JOURNAL OF MANAGERIAL ISSUES
Vol. XII Number 4 Winter 2000: 446-467

The Changing Organizational Structure And Individual Responsibilities Of Managerial Accountants: A Case Study*

Stan Davis
Assistant Professor of Accounting
Wake Forest University

Tom Albright
J. Reese Phifer Faculty Fellow Culverhouse School of Accountancy
The University of Alabama

This study examines organizational structural changes within the finance and accounting function following the adoption of a new information system. Many accounting researchers have predicted a changing environment and role for management accountants resulting from competition, regulation, and manufacturing and information technology (see Baker, 1992; Cooper, 1996; Cox, 1992; Drucker, 1990; Elliott, 1992; Epstein, 1993; Ezzamel, 1994; Flamholtz, 1992; Johnson and Kaplan, 1987; Kaplan, 1984, 1986; King *et al.*, 1991; Madden and Holmes, 1991; McNair, 1996; Siegel *et al.*, 1997; Shea and Kleinsorge, 1994; Spicer, 1992; Tyson, 1996; Weaving, 1995). Disagreement exists regarding the nature of the changes, and whether change is actually taking place. Cooper (1996) foresees an increased need for management accounting, but a decreased need for management accountants. He predicts the management accounting function will be decentralized to those on the shop floor. After new management accounting systems are in place, "much of the day-to-day management accounting can be transferred to the workforce" (Cooper, 1996: 36). Elliott (1992) also predicts an increased reliance on blue-collar workers as they become knowledge-workers, and a part of the aggregate brainpower of the organization; they are supposed

* The authors thank both companies for participating in this project and for the cooperation received during the fieldwork portion of the project. The authors also thank Deborah Archambeault, Lori Kopp, Tom Lee, Lou Marino, Gary Taylor, two anonymous reviewers, and participants at the S. Paul Garner Center for Current Accounting Issues Research Workshop at the University of Alabama for their suggestions and insights on the paper.

to help figure out how to improve quality, speed production, and contribute to customer satisfaction. The management accounting department may adopt a supportive and monitoring role rather than a more proactive decision-making role, as advocated by Kaplan (1995) and Boer (1995), among others.

In a study of the evolving role of management accountants, King *et al.* (1991) report that "a sea of change" is taking place as management accountants become more proactive in the decision-making process. McNair (1996) disagrees with the premise that management accounting has become more relevant. "In general, we see a desire for change, but little evidence that management accounting has had the courage to let go of its ties to financial accounting and external reporting requirements" (McNair, 1996: 40). According to McNair, there has been much discussion about a changed emphasis in management accounting, but she describes the changes as "old wine in new bottles."

Since the early 1980s, numerous research projects have been conducted to gain a better understanding of the management accounting function in organizations (Keating, 1995) and to develop a theoretical basis for management accounting research in the future (Kaplan, 1986). This article seeks to add to that literature by identifying changes taking place in accounting functions as hypothesized by a set of literature-based expectations.

The most significant finding of the study is support for flattening the organizational hierarchy and developing a networked organization within the accounting function. The levels of management within the accounting function at one site were reduced from four to two over the course of five years; accountants began reporting to supervisors located at sites worldwide. At the second site, shared services activities were centralized at one location for the North American continent. The centralization resulted in a reduction of accounting function costs from 1.7 percent of sales to 1 percent of sales. Our study reveals that accountants became less involved in many routine tasks of cost accounting and began providing a support role both to plant personnel and to business managers in making strategic decisions.

The remainder of the article is divided into four sections. The next section develops three research propositions for fieldwork, based on a review of the accounting, information technology (IT), and organizational change literature. Then we consider research design issues including site selection, field research, and data sources. After this we present the field research findings in relation to our research propositions. The final section discusses conclusions, limitations, and opportunities for future research.

RESEARCH PROPOSITIONS

A general proposition for this project is that changes are taking place in the manner in which accounting departments and accounting personnel are utilized within organizations. These changes are associated with several factors, including improvements in IT. Several authors have cited and predicted the impact that information technology will have on organizations and the accounting function in general (see Elliott, 1992; Tyson, 1996). In this article, we pres-

ent specific propositions from IT and organizational change literature, as well as predictions and research findings related to the changes taking place when advancements in IT are present. Two propositions related to the organizational structure of an accounting department and one proposition related to the responsibilities of accountants are presented. The purpose of the propositions was to focus the fieldwork portion of the study and to determine if predicted organizational changes occur for accountants within an organization implementing new IT.

P1 The Accounting Organizational Hierarchy Changes as Companies Adopt New Information Systems.

Support for this proposition is derived from the literature hypothesizing organizational hierarchy changes associated with the introduction of information technology. Elliott (1992), Ezzamel (1994), Ferioli and Migliarese (1996), Fiedler *et al.* (1996) Gurbaxani and Whang (1991), Hitt and Brynjolfsson (1997), Huber (1990), Lucas and Baroudi (1994), Markus and Robey (1988), and Pinsonneault and Kraemer (1993) are among those discussing changes in organizational hierarchy and information technology. Most of the literature predicts a flattening of the organizational chart or the emerging of a network organizational form as a result of changes in information technology. Pinsonneault and Kraemer (1993) and Huber (1990) describe a flattening of the hierarchy because the need for information intermediaries is reduced. One role of a middle manager is to serve as an information supervisor. However, better information technology permits upper management to provide desired information without middle management. Huber (1990) suggests the decision-making process will involve fewer levels of the organization because access to information is greater with improved information technology.

The movement from traditional hierarchical organizational structures to networked structures is facilitated by new systems that permit greater information flow (Elliott, 1992). Network organizations may emerge because IT eliminates the need for physical proximity with respect to grouping tasks, functions, or people (Lucas and Baroudi, 1994). A traditional model of organizational hierarchy groups employees first by geographic region and then by function within the organization. As computer processing becomes more centralized, computers support freer communication between sites and data passage or sharing between common application programs becomes more prevalent. Thus, the organizational forms of companies utilizing new IT may change toward a matrix design whereby employees are grouped first by product type and then by functional expertise (Fiedler *et al.*, 1996).

P2 The Number of Accountants Decreases as Companies Adopt New Information Systems.

