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INTRODUCTION

The prevailing understanding of information technology (IT) resources, especially computers, is that their use can independently lead organizations to achieve high levels of performance and result in large productivity payoffs. This notion has been fueled by findings of several studies that examined only the impact large financial investments in IT have on productivity, while neglecting the effect of the larger organizational context.

For example, Nolan et al., (1985) claimed that above average spending on information technology can enhance a firm's profitability. Harris and Katz (1989) suggested that high performance organizations spend a significantly higher proportion of revenues for IT than do low-performing organizations. Sullivan-Trainor (1989) found that in 1988 leading-edge companies increased their overall IT expenditures by about 9 percent. Roach (1991) recently found that, in the banking industry expenditures for IT increased by 20 percent per year during the 1980s and that by 1989 such spending totaled 45 percent of the entire industry's capital stock. Similar findings abound for studies conducted using public sector organizations as well (see, for instance, Kraemer and King, 1989; Ostrowski, 1987), just to mention two.

While such overwhelming evidence of the impact of large scale spending on IT is noteworthy, IT expenditures alone are not likely to ensure superior performance payoffs for organizations. As important as IT spending might seem, we believe that its impact is often unduly

emphasized. For example, in a recent study, Roach discovered that during the 1970s and 1980s, service sector productivity did not increase in relation to IT resource investment. Although results of that study strongly indicated that IT investment could benefit the organization, it was uncertain what combination of outlays in IT resources and other organizational factors was needed to foster the organization's expected results.

Several scholars share a similar view; in particular, Kevin Wilson notes that "research has been biased by the implicit assumption that technology is an autonomous force with the power to unilaterally achieve tremendous impact upon society in general, and in work organizations in particular" (Wilson, 1988: 3).

In a recent exploratory study measuring the organizational impacts of information technology investment, Mahmood and Mann (1933) offered suggestions toward a better understanding of the relationship between investment in IT resources and the organizational context on the one hand, and productivity payoffs on the other. One of their several conclusions appears relevant to this study: they observed that steady investment in information technology should be considered for enhancing organizational strategic and economic performance. However, to improve organizational performance, IT investment must be accompanied by appropriate organizational adjustments, including training.

Information technology has been variously conceptualized in the literature. One definition that captures many of the IT components is provided by Shohanna Zuboff (1988):

> Information technology (IT) is the convergence of several streams of technical developments, including microelectronics, computer science, telecommunications, software engineering, and systems analysis. It is especially a technology that dramatically increases the ability to record, store, analyze, and transmit information in ways that permit flexibility, accuracy, immediacy, geographic independence, volume and complexity (Zuboff, 1988: 414; see also, Khosrowpour & Yaverbaum, 1990).

This definition details the wide range of activities included under the label, "computer technology" (see for instance, Koppes, et al., 1991).

In this paper, we suggest the belief that IT has an independent effect on productivity may be somewhat exaggerated. Such reasoning fails to recognize organization-specific variables that interfere and interface with a computer-based work environment. Andersen and Dawes sought to advance this view by suggesting that a reciprocal relationship exists between information management and organizational effectiveness. For example, they argue that information technologies are expected to lead to more effective organizations—the very reason for adopting new technologies—while at the same time, effective organizations are expected to lead to better design, implementation, and operation of information systems. The result is a cycle of excellence: effective organizations create improved information systems which in turn enhance

organization effectiveness. Computerization is expected to promote organizational effectiveness and job performance, thus leading to high levels of productivity; however, we believe that computing by itself does not, and cannot, independently work to achieve this goal. Although the principles underlying productivity payoffs often clearly precede the computer, and in some cases run parallel to its use (e.g., for mass production or performing routine functions), the alignment of the technology to the organizational agenda accounts for the productivity payoffs often attributed solely to the implementation of computer systems. Furthermore, we suggest that organizational effectiveness, job performance, and productivity payoffs, if they are to happen at the individual, subunit, or at the organizational levels, must be moderated and influenced by other organizational factors. Therefore, management must focus attention on these factors, while at the same time ensuring that proper planning accompanies information technology implementation and management.

