies.

Another complementary method that can be used with case studies to triangulate the results is a cross-sectional field study. A cross-sectional field study consists of interviews in the field with a cross-section of individuals from several different organizations (Lillis and Mundy, 2005). The interviews are very structured and focus on specific constructs or variables and are limited depth studies in comparison to case studies. While cross-sectional field studies have characteristics from both case studies and surveys, they are distinctly different. Similar to case studies, they are non-random and designed to examine complex phenomena. The data obtained from cross-sectional field studies are more often qualitative, but may use quantitative information for comparison purposes. Table 2 overviews the characteristics of the cross-sectional field studies in comparison to case studies and surveys. (For an in-depth discussion of these differences, see Lillis and Mundy, 2005). The management accounting research provides many examples of well-done cross-sectional field studies, including Merchant and Manzoni (1989), Bruns and McKinnon (1993), and Abernethy and Lillis (1995).

The use of cross-sectional data derived from a systemic research approach can provide support for the theory derived from a case study and enhance the generalizability of the findings. This is a particularly powerful research approach as it uses individual perceptions to connect and substantiate organizational level phenomenon. “These social attributes of theory-defined variables are difficult to document in surveys and difficult to generalize from individual case studies” (Lillis and Mundy, 2005, 126). The use of a cross-sectional field study in conjunction with the results from a case study increases both the internal and external validity of field research and strengthens the overall contribution of the findings.

These field study methodologies based on qualitative analysis are valuable tools in enhancing our understanding of the enterprise systems environment and the related impact on organizational structure, organizational performance, individual performance, and individual perceptions on the work and task environments. However, the value of such research is highest when it provides the foundation for understanding related phenomena in a broad range of organizations—i.e., when the findings are more generalizable. The enterprise

Table 2
Characteristics of field study methods

| | Case study | Cross-sectional field study | Survey |
|---|---|---|---|
| Level of complexity of phenomena | Medium to high | Medium | Low |
| Sampling rational | Theoretical | Construct driven | Statistical generalizability |
| Sampling | Non-random | Non-random | Random |
| Sample size | Very low (one or more) | Medium | Large |
| Preciseness/measurability of existing constructs | Low | Medium | High |
| Method of analysis | Qualitative | Qualitative and/or quantitative | Statistical |

Adapted from Lillis and Mundy, 2005.

systems research community is now at the point in the research evolution where triangulation oriented studies are critical to making sense of prior results and moving the field forward by developing and testing robust theories. To move beyond the existing stage of research on enterprise systems, enhancement of our methods, designs and research study implementations is critical to the maturation and viability of the research discipline.

## 5. Concluding comments

The research on enterprise systems, particularly as it interrelates with accounting, is currently at a relatively foundational stage. There are numerous case studies and a few archival studies that have laid the foundation for understanding *how* enterprise systems affect organizations. However, this array of studies has left us with a limited understanding as to *why* enterprise systems affect organizations and as to the impact on individual decision making and performance within those organizations. The focus of this paper has been on the exploration of opportunities for behavioral research that may enhance the understanding of the impact of enterprise systems on organizations and individuals in those organizations.

One of the goals and perceived advantages of enterprise systems is the integration of data from all processes within the organization to provide a single repository of available data to support business decision making. Yet little is known about how individuals within organizations, particularly management decision makers, use these data repositories to support decision making processes. Can they access the data they need for decision making? Do they know what data is available and how it is stored in the system? Much could be learned by applying what has been learned in other accounting domains about the impacts of expertise, heuristics and biases, and other components of cognitive processing to the domain of enterprise systems and the users of such systems.

This is not to suggest that we should abandon the research strategies that have been used to date in studying enterprise systems. But from the predominance of case studies examining enterprise systems must arise extensions that facilitate the development of theory that is generalizable across organizations. This necessitates the use of methodologies that extend the simple case study approach to the use of case studies with other methodologies that facilitate triangulation and more complex examinations and theories. For the enterprise systems research discipline to mature, the scope of investigation must also mature.

None of this discussion is intended to suggest that there are weaknesses in the extant research. Rather, those studies have developed a foundation for future studies that must now take the

research discipline to another level. The case put forth in this paper is that behavioral research methods have much to offer in assisting the exploration of a deeper understanding of enterprise systems impact in organizations and on individuals.

## References

Abernethy MA, Lillis AM. The impact of manufacturing flexibility on management control system design. Account Organ Soc 1995;20(4):241–58.

Anonymous. Execs recognize growing importance of KM. Knowl Manag Rev 2005;8(4):6–7.

Borthick AF, Bowen PL, Jones DR, Tse MHK. The effects of information request ambiguity and construct incongruence on query development. Decis Support Syst 2001;32:3–25.

Bowen PL, Ferguson CB, Lehmann TH, Rohde FH. Cognitive style factors affecting database query performance. Int J Account Inf Syst 2003;4:251–73.

Bruns WJ, McKinnon SM. Information and managers: a field study. J Manage Account Res 1993;5:84–108.

Dunn C, Gerard GJ. Auditor efficiency and effectiveness with diagrammatic and linguistic conceptual models. Int J Account Inf Syst 2001;1(2):79–87.

Dunn C, Grabski SV. Perceived semantic expressiveness of accounting systems and task accuracy effects. Int J Account Inf Syst 2000;1(2):79–87.