Aside from the downsizing associated with economic forces, a reduction in the number of employees is also attributed to advancements in information technologies. Different reasons exist for reduced employment numbers for firms implementing new IT. Brynjolfsson *et al.* (1994) cite a labor substitution motive as a chief factor in reduced headcounts for firms implementing new IT. By utilizing IT for tasks formerly done by employees, companies can speed up

certain processes, improve productivity, and reduce costs and headcount. Huber (1990) and Pinsonneault and Kraemer (1993) discuss a reduced need for information intermediaries, resulting in fewer employees. Since information technology advances improve the flow of data and communication within organizations, fewer middle-managers are needed to serve as intermediaries between top management and front-line employees.

Advancements in IT also are expected to impact the accounting function within organizations, leading to a reduced number of accountants in the organization as well. King *et al.* (1991) report the time savings realized by implementing IT to reduce the routine tasks of accounting has resulted in fewer accountants, rather than expanding services offered by accountants. Ezzamel (1994) also reports that a goal of implementing IT at some locations was to reduce headcount in certain departments, including the accounting department. Cooper (1996) predicts fewer accountants will be needed as the process of cost management is pushed to the shop floor and more of the data gathering process is automated. As new IT systems continue to incorporate all functions of an organization, fewer accountants will be needed for clerical activities normally regarded as strictly accounting activities. Front-line employees will be initiating accounting entries during the course of their everyday activities and accountants will monitor the output rather than operate the accounting information system.

P3 The Orientation of Management Accountants is Shifting from Scorekeeping to an Active Role in the Decision-Making Process.

Much has been written about how management accountants must change to meet customer needs. Most authors advocate more participation by management accountants in proactive activities, such as membership on strategy- and decision-making teams. As many of the traditional accounting tasks are automated, an increased emphasis is placed on predicting future activities. Thus, management accountants must become part of the management team to retain importance in the organization (Cooper, 1996; King *et al.*, 1991; McNair, 1996; Shea and Kleinsgorge, 1994). Siegel *et al.* (1997) document an expectation among accounting executives for more involvement in activities that focus on customer and product profitability rather than on the traditional costing activities of the past.

Causal Factors of Change

Any discussion of organizational change associated with advances in information technology should include underlying causal assumptions made by the researcher (Markus and Robey, 1988). Two primary schools of thought, the technological imperative and the organizational imperative, attempt to explain organizational evolution when changes in information technology occur. The technological imperative[1] "views technology as an exogenous force

[1] Markus and Robey (1988) and Orlikowski (1996) use this term while Pinsonneault and Kraemer (1993) use "technological perspective," and Winter and Taylor (1996) use "technological determinism." The definitions for these terms are similar.

which determines or strongly constrains the behavior of individuals and organizations" (Markus and Robey, 1988: 585). Technology is seen as the driver of change in organizations; management has very little control over changes that take place (Orlikowski, 1996; Pinsonneault and Kraemer, 1993).

In contrast to the technological imperative, the organizational imperative [2] "assumes almost unlimited choice over technological options and almost unlimited control over the consequences. This perspective holds that human actors design information systems to satisfy organizational needs for information" (Markus and Robey, 1988: 587). Supporters of the organizational imperative often cite exogenous factors, such as social, political, economic and cultural, as reasons for management to orchestrate organizational change. IT is seen as a tool used to achieve desired changes (Winter and Taylor, 1996; Ferioli and Migliarese, 1996).

The assumption of causality is important because generalizability of the findings may be affected. The technological imperative suggests results will generalize to companies implementing new IT. However, the organizational imperative suggests managerial initiatives aided by IT do not generalize solely on the basis of new IT. Remarks from the president and chief operating officer at one of the research sites in this study indicate the new IT was a critical component of the organization's plan to achieve certain changes. The president and chief operating officer commented in an introductory presentation of the new system that IS technology is crucial to achieving desired changes. The chief operating officer also stated that the company could not design independent solutions to every business or location need. It was only through integrated cross-functional systems that the company could achieve desired goals. Evidence from our research supports both technological and organizational imperatives. Consistent with the organizational imperative, some of the findings presented in this study represent how new IT is used to achieve desired organizational change and how these changes impact the accounting function in organizations. Included in this category would be the company's decision to reorganize by businesses and use new IT to allow this change. Other findings support the technological imperative assumption.

RESEARCH METHOD

This research utilizes case study methodology to identify changes taking place in the finance and accounting functions at two different organizations after implementing a new information system. Consistent with Yin's (1994) definition of a case study, we consider this methodology appropriate because we seek to describe how the organization has changed as a result of a contemporary event (the implementation of a new system).

Site Selection: Site A and Site B

A general proposition for this research is that changes are taking

[2] Markus and Robey (1988) use this term while Pinsonneault and Kraemer (1993) use "managerial perspective," and Orlikowski (1996) uses "planned change." The definitions for these terms are similar.

place in the finance and accounting functions in organizations and that recent advancements in information technology (either directly or indirectly) enable some of the changes. Both companies selected as field research sites have recently implemented an integrated information system and offer opportunities to observe the expected effects of the new system consistent with propositions developed from the IT/organizational change and accounting literature. [3]

Research Site A is a major manufacturing firm with annual sales exceeding $20 billion. This company operates over 90 manufacturing sites in 30 countries, and employs almost 40,000 persons. Research Site B also is a major manufacturing firm with annual sales exceeding $30 billion and manufacturing and administrative facilities worldwide. The information systems history of these two companies is similar over the past 30 years. Since the 1970s both companies have developed in-house information systems. Often these systems were unique to a location. During the 1980s and 1990s, the companies centralized several functions, including general ledger duties and distribution systems. Each company had literally hundreds of separate information systems that differed by geographic location and function. Each geographic site required support personnel for system issues. The goal in changing to a new information system was to standardize information systems across geographic locations and functional purposes and to centralize support functions for systems support to one location. SAP was the tool chosen by both companies to help implement this strategy. Site A began the process of educating its employees about the new information system in 1993. Implementation of the new system took place over the course of three years. Site B initiated their educational program about the new information system in 1995. Implementation of the new system at Site B took place over the course of 4 years.

Our primary investigation focuses on changes occurring in the controller's department of one division ("the division") for Site A after the implementation of the new information system. The division selected for this project employs approximately 1,800 persons in addition to several hundred independent contractors. The division manufactures a broad array of intermediate goods, primarily for use in other company-owned plants. Our discussion of findings for each of the propositions consists of an in-depth discussion of changes at the division. As corroborating evidence, we also present findings related to the propositions for company-wide situations both for Site A (the company to which the division belongs) and Site B, a similar company implementing the same information system during approximately the same time period.

Data Sources

Initial discussions with top accounting personnel at the sites were conducted to define the project scope and to determine appropriate personnel to be interviewed; subsequent fieldwork focused on gathering data.

