THE NEW IT ORGANIZATION: EIGHT IMPERATIVES

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ABSTRACT

Change has emerged as the trademark of the 1990s' business environment, and changes in both business and in technology are prompting adaptation in the role and structure of the information technology (IT) function. This article explores some of the challenges IT units now face and defines eight “imperatives” for IT management trying to respond to those challenges. The imperatives are: (1) achieving two-way strategic alignment; (2) developing effective line partnerships; (3) delivering and implementing new systems; (4) building and managing infrastructure; (5) reskilling the IT organization; (6) managing vendor partnerships; (7) building high performance and (8) redesigning and managing the “federal” IT organization. The article also discusses trends in the structure of the IT organization, and emphasizes the growing and crucial role of line managers in the effective use of IT.

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The New IT Organization: Eight Imperatives

INTRODUCTION

Change has emerged as the trademark of the 1990s’ business world. The pace of change is so frenetic that organizational theorists view change management as a critical competency—in some cases the critical competency—for successful organizations in the future. New customer demands and technological capabilities are causing organizations to undergo transformations that involve redefining their very mission. Not surprisingly, subunits within those organizations are also rethinking their roles. This is particularly true for the information technology (IT) function. The increased importance of information, coupled with the increased distribution of the technology to knowledgeable users, has both IT professionals and business managers reexamining the role of the IT unit. Some even wonder whether there is a role for the IT function in the business organization of the future. What is the future of the IT organization? This paper presents our perspective, based on three years of research concerning the changing role of the IT function.

Our conclusions are partially drawn from a study of new IT management practices in fifty firms and a comparative study of IT organizations in four countries. As part of the latter project, IS executives at four large US corporations and twelve European and Japanese companies were interviewed. Their views on the future of IT organizations in general, and, more particularly, their plans and change programs for their own organizations, form the basis for our own thinking. These CIOs, and other IS managers with whom we have discussed the future role of IT, offered diverse views on their environments and most had unique plans for their particular units, but many common themes emerged. We review these themes first by exploring changes in business and in technology that are driving changes in the role and structure of IT units. We then define and discuss eight “imperatives” for IT organizations working to respond to these changes. In the final sections, we

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1See Ross, Beath, and Goodhue (1994) and Beath, Goodhue, and Ross (1995).

2A joint research project between CISR and the Centre for Research in Information Management (CRIM) at London Business School, being led by Prof. Michael Earl, the study is examining similarities and differences in IT management in four countries, the USA, UK, France, and Japan.
suggest what responsibilities will become the core activities of the IT unit and emphasize one other major factor necessary to the success of the IT organization in the future—line management’s assumption of a co-leadership role for IT.

**Business change—driven by a globally competitive world.**

Not surprisingly, the CIOs we interviewed said their firms were experiencing an increasingly volatile business environment, driven by greatly intensified global competition. This global competition has major implications for business firms. There is less slack time, both in developing new products and in delivering customer orders. Customer satisfaction no longer means just prompt, courteous service; it now means designing products and services to meet individual customer needs. Equally important, costs must continuously go down, not up. Finally, firms increasingly must present a single face to multinational customers, who want a consistent product and simplified order and payment processes across their dispersed divisions.

This global competitive environment has, in turn, led to four major changes in the ways that organizations operate and are managed: (1) reengineering to remove unnecessary steps from basic transaction-oriented, operational processes; (2) doing the same in the administrative and support processes of the firm; (3) rethinking internal managerial information flows to provide greater access to data by all levels of management; and (4) the development of new and improved ways to reach, service, and retain customers. All involve major process change. All heavily involve IT. And all are necessary to compete in the new environment.

**Reengineering operational processes.** The joint demands of decreased cycle times, increased customer service, and decreased costs have led to the phenomenon currently titled “business process redesign.” The aim is to improve business performance by taking a process view of the functions and activities in the firm’s operational value chain. In essence, firms are redesigning each key process by creating cross-functional linkages, eliminating steps that from the customer’s perspective do not add value, and focusing on the horizontal information flows needed to support the process. Although many process redesign experiments have failed, companies like Xerox, JCPenney and Texas Instruments, among others, have demonstrated that redesigning across the value chain can
result in reduced inventories, lower headcounts, short lead times, greater customer satisfaction, and increased profits.

**Reengineering support processes.** Similarly, firms are reengineering administrative and support processes which have often been inefficient in terms of both cost and service. In fact, some of the early exemplars of business process redesign were in the “back office.” For example, at Ford and Baxter, automation was applied to take out redundant steps in administrative activities, and rationalization applied to create shared service organizations. This drive to improve support processes continues and has evolved to include, for example, outsourcing of accounting functions as at British Petroleum, or creation of service units for internal and external businesses as in the case of mortgage processing at Guardian Royal Exchange.

