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**REINVENTING THE IS ORGANIZATION:
INFORMATION RESOURCE MANAGEMENT IN LEADING-EDGE US FIRMS**

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Abstract

Faced with changing demands for information technology services and shifting expectations for information resource management, what changes do Information System executives in the US make to their organizations? This paper summarizes findings from interviews with IS executives conducted to identify new practices and reveal current trends in information technology management. We found these American IS executives to be employing a wide range of management initiatives to address four key objectives: creating business value, increasing IS productivity, reducing IS cycle time, and building the information technology infrastructure.

Introduction

While the importance of information resources in modern American organizations is rarely debated, the role of information systems (IS) departments in information resource management is much less clear. Armed with powerful user-friendly tools and flush with the sense of power that those tools provide, individuals and departments often choose to independently pursue solutions to their information resource needs (Beath, 1992; Dearden, 1987). Though it is not always apparent, the success of these users' efforts often depends upon the capabilities provided by sophisticated technological infrastructures. Typically, centralized IS departments in the US are responsible for maintaining these infrastructures, the value of which is not always apparent -- even though the cost is! As a result, many of these IS departments are coming under fire to justify their costs (Wilde, 1992) and at the same time deliver very high quality information services.

Large organizational investments in these information resources have made information resource management responsibilities both more important and more difficult (Benjamin et al, 1985; Boynton et al, 1992; LaBelle and Nyce, 1987). American IS executives are likely to benefit significantly from new management practices targeted at current demands, such as (1) capitalizing on the capabilities of new information technologies, (2) addressing the demands of more sophisticated users, and (3) justifying organizations' IT investments (Rockart, 1982; Niederman et al, 1991; Saunders and Jones, 1992).

This paper describes the first phase of a research project on new information resource management practices. [The research is sponsored by the Advanced Practices Council of

the Society for Information Management International. See Appendix A for information on the sponsor.] This phase of the project examined how leading IS departments in the US are responding to changing organizational demands for information resource management. Specifically, the research poses the question:

"What new approaches are US firms taking with regard to information resource management?"

To address this question we conducted half-hour telephone interviews with top IS executives at fifty US companies identified by IS consultants, practitioners and academics as "leading edge" in their approach to managing information technology. We asked participants to describe new information technology (IT) management practices and the reasons they had undertaken them. We also asked them to evaluate present outcomes of their efforts. This paper summarizes what these top American information systems executives told us about their information resource management initiatives. Because our methodology did not include rigorous evaluation of outcomes of the new practices, we are not recommending the adoption of any particular practice. Our objective at this point of the study is to share information, generate ideas, and broaden perspectives. Follow on research will consider the outcomes of these practices and their transferability to other organizational contexts.

Methodology

Because we wanted to uncover the state-of-the-art in IT management in the US, we decided to study the efforts of IS executives in US firms that are regarded as leading-edge in their approach to managing IT. To identify these firms we contacted 28 IS consultants, practitioners and academics and asked them to name companies that are highly effective or innovative in their management of IT. We also referred to the peer ratings of top IS organizations as listed in Information Week, Datamation and Computerworld. Combined, these sources provided 259 nominations of 149 different organizations. The sixty organizations that received two or more nominations were selected for interviews.

We contacted the head information systems executive in each organization first by letter and then by telephone. Between October and December, 1992, we conducted 30 to 45 minute phone interviews with top IS executives at 50 of the 60 companies (84% participation rate). Thirty-five of our subjects were heads of corporate IS, four were corporate IS executives

who report to the head of IS, one was a third level IS executive in a very large IS organization, and the remaining ten were heads of divisional IS units. Ten companies chose not to participate due to lack of time (four), corporate policies against telephone interviews (four) or a very recent change in CIO (two).

The participating organizations are quite varied in terms of their industry, size and IS structure. They comprise a cross-section of industries that includes 28 manufacturing and 22 non-manufacturing organizations. They tend to be large rather than small, probably because larger firms and their executive staffs tend to be more widely known. Twenty-one of the firms have primarily centralized IS organizations, while the remainder are decentralized or divisionalized. Table 1 provides descriptive statistics on the participating firms. Appendix B lists the names of 49 of the 50 firms (one chose to remain anonymous.)

