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MAJOR ISSUES FACING INFORMATION SYSTEMS MANAGERS--

A COMPARISON OF NATIONAL AND MID-ATLANTIC CIOs

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ABSTRACT

Organizations facing today's marketplace are facing major challenges. The increasingly demanding customers insist on high quality products and services. Organizations facing these demands are going through major changes in order to meet the level of marketplace competition. This paper reports a survey of CIOs in 35 mid-Atlantic firms to determine the issues they face. The ranking of these CIOs were arrayed against two other national surveys using the same methodology. Findings are discussed and a general paradigm for sorting out these issues is suggested.

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ABSTRACT

Organizations facing today's marketplace are facing major challenges. The increasingly demanding consumers insist on high quality products and services. Organizations facing these demands are going through major changes in order to meet the level of marketplace competition. The terms used to describe the change efforts are rightsizing, downsizing, decentralizing, and reengineering. These terms reflect the adaptation of the organization to such environmental trends as the pressures of the quality revolution, internationalization, and information technology. It's difficult to discuss any aspect of the reorganization of the modern company without bringing in some facet of information systems. Client-server technology represents the new design while the mainframe technology represents the old design. Many organizations face changing their existing level of technology to the new client-server. This paper reports a survey of CIOs in 35 mid-atlantic firms to determine the issues they face. The ranking of these CIOs were arrayed against two other national surveys using the same methodology. Findings are discussed and a general paradigm for sorting out these issues is suggested.

INTRODUCTION

Information technology (IT) is a major design variable in organizations (Vroman and Luchsinger, 1994). Reengineering, decentralization, centralization, departmental computing, cooperative processing, networking, user groups, enterprise analysis (Maglitta, 1992; Kalbacker, 1986) are among many strategies organizations reflect the increasing impact of IT on the design of organizations. Information System (IS) units within organizations have had to reflect these changes as well. IS units were historically centralized units. They reflected the hierarchial nature of the traditional Sloan-type bureaucracy and the use of mainframe computers to control information. Those organizations in transition from the old-design bureaucracy to the new-design adhocracy face the dilemma of transitioning from the relative certainty of central control to the uncertainties of the decentralized, networked, organization.

The IS unit dilemma is a microcosm of the challenge faced by the entire organization (Vroman and Burbridge, 1993). The new era of consumer democracy makes adaptation of products and services to an increasingly demanding consumer choice essential. This adaptation requires more flexibility on the part of the organization. Flexibility mandates front-line authority supported by information. "Intelligence" to respond to the increasing demands of consumers requires better trained personnel supported by power information systems. Lawrence puts the design problem succinctly: "The environment presents many opportunities, but no results will flow in terms of value-adding behavior until a matching organizational capability has been put in place... Creating the right organizational capability

means fitting together all the separate elements of organizations... into a cohesive whole...." (Lawrence, 1992: 51).

Information technology has opened many possibilities for supplier relationships, customer responses, product design, and internal coordination. These possibilities, reinforced by marketplace realities, are unraveling most of the traditional organizational assumptions. There is great potential for information technology to enhance the competitive position of the organization (Henderson and Sifonis, 1988: 187; Cash and Kosynski, 1985). Although the potential is evident, the ability to track the impact of information technology on a firm's performance is low. Crowston and Treacy suggest "it is very difficult to trace and measure the effects of information technology through a web of intermediate impacts upon the enterprise level performance" (Crowston and Treacy, 1986: 299).

Networked PCs reflect the key modern technological innovation. Software and hardware advances are beginning to support the growth of client-server (C-S) technology. Practically, this means that front-line computers control the application and often process the data locally. Servers house the data and sometimes do the processing. The server can be a mainframe, mini, work-station, or a powerful PC. Software is evolving toward object technology which enhances rapid generation of applications and reusability of code.

Table 1 illustrates the state of the industry in 1993 (Datamation, 1993). It arrays the size of organization to the degree of aggressiveness in downsizing. Downsizing characterizes an organization strategy to get to some level of client-server. By definition, these are old design organizations that have major changes to undertake to achieve levels of competitiveness required in the modern marketplace. It suggests that large business is significantly more aggressive than medium or small business in downsizing. Seventy to 80% of the smaller and medium-sized businesses only have "some..." to "no..." commitment to downsizing. This could result in massive failures in these sectors as the 1990s rolls along.