**Rethinking managerial information flows.** Companies today are reorganizing to obtain the advantages of both centralization and decentralization. Formerly decentralized companies (e.g., Johnson & Johnson, Citibank) are centralizing some functions, such as purchasing and logistics management, to take advantage of their size and access to worldwide information and to respond to customer demands for one-stop shopping. Formerly centralized companies (e.g., Frito-Lay, Miller Brewing) are moving more decision-making power lower in the organization to make better use of both sales information and existing local knowledge about customers and to provide more effective customer service. These companies are moving toward a “federal organization” model which combines elements of both centralized and decentralized structures and processes (Handy, 1990).

This increasingly understood need to have both the advantages of global resource management, as well as responsiveness to local market conditions, has led organizations to rethink more than just the “horizontal” (across the value chain) systems. It has also encouraged companies to rethink their “vertical” processes—that is, their key managerial processes such as the planning process, the quality process, the sales managerial process, etc. (Applegate, 1989; Simons, 1991). Managerial processes, which with the exception of financial management, were rarely designed at all in the past, can now, with the aid of IT, be designed to deliver appropriate operational, customer, and competitive information to all involved in the process. In companies like Frito-Lay, Miller Brewing,
and Xerox, many managerial processes have been redesigned specifically to deliver information lower in the hierarchy to teams of people closer to the customers, where decisions can be made with the latest detailed information. We call this “managerial process redesign” (Exhibit 1).

**Network-Process redesign.** As Exhibit 1 also shows, however, there is a fourth type of process redesign underway which involves the firm’s external customers and suppliers. With the advent of more cost-effective communications technology, there is also a need to place more emphasis on designing improved approaches to making what Forrester Research terms “the customer connection.” This also often extends in the reverse direction to supply chain integration, as illustrated by the Efficient Consumer Response initiative in the US food industry.

Redesigning processes to serve customers is not a new concept. It is more than a decade since Federal Express wrapped information around its service. In the 1980s, many organizations provided increased customer contact by giving customers access to their order entry systems and some, like Baxter Healthcare, went further by taking over related services in their clients (Short and Venkatraman). But the magnitude of such opportunities offered by cheaper, broadband communications is now more apparent. United Airlines is moving into a ticketless approach to serving customers. State Street Bank has placed information formerly held in its mainframe files onto customer premises in client/server form to facilitate improved and simpler analysis by customer personnel. But the tide of customer-oriented process change is just beginning to swell. The opportunities and perils presented by the Internet and various private networks for companies with established brand names (banks, insurance companies, pharmaceuticals, etc.) are increasingly evident. The last half of this decade will see major attention to such customer-oriented redesign initiatives.

Equally the movements of quick response and efficient consumer response have seized upon the technologies of EDI, shared databases, and collaborative systems to take time, inventory and quality slacks out of the supply chain—Walmart’s integration with Proctor & Gamble in the US, 7-Eleven’s fast replenishment system in Japan, and Marks & Spencer’s contract management system in the UK
Exhibit 1: Four Types of Process Redesign

Managerial Process Redesign

Network Process Redesign

*coordination activities

Operational Process Redesign

*product development
*logistics

Support Process Redesign

*accounting
*human resources
*information technology

Network Process Redesign

*sales mgt
*planning
*quality

*information-based services
are examples. We call this integration of processes with customers and suppliers (plus allies) network process redesign.

These four major efforts at process redesign are having a major impact on IT organizations. Although pressure for the changes noted above started in the manufacturing sector, the needs to reduce costs and increase services have spread to all sectors (including service, health, and education). All IT organizations are now impacted. On the one hand, information technology is a key enabler in most effective process change, so the load upon most IT organizations is becoming much heavier. On the other hand, IT units too must reduce costs, raise quality, reduce lead times, and improve customer service. The challenge for IT units is thus to do more with fewer resources. As a result, some top IT executives are heavily engaged in thinking through the “reengineering of IT.”

