External Cooperative Relationships in Information Technology Management: Alternatives, Challenges and Management Response

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ABSTRACT

Managers of information resources today face tremendous pressures to serve organizational needs for information technology (IT) products and services more effectively. In response to these pressures, some or all of the responsibility for various IT activities are being given to parties outside the boundaries of the organization. This paper analyzes three specific types of external cooperative relationships that can be used to deliver IT products and services and recommends when and how they should be used. It also identifies the significant risks and challenges in managing external cooperative relationships.

Senior managers in many organizations now understand the role of information technology (IT) in achieving and sustaining competitive economic advantage. IT has become central to implementing fundamental strategic initiatives. Businesses have used IT as a mode of product and service differentiation and to support cost-saving in the creation and delivery of products and services, thus affording competitive advantage. Much of the literature during the past decade has focused on the competitive implications of IT [14, 16, 21, 24].

While the competitive payoffs from IT are real, many companies have experienced rapidly escalating costs of developing and delivering IT products and services. In an attempt to control these costs, many companies have pursued outsourcing of their basic IT activities such as data operations, software development, and end-user computing support to other organizations whose primary mission is to perform these activities [6, 7]. Even for those companies that do not choose a radical approach such as outsourcing, the tradition of providing all IT services and products through an internal IS professional staff is quickly becoming infeasible. For selective IS activities, companies are increasingly turning to external partners in order to control costs, to gain access to IS expertise that is not available in-house, and to take advantage of specialized software that has been developed elsewhere [4].

Currently, senior IS management is under pressure to consider alternative ways in which to work cooperatively with external parties [17]. Sorting through these alternatives can be confusing, especially when IS management has had little past experience with external providers of IT services. We hope to help alleviate this confusion by describing three distinct types of external cooperative relationships that can be used to deliver IT products and services effectively. We then present six key questions to guide the selection of an external cooperative relationship. The appropriate selection of an external cooperative relationship is illustrated with three case examples involving major corporations that have successfully externalized substantial parts of their total IT organization. Finally, we assess the risks and challenges associated with each type of relationship.

ALTERNATIVE WAYS OF DELIVERING IT PRODUCTS AND SERVICES

Recent work in organizational design has identified alternative ways of accomplishing work that spread the control of among between separate corporate entities [2, 9, 22]. The traditional structure of an IS organization is an integrated hierarchy where IS has direct authority and control over all of its activities. We define three alternatives to the traditional approach: coordinated contracting, joint ventures, and specific contracts. Each depends in a different way upon external parties to accomplish the work of the Is organization.

Coordinated Contracting

Coordinated contracting consists of a principal contractor and an agent who honor a long-standing relationship of trust with specific performance guidelines and delivery schedules. Coordinated contracts depend on more than just the letter of the law; the contractor and agent become mutually dependent partners who agree to work together even where specific contractual obligations might allow them to do otherwise.

Agreements to outsource various IS activities are the primary examples of coordinated contracts. The rapid increase in the number of outsourcing arrangements has been well documented. This growth has been credited in part to the organizational imperative to downsize and in part to the wide publicity which outsourcing contracts have generated [6]. Outsourcing in information systems consists of subcontracting all or parts of the IS function to an external vendor. While outsourcing originally took the form of facilities management, it has since been extended to encompass other types of data processing and software development services, including telecommunications, hardware and software maintenance, and even planning and development of information systems [17]. The outsourcing relationship is governed by contracts. The parties do not share strategic goals, but agree to specific performance objectives as outlined in the contract. Typically the customer and vendor agree to a "baseline" of services for a fixed fee over the life of the contract, usually five to ten years. Additional services may be purchased from the vendor during the life of the contract for additional fees [17].

Joint Ventures

In joint ventures, separate firms pool resources to share in the operation of an organizational entity. While the term "joint venture" has been rather loosely applied to a range of equity and non-equity partnerships, in this research it is used exclusively to refer to those partnerships in which two or more firms create a separate entity [9]. A joint venture is a new, separate entity with its own management team and with two or more firms as ownership partners, or parents. Through a joint venture, it is hoped that the synergies produced by pooling the strengths of each partner will create a superior competitor.

Specific Contracts

Specific contracts occur when independent parties create nonrecurring agreements with specified terms. This arrangement is common for selected IS software projects. Most often, this type of relationship appears in the form of a joint applications development effort between two separate organizations.

