

# Journal of Business & Leadership: Research, Practice, and Teaching (2005-2012)

---

Volume 2  
Number 1 *Journal of Business & Leadership*

Article 19

---

1-1-2006

## Making The Decision To Outsource A Service Department: Who Should Deliver Internal Audit Services?

Hubert Glover  
*Howard University*

Jeffrey McMillan  
*Clemson University*

Jean Wells  
*Howard University*

Follow this and additional works at: <https://scholars.fhsu.edu/jbl>



Part of the [Business Commons](#), and the [Education Commons](#)

---

### Recommended Citation

Glover, Hubert; McMillan, Jeffrey; and Wells, Jean (2006) "Making The Decision To Outsource A Service Department: Who Should Deliver Internal Audit Services?," *Journal of Business & Leadership: Research, Practice, and Teaching (2005-2012)*: Vol. 2: No. 1, Article 19.

DOI: 10.58809/QOLG9210

Available at: <https://scholars.fhsu.edu/jbl/vol2/iss1/19>

This Article is brought to you for free and open access by the Peer-Reviewed Journals at FHSU Scholars Repository. It has been accepted for inclusion in *Journal of Business & Leadership: Research, Practice, and Teaching (2005-2012)* by an authorized editor of FHSU Scholars Repository. For more information, please contact [ScholarsRepository@fhsu.edu](mailto:ScholarsRepository@fhsu.edu).

## MAKING THE DECISION TO OUTSOURCE A SERVICE DEPARTMENT: WHO SHOULD DELIVER INTERNAL AUDIT SERVICES?

Hubert Glover, Howard University  
Jeffrey McMillan, Clemson University  
Jean Wells, Howard University

---

*The 2001-2003 wave of financial fraudulent reporting, aggressive earnings management, and overall management integrity issues highlight the important role that an internal audit function can have in protecting organizations and demonstrate how important it is that internal auditors operate with independence and objectivity. This paper highlights the issues organizations face when contemplating the internal audit outsourcing market. The illustrative materials provide exposure to the strategic, analytical, financial and operational decisions involved with retaining or outsourcing a corporate internal audit department.*

---

### INTRODUCTION

This paper provides exposure to the strategic, analytical, financial and operational decisions involved with retaining or outsourcing a corporate or operational function. How and why outsourcing has emerged and grown to be such an important part of the business environment during the past twenty years is explained. In addition, a realistic illustrative scenario outlining the steps senior management went through when contemplating whether or not to outsource various core and non-core functions of their manufacturing organization is described. Summary financial and non-financial information that was examined by management during this process is provided. The final decision on whether to outsource or insource the company's internal audit department has been left undecided. Readers are asked to review the information provided, to review additional information (sources listed), and lastly to make a recommendation concerning the status of the company's internal audit function. Guidance on alternative ways the illustrative material can be implemented is provided.

The 2001-2003 explosions of corporate financial fraudulent reporting and aggressive earnings management, along with overall management integrity issues, places the role of the internal audit function as critical to the financial and operational viability of organizations (Swartz 2004). Not since the 1977 Foreign Corrupt Practices Act, has the internal audit function seen such a significant outcry from stakeholders for their active participation in supporting the management and business system of controls and ethical practices. The fundamental role of internal auditors, as outlined by the

International Standards for the Professional Practice of Internal Auditing, is to provide "an independent, objective assurance and consulting activity designed to add value and improve an organization's operations." Internal auditors help by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of an organization's risk management, control, and governance processes. The dubious roles played by the chief executive officers of Enron, WorldCom, Global Crossing, ImClone, and Adelphia, to name a few, prove how important it is that organizations regularly monitor and evaluate their ethical behavior.

Recent rulings by the SEC, NYSE and NASDAQ place greater emphasis on the role of internal audit departments (Hardesty 2003). In addition, the Sarbanes-Oxley Act of 2002 (SOX) specifically prohibits the performance and delivery of internal audit services by a company's external auditor. SOX requirements mandate that a company's audit committee ensure the existence of an effective insourced internal audit function, a combination of internal and external resources, or a fully outsourced internal audit function. Furthermore, SOX demands that management develop, implement, monitor and test their system of internal controls over financial reporting. Lastly, SOX mandates that external auditors report separately on this process of monitoring and testing of internal controls.

### Background on Outsourcing

Outsourcing is the process of contracting out a complete function which has historically been executed by a company's internal staff. Outsourcing differs greatly from discontinuing an operation, closing a manufacturing facility, or reducing staff. Outsourcing is used as part of a

comprehensive and strategic process to reallocate company resources to focus on core competencies. Research has shown that the investment in the production and distribution of a company's core function often yields a better return than expenditures on ancillary functions such as administration. While the cost of providing a function internally versus externally is the main determining factor in making an outsourcing decision, other factors such as access, reliability, and quality control should also be considered. Ultimately, the decision to outsource a function is based on the strategic direction of the company and its capabilities to maximize the utilization of resources while enhancing shareholder value.