Table 1
Description of Participating Companies

<u>Industry</u>		
Discrete Manufacturing		22
Service		12
Process Manufacturing		6
Transportation		4
Communications & Publishing		4
Retail		2
<u>Number of Employees</u>		
	<u>Range</u>	<u>Median</u>
IS Employees	70 - 5,000	1,100
Total Employees	1,250 - 373,000	38,000
<u>IS Structure</u>		
Centralized		21
Decentralized/Divisionalized		28

The interviews focused on the three most significant IT management initiatives the participating firm had introduced within the last two years. We asked questions like:

- ~ Why was the change made?
- ~ How does it work?
- ~ When did it start?
- ~ How big is the commitment?
- ~ What business benefits are expected?
- ~ How is it going?

We took notes during the interviews and transcribed them shortly thereafter, giving us about three pages of text from each interview. When nearly all the interviews were completed, we reviewed our individual transcriptions and identified categories of management initiatives and of objectives or outcomes associated with those initiatives to create a matrix of initiative and objective/outcome combinations. We coded our interviews into the matrix and compared results. After a thorough discussion of these initial results, we refined the matrix. Then two of the researchers recoded all fifty interviews, discussing coding differences until consensus could be reached. The resulting matrix is shown in Figure 1. The following two sections of the report describe and analyze this matrix.

Findings

Most of the IS executives we talked to are concentrating on just a few management initiatives in order to achieve an intertwined, interdependent set of key objectives. But as a group, these executives are employing a wide variety of new practices. Thus, while there appears to be some degree of consensus on the key objectives these IS executives are pursuing, there is much less consensus on how to best achieve those desired ends. This lack of consensus is evident both in the variety of initiatives intended to achieve similar outcomes and in the different anticipated outcomes for very similar initiatives. Figure 1 displays the management initiatives that respondent companies are currently pursuing and the objectives or outcomes associated with those initiatives.

We included in the matrix each initiative that an IS executive identified as a major change in the way information resources are managed in his or her firm. We coded most initiatives (averaging 3.7 per executive) into a single row of the matrix. Coding the objectives was a little more complicated, because in very many cases, the executives described multiple objectives or observed outcomes for a single initiative (averaging 2 per initiative or 7.5 per executive). In Figure 1 and Figure 2 the far right column labeled "Total Co's this Initiative" reflects the number of executives that identified that initiative as a new management practice, and eliminates the double-counting that results from multiple objectives. By the same token, many executives initiate multiple initiatives in order to achieve a single objective. Thus, the number of occurrences within the "Align with Business" column is more than twice the total at the bottom of the column, in the cell labeled "Total companies for this objective," which reflects the total number of executives who mentioned a particular objective at least once.

The Summary Matrix (Figure 2) shows the number of companies which have undertaken any of the initiatives in a particular category. So, for example, in Figure 2 we can see that a total of 17 companies undertook at least one initiative in the "Structural changes to IS" category (as a group, the 17 companies initiated 19 new practices in this category, as can be seen in Figure 1).

The Initiatives

We categorized respondents' IS management initiatives into 6 major categories (see left-most column of Figure 1 or Figure 2): structural changes to IS, reorganizing within IS, TQM practices, new planning processes, changes to systems development processes, and new vision for IT architecture.

