REINVENTING THE
IS ORGANIZATION:
EVOLUTION AND REVOLUTION IN
IT MANAGEMENT PRACTICES

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Abstract

Competitive environments and sophisticated technologies are presenting IS executives with new opportunities and pressures, encouraging many to consider new IS management practices. This paper describes a study of fifty executives' new management practices and the reasons they were implemented. The findings suggest that IS executives are most concerned with delivering business value, but they believe that delivering business value requires attention to five other concerns: the technical infrastructure, the staff infrastructure, productivity, cycle time, and partnership. Executives are making both evolutionary and revolutionary changes in their management practices as they attempt to address multiple objectives simultaneously. The executives' concerns are summarized in a proposed model of IT management that demonstrates the complex interrelationships between objectives and practices.

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Reinventing the IS Organization:
Evolution and Revolution in IT Management Practices

Introduction

Projections for the future of the information systems (IS) organization include extinction (Dearden, 1987; Hopper, 1990), heavy outsourcing (Huber, 1993; Lacity and Hirschheim, 1993), and a redistribution of management responsibility between IS and business units (Boynton, Jacobs and Zmud, 1992; Elam, Ginzberg, Keen and Zmud, 1988; Rockart, 1988). There are many possible scenarios for the future role of IS, but one thing seems certain -- an increasingly competitive global economy and increasingly sophisticated information technology users will drive changes in the management of information technology (IT) in organizations. The global economy has forced companies to seek shorter cycle times, improved product quality and greater customer satisfaction, while sophisticated users of IT are demanding rapid data access and cost effective organizational information systems in order to meet these business demands.

It is unclear whether incremental improvements in traditional IS functions, such as faster systems delivery, can adequately address emerging competitive pressures. Instead of focusing on delivering and running a portfolio of systems that support distinct business processes, IS is becoming responsible for maintaining a complex infrastructure that enables communication, provides rapid access to ad hoc requests for data, and facilitates business processes (Applegate, Cash and Mills, 1988; Haeckel and Nolan, 1993; Hopper, 1990; Rockart and Short, 1989). Emerging IS roles include greater attention to data integration and networking, improved understanding of strategic processes, and stronger partnerships with business unit managers (Applegate and Elam, 1992; Earl and Feeny, 1993; Elam, Ginzberg, Keen and Zmud, 1988; Henderson, 1990).

Confronted with downsizing, reduced budgets, and growing demands, IS executives are rethinking the management processes they rely upon to carry out their roles. While IS executives cannot control the competitive and organizational forces that are driving the need for change in IS management, they can control how they respond to them. Alert IS executives are implementing strategies to respond to their changing environments, but it is not clear what IT management approaches best address current and future needs. This paper describes a study to explore what

strategies leading-edge IS executives are implementing in order to address changing pressures on the IS organization, as well as why these executives have taken their chosen approaches.

Prior Research

Two types of studies have contributed to our understanding of IT management practices. The first type identifies the key concerns of IS executives (Brancheau and Wetherbe, 1987; Champy, 1993; Hartog and Herbert, 1986; Niederman, Brancheau and Wetherbe, 1991) and provides rank-order lists of IS concerns. Examining these studies over time suggests that IS executives are increasingly concerned with six key issues:

    (1)   aligning IT with strategic business goals

    (2)   reengineering business processes

    (3)   building technology infrastructures

    (4)   developing IS human resources

    (5)   managing data as a resource

    (6)   improving software development.

They further indicate that IS effectiveness measurement and IS role definition, while important, are decreasing in importance (Champy, 1993; Niederman, Brancheau and Wetherbe, 1991).

The second type of research examines the implementation of specific management practices believed to represent leading-edge approaches to IT management. Many studies have focused on organizational approaches to addressing the key issues identified above. For example, IS executives work towards alignment between IS and business goals through IS strategic planning (Earl, 1990) and by developing close relationships with top management (Applegate and Elam, 1992; Elam, Ginzberg, Keen and Zmud, 1988; Feeny, Edwards and Simpson, 1992). Studies of business process reengineering implementations suggest that IS executives should view these as opportunities to apply IT to bolster organizational competitiveness (Benjamin and Levinson, 1993; Davenport, 1993; Davenport and Short, 1990; Hammer, 1990). A study of IT infrastructure development suggests that a key function of the central IS organization is to develop and maintain a base of information technologies that can be shared across divisions (Weill, 1992). IS executives can pursue development of new skills for their professional staffs through new hiring practices (Elam, Ginzberg, Keen and Zmud, 1988) and team-based management structures (Shrednick, Shutt and Weiss, 1992). Studies of information engineering (Hackathorn and Karimi, 1988) and strategic data planning (Goodhue,

Kirsch, Quillard and Wybo, 1992; Lederer and Sethi, 1988) describe IS planning efforts to manage data as a resource. Finally, research on system development indicates that software quality and cycle time reduction can result from new delivery methodologies, such as templates and CASE (Rockart and Hofman, 1993; Orlikowski, 1993), from application of total quality management concepts (Swanson, McComb, Smith and McCubbrey, 1991), and from object oriented technologies (Fichman and Kemerer, 1993).