Morse (2000) notes that since the late 1980's, challenges brought on by global competition, emerging economies, advances in technology, and maturing markets caused businesses to adopt new management practices and techniques in order to survive. Practices such as supply chain management, total quality management, continuous improvement, reengineering, and process redesign became common. A major derivative of these strategic initiatives was the process mapping and analysis of all functions directly and indirectly related to the ordering, manufacturing, storing, marketing, and distribution of an organization's products and services and identification of the organization's core and non-core operations.

Having an understanding of its strengths and weaknesses opened the door for organizations to embrace outsourcing as a key element to manage, reduce and control administrative and operational costs. Initially, outsourcing was limited to functions such as janitorial services and payroll. However, the identification of core and non-core operations caused more and more organizations to consider outsourcing as a way to cut costs and become more efficient (Sheridan and Liebs 1999). For example, Xerox is a leader in marketing document management tools such as copy machines, printers and other office equipment. However, Xerox recognized that providing information technology services to its various operating and support units was not its strength. Hence, Xerox outsourced most of its fundamental information technology functions to Electronic Data Systems.

### Instructional Illustration

The following illustration presents a company that is faced with global competition and must streamline operations to manage its revenue and control costs more

effectively. Senior management is reviewing proposals submitted by an outside consulting firm to assist the company in reallocating its resources to operations. The illustration presents the prevailing issues that most companies face when making outsourcing decisions, along with the relevant factors that management must consider in their role to support the governance of the company.

### Company Background

Corecomp, Inc. (CI) was formed in 1944 as one of the pioneer companies in disposable eatware manufacturing. Their successful marketing and distribution helped transform American culture during the post World War II era from eating on ceramic or metal-based plates to disposal paper plates. During the late 1950's when the fast food industry was in its embryonic stage, CI introduced Styrofoam thermo-disposable eatware. This revolutionized the disposable eating package industry and facilitated the rapid growth of the fast food industry. Prior to the introduction of thermo products, consumption of fast food was limited to the location where it was prepared. CI's revenues have increased exponentially from just \$10 million in 1959 to \$650 million in 2003. CI also grew from one location to five plants in three different states and two international locations (sales office and distribution center) along with five regional sales offices and their headquarters.

During the 1990's, CI started facing stiff competition from foreign enterprises that were making better products, offering more innovations and producing goods at a considerably lower cost than CI. In addition, the eatware industry was maturing and fragmenting into special markets. For example, the emergence of quality-oriented chains such as Boston Market dictated the development and introduction of products targeted towards the more upscale consumers, who wanted fast, quality and delicious food distributed in more attractive packaging. These new trends in gourmet fast food restaurants adversely impacted the demand for CI's products. CI had failed to monitor these trends to introduce new products to effectively compete with other companies who were offering eatware to meet the needs of gourmet or health food restaurant chains.

CI's profit margins, which had averaged 25% prior to 1996, slid to an all time low of 5% in 2003. Likewise, their market share also declined from their 1990 peak of 45% to 11% in 2003. CI sought to stop the tide of profit erosion. They hired an experienced consulting company which conducted an extensive three-month review of CI's

operations, management philosophy, organizational structure, and financial management practices. In addition, the consultant initiated an industry study that evaluated CI's costs by major groups (e.g., operations

and general and administrative salaries) and compared them to mean averages of the eatware industry. The results of the consultant's base-line comparison study are summarized in table 1.

**Table 1: Comparison of Results for Key CI Ratios (2003)**

Key Performance Ratio	Corecomp Inc. Ratios	Disposable Eatware Industry Ratios
Revenue/employee	\$35,000	\$58,000
Operating Margin/employee	\$18,000	\$29,000
Return on Investment	6%	15%
Accounts Receivable Turnover	3.3	2.1
Debt/Equity	4.2	1.3
G&A/Employee	\$11,000	\$2,500
G&A/Sales	16%	5%
Five Year Revenue Growth Rate	-55%	18%
Net Income/Sales	5%	20%
Market Share	11%	-
Advertising/Sales	3%	8%
R&D/Sales	0.5%	3%

Table 1 reveals that CI has lost its market share and the financial ability to sustain future growth. It also shows that CI failed to promote its products or invest in the future via adequate investments in research and development activities. CI formed a team of senior management to study the consultant's report and to present recommendations at the next board meeting. The team's recommendations are presented in the next section.

### Outsourcing Recommendation

The senior management team has recommended that certain functions be outsourced to external service providers to reduce costs and allow CI to focus its resources on enhancing revenue and operational performance. A summary of senior management's review of all CI operations and functions is provided in table 2.

**Table 2: Value Assessment of Key CI Functions and Operations**

CI Function	Value Assessment	Senior Management Recommendation
Production of eatware	Core function and basis for market existence.	Maintain as a core competency and invest accordingly to become viable and competitive.
Marketing and distribution of eatware	Core function but significant improvements are required to become a world-class competitor.	Maintain as a core competency and invest accordingly to become viable and competitive.
Research and development	Historically a major weakness but management recognizes it is essential to the future of CI.	Maintain as a core competency and invest accordingly to become viable and competitive.
Corporate services for Human Resources, Accounting, Treasury, Facilities Management and Supply Chain Management	These functions have been deemed to be non-essential and can be outsourced to an external vendor who can accomplish the services better, faster and cheaper.	Outsource to an external vendor.
Information Technology	This function has been identified as an enabler for process improvements in production, marketing, distribution and R&D and should remain internal.	Maintain as a core competency and invest accordingly to become viable and competitive.
Internal Audit Department services	Senior management does not view traditional compliance as value added. Yet, they believe that Internal Audit has the potential to provide more support and insight into operations and thus would like to further explore the cost benefit of this function.	Execute a more comprehensive review of the benefit and cost of maintaining or outsourcing this function.

