Abstracts

Trends in Information Systems Outsourcing

Tendances des systèmes extérieurs d'information.
Etre informé est d'une importance critique pour la performance d'une entreprise dans nos économies contemporaines, et les systèmes d'information sont devenus des ressources essentielles à cet égard. La gestion des systèmes d'information au sein de l'entreprise est en pleine transformation. L'utilisation de sources extérieures -- élément vital de toute stratégie directrice --, devient l'approche de choix dans la gestion des systèmes d'information, avec, en conséquence, l'apparition et l'essor des services d'information. Cet article analyse cette nouvelle tendance dans la gestion des systèmes d'information et en évalue les implications pour les décisionnaires.

Trends in der Verlegung von Bezugsquellen nach außen bei Datenverarbeitungssystemen
Die Datenverarbeitung ist in der heutigen auf Wissen basierenden Wirtschaft für die Leistung eines Unternehmens kritisch; daher sind Datenverarbeitungssysteme heute eines der wichtigsten Hilfsmittel überhaupt. Das Management von Datenverarbeitungssystemen durchläuft derzeit bei vielen Firmen eine Transformation. Der Bezug von außen, ein wichtiger Bestandteil der Unternehmensstrategie, wird zunehmend auf Datenverarbeitungssysteme angewendet. Dies hat wiederum die Geburt und das schnelle Anwachsen der Informatik-Dienstleistungsindustrie zur Folge gehabt. In diesem Beitrag wird dieser neue Trend beim Management von Datenverarbeitungssystemen beschrieben und Schlußfolgerungen für das Management werden ausgewertet.

Tendencias en la provisión externa de sistemas de información
La información es crucial para el desempeño de una organización en la economía de hoy basada en el conocimiento; y los sistemas de información se han convertido en un recurso de primera importancia. La administración de sistemas de información en las organizaciones está pasando actualmente por una transformación. El recurso a proveedores externos, una parte integral de la estrategia de la empresa, está siendo adoptado como un enfoque para administrar los sistemas de información. Esto ha dado como resultado la proliferación y el crecimiento rápido de la industria de servicios de información. Este artículo revisa esta nueva tendencia en la administración de los sistemas de información y evalúa sus implicaciones para la dirección de la empresa.

Trends in Information Systems Outsourcing

By Ravi S. Behara, David E. Gundersen, and Ernest A. Capozzoli

Ravi S. Behara is an Assistant Professor of Management at Stephen F. Austin State University. He earned his Ph.D. degree from Manchester Metropolitan University, United Kingdom. His current research interests include systems and decision making in service organizations.

David E. Gundersen is an Assistant Professor of Management at Stephen F. Austin State University. He received his Ph.D. degree from the University of Mississippi. His current research interests include the management and use of information systems in organizational settings.

Ernest A. Capozzoli is a Staff Systems Analyst with Saudi ARAMCO in Dhahran, Saudi Arabia. He earned his Ph.D. degree from the University of Mississippi. His current research interests include assessing the impact of organizational development on information systems.

Information is critical to an organization's performance in today's knowledge based economy—and information systems have become a primary resource. The management of information systems in organizations is currently undergoing a transformation. Outsourcing, an integral part of corporate strategy, is now being adopted as an approach to manage information systems. This has resulted in the spawning and rapid growth of the information services industry. This article reviews this new trend in the management of information systems and evaluates its implications for management.

INTRODUCTION

Today, the outsourcing of selected organizational activities is an integral part of corporate strategy. Historically, third party participation in a company's business has generally focused on the manufacture of parts and components and the provision of auxiliary services such as legal and travel services. A more recent phenomenon, however, involves third party participation in the management of the information systems (I/S) function. An increasingly competitive and cost conscious environment has caused organizations to reevaluate their approach to the management of many staff functions, including information systems. The outsourcing of information systems is a growing trend that has piqued the interest of companies such as IBM, EDS, and Anderson Consulting, among others.[1] Estimated revenues for the outsourcing industry vary from $7 to $12 billion for 1992, growing to as much as $38 to $50 billion in 1995.[2] In the United States alone, the industry is predicted to grow at an annual rate of 20 percent.[3]

The outsourcing of information systems is also gaining momentum globally. In a 1992 survey of European information system executives, 71 percent indicated that they were

planning to outsource some operations. This represented a doubling of interest from the previous year.[4] The evolving global economy clearly has helped stimualte this trend. Organizations typically have unique I/S needs when clients are located in a variety of forgeign countries. At the same time, the systems that tie these organizations together often face an array of political, cultural, language, and logistics challenges unique to different host countries.[5] Consequently, the use of outsourcing may offer an effective strategic alternative to system development in situations that tend to inhibit satisfactory development and operation of such systems.