The *structural changes to IS* category reflects, to a large extent, the shifting between centralized and decentralized reporting structures that has been common within firms generally and IS units in particular. We see no evidence of a trend toward either centralization or decentralization. Eleven of these companies are either decentralizing staff (4 companies), which we defined as changing solid line reporting responsibility from corporate IS to divisions or business units, or distributing staff (7 companies), which we defined as physically distributing staff while maintaining a solid line reporting responsibility to corporate IS. However, we also found ten companies to be recentralizing and consolidating staffs, sometimes as part of a reduction in the number of data centers. Regardless of the direction of the most recent shift between centralization and decentralization, the IS personnel typically retain responsibility for meeting both IS and business unit objectives. The resulting structures cover a wide range of points on the centralization/decentralization continuum. Two executives who did not identify structural changes as new

Initiatives	Create Business Value				Productivity	Cycle Time	Build Infrastructure		Total Co's this Initiative
	Align with Business	Customer Satisfaction	Partnership				Staff	Tech	
			IS More Involved	Client More Involved					
<i>Structural changes to IS</i>									
centralizing IS professionals	5	1	4	1	7	1	6	10	
distributing: straight line to IS	5	4	3	3	1	1	2	7	
decentralizing: straight line to client	4			2	1			4	
downsizing	1	1	1		3			4	
consolidating data centers					6		3	6	
outsourcing	1	1			5			5	
use of flexible workforce	1					1	1	2	
Move CIO up	2		1					2	
<i>Reorganizing within IS</i>									
IS reengineered/reorganized	4	3	1	2	3	2	1 3	6	
adding new IS specializations	2	3			3	2	3	7	
self managed work teams	2	2		1	3	2	4 1	7	
networked/matrix structure	5	1	1		2	1	2 1	5	
recruiting/training	5		1				6 5	10	
changes to other HR practices	1	1	1	1		1	2 2	3	
<i>TQM practices</i>									
major commitment to TQM	5	4	3	1	2	2	3 3	7	
quality teams	2	1					1	2	
measurement/benchmark	2				1		2	4	
problem solving processes	1			1	1		2 1	3	
communicate/deployment							1	1	
<i>New planning processes</i>									
linked to business plan	10	1	4	9	2		1 3	12	
new funding philosophy/process	7	2	3	4	3		2	12	
steering/advisory committee	10		1	6			1	11	
high level liaison in client orgs	5	3	3	2	1	1	2	6	
strategic data planning	1							1	
<i>Changes to sys devel process</i>									
BPR involvement	9	2	4	1	3	2		13	
client project managers	2			4			1	4	
JAD/RAD/prototype					2	3	1	4	
productivity tools	1	1				2	2	3	
ICASE tools					1	1	1	2	
<i>New vision for IT architecture</i>									
common applications/platforms	4	2			3	1	2 7	10	
standards/open systems	3				4	3	2	6	
client server	1	1		2	2	1	4	6	
<i>Total companies for this objective</i>	45	24	25	27	33	21	21 36	50	

Cell contents represents total number of companies mentioning that initiative/outcome.

Figure 1. A Matrix of Initiatives and Objectives/Outcomes

Initiatives	Create Business Value				Create Business Value Total	IS Productivity	Cycle Time	Build IS Infrastructure		Build IS Infrastr. Total	Total Co's Initiative Category
	Align with Business	Customer Satisfaction	Partnership					Staff	Tech		
			IS More Involved	Client More Involved							
<i>Structural changes to IS</i>	17	6	9	6	21	15	2	2 11	12	26	
<i>Reorganizing within IS</i>	18	9	4	4	22	10	8	13 14	19	30	
<i>TQM practices</i>	9	5	3	2	11	4	2	7 6	10	15	
<i>New planning processes</i>	22	6	11	17	27	6	1	1 8	8	27	
<i>Changes to sys devel process</i>	12	3	4	5	17	6	8	0 5	5	24	
<i>New vision for IT architecture</i>	8	3	0	2	11	9	5	2 12	12	21	
<i>Total companies for objective or sub-objective</i>	45	24	25	27	47	33	21	21 36	42	50	

Cell contents represent total number of companies mentioning that initiative / outcome.

Figure 2. Summary Matrix of Initiative Categories and Objectives/Outcomes

management initiatives said that they decentralize and recentralize staff constantly.

Outsourcing is one of the structural changes that we expected to hear about, but only five executives mentioned outsourcing, and only one outsources IS responsibilities on a large scale. Only one firm is outsourcing programming; it is moving to outsource some maintenance to programmers in India.