Given all these possibilities, what's a manager to do? Surely there will be great variety in the initiatives IS managers adopt to respond to their changing environments. Some managers will be guided in their choices by unique industry or organizational issues. For example, Huber (1993) argues that information technology outsourcing makes sense in the banking industry, despite the strategic importance of IT to banks. Others will reject new management approaches, either because they are skeptical of published reports on the success of initiatives, or because they are comfortable with the ability of their existing practices to accommodate change. Others will value change for the sake of change, and will implement a large variety of new management practices.

Research on key IT management issues has been useful in suggesting how some IS executives view changing demands on the IS organization, but it does not indicate which strategies executives are actually implementing in order to meet those demands. Research on specific management practices describes experiences with potentially important IS initiatives, but it does not reveal how widespread adoption is, nor the intentions of the adopting IS executive. Neither body of research recognizes the need for executives to shape a set of initiatives to address the needs of multiple, sometimes competing, objectives in order to meet complex demands on their organizations.

Methodology

In order to uncover the state-of-the-art in IT management, this study specifically focuses on the efforts of respected IS executives. It examines their self-reported key new management practices, and thus identifies their key concerns through the actions they are taking. Specifically, it addresses two questions:

What new approaches are organizations taking toward IT management?
What are the underlying objectives for these new management practices?

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By asking top information executives what they are doing and why, we learn both their key concerns and the management practices they feel will best address them. In this study, we do not attempt to identify all key IS concerns or all important IT management practices. Rather we identify the current passions and obsessions of a group of leading-edge[1] IS executives in order to better understand the nature of IT management in the future.

Twenty-eight IS consultants, practitioners and academics provided the names of companies they felt were highly effective or innovative in their management of IT. In addition, the 1992 peer ratings of top IS organizations as listed in *Information Week, Datamation* and *Computerworld* provided nominations of companies that are perceived to be at the leading-edge of IT management. Combined, these sources provided 259 nominations of 149 different organizations. The sixty organizations that received two or more nominations were selected for interviews.

We divided the sixty companies among the three researchers and we contacted the top information systems executive in each of our organizations first by letter and then by telephone to arrange telephone interviews. Executives at fifty of the sixty (84%) companies agreed to participate in the study. At thirty-five of the fifty companies the contact was the head of corporate IS. The rest of our contacts were IS heads of relatively autonomous divisions, executives who report to the top IS executive and, in one case, a third-level IS executive in a very large IS organization. All, we believe, are highly placed IS decision-makers. Reasons for nonparticipation included lack of time (four respondents), corporate policies against telephone interviews (four respondents) and very new CIOs (two respondents).

Participating companies represent a variety of industries and company sizes, as shown in Table 1. Due to the method used to identify participants, larger companies, because they are more visible, are probably over-represented in the sample, but the sample includes four firms with fewer than one hundred IS professionals. In twenty of the sample companies IS professionals are centralized,

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[1] 'We define "leading-edge" as respected by individuals knowledgeable in the information systems field. We did not attempt to confirm that our sample of companies represented the "leading edge" in terms of IT management practices. Certainly, some excellent firms were not included in the sample. However, we feel that our methodology in seeking expert opinions delivered a non-random sample of companies that is generally representative of good IT management practices.

reporting to corporate IS, although they are not always physically located together. In the remaining companies IS staff are decentralized to the division and, sometimes, the department, level.

Table 1
Description of Participating Companies

Industry			Size Range	Median
Discrete Manufacturing	22	IS employees	70 - 5,000	1,100
Service	12	Total employees	1,250 - 373,000	38,000
Process Manufacturing	6			
Transportation	4		*IS Structure*	
Communications & Publishing	4			
Retail	2	Centralized		20
		Decentralized/Divisionalized		30

Between October and December 1992, we conducted 30 to 45 minute telephone interviews with our executive participants. We explored two primary questions: (1) What were the three most important IS management practices that had been implemented within the past two years, and (2) Why was the management practice initiated. Follow-up questions included:

- How does it work?
- When did it start?
- How big is the commitment?
- What business benefits are expected?
- How is it going?

We took detailed notes during the interviews and transcribed them shortly thereafter into one and a half to two pages of single-spaced text. These transcribed interviews serve as the "raw data" for our analysis.

It is important to note that the list of management practices developed from the interviews is not an exhaustive list of management practices implemented at the sites, but rather a list of those efforts that were consuming the attention of the IS executives at the time we conducted the interviews. Moreover, the objectives they stated for each management practice were sometimes stated in terms of some initial observed outcomes and at other times stated in terms of what they hoped to eventually accomplish. Often, there were multiple objectives for a single management practice. While individual transcripts may not provide a full picture of what is going on at a given

organization, taken as a whole, the transcripts provide insight into the state of IS management at leading-edge IS organizations.

We began our data analysis by developing categories of initiatives and objectives. First, each researcher, working alone, developed category lists from his or her interview transcripts. We then compared and consolidated the individual lists, attempting to define the essential characteristics as well as the boundaries of each category. This led to the development of an initial matrix of initiatives and objectives.[2] Next, we each coded our third of the interviews into this matrix as best we could, noting ambiguities and omissions in the categories. We revised the matrix, subdividing, discarding and collapsing some categories. When we were satisfied with the structure, we wrote detailed definitions of each initiative and objective category.

With the final 6 x 30 matrix and explicit definitions established, all three of us independently coded all 50 interviews. The resulting matrix, shown in Table 2, incorporates the 257 initiative/objective codings on which at least 2 of the 3 of us agreed. (See Appendix for comments on validity and reliability of the coding.)