The goal of this paper is to examine how the lack of proper attention to certain important organizational factors can undercut the extent of payoffs to be realized from computerization. Specifically, the paper seeks to explore those organizational factors which must be accounted for and properly managed in order to maximize the payoffs from computerization. First, a theoretical review of information technology (IT) management will be provided. Second, selected challenges faced by public or private managers in managing IT resources will be identified; these factors can impede the successful deployment of IT resources. Third, key organizational factors that may promote the deployment of IT resources will be discussed. Finally, we will discuss the implications of the above-mentioned factors and issues for organizations.

THEORETICAL PERSPECTIVES

Several studies have focused on the payoffs of computerization. For example, Northrop, Kraemer, Dunkle and King (1990) used a panel study to determine whether governments that adopted computers early are receiving the payoffs today. Rather than sampling all cities in their target population, 46 different types of cities of over 50,000 population were chosen for the study. Using a mail survey, data were collected to stratify cities on six policy variables: automation, centralization, data integration, technical sophistication, user involvement, and charging for services. The sample reflected leading-edge cities, not simply in terms of technology, but also in terms of computing practice. Specific payoffs examined by the Northrop et al. study included the contribution of IT toward: (1) increased availability of information; (2) better information for management control; (3) better information for city planning decisions; (4) greater efficiency of operational performance, and (5) better interaction with the public. A number of important findings resulted from the study. First, most IT payoffs take time to be realized. Information and tasks are computerized in stages, and there is a learning curve for user personnel as well as for technical personnel. Second, payoffs are easier to realize in the more simple and routine tasks, while payoffs across the board may be more difficult to obtain and to measure. Third, some payoffs may be realized only at a minimal level, even after years of experience by most of the technologically advanced cities, due to the political nature of the tasks.

To maximize payoffs from computerization, management must be sensitive to organizational issues and problems that are brought on by the recent infusion of computers into the workplace. Management must also be willing to face up to these problems by demonstrating their willingness to set up appropriate frameworks and structures to deal with them as they arise.

Simply recognizing that problems exist, while useful, may not be adequate to bring about the high level of performance payoffs management expects. As the Northrop et al. study suggests, there are important organizational factors to watch for: methodological problems that detract from successful IT implementation; management and deployment of IT resources; attitudes of management; political dynamics associated with the IT implementation; the time involved in putting the IT resources in place; the nature of tasks to be automated; the organizational structure; and most importantly, the nature of the technology to be implemented. To these factors we add other variables that are equally relevant: organizational culture, training, corporate strategy, reward system, and leadership style of management. Other studies have examined computerization payoffs as either technical or power related. In the literature, much attention has been directed toward the technical payoffs of computerization. However, the results obtained by the various studies are often in conflict (see for instance, studies by Kraemer & King, 1986; Attewell & Rule, 1984).

One study that focused on the power-related dimension found that major power shifts have not occurred as a result of computerization. Instead, computer use has tended to reinforce existing power relations in organizations (see Danziger, Dutton, Kling & Kraemer, 1982).

Furthermore, according to a more recent account, Ron Weber suggests that "much of the literature [on the impacts of computerization] still presents hearsay, speculation, opinions, or evidence gathered by parties with vested political interests. Unfortunately, carefully conducted theoretical and empirical research studies are still scarce, and even those works are frequently plagued by incomplete and counterintuitive results (Weber, 1988).

All of these studies have a common theme: payoffs result from computerization by governments and organizations. However, the degree and extent of such payoffs are frequently not evaluated in the context of possible mitigating factors, including the confounding nature of the methodologies employed in the implementation, deployment, and the utilization of computer resources. Consequently, little attention has been devoted to examination of factors that detract from the realization of full payoffs from computerization. We turn now to a discussion of some of the challenges faced by the public manager, or any manager for that matter in managing IT resources.

CHALLENGES[1]

In every computerization project, IT managers face a variety of issues that influence eventual payoffs of system development. Among the most challenging are issues of centralization versus decentralization, system design, security, data management, training, technical complacency, and technical determinism.