Some IS departments continue to reorganize internally as can be seen in the *reorganizing within IS* category. The most frequently mentioned initiatives in this category are the creation of self-managed work teams and networked or matrix structures within IS. Most respondents reporting these initiatives indicated that changes of this type require strong and enduring commitment but have significant positive impacts on IS staff and their clients. One company has brought in organizational development specialists to help IS professionals adjust to self-managed work teams. A trend toward fewer hierarchical levels within IS was evident not only in team-based initiatives, but also in many of the IS reorganizations and reengineering efforts.

In some cases, reorganizing initiatives represent IS's efforts to "clean its own house" prior to attempting to facilitate improvements in their firm's business processes. Others represent efforts to prepare a new breed of information systems professional to address changes in the demands on the IS department. One firm is providing training and career counseling to help technical specialists who see career paths changing as business units take more responsibility for their computing. A few IS organizations are addressing the need to build new skills by staffing new functions. We heard about Business Process Redesign departments, System Integration units, and a unit that has absorbed responsibility for much of its organization's transaction processing.

Total quality management (TQM) practices are a major new initiative in seven IS organizations, and another eight respondents noted that ongoing TQM efforts influence their IS management practices. TQM programs are usually introduced at the organizational level and subsequently adopted in the IS unit. Perhaps because quality has long been a concern of theirs, American IS executives find TQM appealing. In particular, they are drawn to the promise of better measures of performance. Four companies discussed large, ongoing global benchmarking efforts as recent initiatives, while several other respondents noted that they rely on benchmarking to assess their performance and to derive new ideas for management practices.

New planning processes include some new twists on some old ideas, the most notable of which is the revitalization of IS steering committees. Eleven IS executives who had recently formed or reformed steering committees waxed enthusiastic about the level of interest, involvement and cooperation they were seeing from high-level corporate and business unit leaders. Steering committees finally seem to be fulfilling their long-intended strategic role, reflecting an increased awareness of the importance of information technology. Rather than being a forum for dickered over shares of the pie, these steering committees are deciding on firm-wide architectures and standards, establishing ownership for cross-functional business processes, or promoting integrated or shared systems.

Many of these companies are getting very explicit about the links between business planning and IT planning. They are building the IT plan on the business plan and occasionally building the business plan on the IT plan. Several firms noted that their IT planning process is particularly valuable for defining global IT objectives and architectures. Included in

this category were initiatives reflecting new approaches to funding IT, in particular those that replace rationing of IS overhead with methods for charging clients on the basis of value received. Two firms have established IS as a profit center that can generate revenues both within and outside the firm. Two firms have begun to ensure market pricing by permitting business units to purchase IS services externally.

The most common *change in systems development processes* is the focus on business process reengineering in the early stages of the life cycle. At least one IS department will no longer undertake new systems development unless it involves reengineering. Thirteen companies identified involvement in organizational business process reengineering efforts as key management initiatives. At least three organizations have set up specific subunits to facilitate business process reengineering. While a few IS executives have positioned IS to lead organizational business process reengineering efforts, generally these IS units tend to view their role as that of a partner who contributes by identifying ways in which information technologies can contribute to reengineering efforts and by lending project management and process analysis expertise. Business process reengineering is seen as sparking change in both IS planning approaches and system development processes.

Other systems development changes include the use of client project managers and the implementation of systems development approaches and tools intended to reduce cycle time and improve system quality. It is clear that these IS executives have not found a magic formula for improving systems delivery. Only two respondents identified integrated CASE approaches to system development as management initiatives. A few other executives mentioned that they are experimenting with CASE or that they have used CASE tools. In general, participants were not enthusiastic about their experiences with, or their expectations for, CASE. Executives describing rapid application development approaches to system development were much more enthusiastic about the results they were seeing.