Because our objective was to be descriptive rather than theoretical, our categories are more derived from, and reflective of, our data than they are of the literature on information technology management. The initiative categories are particularly descriptive, as they draw heavily on what the subjects said about relatively concrete events, activities, practices or behaviors. The objective categories are more interpretive, as they draw more on the respondents' expectations, strategies, or meanings and their own interpretations of their organization's purposes or goals.

Findings on Management Initiatives

In responding to the query on their three new management practices, the IS executives we interviewed sometimes identified more than three new management practices. In all, they described 30 distinct management practices that we grouped into the following six categories: new planning practices, structural changes to IS, reorganizing within IS, new vision for IT architecture, TQM practices, and changes to systems development processes. This list of management initiatives, shown

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[2]Matrices are an economic way to see relationships between initiatives and categories (Miles and Huberman, 1984, p. 225)

in the matrix in Table 2, demonstrates a wide variety of responses to the changing demands on IS departments. Because executives often cited multiple objectives for their management initiatives, the columns in Table 2 include some double-counting across the rows. The final column was added to give a unique count of the number of executives citing each practice. Table 3 lists the initiatives in descending order by number of respondents reporting the practice. Brief descriptions of the management practices are provided below.

The *new planning processes* category includes new approaches to strategic IS planning and to identifying IS priorities. In general, IS executives reported much greater senior management commitment and functional manager participation in this process than had been true a few years earlier. Twelve respondents described business process reengineering (BPR) efforts as key initiatives of IS. These executives view BPR as an important process in identifying key applications of IT. Most said that IS was not leading BPR efforts but was playing very visible roles in order to identify IT applications to support strategically critical, often cross-functional, business processes.

Planning processes that were more tightly linked to business unit planning processes were cited by ten executives as a new management initiative. These processes usually require that business unit leaders identify potential applications of IT as part of their annual plans, and sometimes tie responsibility for the performance of new systems to the business units that requested them. At eight other firms, as well as two that reported IS planning processes linked to business planning, new steering and advisory committees establish priorities for IT investments. Many of these firms had similar committees in the past, but the executives reported that the new committees are more effective, perhaps because they are more likely to have senior management involvement. These committees of senior-level and business unit managers are making decisions on firm-wide architectures, standards and common systems. Five firms increased business unit participation in IS planning by locating high-level IS liaisons in client organizations. These liaisons sit on business unit management teams to help identify IT applications.

New funding philosophies, which allow for closer examination of the value of systems and systems support, have been introduced at seven firms. Two of these firms have implemented chargeback approaches that are based on market-based fees and service contracts. One has implemented a zero-

based budgeting system for allocating IS resources, and another allocates IS funding to business processes rather than to functional units.

The *structural changes to IS* category reflects changes in reporting relationships and staffing of the IS function. It is worth mentioning that four executives were now reporting to a higher management level, but the dominant activity in this category was shifting between centralization and decentralization of IS staff. Eight executives have initiated changes that involved bringing decentralized or distributed staff back under the control of the corporate or divisional IS head ("centralizing"). Seven executives are physically distributing IS staffs who continued to report to the central IS executive ("distributing"), and six have changed primary reporting responsibility of IS staff from the CIO to business unit heads ("decentralizing"). Several other IS executives reported in passing that they regularly centralize and decentralize their staffs--one joked that it was a daily occurrence!

A related initiative, reported by 8 respondents, including four that were centralizing IS professionals, involved reducing the total size of the IS department through downsizing or data center consolidation. Five executives reported outsourcing some IS responsibilities to external vendors, but just one of them was involved in major outsourcing efforts.

The category *reorganizing within IS* encompasses changes to internal IS processes. In this category eleven companies have introduced new team structures in IS. Self-managed and high performance teams, which involve fewer hierarchical layers and greater autonomy within teams for finding solutions to business problems, have been implemented at seven firms. Staff reorganizations were introduced at six firms to increase flexibility or improve performance. Executives at these firms noted a need to reengineer their own processes before they could facilitate improvements in business unit processes. Networked or matrix organizational structures, characterized by multiple reporting relationships within IS, were reported by four interviewees.

Other initiatives identified under the *reorganizing within IS* category included changes to recruiting and training processes, which typically involve a heavier emphasis on interpersonal skills and training on newer technologies. Two companies described unique HR practices. One has a gradeless IS planning function so that people at all levels of the organization can be attracted to short-term

assignments on a planning team. The other has worked out a "loyalty oath" that describes the commitment distributed IS managers have to corporate IS despite their strong reporting relationships to business unit management.

The category *new visions for IT architecture* reflects efforts to focus on building a technology infrastructure. Dominant activities in this category include the adoption of policies to implement common, shared applications, efforts to establish standards (particularly open system standards), and initial plans for client-server architectures. Eight respondents discussed the need for common applications to improve integration and reduce duplicated efforts. Four are focusing on setting standards on hardware, telecommunications protocols, operating systems, data bases, and methodologies. Seven firms have committed to making client-server architectures the IT environment of the future.

The *TQM practices* category includes efforts to adopt TQM concepts. Seven respondents identified a new or renewed commitment to TQM programs as a major IS management initiative within the past two years. Five other executives mentioned that TQM programs established prior to our two-year horizon (and hence not included in the matrix) were central to their management practices. "Major commitment to TQM" describes an effort to change to a customer orientation and to view the role of IS in terms of its contribution to business unit needs. In particular, these IS departments are committed to a greater emphasis on measuring results.