Centralization/decentralization decisions affect users in a very personal way. The IT manager not only makes decisions about the amount of centralization or decentralization, but also must convince both administration and users that those decisions will provide the best value ("payoff") to the organization. While centralized systems often take longer to develop, and

[1] One of this paper's coauthors, a computerization project coordinator, has been directly involved with challenges of this nature over the past twelve years.

software and hardware chosen may not provide the optimal system for all departments, centralization increases the manager's control over issues of security, data integrity, and direction of development. Control over these issues can increase the overall system payoffs to the organization, although it may diminish some of the potential payoffs for individual users or departments.

System payoffs are enhanced by information systems that provide users with the tools they need to improve their performance. The IT manager has a responsibility to ensure that the system provides those tools. The data collected must be relevant to the job and, as much as possible, reflect the established functioning of the department. Reports, designed to meet departmental and organizational information needs, should be available in a timely manner. Screen and report designs based on input of user departments enjoy a much higher level of user acceptance than those designed entirely by the "experts." Timely report generation and/or distribution is critical to the smooth operation of any organization, and such reporting increases system payoffs.

IT managers face the challenge of directing the design or selecting a system with adequate flexibility to meet users' needs. While many packaged systems allow some flexibility in screens and/or reports, they may not be flexible enough to adapt to a department's current practices, forcing user departments to make changes to accommodate the system; the effect of these changes on computerization payoff can be positive or negative. Many packaged systems take less time to implement than custom systems, and written documentation and troubleshooting assistance are usually readily available with packages, while support may be more uneven with custom systems, thus affecting user productivity.

Decentralized computer systems also have implications for users. Even though the development process may take less time, other considerations can affect the payoff achieved from such systems. Among these:

- System support quality may be more variable for departmental systems. Packaged systems are dependent on the responsiveness of vendors. On the other hand, only one or two programmers may be familiar with in-house systems.
- Departments must often maintain their own security and backups, additional responsibilities not directly related to their "jobs."
- Departmental systems are more likely to cause problems in data sharing; interfaces to other systems are often difficult, expensive, and sometimes impossible. The resultant need for redundant data entry may significantly reduce potential productivity.

Whether a centralized or decentralized system is selected, an early "buy-in" of users, encouraged by participation in system selection decisions and in the subsequent development process can increase system payoffs. Users' perceptions about the importance of their own departments' needs is reinforced when their input is solicited during the design and implementation process. The IT manager's challenge is to encourage user participation while maintaining control over the scope and the timing of the development process.

Because the environment of public organizations is unstable, long development schedules required for centralized systems frequently results in a system that does not meet user needs by the time it is implemented. However, some type of closure on the design process is critical; otherwise, the result is a constantly moving target. When users are involved from the beginning, they are more likely to understand the need for design deadlines. It also helps them to understand the implications of critical design changes, and to better determine changes that can wait until system stabilization. They have a larger stake in the outcome; they have "invested" themselves in the system.

IT managers can gain the confidence of users by ensuring reasonable system response times, especially with centralized systems. A 2-second response time might be acceptable for general office applications, but staff members who use computers while interacting with the public or while on the telephone are quickly disillusioned if they must wait for a computer response.

Operational decisions also affect both morale and productivity gained from centralized computerization projects. If backups, updates, and other downtime procedures are done for the convenience of the information services department, without consultation and coordination with users, the system quickly loses credibility.

Security issues must be addressed in a manner that protects data integrity and client/customer privacy while minimizing the impact of such measures on user productivity. While centralized systems can (to some degree) enforce standardized security procedures, those who do manage to circumvent the controls may have access to a much larger data pool than those who break into localized systems.

In the past, a relatively small percentage of workers needed access to computer systems to do their jobs. Now, dependence of computers is so commonplace that very few can get through the workday without interacting with one, or perhaps, many. Advances in software have changed computer access from a complex, awkward process that required extensive training to user-friendly screens that can be understood with minimal instructions. Now, instead of 50 people to monitor, the IT manager may have over 1,000, each with a "secret password" that determines their access to the system.