**Technology change.**

Business change alone provides many challenges to the IT department. However, technology change is also rampant and presents a second major set of issues for IT. In fact, the technology environment has undergone a complete change in the past few years. Instead of a fairly stable, benign mainframe environment, IT now has to deal with a user-centered workstation environment supported primarily by server-based storage and processing. New development methodologies, integrated package suites, and exploding technologies create a situation in which IT units must interface with as many as 50 to 100 suppliers (not the previous five to ten major ones) to meet their needs. And the IT industry is complex, uncertain and ever-changing. The key technological issues are:

*Distributed computing environment.* Users today are well trained and more demanding as they install PCs and portables throughout the organization, often with nonstandard software. Power users abound, and they frequently possess more knowledge about PCs than core IT personnel. More importantly, they are frequently the application innovators in an organization. Often, however, they fail to understand what is necessary to provide secure, industrial-strength systems, and the IS function is called upon to reverse-engineer applications developed by “power users.” Unfortunately, even in 1996, client/server environments remain difficult to implement and support. Inadequate
software, multiple suppliers, and new languages make the cutover from thirty years of mainframe-based COBOL a challenge—and the "legacy systems" still have to be maintained somehow.

**New development methods.** Software development is moving—slowly—from COBOL on MVS to object languages on server platforms. Meanwhile, management’s dissatisfaction with previously costly and slow development, coupled with a sense that basic transaction processing has little competitive advantage to it, has led to a run on integrated packages like SAP. In most companies, IT is not prepared for this revolution. Many COBOL programmers and mainframe operators are having difficulty making the transition to more complicated and uncertain technologies. Some CIOs describe new development methods and technologies as "black holes." Those firms that invest in training IT staff in new tools find that training costs are high, and the payback sometimes slow. In addition, personnel losses to other firms looking for people trained in the new development approaches are growing.

**Exploding technology.** While IT staff are already struggling to implement existing technologies, more technology change looms on the horizon. Object orientation, image processing, wireless communication, pen and voice processing and multimedia are all growing in their usefulness. Most important are the emerging "information highway" capabilities, as evidenced by the Internet, the World Wide Web, the emerging Microsoft Network, and services like CompuServe and America Online. As noted above, they are changing the way that business is done, and they demand new skills and capabilities from the IT organization.

**A new industry.** Less than a decade ago, a few companies, led by IBM, dominated the computer industry. They could supply most of the technologies and services required. Today, the many-layered industry (*Economist*, 1993) includes hundreds of players. Not only are there hardware, software, and communications suppliers, but systems integrators, facilities managers, information brokers, and so on. The industry is continually changing; almost daily there are new entrants, new alliances, and new product announcements. The old certainties, along with many once-successful products and vendors, are gone. Decision-making in IT is much more complex and risky.
Availability of outside suppliers. The “outsourcing” industry, once confined to a few firms such as EDS and to a number of contract systems developers, has burgeoned. What is more, outsourcing is on the mind of every senior executive desiring to cut costs or shrink the size of (or reduce the troubles—perceived or real—connected with) the IT organization. While only a few firms, such as British Petroleum, ITT, and Kodak, have outsourced major portions of the IT function, most IT units have identified specific tasks that could be better served by companies specializing in IT services. Learning how to identify the tasks that are candidates for outsourcing, negotiating an appropriate outsourcing contract, and managing the outsourcing agreement effectively are major new challenges facing IT executives.
EIGHT IMPERATIVES FOR IT

What do all these external changes—both business and technical—mean to the IT organization? The oft-cited metaphor of “changing an airplane engine in midflight” comes readily to mind. The business changes alone are daunting. However, major changes in the way that systems are developed, in the hardware and software on which they run, and in the rapidly changing and vastly increasing set of options for both computing and communications—many of which are new and untried—make the technology issues also particularly challenging. These technology challenges are often coupled, however, with inadequate technical and business training in IT units, and are compounded with IT spending patterns that disperse IT investment planning throughout firms. In sum, the load on IT organizations is heavier than ever before, and the management of IT is more complex.

Given the above environment, we see eight imperatives for the IT organizations of the late 1990s. To be truly successful, an IT organization must excel in each of these. The eight imperatives are listed in Exhibit 2 and discussed in some detail below.

**Imperative 1—Achieving Two-Way Strategic Alignment.** The first imperative is to align IT strategy with the organization’s business strategy (Exhibit 3). With more than 50% of capital equipment investment in the United States now being devoted to information technology, it is clear that IT has become a major resource for management in carrying out its strategic initiatives. To ensure that investments in IT are, in fact, targeted at strategic priorities, IT management must be knowledgeable about senior management’s strategic and tactical thinking. This is not a new challenge. However, to achieve it, it is necessary for the CIO to become either a formal or informal member of the top management team and for other senior IT executives to be members of key task forces. IT people must be present where business strategies are debated.

Alignment, however, is two-way. It is becoming clear as firms consider their future in an information era of superhighways, multimedia and information richness that IT executives should
Exhibit 2: Eight Imperatives for IT

1. Achieving two-way strategic alignment
2. Developing effective relationships with line management
3. Delivering and implementing new systems
4. Building and managing infrastructure
5. Reskilling the IT organization
6. Managing vendor partnerships
7. Building high performance
8. Redesigning and managing the federal IT organization

Exhibit 3: Strategic Alignment
contribute more positively to management thinking by identifying the business threats and opportunities posed by IT. It is evident now that technology influences strategy as well as the other way around.