World-wide benchmarking efforts with companies throughout the world to identify potential process improvements were major initiatives of four executives. Like other TQM practices, benchmarking was described as a useful tool for measuring IS effectiveness. Executives that identified TQM initiatives consistently emphasized the impact of measurement on performance.

Changes to system development processes received minimal attention in our interviews. Several interviewees indicated that they were frustrated with their inability to find tools that significantly improved systems development processes. Four, however, indicated that rapid prototyping (RAD) and joint application development (JAD) either had, or were expected to have, major impacts on system delivery. Major implementations of integrated CASE were reported by two executives; however, others noted that they had been disappointed with CASE. Several respondents mentioned

that they were experimenting with object orientation and thought it might have important impacts on system delivery, but none referred to it as a major initiative.

The management initiatives described by our respondents offer few clear trends, but lead us to the following conclusions about changes in IS units:

- At the same time that some IS departments are centralizing, others are decentralizing staff.
- IS management structures have fewer hierarchical levels, more team-based management and more matrix or multiple reporting relationships.
- Total quality management practices are influencing IS management practices, particularly with regard to assessment of IS quality.
- IS departments can be important players in business process reengineering.
- High-level business managers are increasingly willing, if not eager, to participate in IT planning processes.
- IS has primary responsibility for defining infrastructure requirements, but clients are participating in those decisions.

Findings on Objectives

We identified six objectives for the new management practices: business value, partnership, productivity, cycle time, staff development, and technology infrastructure development. Executives often introduced more than one practice to achieve a single objective. At the same time, they had, on average, two objectives for each management practice. Table 4 provides a summary of the number of respondents who identified each objective and the total number of times each objective was mentioned.

Business value refers to IS executives' focus on meeting business needs and contributing to the bottom line. We placed initiatives in this category when executives told us they wished to align information technology applications with company goals, to make sure that the interests of the company as a whole were served, or to make the company more competitive. In general, this category reflects executives' concern with the close coupling of strategic and IT goals.

Business value, mentioned by forty-three of the fifty respondents, was the single most sought after objective. Ninety-one times during the course of the interviews executives cited business value as

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one objective of a new management initiative. While almost every management initiative could have an impact on business value, the initiatives most frequently associated with contributing to business value were: planning processes that link IT planning with business planning, steering and advisory committees whose key roles involve planning IT investments, and business process reengineering.

Some other initiatives undertaken to focus IS attention on business unit needs included moving IS staff closer to clients by distributing or decentralizing them and adopting the customer focus of TQM. To help the business units think strategically about IT, some executives placed high level IS liaisons in business units or changed funding processes, in part to make IT more salient in their long range planning.

The *partnership* category reflects IS executives' desire to change the relationship between IS and business unit management. Executives reported many variations of this theme, including greater customer satisfaction, IS being more proactive in client relationships, and business units taking more ownership of their systems or becoming more involved in IT-related activities. Thirty-nine respondents mentioned partnership as an objective of their new management practices a total of sixty-six times. Partnership, like business value, was sought through initiatives that bring IS and client staff together, at all levels. Distributing staff provides low level linkages, whereas forming steering and advisory committees provides high level linkages. New funding approaches increase IT and client awareness, whereas linking IT and business planning provides more formal, shared-task links.

Productivity captures objectives to reduce the cost of building, operating and maintaining systems. This can be done either by increasing the output using the same or fewer inputs or by reducing the IS costs to produce equivalent outputs. Twenty-six executives identified 49 initiatives for which productivity was an objective. Some firms' productivity-enhancing initiatives have been undertaken as part of a firm-wide mandate to lower costs; where cost-cutting was mandated by competitive conditions, executives often cited business value objectives as well. The IS executives interested in improving productivity seemed to be adopting initiatives designed to cut slack by downsizing IS or consolidating data centers, or to tighten control over IS resources by centralizing IS professionals or moving towards common applications or other standards.

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Cycle Time is the objective of reducing the time to deliver new systems. Although only 16 respondents identified cycle time as an objective of their new management initiatives, several indicated that it was of utmost concern, claiming that business unit satisfaction with IS efforts and the ability of IS to contribute strategically to the firm were directly affected by the speed with which IS delivered new systems. Respondents generally rely on productivity tools, and to a lesser extent, a solid technology infrastructure, to reduce cycle time.

Technology infrastructure development objectives reflect an interest in facilitating systems integration and ready access to organizational data. This infrastructure includes hardware, software, data, telecommunications and methodologies. Respondents indicated that developing a technology infrastructure requires an understanding of how IT will be used in the organization. Twenty-one IS executives identified 27 different initiatives intended to address this objective. Like cycle time, the technology infrastructure was the focus of fewer initiatives than business value, partnership and productivity, but a number of executives noted that a poorly integrated infrastructure could prevent IS from effectively pursuing other objectives. Initiatives undertaken to build the technology infrastructure included working out and sharing specific IT visions, in particular, policies to move towards common systems and decisions to make initial forays into the world of client-server.