CHOOSING AN ALTERNATIVE: SIX KEY QUESTIONS

The decision to enter into a cooperative relationship with an external party requires the consideration of several economic, competitive, and organizational issues. Based on both the general management literature on cooperative relationships [9, 15, 22, 23] and the literature related to external cooperative relationships within IS [2, 4, 27], these issues are presented as six key questions. These are shown in Table 1. The answers to the six questions can help the organization to choose among the three alternative cooperative relationships. For the sake of simplicity, we have shown the possible answers to each question as either "yes" or "no." In reality, the answers may require more refined judgments involving shades of responses between these two extremes. Also, while each of these six questions is related to the key characteristic that gives it its name, no single question can guide the choice among alternatives. The overall pattern of answers to the six questions is a more useful guide for selection the appropriate alternative.

1. Innovation Requirement

If an organization views its collection of IT products and services as a source of strategic and competitive advantage, it must make a commitment to keep abreast of the latest emerging information technologies so that it can incorporate these emerging technologies into its IT products and services before its competitors can. Being innovative requires a significant investment in IT research and development activities. For some firms, these expenses may be prohibitive, thereby making this area a candidate for externalization. Joint ventures provide a way whereby these R&D expenses can be shared while specific contractual relationships provide a way for the organization to obtain access to new technologies, skills, and specialized knowledge. Both of these relationships make it possible for the organization itself to deliver innovative IT products and services.

If an organization does not view its collection of IT products and services as strategic or competitive, there is little need for the organization to be innovative. In fact, there may be little need for the organization to utilize anything other than standard, existing technologies. In this case, external vendors could most likely support these technologies more efficiently than could in-house staffs [6]. Thus, for an IS organization with low innovation requirements, outsourcing through a coordinated contract may be more attractive than joint ventures or specific contracts.

2. Strategic Impact

In developing overall business strategies, companies are advised to retain in-house those activities that contribute to

Table 1

Ideal Profiles for Cooperative Relationships

Key Questions	Cooperative Relationships		
	Coordinated Contracting	Joint Ventures	Specific Contracts
Innovation			
Does the performance of the activity require that new approaches, processes, and ideas be continually incorporated into the activity?	NO	YES	YES
Strategic Impact			
Does the activity affect the achievement of the organization's strategic goals?	NO	YES	NO
Uncertainty			
Is the organizational, technological and/or competitive environment in which the activity operates uncertain?	YES	YES	NO
Economies of Scale			
Can economies of scale be realized for the activity?	YES	YES	NO
Standardization			
Can the activity take advantage of standard technologies, processes or applications?	YES	NO	NO
Repetitiveness			
Is the activity routine in nature?	YES	YES	NO

their competitive position and to obtain most other activities from the best suppliers available. Outsourcing IT activities that provide the firm no strategic advantage — and perhaps gaining superior delivery from outside sources — is clearly a wise move. If an IS activity has high strategic impact, the firm will be reluctant to enter into any cooperative relationship that results in a loss of control. However, other factors such as the need to gain access to specialized knowledge or to overcome resource constraints may force a firm to consider a cooperative relationship for strategically important activities. Where this is the case, a joint venture will be attractive to the firm because it retains a degree of control. Specific contracts will, in most cases, not be appropriate for strategically important activities. Besides relegating control of a strategically important activity to an outsider, specific contracts may require the firm to disclose company-sensitive information that could too easily be used to support similar activities for competitors.

3. Uncertainty

Uncertainty in IS activities can be the result of fluctua-tions in demand for IS services or a rapidly changing techno-logical base. The IS manager's primary incentive is to reduce risk, and two of the cooperative relationships allow risk to be minimized. Coordinated contracting arrangements provide both long-term stability and flexibility that reduce this risk, and joint ventures deal with uncertainty by pooling risk with contributing partners. Because specific contracts are struc-tured, short-term, and nonrecurring in nature, high levels of uncertainty can make specific contracts problematic.

4. Economies of Scale

Whenever a company produces a service internally that others can buy more cheaply on the outside, it is throwing away profits. For many services, access to substantial economies of scale and lowered overhead costs can be pro-vided through coordinated contracting arrangements. Specific contracts provide no such economies of scale because the services provided through such arrangements involve newly developed and customized products and services that cannot be purchased on the open market. Although joint ventures are also generally formed to develop new products or services,

economies of scale are high because the costs and risks of development are shared among the partners.