Strategic alignment is being ensured in many firms by more than just a new appreciation for the CIO's role. An emphasis is also being placed on senior line management's ability to understand the opportunities available through IT. Formal and informal senior management education about IT is once more underway in many firms. Technology and strategy workshops are being conducted. Leading-edge organizations have revived steering committees for information technology. These new committees are very different from the steering committees of the 1970s and 1980s, when each member argued vociferously for funding for his or her particular function or sub-organization. Today's committees are formally charged with two primary objectives. The first is to ensure that appropriate education is provided to, and absorbed by, all members to enable them to make effective business decisions with regard to information technology. The second objective is to require members to doff their sub-organization "hats" and to take an organization-wide perspective in decisions regarding IT resources. These newer committees reflect the need to support the type of processes noted in Exhibit 1, as well as the increased importance of allocating scarce IT resources effectively.

**Imperative 2—Developing effective relationships with line management.** Strategic alignment alone is not enough. The key people in the use of information technology in any organization are its functionally-diverse and geographically-widespread line managers. They provide the strategic and tactical direction, and the commitment to implementation, that converts visions of new systems into improved organizational processes. It is, thus, an imperative for IT personnel at all levels to develop strong, on-going partnership-like relationships with the key line managers in the organization. Only through these relationships can the necessary communication be engendered to ensure that both business and technology capabilities are integrated into effective solutions for the business at each organizational level. In an effective relationship, IT professionals and line managers need to work together to understand the business opportunities and to choose among technology options, to determine needed functionality, and to decide when urgent business needs demand
sacrificing technical excellence for immediate, albeit incomplete, solutions. Beath, Goodhue, and Ross (1995) note that effective IT-business relationships are one of the three major resources (along with IT human resources and the technology infrastructure) which IT executives must manage well in order to deliver value to a firm (Exhibit 4). These relationships demand that both IT and line managers accept accountability for systems projects. This is achievable only through continuing mutual involvement, in which both parties share their unique expertise.

We see major efforts on the part of IT organizations to move toward more effective relationships. IT education in many companies now includes a component of interpersonal skill-building, such as active listening, negotiation skills, or team building. Many IT executives are assigning high-level “account managers” chosen for their understanding of the business, as well as their technical capability, to focus specifically on IT-business communication and understanding. In addition, IT staff are strengthening contacts with the key power users in each organization, not only to manage what they do, but also to learn from them.

In an article on CIO effectiveness, Earl and Feeny (1994) identify the IT-business relationship as a critical element in the ability of the IT organization to add value to the business. They observe that building the IT-business relationship overlaps with six other factors to enable a CIO to provide business value. In Exhibit 5, we adapt Earl and Feeny’s framework to concentrate on this relationship variable, as well as three others from their paper (focusing on business imperatives, concentrating development efforts on strategically important initiatives, and establishing a credible IS performance track record). To these, we add a fifth variable, increased business knowledge. This requirement often underpins the efforts in some companies, such as BP, to turn systems professionals into business consultants.

We believe these five strategies combine in a positive feedback loop that leads to ongoing IT success. IT managers utilize in-depth business knowledge to build strong executive relationships, which allow them to focus on business imperatives, and then to concentrate IT development efforts on those imperatives. Successful systems built for the key priorities then enhance IT’s track record, which, in turn, improves business relationships at all levels. Successful systems and improved
Exhibit 4: Three Key IT Assets

Human
Technology
Relationship

Exhibit 5: Key Attributes of Effective CIOs

Focus on Business Imperatives

IS/Business Executive Relationships

Increased Business Knowledge

Concentrated IS Development Effort

IT Performance Track Record

relationships in turn add to greater business knowledge and the cycle continues to build. Earl and Feeny's targeting of relationships as a critical imperative for IT management is certainly appropriate.

**Imperative 3—Delivering and Implementing New Systems.** Although the primary function of the IT department has traditionally been development of, and then operation of, systems, the current focus on systems *delivery* and *implementation* is a subtle change of emphasis. To be sure, the IT function still does provide many of an organization's information systems, but there are many changes in the 1990s. The task has changed from developing mainframe-based transaction processing systems that support a single function, to delivering desktop systems that must address the integrated data needs of knowledge workers supporting redesigned processes. The environment has also changed, as internal clients have lost patience with long development times, inflexible interfaces, and cost overruns.