Employees forget passwords, access data screens for peers who have forgotten passwords, and forget to sign off. If the system design is such that signing on is cumbersome, employees may also choose not to sign off. Managers must balance the competing needs for security and efficient user access, both when designing systems and when establishing security and access policies. Users who must wait for a response from the information services department to sign on the system when they forget their passwords reduce the benefits gained by the system.

Data management is another challenge faced by IT managers. System payoffs may be significantly affected by contaminated or inaccessible data. When users incorrectly enter information because of typographical error or selection of the wrong record, system payoffs are reduced; users must spend time going back to correct records later or searching for "lost" files. While these problems may happen with paper files, a computer system makes this type of error less obvious to the user, and thus, less likely to be discovered in a timely fashion, when all of the pertinent information may be available.

A system design that incorporates screen edits can reduce users' ability to enter incorrect information. However, the need for correct and complete information should be balanced against the possibility or probability that the user will not have all of the requested information available when entering the data. Failure to consider this reduces system productivity, as the user may then have to collect the information manually for later input or interrupt the input process to get the missing data before continuing.

IT managers must not only be attuned to concerns about the individual record such as those listed above, but also to implications of a larger scale: threats to the integrity of the entire system, to both programs and data. A policy of regular backups is critical to maintaining system integrity. The IT manager must devise policies to ensure that both centralized and decentralized systems are backed up consistently. Computerization payoffs are adversely affected when users spend time reentering large quantities of data lost to system "crashes" or other computer glitches.

Additionally, IT managers oversee policies for testing, implementation, and fixes and backouts of system changes. These policies must be established and enforced if maximum computerization payoffs are to be realized. Unintended consequences may result from the most thoroughly tested program changes, and very few organizations can stop operations while "bugs" in the system are corrected. The most effective downtime and recovery procedures are the result of collaborative efforts between information services and user departments. Not only must organizations continue to function when the computer is not working, but also, they need an orderly method of "catching up" once the system is again available.

Whether the system is custom or packaged, IT managers are concerned with address storage and retrieval issues. While departmental systems employing PCs allow unlimited storage on floppies, the IT manager must work with user departments to determine data to be retained on minicomputer or mainframe systems. Information stored on tapes is not easily accessible. Disk storage space is expensive, and systems frequently have technical storage limitations. Program or system changes may preclude data retrieval from tape or disk. Tapes also deteriorate after time. This is especially troublesome for public managers, given the importance of archival data for both reference and research. Although the data could be printed and then purged from computer storage, the ability to index, search, and retrieve specific information would be lost. Additionally, the expense of producing and storing large volumes of paper is a consideration.

The IT manager's role in establishing policies for systems integration is critical to making the system work efficiently. With the proliferation of PCs and local systems for many applications, redundant data entry tasks and the lack of information-sharing can seriously reduce both efficiency and effectiveness of expensive computer systems. Information should only be entered once, and it should appear wherever it is needed in the system. The IT manager must formulate policies that consider the needs of all departments as well as all levels of the organization. By establishing guidelines about the type of data which may be stored on floppies or minicomputers, by monitoring the development of interfaces, and by working with departments to develop suitable local applications, IT managers can help both users and the organization realize benefits from the implementation of extensive computer systems.

If system payoffs are to be maximized, training issues must have high priority. The IT manager's role is to place and to keep this issue on the organizational agenda and to emphasize its importance. Inadequate training significantly reduces system payoffs. Poorly trained users take longer to do the same tasks than better trained employees; they are also more likely to make mistakes. Deemphasizing training sends the message to employees that the computer system is "not that important."

Issues of technical complacency also challenge today's IT managers. They must maintain user confidence in the system while helping those same users realize that computers are not infallible, balancing user trust with just enough user skepticism to counter unrealistic expectations, thereby producing maximum computerization payoffs.

Technical determinism challenges IT managers in two ways: system limitations (hardware and/or software) often dictate the development process, and programmer or project team repertoires or knowledge bases also influence system selection and/or development. The resulting system decisions affect payoffs by influencing the "fit" of the system to the departments and tasks to be computerized.