5. Standardization

When an organization has multiple data centers, multiple systems and wants a standardized centralized environment, outsourcing data processing operations and telecommunications management is very cost effective. Where applications are not standardized, a more effective route would be a joint venture, wherein partners can focus on specific changing needs, or a specific contract to develop a unique product.

6. Repetitiveness

The more frequently that IS activities recur, the more important it is to establish longer term arrangements with external parties. Data center operations and telecommunications management are recurring activities and therefore potential candidates for either coordinated contracting or partial ownership designs. For example, a facility management agreement, one form of coordinated contracting agreement, typically covers a five-to-ten-year period. The outsourcing vendor usually takes over the existing data center including staff. Alternatively, operations may migrate to the vendor's own data center. Such a relationship transfers the responsibility for the routine and repetitive computer operations to the vendor.

IDEAL PROFILES

In this section, we describe three companies whose competitive and economic circumstances match those described in Table 1. Each can be used as an illustrative example for one of the three cooperative relationships. For coordinated contracting, Kodak serves as the ideal example. For joint venture, electronic Joint Venture Partners (EJV) provides the ideal. Finally, USAA serves as the ideal example of specific contracts. For each, the six key questions are answered in a way that favors the cooperative relationship. These examples illustrate the potential usefulness of the framework for predicting the use of a specific relationship.

Kodak's Use of Coordinated Contracting

Eastman Kodak is an $18 billion company doing business in 150 different countries. Prior to 1986, Kodak's Corporate Information Systems (CIS) group was not different from most other corporate IS groups. A centralized group of approximately 2000 people supported Rochester-based businesses, with responsibility for four data centers and all other traditional IT activities. By 1986, however, the office of the Chairman had expressed concern about the organization's technological preparation to compete in a fast-changing world.

As a result, the role of CIS was redefined in 1986 and Kathryn Hudson, a former general manager of Kodak's instant photography division, was chosen to lead the group in fulfilling its new role. The new CIS mission was to create an IYT infrastructure that would enable managers to use information as an integral part of business strategy [11, 12].

To help accomplish its new mission, CIS entered into three coordinated contracts for IS activities in 1989 and early 1990. Those contracts assigned Kodak's data center operations to IBM for ten years, telecommunications operations and management to Digital Equipment Corporation and IBM for five years, and PC systems and services to Businessland, Inc. for five years.

Kodak fits our ideal profile for coordinated contracting relationships very well. A critical consideration in deciding to outsource an activity was whether the activity required *innovation*. While an innovative infrastructure was needed to generate competitive consumer and commercial products, Kodak saw no need to be innovative in its IT products and services.

The *strategic impact* of activities was also considered. As part of a study commissioned in 1987, Kodak distinguished between core strategic activities and noncore services. Noncore services were identified as mainframe computing, computer site management, video services, operator services, job scheduling, PC computer support, and installation and maintenance. Kodak elected to deliver these services through one or more of its external partnerships. The remaining core activities that were retained included database services, strategic planning, information technology management, relationship management, project management, and system integration.

The *uncertainty* in Kodak's organizational, technological, and competitive environment had already led it away from its old functional organization and toward a new business unit orientation. The old computing environment, designed primarily to support mainframe processing, was inappropriate for applications run on workstations and office functions executed on a LAN. Mainframes were still useful for databases, network management, and computer-intensive applications, but Kodak needed a different technology base and facilities to react to environmental uncertainties. A partnership with the world's largest computer company allowed Kodak to quickly realize the benefits of this technology transfer [11, 12].

For Kodak, the cost savings from coordinated contracting were significant. The agreement with IBM called for IBM to manage four of Kodak's data centers that housed at least a half dozen IBM 3090 mainframes and one 3080X system. The deal also called for IBM to build and operate a new data center at a site near Kodak's corporate headquarters in Rochester. By capitalizing on the *economies of scale*

provided by IBM, Kodak expected to reduce the cost of data center operation by 40 percent.

By the year 2000, Kodak's CIS group envisioned a new applications environment with flexible, local systems operating within well-defined corporate standards. Common applications would be available to all business units, with off-the-shelf software being used as much as possible. Custom code would be created only for those applications that could provide competitive advantage. A standard infrastructure provided by Kodak's outsourcing partners would service the *repetitive* needs of Kodak's global business by routine performance using well-defined procedures.