IT executives are responding to these challenges with a variety of strategies. Some have introduced timebox approaches, which require the delivery of usable system components at regular intervals. Timeboxes force developers and their business partners to focus on key functionality, thus avoiding over-engineered solutions and unnecessary delays. Another key for avoiding delays and targeting critical functionality, as noted just above, is the recognition that high-level line managers must be the ultimate project leaders, thus ensuring that the business people who will be using the system take responsibility for its implementation.

But faster cycle times, and the need for data integration and sophisticated interfaces, have led to more revolutionary changes as well, particularly to the extent to which firms rely on outside sources. For example, more IT units are enlisting the help of contractors, particularly in areas in which their tools and technologies are needed—two prime examples being client/server systems and Internet applications. Some are subcontracting all specialist application development to niche third parties. Others are using externally-developed templates, i.e., CASE-based tools that they customize to meet their specific needs.
Most dramatic is the increased reliance on integrated packages. Firms are increasingly recognizing that they do not have the time, money, expertise, or inclination to develop large integrated systems inhouse. As noted earlier, they are purchasing software from firms like SSA, SAP, Baan, and others to address their needs for integrated systems. Package implementation is decidedly different from inhouse development. IT staff must understand the system, adapt it to the platforms it can utilize, and troubleshoot code or table-driven procedures that were written outside the firm. More importantly, because of the fact that packages inevitably require changes in business processes, IT must work even more closely with functional managers who are responsible for making the systems work in practice. Integrated systems projects require near equal staffing of technical and functional personnel.

Thus systems delivery often involves procurement, and requires the experience and skills of an informed buyer. Purchased software provides a solution for organizational processes that offer no particular competitive advantage, (or where competitive advantage accrues from use not ownership). However, firms are still identifying applications that offer unique competitive features, in particular those which improve customer connections (Exhibit 1), and thus they are still developing software internally.

In sum, systems delivery now includes not only systems development, but also procurement and integration. The total systems delivery load in most firms has increased greatly and shows no signs of slowing down—mostly due to the business and technology changes identified earlier.

**Imperative 4—Building and Managing Infrastructure.** In the mid-1990s, there is a second major “deliverable” for the IT organization. IT today is charged with creating an “IT infrastructure” of telecommunications, computers, software, and data that is integrated and interconnected in such a way that information of all types can be expeditiously—and effortlessly from the users’ point of view—routed through the network and redesigned processes. Because it involves fewer manual, or complex computer-based, interventions, a “seamless” infrastructure is less expensive to operate than a set of independent, divisional infrastructures. In addition, it is becoming a prerequisite for
doing business in a global world, in which the sharing of information and knowledge through all parts of the organization is increasingly vital.

IT units must address four challenges in developing and supporting their firms’ IT infrastructure. First, IT units must develop an *architecture* that defines the planned “shape” of the infrastructure itself. Hardware and software capabilities are obviously part of that architecture. More significant is the treatment of data (what is to be standardized, where it is to be located, etc.) and the treatment of applications, in particular decisions around the embedding of applications as part of the infrastructure itself (e.g., office suites, e-mail). Interestingly, some of the European companies we interviewed included people in their conceptualization of infrastructure—the information processing skills required of users.

Second, IT units must establish technology *standards* for implementing the architecture. This requires constant screening and testing of technologies to determine what technologies meet organizational needs for integration and support. The rapid pace of change in information technologies means that IT must develop the ability to establish, support, reevaluate, and, as appropriate, change technology standards. Extremely clear today is the movement toward an increased emphasis on standards for both cost and effectiveness reasons. The time, energy, and expertise needed to make appropriate selections is slowly driving every major company toward the selection of a small set of corporate standards usually chosen by a headquarters group, most often in conjunction with a committee comprised of IT personnel from local organizations.

Third, IT executives must understand and communicate the *value* of the infrastructure. In most decentralized and federal organizations, local management is taxed for infrastructure support, so it becomes important that the value of the infrastructure is as apparent as the cost. The value of any infrastructure, however, depends on management’s strategic vision as to its use. Consequently, the design of the infrastructure and the amount invested into it, as well as the infrastructure services IT provides, have become senior management business decisions (Weill, Broadbent, and St. Clair, 1994).
Finally, there is the matter of operating an increasingly complex infrastructure. The user who has a problem cares not at all about whether the error is located in telecommunications, mainframes, servers, routers, a database, or the application itself. He or she needs help. While the capabilities to look seamlessly through all aspects of the network are clearly not here yet, we see the responsibility for building and operating a full network increasingly becoming the role of a new “super operations manager” whom we call the “Chief Network Officer” (CNO). Reporting to the CIO, this person will have end-to-end responsibility for what will be one of the organization’s critical assets as we move toward the networked world. In effect, the CNO will be the IT “chief operating officer,” while the CIO handles the externally-created vision, relationship, education, and consulting responsibilities.