Nevertheless, the effects on organizations implementing an outsourcing strategy are important, if not critical, and are still being evaluated. Since information is a principal resource in most businesses today, the consequences of external control of a firm's information system must be considered carefully. The formulation and management of the service contracts with information services suppliers are critical issues.

This article reviews the trends in information systems outsourcing. A framework for evaluating the outsourcing decision is analyzed, and the implications for organizations making such decisions are discussed.

I/S OUTSOURCING

Outsourcing is defined as the procurement of products or services from sources that are external to the organization. For services, this usually involves the transfer of operational control to the suppliers. In the current environment of right-sizing, with a renewed focus on core business activities, companies can no longer assume that all organizational services must be provided and managed internally. Competitive advantage may be gained when I/S products or services are produced more effectively and efficiently by outside suppliers. The advantages in outsourcing information services can be operational or strategic, or both. Operational advantages usually provide for short-term trouble avoidance, while strategic advantages offer long-term contributions in maximizing opportunities.[6]

The decision to outsource a part or all of an organization's I/S function is a complex issue facing managers in the 1990s. Outsourcing certain aspects of the more general information technology (IT) services has been a reality for the past four decades. These traditionally included on-site facilities management, remote data processing, maintenance functions, time sharing, and contract programming.[7] Such activities either supplemented or replaced in-house services and were under the control of I/S managers. The criteria for outsourcing decisions were also simple. Smaller organizations outsourced when they could not afford the required systems. For instance, these companies used time sharing to obtain processing time and utilized contract programmers for system development. Larger organizations outsourced specific labor intensive back office support applications or outsourced to manage high demand operations.

Organizational decisions to outsource strategic I/S applications rarely occurred until Kodak's outsourcing decision in 1989.[8] Its data center operations were outsourced to IBM, telecommunication services to the Digital Equipment Corporation, and PC support to BusinessLand. This began a dramatic restructuring of organizational information systems, and the initiation the information system outsourcing industry. It is estimated that every Fortune 500 company will consider outsourcing during this decade and that 20 percent of them will enter into a contract by the end of the decade.[9] A variety of firms already exhibit this trend. General Electric Corporation has entered into a five-year, $500 million contract with Electronic Data Systems (EDS) to handle the corporation's desktop computer procurement, service, and maintenance activities.[10] EDS also won a ten-year contract for an undisclosed amount from Del Monte Foods for the purpose of supplying a complete array of data processing services.[11] A cash strapped Continental Airlines recently agreed to a ten-year, $2.1 billion outsourcing deal that includes an agreement covering systems management for all information technology services.[12]

The structure of the outsourcing industry is rapidly changing, but can best be described as fragmented. The industry leader is Electronics Data Services, with a 13 percent market share last year.[13] More than half the global outsourcing market, however, is controlled by EDS, IBM, Anderson Consulting, DEC, Computer Sciences Corporation, KPMG Peat Marwick and AT & T.[14] As these companies continue to win major outsourcing contracts throughout the 1990s, the trend toward developing a less fragmented and more mature I/S outsourcing industry will continue.

OUTSOURCING MODEL

Although current trends indicate continued growth in outsourcing, the reasons and justifications underlying this phenomenon require further analysis. The *Four-S Outsourcing Model*, shown in Figure 1 (see p. 48), provides one framework from which to evaluate a company's outsourcing decision.[15] The model is made up of four quadrants that vary along two dimensions—one describing the organization's objectives in making the decision (Economics/Expertise), and the other indicating the organizational utility of the decision (Functional/Dysfunctional). The model dimensions are not absolute and must be considered in the context of each organizational situation. For instance, not all outsourcing decisions motivated by the sale of assets are necessarily detrimental; this is particulary true when the revenues are reinvested in the core business. Nevertheless, despite the lack of mutually exclusive categories, the model does provide a structure for helping to understand what motivates an outsourcing decision, and what the potential implications of that decision are.