However, communications between the project team or programmer and the future users during the development process may have a stronger effect on the outcome than system limitations, and thus, the benefits that can be realized from the system. Selection of the project team is a critical task for any organization undertaking a computerization project.

In the following portion of this paper, we reexamine some of the key organizational variables which should remain a major concern of management if significant performance outcomes are to be realized.

The Role of Organizational Factors in the Payoff Process

While numerous studies have investigated the impact of computer technology on different levels of organizations, only a few have attempted to assess the ability of computers to lead to productivity payoffs. For example, one study by Kiesler, Siegel, and McGuire (1984) used a laboratory experiment to examine the effect of computer communications on decision making. Subjects in three-person groups were assigned to reach consensus in one of three situations: face-to-face; computer communications in which participants were identified; and anonymous computer communications. They found that the computer-mediated groups took longer to reach consensus and communicated less. However, there was greater equality of participation in computer-mediated groups, and individuals were more willing to change their minds (Kiesler et al., 1984).

A second study by Franz and Robey (1986) used a cross-sectional research strategy to identify organizational and computer technology effects on perceived usefulness of technology. Using data from 118 managers in 34 organizations, they found that organizational variables (e.g., size, decentralization) were not related to level of managerial involvement in computer technology, but were related to perceived usefulness. The longer the MIS department had been

in existence, the less useful the technology was perceived. Overall, they found that organizational variables played a significant role in managers' perceptions of the usefulness of the technology.

In a third study, Rice and Contractor (1990) utilized a research strategy proposed by Golembiewski, Billingsley, and Yaeger (1976) to study the effects of organization development techniques. Rice and Contractor studied the impact of introducing desktop computers and a computer information management system in a federal office building. It was found that the new technology changed how workers conceptualized work. For example, workers initially viewed electronic mail as an information management activity; after the technology was introduced they viewed it as a communication activity.

In a seminal article, Leavitt (1965) explained the mutual relationship between technology, people, structure, and task. Because of the high level of interdependence among these variables, if one of the four were to change, the other three variables would also change, thereby altering the ultimate outcome to the organization. For example, the adoption of information technology tools such as computers can cause changes in the organizational structure (recentralization, centralization, decentralization, etc.) and in people (numbers, skills, or level of cooperation with proposed changes). The introduction of new technology may even cause changes in the definition of tasks (some become more feasible; others, unnecessary), and in outcome or performance (at individual, group, or organizational levels).

The Leavitt model has also been used by Scott-Morton (1986) as a framework for examining the organizational and social impacts of the new information technology. This study involved four variables that were similar to those of Leavitt, but Scott-Morton used "individuals and roles" instead of "people" and "organizational structure and corporate structure" instead of "structure." In addition to these four interdependent variables, other variables were used as intervening variables, including: management process, planning, budgeting, and reward.

In yet another study, Loudon and Loudon (1988) proposed a model of systems development and of the impact process. According to their model, organizations adopt information technology because of environmental factors (uncertainties and opportunities) or internal institutional factors (values, norms, and interests). Based on this model, information technology has an influence on organizational variables (organizational politics, organizational structure, organizational culture, and work) and management decision making through the implementation process of technology. The impact then feeds back to the environment and to the organization by creating forces and resistance.

One similarity noted in many of the studies involving information technology and organizational factors is that while variables influence one another, the direction of causation is unclear. In fact, they may be interactive, with systems development influencing organizational variables, and organizational variables influencing systems development only indirectly. According to Shimada (1991), "since changes in the organization are caused by many factors, it is not easy to determine which of the factors caused the changes. We cannot say that the implementation of information technology in organizations immediately effects changes in organizations" (Shimada, 1991). Computer technology is only one factor that facilitates the realization of productivity payoffs, and should only be seen as such. Only when the proper balance among

relevant organizational variables has been struck can the impact of technology begin. Our analysis therefore builds on the Leavitt model and extends on it.

The alignment of technology with the organizational agenda has a strong influence on the productivity that often is associated with information technology (computers) alone. More specifically, key organizational variables must be adequately restructured to fit the goals and expectations of the organization before technology can significantly contribute to the payoff process (or the organizational outcome).