**Imperative 5—Reskilling the IT Organization.** For almost two decades, the basic approach to systems development did not change. COBOL was the major language, and the mainframe was the major platform on which systems were developed. Today, by far the largest number of systems are being built for client/server systems. Developers in this environment must regularly learn new programming languages, operating systems, and communications protocols. Support personnel are similarly challenged. And network operators are finding systems and network management to be particularly challenging as they migrate from hierarchical network environments to peer-to-peer networks. These changes have resulted in large gaps in the technical skills of IT staff.

Equally important, as IT becomes ubiquitous in all organizations and a critical element of new business strategies and tactics, most IT leaders have found that their people were woefully lacking in business knowledge and skills. If the necessary relationships are to be built (as noted in Imperative 2 above), IT reskilling must go beyond technology skills to business skills.

Neither of these sets of skills is easy to develop within the current ranks. There are estimates that up to 50% of existing IT personnel will not be able to make the technical transition—much less be able to obtain the appropriate business skills. There is, as yet, no consensus on the appropriate way to carry out the skill transition. Some companies, like Morgan Stanley in New York City, are funding an extensive education program to reskill existing staff. Others are working in partnership with “new” client/server software companies, such as Cambridge Technology Partners, to assist both
in building systems and in educating their people. Others are merely hiring people with the appropriate new skills and assigning existing staff primarily to the care and feeding of older systems. Whatever the approach, “reskilling” is underway in all IT organizations. And it must be done—at a very significant cost.

**Imperative 6—Managing Vendor Partnerships.** Just as internal partnerships must be managed, so must external partnerships. Outsourcing some IT responsibilities to computing services firms can compensate for skill shortages in IT units and relieve management of the need to oversee tasks that are not viewed as competitive strengths or core competencies. As a result of their economies of scale, many vendors in principle can provide more reliable, cost-effective support than inhouse units, while allowing top IT management to focus on strategic priorities. The effective management of vendor partnerships, however, is key to realizing the potential benefits that outsourcing can offer. Making outsourcing work is a different proposition from deciding to outsource (Earl, 1996). This requires a set of IT managers who are at least as skilled as the outsourcer in each key area, who are informed buyers and prime negotiators, and who derive satisfaction from seeing a job done well—not just in doing it. This is a slightly different breed of manager than has populated IT in the past. A critical ability is the recognition of whether a vendor relationship is purely transactional and contractual or is more strategic and joint (Henderson, 1990). Vendors as much as customers have suffered from confusion on this point.

**Imperative 7—Building High Performance.** In the 1990s, IT units must keep improving their economic and operational track record. Like all other functions in the firm, IT must strive to meet increasingly demanding performance goals. Exhibit 5, based on Earl and Feeny (1994), showed the importance of an IT performance track record in relationships with business management. We agree with Earl and Feeny that high performance is critical in its own right.

Affordability and cost efficiency have become vital issues as IT budgets continue to rise, especially when companies discover that over 50% of expenditure is in the end-user domain. Outsourcing and downsizing are two responses to this challenge. Companies are also installing new cost metrics to
promote IT cost-consciousness. Examples include IT cost per unit of product or service, activity-based costing of IT services, and distribution cost analysis of IT-intensive operations.

Operational performance improvement has followed trends in manufacturing. TQM and customer service programs have been transferred into IT. For example, Motorola has introduced six sigma performance goals in an IT quality program. Information-intensive service businesses have introduced customer surveys, employed simulated customer queries, and implemented customer complaint analysis.

Finally, borrowing from manufacturing terminology again, “time-to-market” has become a key issue—systems can no longer be a constraint on business development. It is not acceptable to wait for two or more years for an application to be developed when markets are changing so fast. As mentioned earlier, new systems development methods, greater use of packages, and timebox projects are some of the approaches being used to reduce development time. Others approaches include prototyping, acceptance of “80/20” requirements definitions, targeted deployment of end-user software tools, and the use of Internet technologies.

These dimensions of IT performance not only affect the credibility of the IT unit but also show that IT is no different from other units of the organization. They are critical elements in the total competitiveness of any business today.

**Imperative 8—Redesigning and Managing the Federal IT Organization.** For the past three decades, IT organizations have struggled with the “centralization-decentralization” issue. The exact locus of all, or parts, of IT decision-making power is critical, and getting the right distribution of managerial responsibilities is, thus, the eighth imperative we see.