Most organizations in this survey have a relatively long history in their industry. Many are under a great deal of competitive pressure and others are just beginning to notice it. The variable response can come from several reasons. First, moderately successful organizations can't be expected to be any better in recognizing the demands for change than they were in recognizing traditional marketplace demands. Second, these firms might see the problem as just competition-as-usual requiring more emphasis on traditional strategies. Third, they might be intimidated by the uncertainty in C-S technology.

TABLE 1: Commitment to Downsizing by Organization Size*

Level of Commitment to Downsizing	$50 million or less	$51 to $250 million	$250 million or more
"Very Aggressive"	22%	28%	36%
"Some Commitment"	20%	16%	20%
"No Commitment" or Beginning	58%	56%	44%

*Datamation, December 1993, p. 41.

C-S is a natural extension of the connected PC, but not a natural migration from the mainframe. The simplified, hierarchial, authority-oriented environment complemented the mainframe, and its derivative- the mini computer capability. These were largely transaction-oriented and control-oriented computer facilities. Organizations starting with the mainframe/mini base are adapting this investment to the modern C-S environment.

Table 2 describes the dilemma faced by industry. Companies are decreasing their use of minis and mainframes while they increase their use of networked PCs as their principal platforms. It doesn't look like it should make a difference whether a server is a powerful PC, minicomputer, or mainframe. A factor in this decision is the relative cost of a PC based system and a mainframe based system. PC prices per MIP are a fraction of mainframe MIPs. Even more potent, PC-based systems make the organization's front-line more powerful and thus more competitive. These factors have an increasing eroding effect on the arguments supporting traditional computing. Existing investments in hardware and software along with security and data integrity issues still slow the movement to C-S.

TABLE 2: Planned Principal Platform for MIS/DP

	1991	1992	1993
Standalone	8%	10%	7%
Networked PCs/ Workstations	25%	34%	39%
Minicoputers	41%	36%	33%
Mainframes	26%	20%	21%

Datamation, 1993: 41.

Another implication of Table 2 is how organizations are dealing with present assets in computing. It makes sense to utilize as many of these resources as possible for as long as possible. It also makes sense not to risk a highly secure mission-critical application and "dump" it into the developing world of client-server. The term migrating refers to how an organization moves to a new platform. They are trying to migrate from mainframe to client-server.

The old-design company has many problems. They have investments in old code that was designed to work within this hierarchial organization. Over the last decade or so, databases were developed independently in many units of the organization on different platforms. Thus the data wasn't accessible. The formats were incompatible and hardware platform and their operating systems didn't talk with one another. As national and international responses became more critical and management information more essential, the need to rationalize this situation became paramount.

The evolving technology of relational database management and objective oriented programming deals with the availability of computing power and the flexibility and speed required in programming applications. Open systems is a code term for the emerging power of standards that make different platforms and software work together.

The challenges facing organizations in general, and IS units in particular, are immense. This paper reports part of an on-going study on how IS units are responding to the challenges of the 1990s.

THE STUDY

CSX/Index has published a survey since 1989 on the issues facing IS units (CSX/Index, 1993). CIOs in this national sample listed the major issues facing their organization and then rank-ordered them. The results of these surveys have been reported widely and replicated in some cases. CIO Magazine (CIO, 1993) replicated the study on a sample of subscribers. Using this data for benchmarking purposes, the author surveyed 35 CIOs of major corporations in the mid-Atlantic area using the same methodology, during August, 1993.

Table 3 reflects the results of the survey to the Mid-Atlantic (M-A) group and compares their views to the CSC/Index and CIO results. The CIO report included the top 10 items from that sample. The issues listed in the rows are defined in Appendix A.

There are many interesting findings.

♦ The M-A and CSC/Index responders agreed on the top three issues. CIO subscribers didn't think creating information architecture was a major issue.

Reengineering Business Processes Through I/T
Creating an Information Architecture
Aligning I/S and Corporate Goals

♦ While M-A members thought integrating information systems was an important issue, neither CSC or CIO responders agreed.

♦ Of those items corresponding to the quest for quality, reengineering and improving cross-functional processes were ranked in the TOP 10 items. Connecting to customers/suppliers and instituting TQM were ranked lower than 10th.