[3] This is consistent with site selection criteria for case studies as discussed by Young and Selto (1993).

Because this research seeks to identify changes that have taken place over several years, fieldwork was divided between documenting the departmental structure and accountants' responsibilities in 1992 (prior to the new IT system) and as of June, 1997 (4 years following the initial implementation phase) for the division at Site A. The implementation phase for research Site B was from 1995-1999.

Sources of information include semi-structured group and individual interviews, documentation, and direct observation. The group interview sessions included a discussion of the research project's scope, group projects designed to recreate organizational attributes prior to and after the new system implementation, and discussions about the new system. Structured interviews with three consultants, having experience in over 200 SAP implementations, were conducted to discuss changes that have taken place in the accountants' roles and responsibilities. Documentation obtained from the sites included job descriptions, organizational charts, information system descriptions, and *post-hoc* project cost/benefit analyses. Finally, direct observation of the department and accountants was used for further verification of changes that have taken place.

SAP—The New System

Important aspects of this research include understanding the new information system's functionality and identifying operational and structural changes associated with its use. Companies have long used computerized accounting systems, including in-house creations and purchased systems, but a limiting factor was their inability to interface with other systems within the organization. A recent development in information technology is the wholly integrated management information system. These systems encompass almost every aspect of the information system of a company, including accounting, manufacturing, and marketing. Software changes in this case involved switching to SAP (Systems, Applications and Products in Data Processing), a developer of integrated business application software.

SAP offers client/server and mainframe business applications to manage comprehensive financial, manufacturing, sales and distribution, and human resources functions. An advantage of SAP software lies in real-time integration, linking a company's business processes and applications while supporting immediate responses to change throughout the organization on a departmental, divisional or global scale.

A major advantage of integrated software systems is the compatibility among software programs representing different functions of an organization. Software packages representing accounting, manufacturing, inventory, and sales have existed for many years. In many cases, prior to the use of integrated software, effective interface among these systems was lacking. Often, monitoring and facilitating interfaces were a standard part of a cost accountant's duties during the closing process.

The systems replaced at each research site by SAP had been created over the course of many years. Several systems and applications had been developed or purchased to automate a variety of functions. The resulting information system was a network of canned and internally created software applications interfaced, where

possible, to interact with each other. Each major production site had its own mainframe and unique set of programs designed to meet its needs. There was little standardization in the manner in which each manufacturing site at these two organizations met its information needs. The new system replaced a vast majority of old systems and permitted system standardization across functions and sites. Advantages of the new system include integration of functions, standardization of processes and systems across geographical and business segments, and implementation of one enterprise-wide system. The remainder of the article presents and discusses the findings related to the propositions.

FINDINGS

Propositions 1 and 2 The Accounting Organizational Structure Changes and the Number of Accountants Decreases as Companies Adopt New Information Systems.

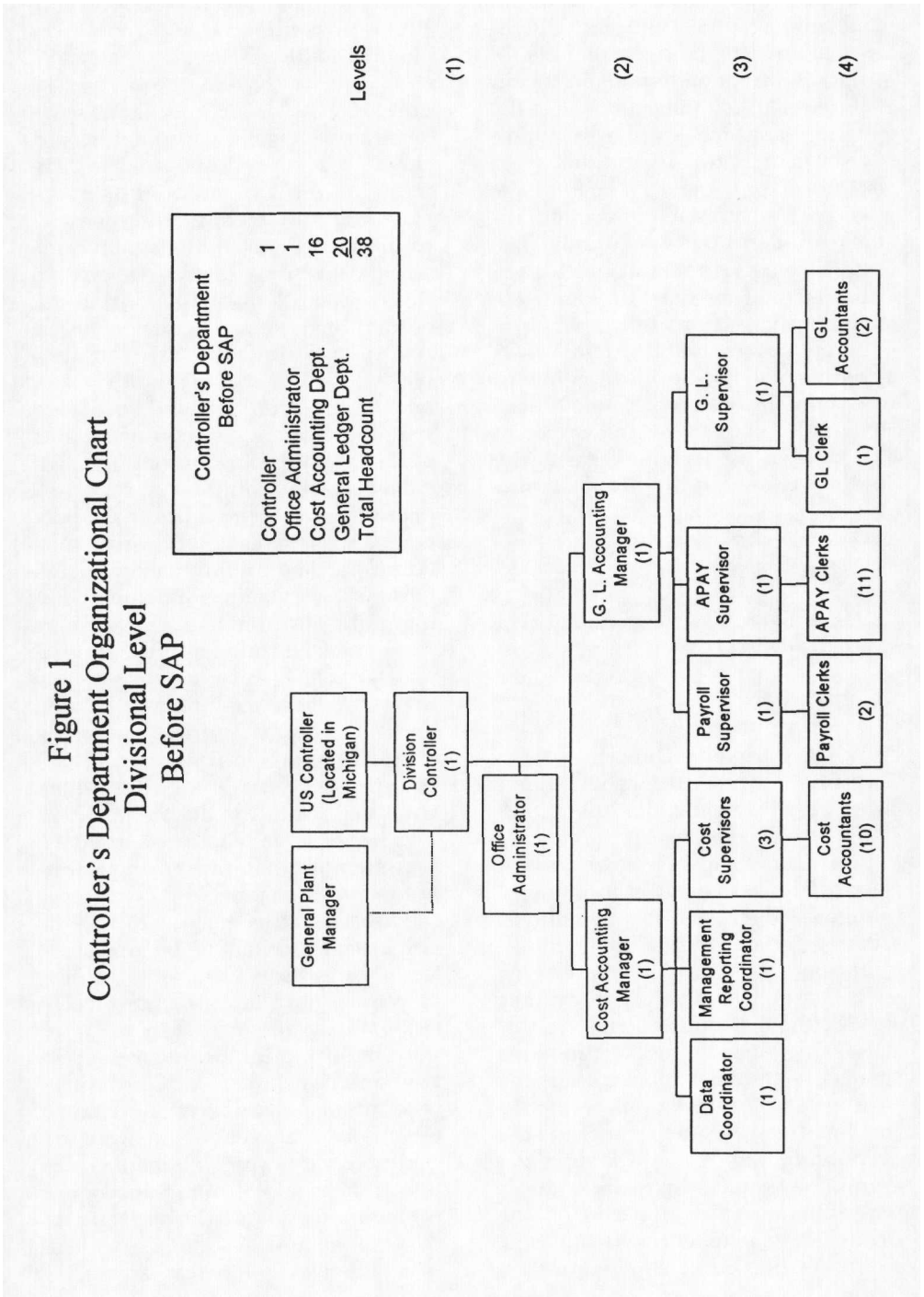
Site A Divisional Findings

The Controller's Department Before SAP. The controller's function prior to the implementation of SAP included 38 employees organized within four reporting levels. These employees were involved in cost and general ledger accounting duties. General ledger duties included accounts payable, invoicing, property, and payroll. A division controller headed the department. This individual also was a member of the plant manager's staff and reported directly to the US controller at corporate headquarters. Two departments, cost accounting and general ledger accounting, existed within the controller's function; each department was headed by a manager who reported to the division controller (Figure 1). The controller's primary responsibilities were confined to the geographical area of the division.