Our research suggests that, increasingly, these responsibilities are being distributed to both local organizations and the central IT unit, along the lines that Handy (1990) has designated as a “federal” structure. Handy describes the federal organization as one which follows the political model of the division of power between a central authority and local governments (e.g., the federal government
vs. the states in the United States). This model allows for a significant measure of autonomy at the local level in business organizations, but also the “scale” which is necessary for organization-wide planning, resource allocation, centralized purchasing, and other benefits.

Hodgkinson (1996) has applied this theory to the IT organization. He notes that both decentralized IT and centralized IT have real disadvantages, as displayed in the unshaded sections of Exhibit 6. Both, however, as noted in the central ellipse in the exhibit, provide many advantages. Decentralization of some decisions fosters user control over IT priorities and business unit ownership of their systems, for example. But on the other hand, economies of scale and control of standards can only be gained from centralized activities. Hodgkinson illustrates a federal organization which delegates some responsibilities to the center and much to the local organizations. What ties all of this together is a well thought-out IT vision, effective leadership, and a group-wide IT strategy and architecture. These, in turn, enable the benefits of both centralization and decentralization and allow strategic control and synergy throughout the organization. Moving from the status quo to an effective federal organization, however, is not easy—especially in formerly decentralized organizations. Importantly, though, once a federal structure is in place, it can be easily modified as the requirements of the host organization change and technological learning evolves. It is thus a relatively stable structure (Earl, Edwards, and Feeny, 1996).

Past work on federal IS structures has assumed a multi-divisional context. However, single line businesses are now also discovering the advantages of federalism. The model here is devolution of systems analysis and consultancy activities to departments, functions, or processes, and a unifying central responsibility for strategy and operations. In other words, federal structures help achieve alignment with the business, together with economy of scale and architectural integrity.
Exhibit 6: Federal IT

The Federal IT Organization attempts to capture the benefits of both appropriate centralization and appropriate decentralization of IT resources.

THE NEW CORE IT ACTIVITIES

While it is relatively simple to describe these eight imperatives, the act of putting everything in place to be effective in each area is much more difficult. Unfortunately, most IT organizations cannot succeed in all these areas. Because of a lack of skills, or just inadequate numbers of people to staff all of the IT-related efforts underway in most major organizations, outsourcing is growing rapidly. In fact, most of the activities which the old IT organization used to pride itself on doing can now be outsourced. As shown in Exhibit 7, this old fundamental set of responsibilities —running the network, managing the utility, developing and maintaining systems, and managing workstations—are all activities that can now be moved to an external vendor. This has raised the issue of what, if anything, the current and future role of the IT organization might be.

It is clear that no matter how many or how few of the old activities of the organization are outsourced, the center of gravity of the IT organization itself has shifted. This shift is essentially from being primarily a “doing” function to acting as a more business-centered, advisory and management function. In large organizations, IT management will increasingly see its newer primary roles as (1) ensuring that line managers at all levels understand the potential of IT and how to make most effective use of the IT resource in carrying out their strategies; and (2) providing advice and expertise to ensure the effective implementation of these business strategies and tactics. In other words, IT management will work with line management to ensure that the business is doing the right things with information technology and is doing them right.

As a result, the core responsibilities for the IT organization as we move toward the year 2000 increasingly will be those shown in the central box of Exhibit 7. These include understanding and interpreting technology trends; working with key line managers to help them develop IT-enhanced strategies; educating and consulting with line management to ensure that the strategic direction is carried out; taking responsibility for, or supporting at the very least, effective process innovation; developing relationships which permit useful internal partnerships; managing suppliers to whom parts of IT have been outsourced; and developing and managing the IT human resource.
Exhibit 7: The New Core Activities for IT

The Old IT Core
(now often through Supplier Alliances)
Data Center Utility
Network Management
Application Construction
Application Maintenance
Workstation Life Cycle

The New IT Core
Technology Anticipation
- Strategic Direction
- Consulting
- Education
Process Innovation
Internal Partnerships
Supplier Management
Architecture & Standards
Human Resource Mgmt

Internal Customers
Executive Management
Functional Management
(Global, Regional)
Operations Management
Global Product Managers

In the left hand box are the old core IT activities, many of which are being subcontracted to the market place by outsourcing or joint ventures. These are the “doing” activities; they may be retained inhouse (“insourcing”), but they are managed very much as a commodity factory.

In the right hand box are user-management responsibilities. Two are traditional—carrying ultimate responsibility for applications strategy and for systems implementation. Two are newer—personal and local computing, and increasingly, business-oriented experimentation with new technologies.