Scale

The factor of scale comes into play when I/S functions are outsourced to a high-volume operator. Under these circumstances, the outsourcer is able to provide the same service at

Figure 1

FOUR-S OUTSOURCING MODEL

	Economics	Expertise
Functional	Scale	Specialty
Dysfunctional	Sale	Surrender

Source: Zucchini, 1992

a cost that is lower than that the company could achieve through in-house operations. The traditional outsourcing of payroll and other back office operations are typical illustrations. Scale factors are also relevant when an organization utilizes its in-house resources inefficiently because the volume associated with the specific operation is too small to produce the desired efficiency. For example, W. Atlee Burpee & Co. entered into an outsourcing agreement with Computer Sciences Corporation because the firm underutilized its mainframe and its operations staff for a large part of the year simply because of the nature of its business. As a result, a 50 percent saving of the firm's fixed costs associated with the replaced in-house system is expected. As a general rule, outsourcing I/S functions based on factors of scale is viewed as an effective rationale for the decision.

A key issue in the decision to outsource for reasons of scale is the determination of whether internal I/S departments can be cost competitive in the specific I/S application in question. Unfortunately, effective measurements of efficiencies based on scale are difficult to make, at best.[16] Consequently, care must be taken to ensure that accurate analysis and comparison of internally generated versus externally provided I/S costs is in fact achieved.

Specialty

Sound outsourcing decisions can also occur when the rationale for making the decision focuses on the acquisition of specialized expertise. These decisions are designed to take advantage of the outsourcer's specialized technological or operational expertise. The organizational impetus for outsourcing based on such considerations is often associated with reduced budgets and rapidly advancing technology. This type of outsourcing provides the firm with the ability to build and develop an I/S infrastructure quickly in areas of specialization.[17]

Alternatively, some firms outsource some of their routine activities so they can concentrate on higher value-added areas of specialization. Wordperfect Corporation and Corel Corporation, for example, have announced plans to outsource parts of their technical support activities so that they can free up additional resources to focus on new product development.

Sale

The sale of I/S resources to achieve short-term earnings or balance sheet improvement should *not* be a primary reason for outsourcing. A recognition and understanding of the strategic role I/S capability can play in an organization is of major importance when potential decisions regarding outsourcing are analyzed. Nevertheless, cost pressures in todays extremely competitive economy make this option an attractive short-term alternative for many firms. Only when the revenues generated from such sales are reinvested in the core business, though, is this decision generally in the best long-run interest of the firm.[18]

A positive illustration of this situation is seen in the Sun Company case. Sun recently decided to get back to its core when it sold its Dallas computer center to Anderson Consulting for $15 million; this was part of a larger agreement in which the Sun Company outsourced all of its mainframe systems work.[19] This type of action clearly is different from the purely short-term "sale" focus discussed earlier.

General Dynamics' decision to outsource with Computer Sciences Corporation (CSC) in an environment of deep defense-spending cuts provides another good example. CSC acquired General Dynamics' information systems division as part of the process. This resulted in General Dynamics' elimination of a capital budget for computing which provided more investment capital for core businesses. The separation of information systems from core businesses is a growing trend in many leading-edge organizations. And it is likely to continue as information continues to become more of a commodity.

A negative aspect of the sale of I/S resources, however, involves the loss of valuable human resources. Outsourcers generally hire the outsourcing organization's technical personnel. Unfortunately, these people subsequently may be lost to the organization should they be reassigned to other projects of the outsourcer, or should the outsourcing contract be terminated. This would create an additional barrier to the redeployment of I/S resources if the need arises.

Surrender

The difficulties of managing an I/S function in a rapidly advancing technological environment may also force some organizations to consider outsourcing. Under these circumstances, such organizations would effectively surrender control of the I/S function to external suppliers who provide the needed products and services. While many firms believe that outsourcing suppliers will become "strategic partners" in the area of the outsourced I/S operations, typically this does not happen. Outsourcing contractors deal with large numbers of customers and usually do not have the same incentive to become a "partner" as do manufacturing component suppliers.[20] They tend to seek a traditional relationship and look to the outsourcing contract for operating guidelines.[21] Consequently, difficulties in managing the I/S function effectively should not be the *sole reason* for outsourcing it.