The cost accounting group had 16 employees. A data coordinator, management reporting coordinator, and three cost supervisors reported directly to the cost accounting manager; ten cost accountants reported to three cost accounting supervisors. The data coordinator was responsible for the flow of information within the accounting system. The management reporting coordinator was responsible for divisional (geographical) reporting for both local and corporate requirements. Cost accountants and supervisors were responsible for providing cost accounting services to plants located at the division. Cost accountants were assigned to different areas of responsibility based on experience, workload, and plant groupings. The division had one general plant manager and several "major" managers. Each major manager was in charge of a group of plants or service functions. If possible, a major manager would have only one cost accountant responsible for all local accounting duties for his or her area. The size of certain areas required assigning more than one cost accountant to a major manager.

The general ledger group had 20 employees and included a manager, three supervisors, fourteen clerical employees, and two accountants. Divisional payroll and cashier duties were the responsibility of one supervisor and two clerical employees. The accounts payable supervisor managed eleven payable clerks who were responsible for keying vendor invoices into the payables system and coding each transaction with the appropriate cost center and account code. The general ledger supervisor was respon-

Figure 1
Controller's Department Organizational Chart
Divisional Level
Before SAP



sible for various functions, including property accounting and subsidiary accounting. One clerical worker and two accountants reported to this supervisor.

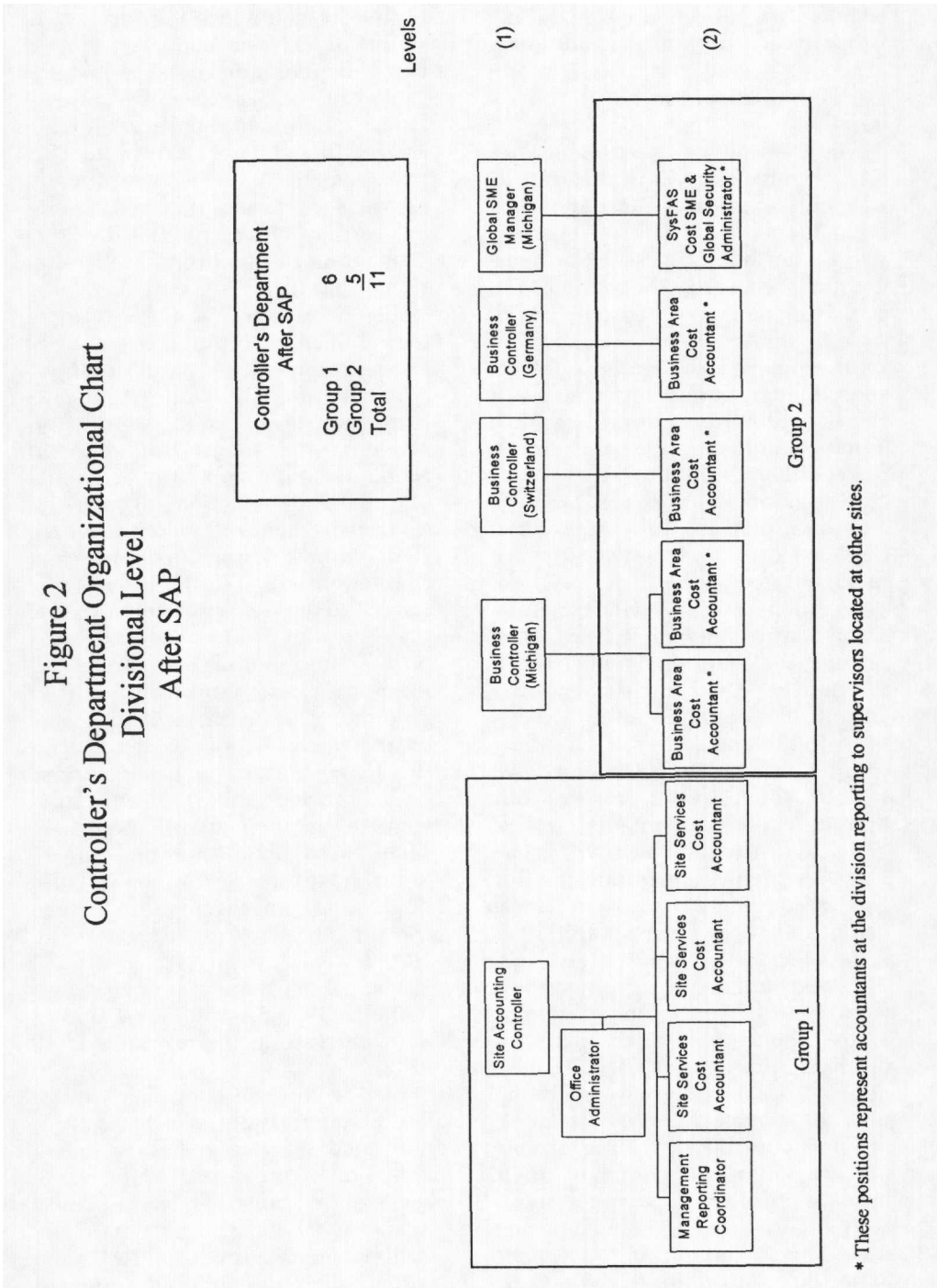
The Controller's Department after SAP. Figure 2 presents the restructured organizational chart after SAP containing two levels of responsibility. Eleven employees provide accounting services to the plant and to business managers located worldwide. Cost accountants are divided into two groups according to job responsibilities. Group one consists of the site accounting controller, office administrator, management reporting coordinator, and the site services cost accountants. Two cost accountants are responsible for cost accounting services for the service departments located at the division. These service departments include maintenance, environmental, utilities, engineering and other services located at the division. The third cost accountant provides cost accounting services for a joint venture and a subsidiary company located at the division.