Given the division of activities in Exhibit 7, IT management not only is responsible for the new IT core but also has to assist line and user management in managing IT activities. In addition, IT management has to ensure that the “old” tasks shown in the left-hand box are efficiently and effectively carried out, either internally or externally to the corporation. While both these concerns have always been a part of the IT mission, too few organizations have successfully addressed the need for business-oriented IT personnel who are capable of building the relationships necessary to work effectively with line managers and third parties. Today, this job is being elevated to become the primary or “core” role of the IT organization.
LINE LEADERSHIP

The success or failure of an organization’s use of IT, however, is only partially dependent on the effectiveness of the IT organization. It is even more dependent on the capability of line managers, at all levels, to understand the capabilities of the IT resource and to make effective use of it.

In fact, information and information technology have become the fifth major resource available to executives to shape an operating organization. Companies have managed four major resources for years: people, money, materials, and machines. But, today, as previously noted, IT accounts for more than 50% of the capital goods dollars spent in the United States. Information has become the source of product and process innovation and the wellspring of new businesses. IT is thus a major resource that—unlike single-purpose machines such as lathes, typewriters, and automobiles—can radically affect the structure of the organization, the way it serves customers, and the way it communicates both internally and externally.

Only line managers are close enough to their segments of the business to see the most effective ways to utilize this resource. Only they possess the clout to embed IT into their strategies and to commit the necessary financial resources. Unless IT is included in line managers’ strategy and tactics, and unless line managers can effectively understand and implement a process view of the world, the best IT organizations are almost powerless. We have noted this before in our discussion of the IT imperatives, and recognize it in the right hand box of Exhibit 7, but it deserves underlining. For the past decade, we and others (Rockart, 1988; Boynton, et al., 1992) have pointed out that line leadership is an absolute necessity. However, far too few organizations have stepped up to the plate to deliver the appropriate education and training necessary to allow the line to assume this responsibility.

In addition to effective planning for the use of the IT resource, line managers are also responsible for effective implementation of information technology. Although building good information systems is seldom easy, it is far easier than revamping the processes by which people work, their roles, their reward systems, the organization’s accounting systems, or even the organization’s
structure or culture—all of which need to be altered to install today’s process-based systems. About thirty years ago, Harold Leavitt defined an organization as a balancing act (Exhibit 8). He emphasized that an organization’s strategy, its structure, people and their roles, and its technology had to remain in balance. If any one of these four variables is changed, Leavitt noted, the others must be changed to keep what the organization does in balance. Thinking about this about a decade ago, Rockart and Scott Morton (1984) added a fifth variable to the balancing act—the major set of organizational processes. These include not only horizontal and vertical processes, but also reward processes, accounting processes, etc.

With this diagram in mind, it becomes painfully obvious that, to implement systems successfully, line management must be heavily involved. IT management can only change one variable, the technology, in accord with a strategic or tactical change. The CIO has no power to affect the necessary changes in the middle column on Exhibit 8—the changes in structure, culture, processes, and people’s roles—and therefore no power over the most crucial factors in an implementation process aimed at vastly improving the efficiency and effectiveness of an organization. Only line management has the responsibility and the power to effectively change these variables. For an organization to be successful with the use of IT today, IT management must successfully respond to the changing business and technology environment through effective efforts in each of the eight “imperatives” noted above. However, this alone is not enough. Line management must also shoulder its twin roles of effective planning for the “fifth resource” and for the implementation of new IT-based processes. If it does not, all the herculean efforts that IT managers are making to respond to this new environment will be in vain.
Exhibit 8: Leavitt’s Balancing Act (adjusted)

SUMMARY

The IT organization of the future must address the dual demands of improving the performance of the services it renders while increasing the impact of those services on the firm’s bottom line. For most firms, this means that the IT unit will become smaller over time, but it will necessarily possess greater expertise in both technology and business processes. Most important, IT resources will be aimed at the strategic needs of the organization.

Outsourcing of IT tasks is increasing and seems likely to grow if IT management learns how to handle all the challenges involved. Then IT executives will be able to focus their time and energies on the highest value-adding responsibilities, such as helping top management identify strategic opportunities and developing the blueprint for a solid IT infrastructure.

The IT unit of the future, even if smaller, will be more critical to its firm’s operations. The demise of the IT function is not nigh. Effective IT units will help their firms apply IT to redesign processes and access needed information, and they will do so on a tight budget. Addressing the eight imperatives will be central to their effectiveness. Those who fail to address the imperatives, or who are unable to convince line management to undertake its leadership role in both IT-enabled strategy development and systems implementation, will not be able to provide the support their organizations need to be competitive in a fast-changing world.
REFERENCES