Staff development refers to interest in building the skills and motivation of IS professionals to create a high quality (sometimes referred to as "world class") human resource to be applied to a firm's information technology needs. This objective, mentioned by only 14 respondents, received the least attention among the six objectives. However, several respondents who had no initiatives in this area mentioned that their staffs are not equipped with the skills they need to be effective in the current IS environment. In some cases, IS executives are attempting to address changing staff requirements through new organizational structures, such as self-managed work teams. Others are implementing training programs which include training on new technologies, interpersonal skills, and quality concepts. One organization has brought in organizational development specialists to help employees adapt to change, and another has assigned mentors to help individuals plan their careers.

Discussion

In this section we examine our findings in two ways. First, we compare current practices at leading-edge IT organizations with recent literature on IT management. By understanding where the findings confirm and disconfirm expectations for IT management, we gain insights into how IS units are evolving. Second, we develop a model of IT management based on the key objectives of the IS executives in our study. This model provides a framework for understanding and planning IT management changes.

Comparison of Findings with Prior Literature

Leading-edge IS executives are taking action on all six of the issues identified in the literature as growing concerns of IS executives: aligning IT with strategic business goals, reengineering business processes, building technology infrastructures, developing IS human resources, managing data as a resource, and improving software development. They are most focused on developing structures and processes to align IT with strategic business goals. They discussed two aspects of alignment: tight partnering with business unit and senior management (a prerequisite to alignment) and contribution to business value (an outcome of alignment). Executives are relying heavily on new planning processes to advance both of these objectives.

Executives also demonstrated great interest in business process reengineering, which was identified as the top concern of IS executives in Champy's (1993) study. In our study BPR emerged as a type of planning activity that IS executives found could lead to enhanced partnership. This is perhaps because IS involvement in reengineering projects helps IS executives identify opportunities to increase the business value contributed by IT. One executive indicated that BPR is a crucial test for IS in that these efforts will demand fast, effective systems to enable change. IS units that create bottlenecks in the change process will lose credibility and hamper organizational competitiveness.

IS Executives are interested in building technology and staff infrastructures, primarily through efforts to standardize computing environments and to specify staff skills and expectations. The emphasis on infrastructures, or shared and leverageable technology resources, likely signals a shift from a "portfolio" or "list-of-applications" mentality to an "infrastructure" mentality. Standards both control the chaos presented by multiple incompatible platforms and ease the sharing of information technology assets, particularly data resources, across business units. Distributed computing is seen

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as a way to change the way services are delivered to clients. Client-server systems are more flexible and user friendly, and they can make data more available to those who need it. In terms of staff development, it seems that, in addition to vigorous training efforts, IS executives are increasingly looking to greater empowerment through team structures to promote professional development and job satisfaction.

Software development seems to be receiving less attention than the literature indicates. The main concern the executives we talked to had about system development was cycle time. It was, perhaps, surprising to find that only two executives reported any enthusiasm for CASE tools. Several executives said that existing software engineering methodologies will not deliver the needed quantum leaps in software development improvements. Cycle time reduction objectives, they say, are more likely to result from the implementation of a common platform that simplifies access to data.

The findings also revealed greater concern in some areas than was anticipated by prior research. For example, executives were engaged in a fair amount of cost-cutting, probably reflecting increased competitive pressures on their organizations. Interestingly, only five firms were using outsourcing to reduce costs. This may be because executives in our sample have senior managers who are relatively more satisfied with IS performance than their counterparts at other organizations.

Contrary to literature on key management issues, the findings suggest that performance measurement is an increasing, rather than decreasing, concern of IS executives. Consistent with their interest in cost-cutting, executives are attempting to measure the quality and impacts of their efforts. Two executives reported that, of all their management practices, performance measurement has had the single biggest impact on cycle time. These executives are rejecting longstanding measures of productivity, such as lines of code, in favor of measures on cycle time, customer satisfaction, and contribution to business unit productivity.

Despite press reports describing disillusionment with total quality management concepts (see, for example, Newsweek, 1992), TQM emerged as a key management initiative, accompanying the interest in performance measurement. Both firms with long-established programs and those with recently implemented TQM programs acclaimed their impact on productivity and partnership with business units. Executives credited TQM with focusing IS attention on organizational goals and with

providing useful measures of IS performance. They also noted that TQM focuses the organization's attention on appropriate use of information, thus creating an interest in leveraging organization data.

Overall, our assessment of the initiatives IS organizations are undertaking is that they are largely consistent with prior literature. Although some participants suggested that the major economic and technology changes they are facing require rethinking of IS processes, most of the IS executives in our study are making incremental changes in their organizations. Executives are focusing their efforts on new planning processes that increase partnership and alignment. They are also looking to cut cycle time and operating costs, while building a strong infrastructure.

A Model of IS Management

Leading-edge IS executives appear to share a fairly consistent view of key management concerns. We have depicted our understanding of their management objectives in the IS management model shown in Figure 1. This model recognizes business value as the ultimate objective in managing IS, and it reflects executives' convictions that partnership is a prerequisite for business value. Fewer executives emphasized productivity and cycle time improvements as key objectives, but these, too, appear to lead to increased business value. Although individual executives' models of how they build business value would vary, most would agree that IS must understand strategic goals (achieved through partnership), and then deliver systems to meet their goals in a timely (cycle time), cost-effective (productivity) manner. Moreover, some IS executives suggested that partnership, cycle time, and productivity depend on a solid technology and human resource infrastructure. This is because achieving partnership, productivity and cycle time objectives requires both technology and staff resources.