EJV Partners — a Joint Venture

Electronic Joint Venture (EJV) Partners was formed in 1990 as a consortium of investment and commercial banks to develop an electronic investment information service. EJV's six members (Salomon Brothers, First Boston Corporation, Citicorp, Shearson Lehman, Goldman Sachs, and Morgan Stanley) united to distribute information on fixed-income markets. Their system was a creative alternative to marketing bonds because the bond market has historically been shrouded in secrecy. While specific dealers and brokers have shared limited information, no industry-wide system has provided up-to-date intelligence about bids and deals.

The EJV consortium appears to fit the ideal profile for joint ventures, as detailed in Table 1. EJV required a very *innovative* on-line government bond network, linking 100 traders at almost 40 brokerage firms. A high-speed network used 80386-based microcomputers supplied by EJV, allowing buyers and sellers of government bonds to be matched. Traders used voice recognition technology to input bids and deals into the network [3, 18]. The electronic investment information service, UniVu, offered by EJV Partners ran at workstations and incorporated analysis tools and communication technology so that traders could share their analyses and reports with customers. Individual customers were expected to customize the system based on their preferences for certain analysis tools and information received from other sources.

The *strategic impact* of EJV was potentially very high. While other systems for disseminating bond information existed (for example, Reuters, Telerate, and Bloomberg Financial Markets), EJV differentiated itself by offering "… the ability to take information from brokers, package it, and deliver it electronically to the other side of the street," according to EJV's CEO, D. Bruce Peterson [13]. The cooperation among EJV's partners not only provided access to the most current and reliable information available but also increased leverage in marketing the system to nonmember financial institutions. Since the move toward some type of electronic system seemed inevitable, a widely dispersed system would gain a significant competitive advantage for its subscribers.

The competitive, organizational, and technological environments faced by EJV Partners was *uncertain*. Increased government attention created the expectation that Congress might mandate more complete disclosure of information to bond investors. Anticipating such Congressional action, many participants in the bond market have investigated ways to provide more complete and accurate information to institutional investors, brokers, and dealers [8]. Because information in the bond market is constantly changing, on-line information systems seemed particularly well-suited to traders' needs. EJV's Peterson saw the information services market doubling from $500 million to $1 billion a year by 1995. Some partners in EJV felt that on-line systems would eventually replace salespeople in the bond market.

By sharing the costs and risks of system development and implementation, the six partners in EJV expected to reap substantial *economies of scale*. It was almost inconceivable that such a system could be purchased elsewhere or developed in-house. The partners felt they could build a more useful system by combining their expertise and information than any one of them could working separately.

Standardization in bond trading was low because of the variety of methods and procedures used by different firms. The analysis tools contained in UniVu represented a combination of formulas and data used by the individual partners. Because of the competition inherent in the bond market, the partners did not reveal all of their methods and procedures.

Finally, *repetitiveness* was high because bond trading is a recurring process. The type of information required and the methods of analysis used in the evaluation of offerings do not change drastically in the short-run, making a long-term joint venture appropriate. In addition, adoption of the system by non-member financial institutions ensured longer-term relationships with the joint venture's customers. As Richard S. Davis, managing director of J.P. Morgan Securities and EJV's first customer, stated, "We have made a major commitment to the fixed-income securities business." [19]

Specific Contracts Used by USAA and IBM

The joint development by USAA and IBM of an image processing system provides an example of a specific contract [5]. Image processing had been targeted by USAA as a promising technology for implementing "the paperless office" as early as 1982, but the necessary technologies to support a large-scale system were not commercially available. To speed along the necessary development, USAA convinced IBM in 1986 that an investment in Write Once Read Many (AORM) optical storage technology would be worthwhile for insurers like USAA who needed to archive large amounts of information. Subsequently, USAA and IBM embarked on a joint

development project to develop for USAA what would ultimately become the standard IBM image processing product — ImagePlus.

The relationship between IBM and USAA fits our ideal profile for specific contracts. The development of an image processing system exhibited high *innovation* requirements. At the time of the contract, the venture was considered highly exploratory because no large scale implementations of WORM technology existed. There were no standards to adhere to, and one objective of the joint project became setting standards for future image processing systems.