♦ Service firms emphasized organizational issues like the IS strategic plan and improving cross-functional processes. Manufacturing firms were most concerned with data utilization, I/S costs, managing dispersed systems and I/S leadership.

♦ About 40% of the members listed 5 internal I/S unit issues in their TOP 5 issues.

Integrating Info Systems
Boosting Software Development Productivity
Developing an I/S/ Strategic Plan
Improving Software Development Quality
Cutting I/S Costs

♦ Six of the TOP 10 issues are organizational and 4 are technical.

Table 3: Comparison of the Ranking of Information System Issues Across Three Studies

ISSUES	CSC* 1992	CIO** 1993	M-A*** 1993
Reengineering Business Processes Through I/T	2	1	1
Creating an Information Architecture	3	7	2
Aligning I/S and Corporate Goals	1	2	3
Integrating Info Systems	13	*	4
Utilizing Data	4	5	5
Boosting Software Development Productivity	9	*	6
Developing an I/S Strategic Plan	10	9	7
Improving Software Development Quality	7	3	8
Instituting Cross-Functional Info Systems	6	4	9
Cutting I/S Costs	11	6	10
Connecting to Customers/Suppliers	15	*	11
Improving the I/S/ Human Resource	5	*	12
Improving Leadership Skills in I/S	8	*	13
Managing Dispersed Systems	16	*	14
Educating management on I/S	14	*	15
Instituting Total Quality Management in I/S	12	*	16
Updating Obsolete Systems	17	8	17

* CSC/Index. 1992. Critical Issues of Information Systems Management for 1992. Boston: CSC/Index;
** Champy, James. 1993 "Grand Designs" CIO. January: 26.
# Mid-Atlantic Survey. August, 1993.

DISCUSSION

Not reported here is the M-A data on aggressiveness of change efforts or the principal platform. It wasn't available for the CSX or CIO respondents and so was left out. The information, though, indicates that level of commitment of all three samples reflects the findings of the Datamation (1993) survey reported earlier in this paper.

The information says most companies are in the process of evolutionary or transformational change. What doesn't come through in this information are the assumptions behind the underlying strategies. For example, some firms are trying to respond to the new demands from consumers in the marketplace. The underlying assumptions are to do what is necessary to meet every need of their consumers. Other firms are trying to minimize costs. This approach invariably results in more controls and regulation, which reinforces the old bureaucratic model.

Most of these organizations are trying to transform themselves into a more effective competitor and provider of quality products and services. Many fall into the inertia trap and only respond with evolutionary change efforts. Some firms were recently designed for the modern era and compete easily. These three categories seem to make some sense out of the issue priorities expressed in the survey.

♦ The old-design LAGGARD-- 1) This category was the winner in 1967. It represents the peak of the bureaucratic period. Thus, most firms started pre-1975 probably had the bureaucratic principles built in. If the companies haven't begun to change, they are certainly in trouble. Any change effort reflects the inertia of the old-way of doing things. If there is international competition, the company is in trouble, if it is a protected marketplace, the company probably is behind, but can become competitive. Information systems expenditures generally "pave the cow-path" in this organization. MIS is still centralized and mainframe oriented. Expenditures can be high, but don't result in any meaningful change.

Most companies leave this category by failing or realizing that more than evolutionary changes are needed. There are many companies with one corporate foot in this category. Many of these firms can be identified by a rather panicky strategy of laying off thousands of employees. Others can be identified by being featured in articles panning total quality management or reengineering programs that don't seem to work in their organizations. Response to today's marketplace doesn't come from a recipe. It comes from commitment and vision. This setting results in a customized "recipe."

♦ The old-design SURVIVOR-- 2) The old-design companies which diagnosed the need for transformational change fit here. Some firms are clearly successful in transforming their organization. Others are on a continuing journey and sometimes resemble the cross-eyed Javelin thrower. They don't complete the journey and win, but keep things exciting, in the mean-time. Some organizations just give-up and regress to the old way of doing things.

Most of these firms are involved with strategies like reengineering, quality interventions, right-sizing, decentralizing, restructuring and experimenting with distributed processing and client-server technology. They all make sense depending on industry and previous success of the firm.

Information system expenditures are a combination of partially "paving the cowpath" in order to migrate from existing assets and implementing cutting edge technology. While still maintaining the mini or mainframe assets, these companies have many LANs and a

variety of client/server efforts. CASE, legacy systems, distributed processing efforts are strategies resulting from corporate reengineering and restructuring initiatives.