From an engineering perspective, the model in Figure 1 suggests a logical causality: staff and technology infrastructures are necessary ingredients to cycle time and productivity. Cycle time and productivity, guided by partnership, are logical prerequisites to delivering business value. However, because building infrastructure involves large investments and those investments may only be available to a credible IS department, one with an established reputation for delivering business value. Thus from an organizational perspective, it would seem unlikely that one could start at the left of Figure 1 and build toward the right. Rather, IS departments may need to address all or many

components of the model simultaneously (or cyclically). This view of the model suggests that delivering business benefits from existing infrastructure creates the credibility necessary for new infrastructure investments and heightens the potential for new partnership.

Some of the executives in the study were very explicit about the causal links among their objectives. One offered that business value revolves around velocity, which he explained as fast cycles of new systems delivery that promote business partners' learning of, and enthusiasm for, new applications of information technology. High velocity, he noted, depends upon very proficient systems professionals with solid technologies to enable responsiveness and low cost. A second executive proposed that cost, cycle time and quality are the touchstones to IS success. These three depend on, and contribute to, high quality technical and human infrastructures, and they facilitate effective partnerships, he says. Some executives explicitly described the value-to-infrastructure links in our model. They said that in the process of providing value-adding applications of IT they developed partnerships with key business unit managers, and at the same time convinced them of the importance of investments in infrastructure.

These different points of view highlight the difficulty in finding the starting point for making changes in the IS organization. In our sample, executives cited, on average, three different objectives they were targeting. This suggests that executives perceive a need to pursue these objectives simultaneously.

Only one executive was targeting all six objectives simultaneously and just four others were targeting five of the six objectives. Our sense is that executives tend to focus on a limited number of objectives that they view as key at a given point in time. At the time of our study, a majority of the executives appeared to be particularly concerned about partnership, so we saw large numbers of initiatives intended to bolster relationships with business units.

In the four cases where executives were focused on a single objective, they introduced a variety of initiatives to address it. For instance, to cut costs, one executive was recentralizing staff, consolidating data centers, downsizing, and establishing team structures within IS. An executive whose key concern was cycle time was introducing self-managed work teams, full-blown TQM, and new productivity tools that included object-oriented tools, rapid application development, and SEI

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methods. While other executives were implementing these same initiatives for different reasons, these executives focused their efforts on a single, superordinate goal.

Most executives were focusing on multiple objectives, and they were attacking them in a variety of ways. In some cases, executives addressed multiple objectives with a single initiative. One executive, for example, had introduced self-managed work teams to increase business value and partnership and to develop both the staff and technology infrastructures. Another was moving the organization to a client-server environment for business value, partnership, productivity and cycle time reasons. Most executives were addressing multiple objectives through multiple initiatives, like the one who was distributing IS employees to business unit sites for business value and partnership, adopting client-server architectures for productivity and technology infrastructure development, and introducing JAD methodologies for cycle time and staff development.

Some executives carefully packaged initiatives. This was particularly true of those executives who were either decentralizing or recentralizing their staffs. These executives clearly understood the advantages and limitations of each of these contrasting structures. Thus, an executive who had recentralized his staff for productivity reasons had also created self-managed teams to create closer working relationships with business units and had implemented a new chargeback method that provided business units with significantly greater control over their costs and levels of IS service. In contrast, an executive who had decentralized IS staff to increase partnership and business value had simultaneously established explicit technical standards to facilitate integration and was working with business divisions to introduce common applications across divisions. He felt that these efforts would increase productivity and reduce cycle time, while a new organizational planning process would help define IS priorities consistent with long-term organizational goals.

It appears that, as IS executives attempt to address multiple objectives through multiple initiatives, their success at one objective can enhance efforts to achieve other objectives. In other words, once IS organizations have convinced business partners that IT investments can create business value, they will find it easier to develop effective partnerships and to win funding for IT infrastructure investments. By the same token, it is easier to contribute real business value when a strong infrastructure is in place and partnerships with business units are established. Where the

infrastructure is weak and business unit perception of IS's contribution is lacking, acquiring momentum is a major challenge.

We believe that IS executives must attend to all six objectives in the model in much the same way a juggler keeps six objects in the air -- by giving a boost to falling objects. Thus, an executive should introduce management initiatives targeted at increasing partnership, if partnership is one of IS's most notable deficiency at a given point in time. However, focusing too selectively on partnership could be detrimental. Partnership is valuable to the extent it helps IS identify appropriate applications of IT and facilitates business partners' IT competency. It is not useful when close partnerships lead to unrealistic expectations. As executives succeed in strengthening partnerships they must quickly address infrastructure, productivity, and cycle time deficiencies so that they can deliver on the demands they are generating.

Unlike jugglers, IS executives have a single ultimate objective: business value. This appears to influence how leading-edge executives choose their new management practices. If the technical infrastructure is viewed as deficient, our sense is that the choice of the infrastructure-building initiative should be based on its contribution to business value. More importantly, it should focus on immediate business value, because focusing on immediate business value leads to infrastructure investments that enhance partnership. Quick hits build business partners' enthusiasm for the capabilities of IT by delivering observable value. Ultimately, this enthusiasm leads to funding for future infrastructure investments -- and additional business value.

Conclusion

By examining IS executives' new management practices and their reasons for implementing them, this paper has attempted to bridge the gap between research on key IS concerns and research on new IS management practices. We found that IS executives' practices address the issues that have been identified in prior studies as their key concerns. They are focused on delivering business value by building staff and technology infrastructures, increasing partnership with business units, reducing cycle time and improving productivity. They are attempting to simultaneously address multiple objectives, usually by introducing a variety of new management practices.