One frequently suggested means of maximizing computerization payoffs is to enforce organizational adherence to rational methodologies that promote an orderly introduction of information technology (see for instance, Kesner, 1988; McConnell & Koch, 1990, Schnitt, 1993; Morton, 1991; Person, III, 1988; Adler, 1986; Walton & Susman, 1987; Linder, 1985).

In their book on corporate computerization, Vicki McConnell and Karl Koch (1990) suggest that in order to get the most out of technology, the intimate link between people and machines must be reassessed. They suggest that information technology be seen only as a tool that can be more efficiently used to support the changing nature of human work and processes. They say that a shift in perception is needed, from viewing technology implementation as a technological task toward viewing it as an organizational task (McConnell & Koch, 1990).

According to David Schnitt, rather than focusing on information technology itself, we must "reengineer" the organization by using that technology:

> Reengineering involves redesigning work to take advantage of two demographic and technological changes that have emerged since the advent of the Scientific Management. For example, there are now pools of well-educated people that are knowledgeable and experienced enough to complete the work they have always performed, and make the decisions formerly reserved for superiors and managers. And, technology now makes it possible for pieces of information and even entire documents to be in many places at once, allowing different work that uses the same information to proceed ahead simultaneously. (Schnitt, 1993)

Schnitt goes on to argue that the huge investments in technology have so far had very little impact on productivity because managers tend to focus too much on how technology is used instead of what it is used for. For example, he notes that organizations typically introduce IT resources, but continue to perform work in the same manner. In order to take full advantage of technology, work itself must be transformed or reengineered. Schnitt advises that organizations: (1) think before they automate; (2) redesign before they initiate; and (3) fix before they integrate. Most importantly, he suggests that in particular, three functional areas be addressed: organizational design (organizing people and work to achieve critical success factors - "CSFs"); human resource policies (performance measures for personal and organizational processes, staffing changes, competence levels required to achieve the stated goals); and finally, information technology itself (how IT will increase effectiveness and efficiency to achieve CSFs and support organizational design and human resource policies). All too often, he maintains, organizations implement only the organization design and the information technology components of this four-part process, and ignore the all-important human resource component (Schnitt, 1993).

Organizational factors that are of paramount importance in maximizing payoffs from computerization include a redefinition of the tasks, investment in human resources (including an emphasis on training), a reassessment of the role of formal organization, and a readjustment of the organizational strategy needed for accomplishing the tasks. Although these components are critical to the realization of performance payoffs, they do not always receive the attention they deserve.

First, a need to introduce information technology within a work environment must be matched with a sound strategy that is congruent with the mission of the organization. The need for strategy cannot be overemphasized. Because of the evolving nature of current information systems, an organization must assume a strategic stance in deciding upon a system that is suitable for its many purposes (see Enslin, 1984; Walton, 1988). A number of approaches exist for accomplishing this—feasibility studies, systems analysis, service analysis, etc. (see for instance, Boynton & Zmud, 1987).

Additionally, a high degree of congruence within and among human resources, task redefinition, and the role of the formal organization (management) must be established. For example, we must reexamine the relationships of human resources (people) and the tasks to be performed; human resource needs and expectations, and the stance of the formal organization; and finally, redefined tasks to be done and the role of management. The technology envisioned for this work environment should complement the work process rather than complicate it. According to Gareth Morgan (1988), technology is a double-edged sword: when properly deployed, it will enhance work accomplishment; however, it can also frustrate and stifle innovativeness when it is haphazardly conceived and implemented.

People (or human resources) constitute the most important part of any organization. Unfortunately, some organizations tend to lose sight of this fact by not paying the proper attention to employees' needs. In fact, after in-depth study of several factories that have introduced advanced manufacturing technology into their organizations, Richard Walton and Gerald Susman (1987) made some very important observations:

> . . . closer interdependence among activities; different skill requirements—usually higher average skill levels; more immediate—and more costly—consequences of any malfunction; output more sensitive to variations in human skills, knowledge, and attitudes, and to mental effort rather than physical effort; more dynamism, that is, continual change and development; higher capital investment per employee and fewer employees responsible for a particular product part or process (Walton & Susman, 1987).