In order to facilitate the availability of imaging processing systems for all of its product lines, USAA opted to influence the development of a standard, off-the-shelf product rather than to develop its own proprietary system. Thus, the image processing system itself offered no sustainable *strategic advantages* because the system did not give USAA any capabilities that other companies could not acquire. The advantages of the joint project came not from the image processing system itself but from allowing USAA to significantly influence the design of a standard product and to be the first in implementing such a system.

Overall, *uncertainty* for the image processing project was low. The development and testing of two prototypes convinced USAA of the feasibility of the approach and provided the knowledge necessary to define the requirements for a production system. Selecting IBM as a development partner also reduced the uncertainty concerning the successful completion of the project.

For this one-time cooperative effort, *economies of scale* were not an issue. The application was designed to offer a *standardized* product that would be available not only to USAA but also to its competitors and others. Finally, *repetitiveness* was low; USAA planned to participate in the development of an image processing system only once. They would purchase, rather than develop, any additional image processing applications. Each of these extended examples illustrates the importance of assessing different economic, competitive, and organizational issues before deciding on a specific cooperative relationship. Our six key questions yield different recommended answers in each case, leading to different forms of external cooperative relationships for the delivery of IT products and services.

MANAGEMENT CHALLENGES: RISKS AND RESPONSES

Effectively managing the external cooperative relationships presented in this article is a significant challenge faced by senior Is executives. Below, for each of the cooperative relationships, we identify the most compelling risks and the corresponding response required of management.

Coordinated Contracting

The risk of putting your eggs in the wrong basket. The single greatest risk from entering into a coordinated contracting arrangement is the increased dependence on an outside supplier. Once a contract has been signed, there is no easy return to independent IS development and operations. The firm has given up its programmers, technicians, software licenses, and its data center and lost control over its information technology architecture and the timing of upgrades. Consequently, the firm will be able to take advantage of innovations in the IS marketplace only if its outsourcing vendor chooses to pursue these innovations.

The organization thus places its technological future in the hands of another organization that may be expected to act opportunistically in its own interest rather than in the interest of the contracting firm. For example, a vendor of mainframe-based data center operations may actually conceal from its clients information about PC-based computer-aided software engineering tools that take cycles off the mainframe. One must assume that the vendor's goal is to maximize its own profits, not to reduce its client's costs or improve its quality.

Management response. The risk of increased dependence can be minimized through careful selection and periodic evaluation of vendors, and by drawing upon one's own sources of influence over the vendor. It is important that both parties make it known that coordinated contracts are two-way streets, in which both parties stand to lose if the contract is discontinued. One's partner should thus be required to dedicate resources to the relationship and develop specific skills and tangible programs for the client that are not easily transferred to another situation. This demonstrates a commitment by each partner to maintain the relationship.

IS management's key assumption in responding to the risk of dependence is that it cannot afford to lose awareness of technology trends. IS must not lose contact with competing outsourcing vendors, who may be unwilling to call on a firm with a long-term contract with a single vendor. IS managers must continue to court them as part of their technological intelligence gathering. Rather than making the firm seem like an unfaithful partner, such activities can actually strengthen the relationship between partners by keeping the vendor motivated to satisfy a vigilant customer.

Joint Ventures

The risk of creating a monster. Joint ventures are preferable to coordinated contracting arrangements where a much higher degree of control is required. Paradoxically, the greatest risk in strategic alliances is losing that control by creating a monster with a mind of its own. As a legal partner in a new organization, a firm is formally involved in strategic and operational decisions and it formally owns the knowledge

assets that would otherwise be impossible or difficult to obtain. Further, investment risks are minimized through the pooling of resources and skills. However, these measures do not guarantee a successful partnership because the newly created venture may acquire its own sense of autonomy and resist attempts to control it.

The problem stems from the very conditions that give rise to the joint venture. The parent firms may represent very different cultures with different management styles, objectives, and motivations for cooperation. This diversity can lead to conflict in the operation of the alliance as firms adjust to the demands of working together. While resolving these conflicts can actually strengthen the partnership, the joint venture may establish its own identity so strongly that it resists attempts to the owning parent firms to interfere with its operations. If control over the joint venture is lost, strategic effectiveness can actually deteriorate, thus voiding one of the primary reasons for adopting the strategic alliance form [23].