THE OUTSOURCING DECISION

A number of issues are involved in the decision to outsource an organization's I/S resources. To summarize, key items just discussed include *scale economy, outsourcer expertise,* short- and long-term *financial advantage* from the sale of resources, *inability to manage* the I/S function, *strategic realignment,* and a need to *focus on the core business.* Additional issues that typically are involved and need to be considered in the context of a specific firm's situation include:

- Impact on company competitiveness
- Identifying services to be outsourced
- The number of suppliers to be used
- Ability to return to in-house operations if required
- Supplier reliability
- Supplier service quality
- Coordinating with the supplier and evaluating performance
- Flexibility in the products offered by the supplier
- Providing the latest/advanced technology and expertise

Many of these issues are similar to the criteria that govern all outsourcing decisions. However, their importance is heightened due to the strategic role of information systems in most organizations. An effective contract with the outsourcing supplier should address many of these issues. Although total outsourcing of entire I/S divisions is being undertaken by some firms, many managements are adopting the more cautious approach of outsourcing specific operations and subfunctions. Training is among the most frequently outsourced activities. Other operations frequently outsourced include systems planning and development, data center operations, technical support, wide-area communications, PC maintenance, and voice communications.

Organizations typically approach the issue of identifying I/S operations to outsource by evaluating their overall significance to the firm as a whole. There appears to be greater reluctance to outsource *strategically significant* or "core" activities, such as IT management, data base administration, infrastructure development, and strategic planning.

OUTSOURCING AND REENGINEERING

Reengineering means "new beginnings." It is the search for a new way of organizing the various elements of work. And it marks the true beginning of the information revolution through the innovative use of information systems. Reengineering is "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed."[22] Such change is possible only through innovation that "encompasses the envisioning of new work strategies, the actual process design activity, and the implementation of the change in all its complex technological, human, and organizational dimensions."[23]

Technology evaluation and the creative application of IT/IS are critical to the reengineering of business processes. Further, these requirements are needed on an ongoing basis. In fact, companies at the leading edge should be evaluating technologies and systems that are still being developed so they can be implemented as soon as they become available. Innovative IT/IS applications, however, require a comprehensive understanding of the operating processes in an organization. In addition, organizational and personnel issues usually are critical in the successful implementation of any designed changes. Outsourcing decisions therefore cannot be made without addressing the role of I/S in an organization's reengineering efforts. In fact, many consider reengineering to be the most pressing challenge for high-ranking information executives in the United States and Europe today.[24]

The decision to outsource should address the critical role of information and processes in organizations, including the role that systems play. If the entire I/S function is to be outsourced, sufficient provision should be made in the outsourcing contract to deal with current and future requirements of the organization. Special attention should be given to the potential need for innovative solutions to be provided by the outsourcer, and to the timing of these actions. The different types of I/S applications within a firm can be viewed through the framework shown in Figure 2.

An increased organizational dispersion of applications influences the management of the systems. Cross-functional applications, which are becoming the norm with an increased focus on business processes, require a greater amount of coordination and cooperation between participating groups. Outsourcing such systems will require significant efforts in developing and sustaining a suitable approach to managing the outsourcer. This will also be required when innovative solutions are sought in more focused processes that typically lie within the same function. The probability that the outsourcer can deliver on these criteria should be evaluated carefully before the outsourcing decision is made. When innovation and cross-functional efforts are needed at the same time, insourcing may be the better option.

As reengineering dominates the organizational imperatives in the 1990s, the decision to outsource information systems cannot be based solely on the dimensions of economics

Figure 2

REENGINEERING - OUTSOURCING DECISION MATRIX

Applications	Dispersion: Functional	Dispersion: Cross-Functional
Established	Outsource	Out/In Source
Innovative	Out/In Source	Insource

and expertise. The need for process reengineering should in fact guide the outsourcing decision. The focus should shift from the "system" to the "information" that is provided by information systems. Timely innovation should be a deliverable provided by any outsourcer.

OUTSOURCING CONTRACTS

The purchasing function must be involved in the negotiations and contract development when I/S services are purchased. This procedure will have a positive impact on the quality and value the organization receives because of purchasing's expertise in procurement issues related to service contracts.[25] Corporate risk management, legal, and strategic planning groups should also be involved. This will ensure that the strategic impact of the outsourcing contract is adequately evaluated. It is estimated in one study, however, that only 41 percent of the surveyed senior executives who negotiated ten-year contracts in 1989 looked ahead three years into the firm's strategic planning, 33 percent looked five years ahead, and fewer than 2 percent actually considered the full ten-year strategic plans.[26] Issues such as changes in demand patterns and the possible availability of better technology were rarely even considered. Such an incomplete analysis prior to negotiations is a major reason companies become involved in contract renegotiations or terminations today.