The second group consists of four business cost accountants and a global security administrator. The cost accountants are responsible for cost accounting services to local plants and reporting responsibilities at both local and business-wide levels. These accountants report to business controllers at different locations around the world. The company has divided its products into 15 core businesses. A business may have operating sites at several different locations. Business controllers are responsible for accounting functions of their business units, and supervise business accountants at all manufacturing sites. The site accounting controller is not directly responsible for these business accountants, but serves as a source of technical support, mentoring, and communication.

Two of the accountants shown in Figure 2 have duties unrelated to the costing function at the division. The management reporting coordinator for the site oversees financial reporting responsibilities for the division. The amount of reporting at the divisional level has decreased significantly because of business realignment initiatives. Business reporting is now a responsibility of the cost accountants for the businesses. The management reporting coordinator also serves as a mentor to the newer accountants and site services accountants. The other accountant serves as a Global Subject Matter Expert (SME) for the costing function within the new system. This position is not related to any services offered at the plant site, but involves providing support for any employees (regardless of location) on questions involving cost accounting and the new system. The company has 13 Global SMEs. Ten of the 13 are located at headquarters, but all provide support for the entire company in their area of expertise. These accountants are on call 24 hours a day on a rotating basis. Both the SME and management reporting coordinator were cost supervisors in 1992.

The organizational changes hypothesized by propositions 1 and 2 were observed at the divisional level for Site A. Four organizational levels existed within the controller's function at the division prior to SAP. As illustrated in Figure 1, these included a divisional controller, section managers, supervisors, and accountants. As shown in Figure 2, only two organizational levels existed after SAP. Certain accountants employed in similar

Figure 2
Controller's Department Organizational Chart
Divisional Level
After SAP



* These positions represent accountants at the division reporting to supervisors located at other sites.

positions to those existing prior to SAP have no direct supervision at the divisional level. Accountants are part of a networked organization that allows their responsibilities to extend beyond geographical boundaries. Certain accountants at the site now service clients located in other geographical regions and report operating results on a business-wide basis.

The number of accountants employed at the site also has decreased. Specifically, 21 accountants were employed at the division prior to SAP compared to ten after SAP. The number of clerical employees also declined from 16 to one over the same time period.

Causes for Change. Two primary reasons are cited for the decrease in organizational levels at the controller's department. The company (1) centralized and standardized functional accounting operations, and (2) reorganized the controller's function by businesses. The centralization of functions resulted in a reduction of one organizational level in the controller's department. Because no general ledger duties remained at the plant site, the responsibilities of the division controller were reduced and combined with the cost accounting manager's position to create the site accounting controller's position after the implementation of SAP.

The reorganization from a functional alignment to a business alignment eliminated another level of management in the controller's function. Cost accountants now report either directly to the site controller or to a business controller located at another site. This arrangement eliminated the need for an additional level of supervision to coordinate the accountants; many responsibilities shifted from the accountant's geographical location to the business sub-unit. Coordination of efforts among business accountants now takes place by business controllers located at various sites around the world.

Three primary reasons are cited for the decline in headcount observed in the controller's department. The company (1) implemented a downsizing program, (2) centralized and standardized functional accounting operations, and (3) implemented a new information system. The downsizing program resulted in a decrease of approximately five employees (including three employees with cost accounting duties and two employees with general ledger duties). The exact number of employees leaving the department due to the downsizing effort is difficult to determine since some retired during the downsizing program.

Centralization of general ledger duties to headquarters was responsible for the largest decrease in employee count. Two supervisors and the general ledger manager were relocated to other sites and other positions within the company. The payables and payroll clerks (14 employees) were reassigned to positions with other departments of the same division. Savings associated with a central payables site and standardization of general ledger processes drove the payables restructuring process.

A decrease of five employees, all from the cost accounting department, is attributed to the implementation of the new information system. The new information system and the removal of responsibilities previously assigned to cost accountants permit each accountant to manage a broader area of responsibility. Prior to the re-

alignment by businesses and after the centralization of general ledger activities, cost accountants served as the contact person for all accounting questions from the plants. Accountants were asked to familiarize themselves with payroll and property and plant issues, and other areas formerly handled by other local accountants. With the alignment by businesses, the role of the site accountants was reduced to responsibility for cost and property accounting duties. For example, prior to SAP, one cost manager, one data coordinator, one management reporting coordinator, three cost supervisors, and ten cost accountants provided cost services to 45 cost clients. A cost client could be either a plant or a service area located at the division. Some clients required much more attention than others. Determining equitable workload distributions was difficult. Some accountants handled only two clients while others had five to nine clients. Alternatively, after SAP, one site accounting controller, one management reporting coordinator, and seven cost accountants managed the same workload.

Site A Company-Wide Findings for Propositions 1 & 2

Changes observed at the division level for Site A reflect changes that took place at the company level. Cost accountants at all locations were grouped not by geographic location, but rather by business organizations. Another change was the centralization of cost accounting services. Before the new system was implemented, each manufacturing site had its own information system, developed independently of other systems. Therefore, each site had its own local cost accounting systems expert that would resolve cost issues for that location. The new system was implemented, in part, to establish a globally common means by which to capture transactions. When the new system implementation began, a new group of cost experts was designated to map costing practices from old systems into the new system. This new group (called the Cost Process Technology Center Group, or CPTC) remained after installation of the new system to become cost and systems experts on a global basis for the organization. Currently, this group has approximately 20 employees that serve as in-house consultants on costing and system issues for the entire organization.

The number of accountants employed by the company before and after the implementation of the new system was consistent with changes observed at the manufacturing sites. Other divisions of comparable size to Site A have experienced decreases in the number of cost accountants over the same time period. When the corporate directive was issued to decrease headcount in the controller's function because of the pending changes in restructuring and the new information system, site controllers took different approaches to reducing headcount. The controller at Site A aggressively placed his accountants in various positions at other locations (primarily in positions at corporate headquarters). Many of the reassigned accountants at the division were placed in positions in other accounting departments, such as statutory accounting or financial reporting. Some accountants were placed in temporary positions created due to the implementation of the new system. Controllers of other divisions

chose to allow natural attrition to lower their headcounts. Company-wide, the number of accountants has decreased since the implementation of the new information system.