Most of the new practices identified by IS executives in this study might be classified as evolutionary changes and incremental improvements of established practices, such as better implementation of steering committees, strategic planning processes, and hybrid organizational structures. At the same time, many IS executives are attempting to adapt to their rapidly changing environments through revolutionary changes as well. Major changes to IS processes, roles and cultures are evident in a few new management practices, such as large scale adoption of client-server architectures, self-managed work teams, business process reengineering, and total quality management initiatives. These evolutionary and revolutionary changes indicate that the executives in this study are responding to changing competitive and organizational forces.

This study did not examine whether these changes are adequate to meet competitive pressures and respond to client demands for greater flexibility, but it appears that these executives are responding appropriately to their environments. IS organizations that are not adapting to changing demands would seem more susceptible to eventual demise. While this research describes what some leading-edge executives are doing to address a variety of objectives, it does not ascertain the consequences of their efforts. It cannot ascertain the outcomes of their efforts. Further research is needed to better understand what initiatives best meet specific objectives and how IS organizations can generate momentum that enables them to build on the success of prior management initiatives and contribute value to their firms.

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Table 2
Matrix of Management Initiatives/Objectives

Initiative	Business Value	Partnership	Productivity	Cycle Time	Staff	Tech	Total Citations	Total Firms
NEW PLANNING PROCESSES:								
• BPR involvement	10	2	2	1	0	0	15	12
• linked to business plan	10	6	1	0	0	2	19	10
• steering/advisory committee	10	5	0	0	0	0	15	10
• new funding approach	5	6	1	0	0	0	12	7
• high level liaison in client organization	5	4	1	1	0	1	12	5
• strategic data planning	1	0	0	0	0	2	3	2
STRUCTURAL CHANGES TO IS:								
• centralizing IS professionals	3	0	7	0	0	2	12	8
• decentralizing IS professionals	5	3	1	0	0	0	9	6
• distributing IS professionals	5	6	1	1	0	1	14	7
• downsizing	0	2	3	0	0	0	5	4
• consolidating data centers	0	0	6	0	0	0	6	6
• outsourcing	1	1	5	0	0	0	7	5
• moving CIO up	4	2	0	0	0	0	6	4
• use of flexible work force	1	0	0	0	0	0	1	1
REORGANIZING WITHIN IS:								
• team structures	6	3	4	3	5	1	22	11
• IS reengineered/reorganized	4	3	2	2	1	2	14	6
• adding new functions	2	0	0	0	0	1	3	3
• new recruiting/training programs	3	0	0	0	4	3	10	7
• changes to other HR practices	1	0	0	0	2	1	4	2
NEW VISION FOR IT ARCHITECTURE:								
• common applications	4	0	3	1	1	3	12	8
• standards/open systems	0	0	3	2	0	1	6	4
• client server	2	4	2	1	0	3	12	7
TQM PRACTICES:								
• major commitment to TQM	5	3	2	2	2	2	16	7
• measurements, benchmark	1	1	2	0	0	0	4	4
• quality teams	1	1	0	0	1	0	3	1
• problem solving processes	1	0	0	0	0	0	1	1
CHANGES TO SYSTEM DEVEL. PROCESS:								
• client project managers	1	3	0	0	0	0	4	3
• RAD/JAD/prototype	0	0	2	2	0	0	4	3
• productivity tools	0	0	1	2	0	1	4	3
• ICASE tools	0	0	0	1	0	1	2	2

NOTE: Some firms adopted an initiative for more than one objective, so the "Total Citations" column includes some double counting. The "Total Firms" column shows the number of firms adopting the initiative, irrespective of objective.

Table 3
New Management Practices

Management Practices	Number of Respondents
BTR involvement	12
Team structures	11
High-level steering/advisory committee	10
IS planning linked to business planning	10
Common applications	8
Centralizing IS staff	7
Distributing IS staff	7
New recruiting/training programs	7
Major TQM commitment	7
New IT funding approach	7
Client-server architecture	7
Decentralizing IS professionals	6
Consolidating data centers	6
IS reengineered/reorganized	6
High level liaison in client organization	5
Outsourcing	5
Downsizing	4
Moving CIO up	4
Standard/open systems	4
Measurements, benchmark	4
Adding new functions	3
Client project managers	3
RAD/JAD/prototype	3
Productivity tools	3
Strategic data planning	2
Changes to other HR practices	2
ICASE tools	2
Use of flexible work force	1
Quality teams	1
Problem solving practices	1

Table 4
Summary of IS Management Objectives

| Objectives	Times Mentioned [1]	Number of Respondents [2]
Business Value	91	43
Partnership	66	39
Productivity	49	26
Technology	27	21
Cycle Time	19	16
Staff	16	14

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[1] Number of times a new management practice was said to have this as an objective (some practices had multiple objectives).

[2] Total number of respondents who included this as one of their objectives.