As in the case of all other procurements, purchasers of I/S outsourcing services should *not* be willing to accept the standard contract offered by most suppliers.[27] The following factors should be an integral part of the planning and conduct of the acquisition process.

1. Purchasing representation on the I/S supplier selection team
2. Competence factors to use in evaluating suppliers (e.g., flexibility, understanding the company's business, technology leadership)
3. Bid evaluation procedures, including the specific evaluation of low bids
4. A precisely defined scope of work, detailing the nature and extent of collaboration between buyer and supplier
5. Safeguards for performance and cost control
6. Methods and procedures for measuring supplier performance

The specific needs of the organization should be matched with the supplier's capabilities during negotiations so as to develop a contract around a shared vision. A cross-functional team with members from a variety of decision-making levels is required to assess the company's needs. Such a team is also required to manage the contract after its execution. Outsourcers should have the financial and technological incentive to help the company migrate to technology that is suitable to the organization.[28] Suppliers that have a good understanding and an interest in the outsourcing firm's business will be better positioned to help define mutually beneficial goals.

The types of contracts that are emerging today bind the buying firm to a long-term relationship with the outsourcing supplier. The organizational risks involved in such relationships must be carefully evaluated. The market-staying power of I/S suppliers should be estimated and contingency plans for supplier failure should be formulated. These plans may also be useful in the event contract termination is required because of supplier nonperformance. The experiences of Eastman Kodak provide examples of situations that may evolve during the contract term. Business-Land Computers, the company that handled the area of personal computers for Kodak, was taken over by JAP Inc., which in turn assumed the outsourcing contract by default. These types of developments do not enhance long-term relationships. In a separate situation, a dispute over contract interpretations prompted Kodak to consider IBM as the outsourcing firm for telecommunication services which it initially contracted to the Digital Equipment Corporation.[29]

Supplier performance should be evaluated on the twin dimensions of technical and functional quality. Technical quality includes maintaining the required response time, minimizing system down time, providing error-free service, and utilizing leading edge technology. Functional quality, in essence, is the quality of customer service.

Information systems outsourcing contracts can be *all inclusive*, *modular* (focusing on specific operations), or *turnkey* (specific jobs). While turnkey contracts historically have represented the typical arrangement between buying firms and outsourcing suppliers, the modular and all inclusive approaches characterize today's outsourcing relationships. In an environment in which organizations are undergoing extensive restructuring, negotiating contracts for individual divisions of the company—modular contracts—is a sensible approach. This ensures that the overall relationship with the outsourcing supplier need not be altered when certain divisions are restructured or divested as a result of the reengineering process. This situation is illustrated by the General Dynamics arrangement with Computer Sciences Corporation. In this case each of General Dynamics' eight business units had its own contract with Computer Sciences Corporation.

In identifying potential outsourcing suppliers, the firm's own information systems division might well be considered as a possible alternative. Internal I/S audits indicate that a division that rationalizes its operations can generally outbid the outsourcing supplier.[30] Ironically, a number of outsourcers, after being awarded the contract, eventually hire the firm's existing I/S professionals. If disruptive relocation of employees can be avoided, it is usually in the firm's best interest to make such arrangements. Outsourcing may remain a suitable option, however, even after right-sizing an organization's I/S operation. Hence, contracts involving transfer of employees should be utilized when it is practical to do so.

Areas that are considered nonstrategic typically are the first areas targeted for outsourcing. At the present time, however, some firms are also including strategic areas in the plan. Making this transition will prove to be a paradigm shift for both functional and senior managers. The entire

contract formulation and negotiation process must address this issue to ensure that the contract is successfully implemented.

CONCLUSIONS

While the jury and the verdict are still out regarding outsourcing decisions, the ultimate criteria for measuring the strategic success of these decisions are certainly known. Will organizations that outsource key information functions be able to react quickly enough to take advantage of opportunities and to avoid competitive threats? Some experts think that outsourcing I/S functions will hamper an organization's ability to respond to competitive challenges in a timely fashion. Others believe that the benefits associated with outsourcing will far outweigh any disadvantages of removing information activities from inside the organization. Only when I/S is perceived as a "function" can it be considered as a candidate for outsourcing.