Site B Company-Wide Findings for Propositions 1 & 2

Consistent with the findings at Site A, management at Site B also reported an overall reduction in accounting-related headcount. The company has five years experience with SAP, as the implementation project began early in 1995. By the end of 1999 the company had 5,000 users in 200 locations across the North American continent. In assessing the overall reduction in accounting overhead costs, we considered the possibility that external consultants may have been substituted for full-time employees. At Site B, management did not rely heavily on external consultants for installing the system, but chose to use internal resources at an estimated project cost of $57 million. In 1995 approximately 20 consultants were on hand when the initial implementation began. After six months only three or four remained; by 1996 all external consultants were gone. Some consultants were hired for their technical expertise in a specific area while others were hired as trainers. Management did not believe significant external assistance in the area of planning, organizing, managing, and monitoring projects was necessary because the company had managed major projects for years. Key individuals throughout the company were selected to drive the implementation. As a result, problems associated with potential detractors were eliminated. Two types of IT staff, development and support, were used in the system roll-out. Approximately 80 people were involved in custom development to add functionality to the system. In addition, these developers required hardware, communications, and network support from other groups within the company.

Accounting headcount and overhead cost reductions were achieved at Site B by removing activities performed at multiple manufacturing locations and centralizing these functions at one location. The business process reengineering of the finance activities, known by the company as shared services, are as follows: invoicing, warehouse accounting, fleet accounting, accounts payable, travel and entertainment, general ledger, governmental accounting, capital and asset accounting, internal audit staff, accounts receivable, and purchase card accounting. Prior to SAP implementation, the controller at each plant had responsibility for all shared services activities.

The economic advantage of centralizing accounts payable and invoicing activities results from eliminating duplication of effort at numerous sites across North America. However, additional system complexity may require additional effort in the internal audit function. Evidence from Site B indicates otherwise. Interestingly, though the system is more technically complex, the company now requires fewer internal auditors. Before centralizing shared services, auditors would conduct a walk-through at each facility, worldwide, every three years. The new system permits auditors to target sites where problems may occur. According to management, the proactive approach results in better quality audits, less travel, and greater levels of auditor productivity.

A post-project assessment conducted by management at Site B provides evidence of company-wide savings in the finance and accounting functions. Most of the efficiencies were realized through headcount reductions made possible by centralizing redundant clerical accounting activities at 300 locations. Thus, data at Site B support Propositions 1 and 2, suggesting the organizational structure changes and the number of employees decrease with the adoption of a new enterprise-wide accounting system. Prior to the SAP implementation administrative costs represented 1.7 percent of sales. The post-implementation cost approximates 1 percent of sales. Organizational charts indicate multiple levels have been removed from each plant location. For example, seven to eight accounts payable staff members were required at each plant location. After the company centralized the accounts payable function, only three persons were needed. Additional savings permitted by the system include:

- Working capital reduction (savings $10 million). The automated system permitted maximum company- wide purchase discounts and facilitated rapid collection of accounts receivable. Additional savings in accounting-related costs resulted from the "evaluated receipts" process. When invoices are received from approved vendors, the system automatically pays the invoice upon receipt. SAP enabled approximately 55% of incoming invoices to be paid in this manner.
- Purchase leverage (savings $20 million). Negotiating corporate purchasing agreements reduced costs on materials and supplies previously purchased at 300 locations. In addition, for those purchases not covered by corporate agreements, managers at remote locations had immediate access to company-wide pricing information to use as a basis for comparison.
- Capital spending management (savings $5 million). SAP impacts areas external to the accounting process. For example, the system permitted engineers to estimate, plan, and track expenditures against project estimates.
- Transportation leverage (savings $10 million). The system helped managers reduce inefficiencies in the transportation and logistics systems and to negotiate more favorable contract rates.

Summary of Propositions 1 and 2—Consistent with Observations from Site A and Site B

Pinsonneault and Kraemer (1993) and Huber (1990) suggest fewer levels of management are necessary as managers provide the information they need. The global information system implemented by our research sites allows for information access across geographic and business divisions. Therefore, fewer persons are required to accumulate data from multiple sites. Elliott's (1992) hypothesis that networked organizations evolve as a result of improved information systems is also supported in this study. The reporting relationships described above reflect a networked organization where employees no longer are grouped by geographical regions and functional responsibilities. Employee groupings now are based on business units within the organization without re-

gard to either geographic or functional responsibilities. These changes are consistent with a matrix organizational design (Fiedler *et al.*, 1996) where members report both to product and functional leadership. Changes attributed to the new information system appear to support the organizational imperative view of IT-induced change. Management's decision to realign by business resulted in fewer levels of management, created new reporting relationships, and reduced the number of employees in the accounting department. The implementation of a new information system is viewed as a crucial means by which these goals were achieved.

This article seeks to understand the change in accounting personnel, in numbers and job responsibilities, following implementation of an enterprise-wide integrated information system. A factor that may obscure the absolute count, system-wide, is the use of external consultants to replace accountants whose positions were eliminated. From a corporate-wide perspective, research Site B experienced only a temporary increase in overall personnel (one to two weeks) as positions were eliminated and consultants were hired to perform specific technical tasks. The majority of new employees and consultants hired by Site A for implementation services no longer work for the organization. Accounting and simple systems issues are handled by the CPTC group created during the implementation of SAP. Site A made the decision to outsource its systems development and critical support needs to a consulting firm that provides assistance with SAP on an as-needed basis.

Proposition 3 The Orientation of Management Accountants is Shifting from Scorekeeping to an Active Role in the Decision-Making Process.

Site A Divisional Findings

Overall responsibilities of the controller's function at the division do not appear to have changed; their function remains to ensure the integrity of reported information. The new information system and reporting relationships have redefined the manner in which accountants perform their duties.

Changes Associated with the New Information System. The most significant change in accountants' duties is in accounting for inventories. Previously, accountants were responsible for reconciling inventory balances received from the plants' production reports to general ledger balances updated from a separate system. Some accountants also were involved in manually calculating moving average prices for inventories and preparing adjusting entries during closing. Preparing reconciliations and calculations, along with running computer programs to recharge service area costs, were the primary activities for accountants during the first four days of closing. Although plant personnel were responsible for providing data for inventory entries, accountants were responsible for preparing the entries, ensuring that plant personnel provided information on a timely basis, and making correcting entries for incorrect inventory balances. Inventory transactions were prepared in batches at the end of the month, while plant personnel maintained daily production and shipping records within their own systems. One accountant noted that the old system did not require plant personnel to be concerned with accounting inventory balances as long as their own reports were correct. The accountants viewed changing this mindset as a major

challenge since there is now only one set of inventory balances.