Dunn C, Grabski S. An investigation of localization as an element of cognitive fit in accounting model representations. Decis Sci 2001;32(1):55–94.

Dunn C, Grabski S. Empirical research in semantically modeled accounting systems. In: Arnold V, Sutton SG, editors. Researching accounting as an information systems discipline. Sarasota Florida: American Accounting Association; 2002. p. 157–80.

Ferreira LD, Merchant KA. Field research in management accounting and control: a review and evaluation. Account Audit Account J 1992;5(4):3–34.

Grabski SV, Leech SA, Lu B. Risks and controls in the implementation of ERP systems. Int J Digit Account Res 2001;1(1):51–78.

Hunton JE, Lippincott B, Reck JL. Enterprise resource planning systems: comparing firm performance of adopters and non-adopters. Int J Account Inf Syst 2003;4:165–84.

Ittner C, Larcker D. Assessing empirical research in management accounting: a value-based management perspective. J Account Econ 2001;32:349–410.

Jick TD. Mixing qualitative and quantitative methods: triangulation in action. Adm Sci Q 1979;24:602–10.

Kerlinger FN, Lee HB. Foundations of behavior research. Fourth Edition. London: Wadsworth Thompson Learning; 2000.

Kirkos E, Spathis C, Manolopoulos Y. Detection of fraudulent financial statements through the use of data mining techniques. Proceedings 2nd International Conference on Enterprise Systems and Accounting (Thessaloniki Greece); 2005. p. 310–25.

Kock C. Flipping the switch. CIO 1996:43–66 [June 15].

Kræmmergaard P, Rikhardsson P, Møller C. Enterprise systems management — a position paper. Proceedings 2nd International Conference on Enterprise Systems and Accounting (Thessaloniki, Greece); 2005. p. 28–38.

Lillis AM, Mundy J. Cross-sectional field studies in management accounting research — closing the gaps between surveys and case studies. J Manage Account Res 2005;17:119–41.

Merchant KA, Manzoni JF. The achievability of budget targets in profit centres: a field study. Account Rev 1989;64(3):539–58.

Modell S. Triangulation between case research and survey methods in management accounting research: an assessment of validity implications. Manage Acc Res 2005;16:231–54.

Murray MG, Coffin GW. A case study analysis of factors for success in ERP system implementations. Proceedings of the Seventh Americas Conference on Information Systems, Boston; 2001. p. 1012–8.

Nemati HR, Barko CD. Key factors for achieving organizational data-mining success. Ind Manage Data Syst 2003;103(3/4):282–93.

Nicolaou AI. Firm performance effects in relation to the implementation and use of enterprise resource planning systems. J Inf Syst 2004a;18(2):79–105.

Nicolaou AI. Quality of post implementation review for enterprise resource planning systems. Int J Account Inf Syst 2004b;5:25–49.

Nicolaou AI, Bhattacharya S. Organizational performance effects of ERP systems usage: the impact of post-implementation changes. Int J Account Inf Syst 7 2006-this issue. 18–35, doi:10.1016/j.accinf.2005.12.002.

Poels G, Maes A, Gailly F, Paemeleire R. User attitudes towards pattern-based enterprise information models: a replicated experiment with REA diagrams. Proceedings 2nd International Conference on Enterprise Systems and Accounting (Thessaloniki, Greece); 2005. p. 101–28.

Poston R, Grabski S. Financial impacts of enterprise resource planning implementations. Int J Account Inf Syst 2001;2:271–94.

Rikhardsson P, Kræmmergaard P. Identifying the effects of enterprise system implementation and use: examples from Denmark. Proceedings 2nd International Conference on Enterprise Systems and Accounting (Thessaloniki, Greece); 2005. p. 377–91.

Romero J, Banker R, Anderson M, Menon N. An industry study of the impact of ERP adoption by oil and gas firms. Working paper. University of Texas at Dallas; 2005.

Ross JW, Vitale MR. The ERP revolution: surviving vs. thriving. Inf Syst Front 2000;2(2):233–41.

Scapens RW, Jazayeri M. ERP systems and management accounting change: opportunities or impacts? A research note. Eur Account Rev 2003;12(1):201–33.

Schrage M. If you build it, will they come? — KPI digital dashboards might just be the next priority for CIOs. But how many CEOs really want all that real-time data anyway? CIO 2004;17(23):1.

Scott JE, Vessey I. Implementing enterprise resource planning systems: the role of learning from failure. Inf Syst Front 2000;2(2):213–32.

Shanks G, Seddon PB, Willcocks LP, editors. Second-wave enterprise resource planning systems: implementing for effectiveness. Cambridge: Cambridge University Press; 2003.

Shields MD. Research in management accounting by North Americans in the 1990s. J Manage Account Res 1997;9:3–61.

Soh C, Kien SS, Tay-Yap J. Cultural fits and misfits: is ERP a universal solution? Commun ACM 2000;43:47–51 [April].

Stephanou CJ. The selection process of enterprise resource planning (ERP) systems. Proceedings of the Americas Conference on Information Systems. CA: Long Beach; 2000. p. 988–91.

Yin RK. Applications of case study research. Applied social research methods series. Second Editon. Thousands Oaks CA: Sage Publications Inc.; 2003a.

Yin RK. Case study research: design and methods. Applied social research methods series. Third Edition. Thousands Oaks CA: Sage Publications Inc.; 2003b.