We believe that concern for the human element in itself remains an essential factor in the payoff process involving computerization. Constructive behavior must be managed; people will be more productive if their needs are met, and they will be less likely to resist technical change. If the need for computerization is properly communicated to workers, they will be more inclined to work with management and embrace the skills necessary to remain productive.

Organizational culture strongly influences the outcome of any computerization plan. An open organization, one in which communications and interactions cross departmental lines,

can significantly increase the payoff realized from implementation of both major and small computer systems. In such an organization, an interactively structured project team can work more closely together, and the active participation of end users in the development process reinforces user acceptance. By participating in the development, users stay current on project status and learn the "language" (the technical terms, the acronyms, etc.) that make them feel they have a stake in the outcome.

A high level of user participation during development also has an additional benefit—it encourages departments to evaluate existing practices and procedures. Operational changes resulting from this analysis can improve intra- and interdepartmental workflows, as well as increasing system payoffs.

Open communications throughout the organization about new or replacement systems can increase benefits, even when departments are not directly affected. Departmental changes in operations and reporting mechanisms often affect other units in the organization, sometimes several steps down the line. By keeping organizational communication lines open, potential problems can be addressed early in the development process and costly mistakes can be avoided.

Increasing visibility of the project within the organization through frequent updates on project status and project team visits to user departments help build trust and make the transition a more positive experience for both the project participants and for the organization as a whole.

The level of administrative support for the system is a critical factor. If top-level management sees the system as a worthy goal and communicates that perception to those both inside and outside the organization, the project begins to take on a positive tone. Promoting the system by talking about it, however, is not enough. Managerial commitment must be reinforced through action in order to be believable.

The extent to which management supports training efforts has an important bearing on whether or not significant payoffs are realized. The amount of emphasis placed on user training often affects both short- and long-term payoffs. While the expertise and the attitude of the training staff has a definite impact on users' perceptions of the system, the level of managerial support may have a stronger influence on individual users. In this time of reduced budgets and increased workloads, managers often feel squeezed. Releasing employees from pressing job obligations to send them to training sessions may cause managers to minimize both the need for training and the importance of the computer system, which may affect user attitudes.

Additionally, while an organization may provide thorough training prior to implementation of a new system, ongoing training for new or transferred employees is frequently conducted by coworkers at varying levels of proficiency and varying perceptions of system importance.

A related factor, the availability and readability of user manuals, may also affect payoffs. Manuals that are available, current, easily understood, and convenient to use (i.e., give step-by-step instructions) improve payoffs by reducing both frustration levels and the amount of time needed to complete tasks.

Thorough formal and informal testing of the system prior to implementation is also critical to user acceptance and realization of system benefits. Implementing a poorly functioning system destroys user acceptance within a very short time.

Emphasis on individual accomplishment rather than team or organizational success can also have a detrimental effect by turning a computerization project into a competitive rather than a cooperative effort. While individual successes should not be overlooked, managers must strike a balance between individual and team or group accomplishments in order to maximize payoffs.

CONCLUSION

The importance of management's role cannot be emphasized enough in the information technology payoff process. Management can attain these goals through a number of ways, some of which are worth mentioning here.

Management can provide additional rewards, communicate the need for a change in strategy involving automation of the work process, and communicate the benefits of technology infusion at the organizational, group, and individual levels of the organization. They can communicate and rationalize the need to reform a work process that has been in place over time, one that no longer serves the organization well. They can provide "transition resources" that make adaptation to a new work mode less painful and provide the leadership needed to restore workers' confidence in organizational directions.

While all these strategies do not guarantee a complete buy-in from current and future computer system users, they certainly help reduce tension, keep momentum high, and help reaffirm worker commitment to remain productive and loyal members of the organization.

We would like to reemphasize the idea that people should not be seen as an item that can easily be expended in the hope that technology itself will allow the organization to "accomplish more with less." In the absence of people, technology is incapable of substantially influencing the performance process in the anticipated directions.

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