The new information system has removed much of the time-consuming reconciliation activities associated with periodic closings. Only one set of balances exists; transactions are recorded automatically when plant personnel close production orders, ship inventory, or receive materials. Instead of reconciling balances during closing and making correcting entries, accountants monitor the plant's progress toward entering all production orders and shipments of inventory. If the accountant detects a mistake, plant personnel must make correcting entries because of authorization limits placed on job functions. The new system places a greater emphasis on maintaining a good working relationship with plant personnel and a greater responsibility on plant personnel for maintaining the accuracy of cost information. Overall, accountants at Sites A and B report less overtime and fewer manual entries during the closing process; therefore, more time is available for account analysis.

Nonclosing activities of the accountants have changed little following the installation of the new system. The primary activities during nonclosing weeks still include special projects, troubleshooting, and answering cost questions. Providing product cost estimates, establishing new product identification codes in the system, monitoring account balances on an ongoing basis (an activity now possible given the real-time nature of the new system), and recalculating product standards on a monthly basis are all responsibilities associated exclusively with the new system. Previously, a plant could produce and ship a new product (in the system) without the accountant's knowledge. Because the new system is integrated, the accountant must set up new product information in the system prior to production of the product.

Overall, accountants favorably viewed changes associated with the new information system. Less overtime, less clerical/manual work, and more opportunity to analyze accounts and detect problems prior to closing were the primary benefits identified by the accountants who used the new system. The major concern expressed by accountants was the feeling of a loss of control over the accounting process. Most of the responsibility for initiating and recording accounting entries had been shifted to nonaccounting plant personnel. Encouraging plant personnel to take responsibility for problems traditionally viewed as accounting tasks, such as correcting incorrect inventory balances, entering all shipments or production orders in a timely manner, and ensuring that the appropriate plant personnel were involved in the inventorying process, were also concerns identified by the accounting staff. As a result, accountants felt less involved in the accounting process and more involved in coaching, monitoring, and support activities.

Changes Associated with the Realignment by Businesses. Significant changes in responsibility came as an indirect result of the new system. The realignment of functions by business changed the focus of reporting for many accountants. Accountants responsible for manufacturing plants now report on both a plant and business level. Reporting at the business level requires gathering information from many different plant sites and consolidating data into a business-wide report. The old system would

not permit one person to gather and organize all necessary information. Consequently, the amount of time spent coordinating efforts among accountants at different sites delayed the reporting process.

Business accountants at the division report to supervisors located at different sites. Some accountants are now responsible for plants located in different areas of the country. Two of the four business accountants at the division had met with their supervisors only once during the 18 months since business realignment took place. The other two had met with their supervisors less than 4 times each. The new relationship places more responsibility on accountants to be better problem-solvers and to make decisions independently. However, the new reporting relationship also leaves them without an official local backup during absences from work. "Official" backup for business accountants are accountants working for the same business unit but located at other sites. Accountants at the division all stated they felt comfortable when another accountant on-site would cover their duties while they were away from work. The major concern with a supervisor located off-site was the supervisor's inability to monitor activities on a first-hand basis. These issues become important during the performance review process. Another concern with the reporting relationship was the absence of a local supervisor responsible for monitoring workload distributions and coordinating efforts to relieve work overloads on certain desks. Despite these concerns, business accountants supported the new reporting relationships and welcomed increased responsibilities associated with the restructuring effort.

Site A Findings for Proposition 3

Implementing the new system freed accountants from the manually tedious tasks associated with traditional cost accounting functions and allowed for more analytical activities. The emphasis organization-wide was for accountants to become analysts rather than to continue as scorekeepers. Toward this end, the organization has a goal of hiring persons with MBA degrees to fill analyst positions formally filled by persons with undergraduate accounting degrees. Thus, the new system has already affected the responsibilities of the accounting profession in significant ways.

Site B Findings for Proposition 3

At Site B, the accounting function is losing control over data input because control is disbursed. Much of the data entry takes place in the production area; thus control is now located at the operational level. The system creates an atmosphere to utilize marginal economic concepts to run the business. More time is available for analytical work because integration has created efficiencies. Previously, as many as four of five different systems may have been required to conduct a study requiring multiple users to be involved in the data gathering process. Now, similar studies can be conducted by one person in a fraction of the time previously required, thereby increasing efficiency and time spent on value-added activities.

Summary of Proposition 3

In general, the business accountants believe their role has been enhanced by the new accounting system and business realignment. Account-

ants are an important source of information about the system for plant personnel since more of the actual entry-generating activities are taking place outside the accounting department. Business accountants also enjoy a broader scope of responsibility and the opportunity to work on the business level. During the interview phase of this research, most accountants stated their tasks were becoming increasingly analytical. Definitions of "analytical" varied among the accountants. Some felt that becoming more analytical meant spending time monitoring their accounts and explaining variances on their cost sheets, while others defined analytical as not only providing reports to their managers, but also providing answers to anticipated questions arising from the reports. Alternatively, other accountants stated plant-specific problems causing additional clerical work prevented them from conducting analytical activities.

Cooper's (1996) prediction that management accountants will adopt a more supportive role in the organization is upheld by observations in this study. Accountants feel less involved in the functional activities of accounting and more involved in supplying management with information needed to make decisions. Accountants also stated a large part of their duties included aiding plant personnel with questions involving the correct use of the new information system. This, too, is consistent with the supportive role Cooper describes for management accountants of the future.

CONCLUSION

Support exists for the organizational and technological imperative regarding changes induced by information technology. The new information system was used to achieve company goals by facilitating business realignment. Expected organizational changes (Proposition 1) associated with improved information technology have taken place in the accounting function for both research sites. Support was found for both a flattening of the organizational hierarchy (as suggested by Pinsonneault and Kraemer (1993) and Huber (1990)), and the development of a networked organization (as suggested by Elliott (1992) and Fiedler *et al.* (1996)). At both sites, the number of reporting levels decreased and reporting relationships were no longer constrained by geographical locations within the organizational structure. In addition, overall accounting personnel-related costs declined at both research sites as headcount was reduced through system efficiency and restructuring.

A role of the cost accountants is to ensure the integrity of reported financial numbers associated with inventories and expenses. The manner in which these responsibilities are performed has changed dramatically. Each accountant interviewed cited a reduction in the manual activities of reconciling, calculating, and inputting necessary to perform their duties, as compared to the manual activities performed under the old system. Some accountants reported these clerical tasks had been replaced by other clerical activities. These new clerical activities were related to problems specific to certain plants and were not indicative of an overall replacement of old clerical activities with new ones. Many accountants expressed a belief that most new clerical tasks would disappear after plant per-

sonnel became fully accustomed to their new responsibilities. Manual accounting entries have been reduced significantly and the majority of accounting entry-generating activities have been moved to the plant. The accountants' role has expanded to include support or coaching for plant personnel as they perform activities that create accounting entries.