New visions for IT architecture varied from a client-server focus to long-range visions for radical new uses of information technologies. Most of the IS executives' attention with regard to IT architecture is focused on development of standards and common applications. Even highly decentralized companies are demanding greater compatibility of systems and integration of data. Several respondents noted that establishing standards is an important task, but enforcement of standards requires top management support. Six respondents listed the move to client-server technologies as management initiatives, and several other respondents indicated that they are trying to deal with the technical and managerial changes brought about by increased reliance on client-server technologies. Some noted that reverberations from the move to client/server on organizational structure and human resources will be significant.

The management initiatives described by respondents offer few clear trends, but lead us to the following conclusions about US firms and their IS units:

- ~ IS departments continue to fluctuate between centralized and decentralized structures.
- ~ 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, and IS

executives view business process reengineering as a critical organizational development.

- ~ High-level users 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.
- ~ Some highly-touted management initiatives, such as outsourcing and integrated CASE methodologies, are playing only minor roles in leading-edge IS organizations in the US.

The Objectives

During the interview we asked respondents why they had undertaken each initiative and what kinds of outcomes they have seen so far from their actions. In describing their expectations and realizations, IS executives highlighted four major objectives that guide their management of information resources: to create business value, to improve IS productivity, to reduce IS cycle time, to plan for and develop the IS infrastructure. We broke these four objectives into eight specific sub-objectives or outcomes, as shown in Figures 1 and 2.

Of the eight sub-objectives, the first four -- alignment with the business, customer satisfaction with IS, greater involvement of IS in the firm's IT-related decisions, and greater client involvement in IT-related decisions -- all relate to *creating and delivering recognized business value*. This is clearly a dominant concern among leading IS executives in the US, as forty-seven of the fifty participants identified at least one management initiative pointed toward this objective. On average, they undertook two initiatives in order to create business value. For some companies aligning IT with business objectives is key to creating value. Others focus on partnership with users or customer satisfaction.

Aligning with the business refers to efforts to identify business strategies and objectives and then ensure that IT supports them. For some, the need to align IT with business objectives is at the heart of their management practices. At least one respondent viewed alignment as necessary for organizational survival.

Customer satisfaction refers to a concern by IS executives with the opinions and evaluations of IS made by business unit leaders. Respondents citing customer satisfaction objectives are concerned that IS is doing the right things in the right ways. To some extent IS executives pursuing customer satisfaction objectives acknowledge the difficulty of measuring the actual impacts of information technologies; they rely instead on the general sense among IS's customers that IS is performing well.

Many IS executives are seeking stronger *partnerships* with their clients. Depending on their existing situations, some work to become more involved in the firm's decision making process, particularly as it relates to information technology, while others work toward deeper client involvement in information technology decisions and processes. Twenty-five respondents indicated their desire to take a leadership role in identifying appropriate applications of IS resources; several specifically rejected their old role of order-taker. Twenty-seven respondents emphasized the need for clients to become more involved in defining IT requirements. Many of these respondents indicated that both IS and user perspectives were needed in order for the firm to set priorities for IT applications.

Most *productivity* concerns centered on cost containment or cost reduction as opposed to obtaining a greater level of output for the same level of input. A number of the firms in our sample were under severe competitive pressures and several had mandated large cost-cutting measures for IS. Some executives who discussed productivity objectives were more concerned with increasing the return on their IT investment. Just as they had different reasons for being concerned with costs, IS executives had different approaches to dealing with cost pressures. Some looked for expenditures that could be reduced, while others examined IS processes and tried to identify those that were not value-adding relative to organizational objectives. Both approaches sometimes resulted in headcount reductions.

Cycle time reduction was mentioned by only 21 of 50 executives, but several of those who identified it as an objective claimed it was absolutely pivotal. One identified cycle time reduction as the key to customer satisfaction. Others felt cycle time was necessary to address constantly changing business needs and to build IS credibility. Another noted that cycle time both results from, and contributes to, quality, explaining that reducing defects reduces cycle time, while reducing cycle time reduces costs and permits more appropriate allocation of IS resources. Executives focusing on cycle time tended to see reduced cycle time as a prerequisite to reducing IS costs and improving alignment with business objectives.