Most old-design companies are in this category in the 1990s if they intend to survive to the turn of the century. IBM and GM's travails the last decade are representative of the Survivors still on the transformation journey. There is plenty of pessimism about their ability to succeed. However, one could pick some clear winners among their subsidiaries. GM's Saturn and IBM's Baldrige winning AS/400 and PC subsidiaries seem to have responded. Each large company has its laggards as well. McCormick Co. (spices) is a company that successfully fought its way from the survivor to competitor category. USF&G (a property and casualty company) is a story still unfolding. It's survival was in question in 1990. The turnaround started then and is progressing rapidly on the journey from the laggard through the survivor category.

♦ 3) The new-design COMPETITOR-- New-design companies which are aligned with the 1990s marketplace fall into this category. These companies are designed to manage the rapid adaptation to customer, competitor and technology changes. Partnerships, joint ventures, intense communication requirements, information rich environment... are just some of the characteristics of this company. Many service firms, and smaller manufacturers, are in this category because they grew up during the 1980s and adapted the new principles easily. Large manufacturers are here because they were faced with survival and made wrenching changes.

Information system expenditures concentrate on paving the super-highway that builds more "intelligence" into front-line, boundary, positions. These companies have an appropriate information architecture that results in information at the right place at the right time. There is a consistency of platforms and in application development that enhances rapid change. These companies have competence in distributed and client/server technology. IS competency is decentralized, spread throughout the organization.

There many different kinds of firms in this category. Many are service firms, many smaller manufacturing firms, and some large manufacturers. Motorola, Xerox, McCormick and Milliken are four large firms that made the transition from Laggard to Competitor because they faced competitive situations that threatened their survival. Smaller manufacturers like Novell, Microsoft, Compaq and Solectron were designed during the last decade, or so and fit into this new-design category as well. Service firms like T. Rowe Price, Wal-Mart, Nordstrom, and Federal Express were designed and grew during the last two decades.

There are many research questions evolving from this effort. Clearly more demographic information on firms would help identify the issues of firms in each of the three change categories. Tying these issues back into the company's strategies would be important. The alignment of the strategies in the IS unit and the organization's strategies would seem to be straightforward. Many of the issues faced by the IS unit are created because of a misalignment of the IS unit with the organization, and/or the organization with its competitive environment. Sorting out the issues likely to be encountered in one of the mis-alignment situations from those faced by leading organizations aligned with their environment would be a service.

APPENDIX B
DEFINITIONS OF ISSUES
USED IN SURVEY

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♦ *Using IT effectively in the strategies of the organization.*

Creating Systems for Competitive Advantage
This strategy pushes an organization a step beyond doing well. This effort results in developing a core competency which translates into a competitive advantage in the marketplace.

Creating New Value-Added for Clients
This is a proactive strategy looking for ways to improve the organization's response to client needs through value added products/ services based on I/T.

Aligning I/S and Corporate Goals
Tying I/S and corporate goals so the business is competitive.

Developing an I/S Strategic Plan
Developing a blueprint for the allocation of systems and software that's consistent with the corporate strategy.

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♦ *Assuring an architecture that meets an organizations present and future needs.*

Creating an Information Architecture
Mapping the organization's information requirements and using it for application developing, I/T deployment and sharing data.

Utilizing data
Putting the right data at a person's disposal at the right time.

Building Secure Remote Access Systems
Distributed and client/server technology are just addressing this issue.

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♦ *General strategies to assure efficiency of the existing information systems*

Managing Dispersed Systems
Establishing the support system for computing activities at department or unit level.

Integrating Information Systems
Working to solve the technical barriers to interoperability across disparate hardware and software.

Updating Obsolete Systems
Updating, migrating, augmenting or eliminating obsolete systems in order to make fundamental changes in organizational computing.

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♦ *Change strategies directly creating customer response systems.*

Reengineering Business Processes
Redesigning cross-functional processes to be more responsive to customer needs. This is enabled through the use of I/T.

Connecting to Customers/Suppliers
Integrating upstream and downstream elements of the value chain into the organization process through information technology.

Instituting Cross-Functional Info Systems
Integrating business processes, information systems and data across departments more effectively is the focus.

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♦ *Strategies improving IS management.*

Boosting Software Development Productivity
Increasing the productivity in developing applications.