Figure 1

Model of IS Management
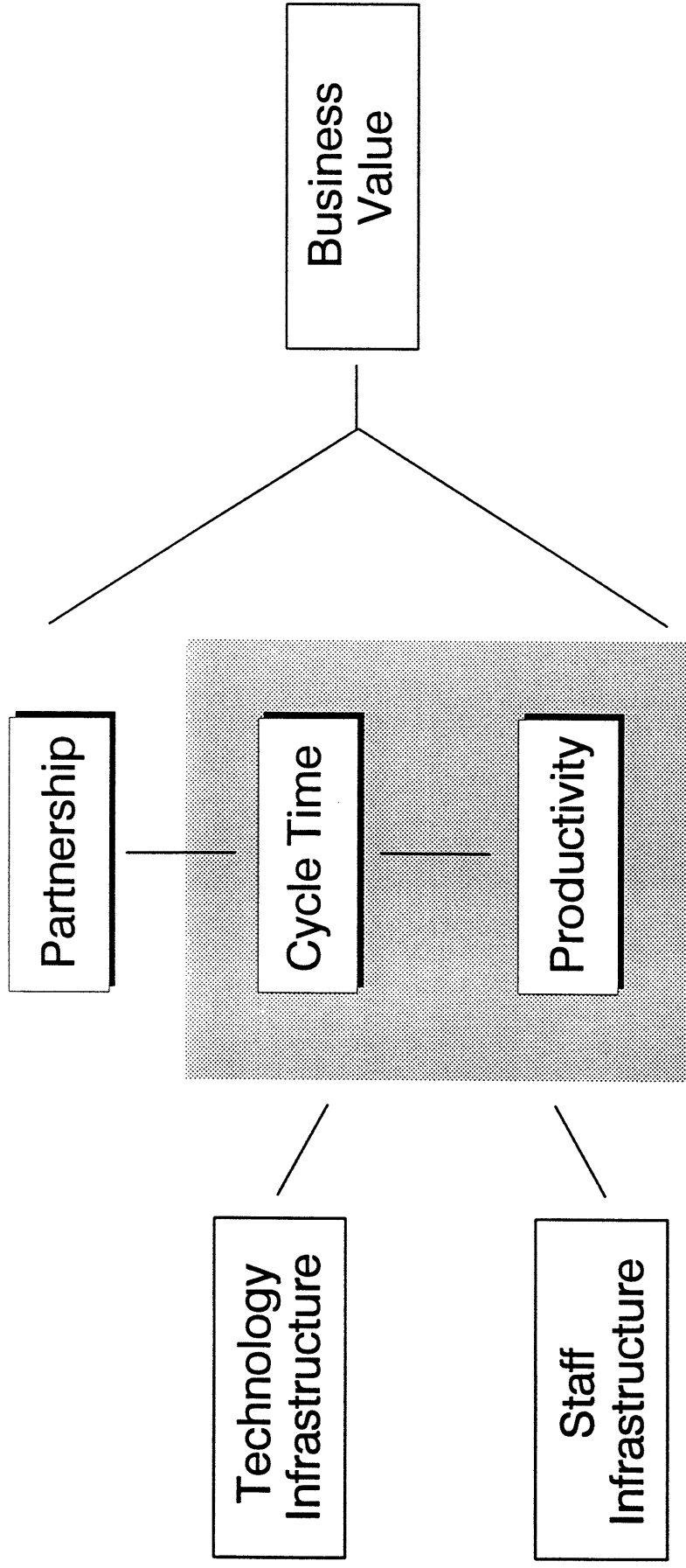
Appendix

To increase the validity of the coding of our relatively brief and unstructured interviews, we decided to use the entire transcript as our "context unit," or the unit from which meaning is extracted or coded (Carney, 1972). Since we had asked questions which revealed "objectives" both at the beginning of the discussion of each initiative ("Why was the change made?") as well as at the end of the discussion ("What business benefits are expected?" or "How is it going?"), we believed it was important to leave the coder free to use all this information in selecting objective categories. We also found that our respondents often intertwined their initiative descriptions, and that, given our time constraint, we had often done more listening than probing. So we chose to use an entire interview as a context unit for both initiative and objective categories.

For similar validity-enhancing reasons, we decided not to restrict the number of "recording units" to be extracted from the interview (Carney, 1972), even though we had begun our interviews by asking for three recent initiatives. By not pre-specifying recording units, we allowed each coder to identify as many, or as few, initiative/objective combinations as he or she decided had been described by the subject. We required that initiatives be significant (relying on answers to our question, "How big is the commitment?" or comments indicating high-level IS involvement or the involvement of a significant proportion of the IS staff). We also required that initiatives be recent, that is, begun in the last two years (relying on answers to our question, "Why did it start?") or current. Across the interviews as few as 1 and as many as 16 initiative/objective combinations were recorded for a single interview by a single coder.

The reliability of the coding is best assessed in this case by a score of simple percentage agreement between coders on occurrence observations [(agreement codings / (agreement + disagreement codings)]. With only 3.5% (a very small percentage) of the scoring categories (cells) being used to code the typical transcript, there is a relatively small possibility of chance agreement among the cells chosen and a high probability of non-occurrence agreement (both coders leaving a cell empty). Thus we calculate agreement on occurrence observations only. For agreement among all three coders, the rate is 33%. For agreement among two of the three coders (2 or 3 coders agreeing) the rate is 65%, an adequate reliability level (Karterud and Foss). We use the 2-of-3 agreements in Table 1.

Using the approach advocated by Brennand and Prediger (1981) for situations like ours where marginals are not fixed, that is, there is no restriction on the distribution of codes across categories, we calculate kappa(n) to be .648, which is well above the acceptable level of .50.