As I/S needs and resources are dispersed throughout the organization, it may become more difficult to outsource the function. Such a situation will increasingly come to the forefront as organizations develop a process view of their operations. Ultimately, for outsourcing in any form to be successful, quick response times to strategic opportunities and threats are essential. Effective management of the outsourcing relationships is an organizational imperative.

REFERENCES

1. J. Keyes, *Infotrends: The Competitive Use of Information* (New York: McGraw-Hill, 1993), pp. 100-116.
2. J. Teresko, "Outsourcing: Tie It to the Right Objectives," *Industry Week*, June 1, 1992.
3. J.J. Keller, "More Firms Outsource Data Networks," *Wall Street Journal*, March 10, 1992.
4. J. Greenbaum, "Planning for Pan-European Outsourcing," *Information Week*, June 22, 1992, pp. 29-32.
5. E.A. Capozzoli, J. Malley, and D.E. Gundersen, "A Cross-Cultural Perspective for Information System Development Outside the U.S.," *Proceedings of the International Conference of the Academy of Business Administration*, 1993, pp. 337-43.
6. H.E. Fearon, D.W. Dobler, and K.H. Killen, *The Purchasing Handbook* (New York: McGraw Hill, 1993), p. 291.
7. R.E. Zahler, "Ensuring Value in Outsourcing Relationships," *Resource*, November 1992.
8. L.M. Applegate, "Eastman Kodak Co: Managing Information Systems Through Strategic Alliances," *Harvard Business School Case*, 9-192-030, January 1993.
9. M.C. Lacity, "Outsourcing: The Untold Tales," *Information Week*, August 10, 1992, pp. 19-20.
10. J. Teresko, op. cit., June 1, 1992.
11. D.K. Taft, "CSC Creeps into the Commercial Sector," *Computer Reseller News*, November 2, 1992.
12. J. Keyes, op. cit., (1993), pp. 100-116.
13. J. Verity, "They Make a Killing Minding Other People's Business," *BusinessWeek*, November 30, 1992.
14. M.J. McDermott, "Who Let the Strangers into Your Files?," *Profiles*, October 1992.
15. M. Zucchini, "The Four-S Outsourcing Model," *Fleet/Nostar*, 1992.
16. M.C. Lacity and R. Hirschheim, "The Information Systems Outsourcing Bandwagon," *Sloan Management Review*, Fall 1993, pp. 73-86.
17. T. Guimaraes and S. Wells, "Outsourcing for Novices," *Computerworld*, (June 8, 1992), pp. 89-92.
18. L. Loh and N. Venkatraman, "Stock Market Reaction to Information Technology Outsourcing: An Event Study," *Sloan School of Management Working Paper*, No. 3499-92BPS, November 1992.
19. J. Keyes, op. cit., 1993, pp. 100-116.
20. M.C. Lacity and R. Hirschheim, op. cit., Fall 1993, pp. 73-86.
21. J. Henderson, "Plugging into Strategic Partnerships: The Critical IS Connection," *Sloan Management Review*, Spring 1990, pp. 7-18.
22. M. Hammer and J. Champy, *Reengineering the Corporation: A Manifesto for Business Revolution* (Harper Business, 1993), p. 32.
23. T.H. Davenport, *Process Innovation: Reengineering Work Through Information Technology* (Cambridge, Mass.: Harvard Business School Press, 1993), p.2.
24. N. Margolis, "Reengineering Gets Real," *Computerworld*, January 18, 1993, p. 69.
25. K.M. Rowe, "Purchasing Services: An Issues of Intangibles," *NAPM Insights*, National Association of Purchasing Management, August 1991, pp. 10-11.
26. J. Teresko, op. cit., June 1, 1992.
27. M.C. Lacity and R. Hirschheim, op. cit., Fall 1993, pp. 73-86.
28. G. Harrar, "Outsourcing Tales," *Forbes*, June 7, 1993, pp. 36-42.
29. B. Caldwell, "New Image for Outsourcing," *Information Week*, Feb ruary 22, 1993, pp. 19-21.
30. C. Wilder, "Before Outsourcing, Clean Up the Internal IS Shop," *Computerworld*, April 6, 1992.