If a clash of cultures is not resolved, the joint venture may resemble a two-headed monster and not be effective. Speculations of a culture clash surrounded the recent formation of joint ventures by IBM and Apple Computer. Differences in management style, control systems, and even codes of conduct may be difficult to blend into a coherent management team for the venture.

Management response. Losing control over joint ventures can be avoided in two ways. First, management must remember the reasons why such an approach is considered in the first place. Management's goal is not to create a new firm, but to achieve synergies that are not otherwise obtainable. IS managers should always participate in the selection of partners and the negotiation of terms to insure that technical symmetries are obtainable and that agreements and terms are feasible [1]. General Motors' fateful acquisitions of EDS to design robots for its production plants was apparently not the product of careful assessment of GM's needs and EDS's capabilities. Clearly, synergies cannot be forced after the fact; they must be identified up front with detailed analyses that demonstrate a high level of technological sophistication.

IS managers can also respond to the risk of creating a monster by engaging only in symmetrical ownership arrangements. Partners in a joint venture want to control the venture and are reluctant to give up control [9, 22]. A lack of symmetry results in uneven bargaining positions. Symmetric partners are better able to mesh resources, objectives and abilities. Recognizing asymmetries beforehand may mean avoidance of a partnership, but it can also be handled through early negotiations in which the contributions of each party in the venture are carefully spelled out.

Specific Contracts

The risk of the one-night stand. While a joint venture

brings together organizations that share an interest in synergistic outcomes, parties to a specific contract choose each other for more expedient reasons. They provide something specific that cannot be efficiently acquired internally. Unlike coordinated contracts and joint ventures, where a long-term commitment increases trust between parties, specific contracts offer the opportunity and the incentive to cheat. The biggest risk is inadequate protection against a host of problems, ranging from simple performance errors to the inadvertent infection by computer viruses. Because "live" conditions for software testing are almost impossible to specify in advance, specific contracts can bog down in endless disputes between both parties over performance. Although few disputes may actually find their way into the courts, the additional costs and time delays needed to fulfill many contracts make this risk an extremely important one.

Management response. The most obvious response to inadequate protection in specific contracts is clear specification of the terms agreed to by the parties. The contract should, at a minimum, specify all requirements to be fulfilled, set service levels, and outline all policies and procedures regarding performance. Agreements on how to measure performance should also be included. Good contracts will also provide mechanisms for terminating the agreement if the vendor does not live up to its terms.

Even the best contract is useless if not executed properly. It is critical for managers who will be responsible for the terms of the contract to be involved in contract negotiations to ensure that terms agreed to are realistic and in the best interests of the firm. In addition, since the role of IS personnel may move from operational and technical duties to coordination and control, such responsibilities should be carefully delineated and specifically assigned to ensure that contractual commitments are carried out.

CONCLUSIONS

IS managers will become increasingly involved in the management of external cooperative relationships. The need for IS managers to build effective working relationships with line managers has been well documented [10]. We see an equally important need to build effective working relationships across organizational boundaries with the other partners in delivering IT services and products. IS managers have traditionally been in contact with vendors, but their focus has been more narrow and technical. External relationships have become more complex and will require greater attention to contract management, quality assurance, standards, telecommunications, and numerous other challenges. Coordinating such an external network requires a clear understanding of both organizational and technical requirements, so the challenge falls squarely on the shoulders of IS management.

The management of external relationships has signifi-

cant implications for the internal distribution of power in the organization. Power within the organization accrues to those who control critical external dependencies [15]. The development of external cooperative relationships represents an occasion for IS managers to restore power that might have eroded with the externalization of IT activities and functions. By effectively dealing with external parties, IS managers will regain respect in the boardroom. For example, Kodak's Kathryn Hudson was promoted to Director of Information Services within Kodak's imaging unit, reporting directly to the unit's president [26]. If relationships with external parties result in better systems and services for the organization, the IS department can rightfully claim responsibility for making it happen.

The challenges discussed here promise to extend the requirements for effective IS management well beyond the traditional skills of acquiring, housing, and deploying technical resources. Enhanced political skills and new attitudes are integral to managing these new cooperative relationships. Selecting vendors, negotiating contracts, and monitoring contract performance should be seen as strategic responsibilities, an opportunity for IS management to contribute to the welfare of the entire corporation. Rather than being seen only as managing a cost center, IS managers can add value to their organizations by responding to these challenges.

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