We divided comments on *IT infrastructure* into two categories -- *staff* and *technical infrastructures*, by which we mean infrastructures of equipment, data and applications. Twenty-one of the fifty respondents introduced initiatives intended to build staff competencies or morale. Several respondents said that their staffs now needed very different skills than they had in the past, both in the area of technical skills which are changing from COBOL, CICS and VMS to C, object-oriented databases and LAN management, and in the area of interpersonal and business skills, which are becoming more important. Staff morale improvement were most often associated with the implementation of team structures, particularly self-managed work teams.

The major concern with regard to IT technical infrastructure was integration of data and systems, which is viewed as key to providing decision makers with access to information. At least two IS organizations are shaping their infrastructures around plans to enable individual users anywhere to display on a terminal any information that they need. While integration is of particular concern to global organizations, even respondents whose operations are geographically restricted are establishing standards and common applications and platforms. In most cases, respondents indicated a kind of infrastructure "rightness" that related to taking advantage of newer technologies. Strong technical infrastructures both enable data integration and accessibility and reduce time spent "reinventing the wheel."

Like cycle time, developing the IS infrastructure was seen as a central objective by some IS executives. These respondents view creating business value, improving IS productivity and reducing cycle time as dependent upon a reliable, high quality, innovative IT assets. Some noted that significant investments in the infrastructure are occasionally necessary for long-term cost containment. Although developing IS staff was less frequently mentioned than developing the technical infrastructure, some of the executives who focused on it are convinced that IS staff development is the key that unlocks all the other possible outcomes, and several noted that developing staff morale was as important as developing staff skills.

Discussion

Respondents differed in the number of objectives they are pursuing and in the number of initiatives they have undertaken in order to pursue those objectives. Some IS executives are pursuing a single objective through several initiatives. For example, one global organization is focused entirely on cost reduction. In this company, IS has introduced a process to link IT planning to corporate planning, which is intended to reduce the number of new IT applications, thereby reducing costs. It has also cut costs by eliminating some data centers, consolidating IS staff and introducing hardware and software standards to leverage technical expertise.

In contrast, some IS executives are pursuing a single initiative in order to achieve multiple objectives. For example one respondent expects to improve alignment, increase client involvement, develop staff and improve the technological infrastructure through self managed work teams. Another IS executive reports that the outcomes of their TQM efforts include better alignment, increased productivity, reduced cycle time, and improvements in both the staff and technological infrastructures.

Most companies, however, were trying to achieve multiple objectives through multiple, often interrelated initiatives. These efforts were especially apparent when respondents discussed relocation of IS staff. After years of shifting between decentralized and centralized structures, IS executives know well the advantages and disadvantages of these contrasting structures. We found that many were adopting one structure while at the same time implementing initiatives that would allow them to compensate for the weaknesses of that structure or garner the benefits of the opposite structure.

For example, four companies decentralized in order to achieve better business alignment and client involvement. In order to achieve benefits normally associated with centralization (the ability to establish and maintain standards and common platforms, the efficiency associated with not reinventing the wheel, and the development of high levels of IT expertise), they have instituted the following practices:

- ~ involving high-level steering committees of business and IS leaders in establishing technical standards and IT objectives
- ~ introducing new funding philosophies that involve negotiation of the amount charged for the services
- ~ developing mission-critical client-server applications
- ~ holding intensive meetings with decentralized staff to work out a statement describing what loyalty is owed to corporate IS
- ~ investing heavily in IS professional training and career development

Seven other companies sought the advantages of both centralization and decentralization by physically distributing staff while maintaining solid line reporting to central IS. They address the potential problems of distributed staff, most specifically lack of integration and loss of staff expertise, through the following practices:

- ~ grouping decentralized IS professionals into "homeroms" or centers of excellence, which provide them with coaches who are responsible for their professional development
- ~ standardizing system development methodologies around new productivity tools
- ~ introducing planning processes that will involve top business unit managers in determining

business-level priorities for applying information resources

- ~ replacing several independent legacy systems with a single integrated package, and thus an integrated software resource
- ~ regularly shifting staff between central IS and user departments, for cross training and acculturation