Improving Software Development Quality
Enhancing that systems respond closely to business needs.

Cutting I/S Costs
Keeping costs in line without lowering service.

Improving the I/S Human Resource
Upgrading personnel to meet the continuing challenge of I/S in the organization.

Improving Leadership Skills in I/S
Highlighting the need for leadership at the top of the I/S organization.

REFERENCES

Benjamin R.I., Rockart, J.F. Scott Mort, M.S. & Wyman, J. 1984. Information Technology: A Strategic Opportunity. Sloan Management Review. 25: 3-10.

Bergeron, Francois, Buteau, Chantal, & Louis Raymond. 1991. Identification of Strategic Information Systems Opportunities: Applying and Comparing Two Methodologies. MIS Quarterly. 15: 89-101.

Cash, J.I.,Jr & Konsynski, B.R. 1985. IS Redraws Competitive Boundaries. Harvard Business Review, March-April 1985.

Cash, James I, McFarlan, F. Warren, & McKenney, J.L. 1983. Corporate Information Systems Management: Text and Cases. Homewood, IL: Richard D. Irwin.

Crowston, K. and Treacy, M.E. 1986. Assessing the Impact of Information Technology on Enterprise Level Performance. Proceedings of the Seventh International Conference on Information Systems. San Diego, CA: 123-146.

Diebold, J. 1982. Corporate planning and the Linkage with Information Management. Proceedings of the Society for Information Management: 1-7.

Frohman, A.L. 1985. Putting technology into strategy. The Journal of Business Strategy. Spring: 54-65.

Gerstein, M. 1992. From Machine Bureaucracies to Networked Organizations: An Architectural Journey. In Nadler et al. (Eds) Organizational Architecture: 11-39. San Francisco: Jossey-Bass.

Hayward, Richard G. 1987. Developing an Information System Strategy. Long-Range Planning. 20:100-13.

Henderson, John C., & John G. Sifonis. 1988. The Value of Strategic IS Planning: Understanding Consistency, Validity, and IS Markets. MIS Quarterly, 12.

IBM Corporation. 1984. Business Systems Planning: Information Systems Planning Guide, Application Manual GE20-0527-4. White Plains, New York: IBM Corporation.

Johnson, J. 1984. Enterprise Analysis. Datamation, 30: 96-103.

Johnston, R. and Vitale, R. 1988. Creating Competitive Advantage with Interorganizational Information Systems. MIS Quarterly. 12: 153-165.

Kalbacker, W. 1986. Matching MIS to the Business. Computer Decisions. September 30: 40-42.

Lawrence, P. 1989. Why Organizations Change. In Mohrmann et al. Large-Scale Organizational Change: 48-62. San Francisco: Jossey-Bass.

Maglitta, J. & Mehler, M. 1992. The New Centralization. Computerworld. April 27: 85-88.

McFarlan, F.W. 1984. Information Technology Changes the Way You Compete. Harvard

Business Review, May-June 1984.

Neo B.S. 1988. Factors facilitating the use of information technology of competitive advantage: An exploratory study. Information and Management. 15:191-201.

Porter, M.E. "Technology and Competitive Advantage", Journal of Business Strategy. 5, 63-68 (1985).

Porter, M.E. and Millar, V.E. "How Information Gives You Competitive Advantage," Harvard Business Review, July-August 1985.

Rockart, J. & Morton, S. 1984. Implications of Changes in Information Technology for Corporate Strategy. Interfaces, 14(1): 84-95.

Singleton, J.. McLean, E. and Altman, E. 1988. Measuring Information Systems Performance: Experience with the Management By Results System at Security Pacific Bank. MIS Quarterly. 12: 325-337.

Tavakolian, Hamid. 1989. Linking the Information Technology Structure With Organizational Competitive Strategy: A Survey. MIS Quarterly. 13: 309-317.

Vroman, H. William and John Burbridge. 1993. "Aligning Information System Units with Competitive Strategies." Proceedings of the Southern Management Association. Atlanta, Ga.

Vroman, H. William and Vincent Luchsinger. 1994. Managing Organization Quality. Burr Ridge, IL: R.D. Irwin.

Wiseman, C. 1985. Strategy and computers: Information Systems as Competitive Weapons. Homewood, IL: Dow Jones-Irwin.