Accountants expressed a belief that their roles were evolving from a traditional recording function to an analyst position. Creating reports and explaining changes, trends, variances, and other issues, as well as forecasting future performance, will be future responsibilities according to most of the accountants. Some accountants stated they were much further away from this goal than others, however. Accountants viewed their positions as support personnel to decision-makers, and not as decision-makers themselves. As one accountant explained, a "company [in our industry] is going to be run by . . . engineers. If it's not, then we're all in trouble." The observations in this case provide support for the changing roles of cost accountants from a scorekeeping orientation to an active support role in the decision-making process. Accountants are not only involved in providing cost support to local plants, but also to business controllers and managers involved in a decision process at a company level.

References

Baker, D. W. 1992. "Perspectives: Management Accounting in the 21st Century." *Management Accounting* (February): 6.

Boer, G. 1995. "Management Accounting Beyond the Year 2000." *Journal of Cost Management* (Winter): 46-49.

Brynjolfsson, E., T. W. Malone, V. Gurbaxani, and A. Kambil. 1994. "Does Information Technology Lead to Smaller Firms?" *Management Science 40* (12): 1628-1644.

Cooper, R. 1996. "Look Out, Management Accountants." *Management Accounting* (June): 35-41.

Cox, D. 1992. "Trends in Management Accountancy." *Executive Accountant* (Winter): 17.

Drucker, P. E. 1990. "The Emerging Theory of Manufacturing." *Harvard Business Review* (May/June): 94-102.

Elliott, R. K. 1992. "The Third Wave Breaks on the Shores of Accounting: A Commentary." *Accounting Horizons* 6 (2): 61-85.

Epstein, M. J. 1993. "The Expanding Role of Accountants in Society." *Management Accounting* (April): 22-26.

Ezzamel, M. 1994. "A Survey of Management Practices." *Management Accounting* (July/August): 10-12.

Ferioli, C. and P. Migliarese. 1996. "Supporting Organizational Relations Through Information Technology in Innovative Organizational Forms." *European Journal of Information Systems* 5: 196-207.

Fiedler, K. D., V. Grover, and J. T. C. Teng. 1996. "An Empirically Derived Taxonomy of Information Technology Structure and its Relationship to Organizational Structure." *Journal of Management Information Systems* 13 (1): 9-34.

Flamholtz, E. G. 1992. "Relevance Regained." *Advances in Management Accounting* 1: 21-34.

Gurbaxani, V. and S. Whang. 1991. "The Impact of Information Systems on Organizations and Markets." *Communications of the ACM* 34 (1): 59-73.

Hitt, L. M., and E. Brynjolfsson. 1997. "Information Technology and Internal Firm Organization: An Exploratory Analysis." *Journal of Management Information Systems* 14 (2): 81-101.

Huber, G. P. 1990. "A Theory of the Effects of Advanced Information Technologies on Organizational Design, Intelligence, and Decision Making." *Academy of Management Review* 15 (1): 47-71.

Johnson, H. T. and R. S. Kaplan. 1987. *Relevance Lost—The Rise and Fall of Management Accounting.* Boston, MA: Harvard Business School Press.

Kaplan, R. S. 1984. "The Evolution of Management Accounting." *The Accounting Review* LXI (3): 390-418.

_____. 1986. "The Role for Empirical Research in Management Accounting." *Accounting, Organizations and Society* 11 (4/5): 429-452.

_____. 1995. "New Roles for Management Accountants." *Journal of Cost Management* (Fall): 6-13.

Keating, P. J. 1995. "A Framework for Classifying and Evaluating the Theoretical Contributions of Case Research in Management Accounting." *Journal of Management Accounting Research* 7: 66-86.

King, M., R. A. Lee, J. A. Piper, and J. Whittaker. 1991. "W(h)ither Management Accounting?" *Management Accounting* (March): 46-50.

Lucas, H. C. Jr., and J. Baroudi. 1994. "The Role of Information Technology in Organization Design." *Journal of Management Information Systems* 10 (4): 9-23.

Madden, D. L. and J. R. Holmes. 1991. *Management Accountants: Responding to Change. An Exploratory Study.* Montvale, N.J.: National Association of Accountants.

Markus, M. L. and D. Robey. 1988. "Information Technology and Organizational Change: Causal Structure in Theory and Research." *Management Science* 34 (5): 583-598.

McNair, C. J. 1996. "To Serve the Customer Within." *Journal of Cost Management* (Winter): 40-43.

Orlikowski, W. J. 1996. "Improvising Organizational Transformation Over Time: A Situated Change Perspective." *Information Systems Research* 7 (1): 63-91.

Pinsonneault, A. and K. L. Kraemer. 1993. "The Impact of Information Technology on Middle Managers." *MIS Quarterly* (September): 271-292.

Siegel, G., C. S. Kulesza, and J. E. Sorensen. 1997. "Are You Ready for the New Accounting?" *Journal of Accountancy* August: 42-47.

Shea, J. E. and I. K. Kleinsorge. 1994. "TQM: Are Cost Accountants Meeting the Challenge?" *Management Accounting*(April): 65-67.

Spicer, B. H. 1992. "The Resurgence of Cost and Management Accounting: A Review of Some Recent Developments in Practice, Theories and Case Research Methods." *Management Accounting Research* 3: 1-37.

Tyson, T. 1996. "The Impact of Advancements in Manufacturing and Information Technology on Management Accounting Systems." *Accounting History From the Renaissance to the Present.* Eds. T.A. Lee, A. Bishop and R.W. Parker. New York, NY: Garland Publishing, Inc. pp. 143-165.

Weaving, J. 1995. "The Changing Role of the Accounting Department." *Management Accounting* 73 (5): 56.

Winter S. J. and S. L. Taylor. 1996. "The Role of IT in the Transformation of Work: A Comparison of Post-Industrial, Industrial, and Proto-industrial Organization." *Information Systems Research* 7 (1): 5-19.

Yin, R. K. 1994. *Case Study Research: Design and Methods*, Second Edition. Beverly Hills, CA: Sage Publications.

Young, S. M., and F. H. Selto. 1993. "Explaining Cross-Sectional Workgroup Performance Differences in a JIT Facility: A Critical Appraisal of a Field-Based Study." *Journal of Management Accounting Research* 5 (Fall): 300-326.