Ten companies are recentralizing IS staff for reasons that include efficiency and cost reduction, strengthening the technical infrastructure and aligning with business needs. While attempting to reap the benefits of centralization, these IS executives are also attempting to maintain the benefits of decentralization, such as client involvement, client satisfaction, and the better articulation of user needs. Some of the practices they have initiated include the following:

- ~ new planning processes that heavily involve clients in IT planning and link IT planning to business planning
- ~ IT steering committees with heavy involvement by business unit leaders
- ~ taking responsibility for many administrative processes, such as payroll, expense approvals, etc. in order to ensure accuracy and availability of information as needed and to satisfy clients
- ~ funding philosophies that permit users to determine which services they wish to purchase and allow external purchase of IS services
- ~ customer focused self-managed work teams
- ~ move to client-server environments
- ~ customer focused total quality initiatives

Overall, these 50 US executives' initiative choices depended both on their objectives and their personal models of how objectives and initiatives are interrelated. A look at Figure 1 reveals that just about any initiative could be applied to just about any objective, although certain initiatives predominated for each intended outcome. We attribute the density of the matrix to the interrelationships among the four objectives. Our sense is that, regardless of the objectives they cited in the interviews, most of the IS executives we talked with would agree that creating business value, improving IS productivity, reducing IS cycle time and developing the IS infrastructure are all important and, to a large extent, interdependent.

Conclusion

This paper described six categories of information resource management initiatives (structural changes to IS, reorganizing within IS, TQM practices, new planning processes, changes to systems development processes, and new visions for the IT architecture), and four categories of IS management objectives/outcomes (business value, productivity, cycle time, infrastructure development) described by 50 leading IS executives in US firms. The finding that a broad variety of initiatives focuses on a fairly consistent set of objectives suggests that these IS executives are experimenting widely as they look for practices that address evolving organizational demands for IS services.

Follow up research is underway to examine in more depth the intended and unintended consequences associated with some of these initiatives and their transferability to other firms. Looking farther into the future, we hope to compare IS management practices in the US with practices in other parts of the world.

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**Appendix A
Background on the Research Sponsor**

The Society for Information Management (SIM)

Founded in 1968, the Society for Information Management comprises 2,500 leaders worldwide who are involved in the management and application of information technology to achieve business objectives. SIM members are corporate and divisional heads of information systems (IS) organizations and their key IS managers, leading academicians and consultants, and other leaders who shape or influence the management and use of information technology. SIM's mission is to provide leadership and education in the successful management and use of information technology to achieve business objectives.

The Advanced Practices Council (APC)

The mission of the Advanced Practices Council of the Society of Information Management is to create a value-added learning experience for senior information executives by facilitating the interchange of concepts, ideas, thoughts, personal experiences and reflections in the context of pertinent new research and real-world challenges. Membership in the APC is made up of a small group of chief information officers from major companies in various industries. The members develop research agendas and solicit proposals from leading academicians to stimulate applied research and field work on current information technology management issues.

**Appendix B
List of Participating Firms**

- | | |
|------------------------------|----------------------|
| Aetna | Inland Steel |
| Air Products and Chemicals | K-Mart |
| American Airlines | Medtronic |
| American Express | Merck |
| ARCO | Monsanto |
| AT&T | Motorola |
| Atochem | New York Times |
| Bell Atlantic | Paul Revere |
| BellSouth | PepsiCo |
| Brigham and Women's Hospital | JC Penney |
| Carrier | Proctor & Gamble |
| CIGNA | Prudential |
| Corning Glass | Roadway |
| Delta Airlines | Salomon Brothers |
| Du Pont | Sara Lee Corporation |
| Eastman Kodak | Tennant |
| EDS | Texaco |
| First Bancorporation of Ohio | Texas Instruments |
| GE Appliances | 3M |
| General Mills | Travelers |
| Gillette | Union Pacific |
| Grand-Met Pillsbury | USAA |
| Honeywell | Vanguard |
| IDS | Whirlpool |
| Ingersoll-Rand | (anonymous --1) |