As table 2 shows, the senior management team feels that the identified functions do not represent the core competencies of CI. The senior management team has recommended that all human resource and business transaction processing functions including purchasing,

accounts payable, billing and accounts receivable and mail distribution, should be outsourced to external contractors. Their recommendations are supported by the consultant's report, which indicates that the costs to fund the identified areas are in excess of industry averages.

The enormity of CI's general & administrative expenses per employee led them to this decision. Senior management and CI's board of directors unanimously agreed with the outsourcing recommendations and also agreed that the decision to outsource the internal audit department required further evaluation. Accordingly, CI's audit committee asked the CEO to provide a more comprehensive review of the costs associated with their internal audit function and the benefits and risks of outsourcing this function.

Description of CI's Internal Audit Department

CI's internal audit department was established in 1978

in response to the 1977 Foreign Corrupt Practices Act. Since its creation, the primary mission of the department has been to verify compliance of operating units, divisions, and departments with company policies and the Foreign Corrupt Practices Act. The rapid growth during the 1970's in both revenues and locations increased the control risks for CI. Hence, internal audit personnel visit all CI locations annually and review all major functions. The director of the Internal Audit Department reports directly to the audit committee chairperson and manages a staff of 25 audit professionals and administrative personnel. The annual \$3.2 million budget for the Internal Audit Department is outlined in table 3.

Table 3: Summary of the Internal Audit Department's Key Cost Factors

Corecomp Inc. Annual Internal Audit Department Budget	
Professional Salaries	\$2.2 million
Administrative Salaries	\$0.1 million
Travel Expenses	\$0.5 million
Training	\$0.2 million
Information Technology	\$0.2 million
Total	\$3.2 million

Table 4: Summary of Consultant's Bench Marking Comparison of CI's Internal Audit Department

Audit Activity	Bench Marking Assessment	Recommendation and Comments
Compliance auditing where Internal Audit devotes 60% of its resources	Competitors internal audit departments dedicated less than 20% of their audit schedule to compliance audits.	Reallocate resources to more value added audit activities.
Financial audits where Internal Audit allocates 15% of its resources	All competitors abandoned financial audits after SAS 65, which is entitled The Auditor's Consideration of the Effect on an Internal Audit Function on the Scope of a Financial Statement Audit), to concentrate on more consulting/operational audits.	Eliminate financial audits from the schedule since effective operational audits will yield positive economic results.
Assisting external auditors where Internal Audit devoted 15% of its resources	All of the competitors also abandoned this support function along with financial audits to allocate more resources to conduct internal consulting for management.	Since the issuance of SAS 65, external audit fees increased despite internal audit departments. Recommend CI's Internal Audit Department devote resources to more value added activities.
SOX 404 and related support	Most of their competitors were devoting at least 50% of their time to providing support for SOX 404 compliance. Significant differences in long term plans, e.g. using external support or expanding the department to provide the compliance monitoring and support effort.	Determined that the contract auditors cost 45% more per hour than the hourly fully burdened (salary plus fringe plus overhead) costs for CI's Internal Audit Department to complete the SOX work. However, the consultant noted that the contract auditors had more experience and could complete the task more efficiently
Operational auditing where Internal Audit presently did not dedicate any resources	Competitors invested 85% of their resources to operational auditing or consulting.	Identified as a major deficiency in CI's Internal Audit Department.
Size and budget of audit department	CI's cost for maintaining its Internal Audit Department was 0.5% of sales as compared to less than 0.1% for the industry.	Determined that CI's Internal Audit Department generated savings over the last five years of \$1 million, compared to \$10 million for the industry.

Decision - Outsource or Insource?

CI faces the challenge of translating the information discussed herein to a vehicle, which will effectively

convey the best option for management to select, regarding outsourcing or insourcing their internal audits function. Your assignment is to help reach a decision and provide support for the position taken. You may use

assumptions to fill in information gaps as deemed appropriate as long as they are clearly noted in your response.

### Learning Objectives and Implementation Guidance

**Learning Objectives:** As stated in the illustrative materials, the financial services segment of the outsourcing market will grow to be more than \$400 billion by 2005 (Benor-Samuel 2004). The factors addressed in the exercise provide exposure to the strategic, analytical, financial and operational decisions involved with retaining or outsourcing a corporate function and can be used to help students: (1) understand

the role accounting information plays in the outsourcing decision process, (2) identify the key financial metrics that should be used to evaluate a core competency, and (3) evaluate the impact of non financial measures on the decision to source a product or service. These learning objectives were adapted from the AICPA Core Competencies developed to provide academicians with a guideline to evaluate their courses on preparation of students in the functional, personal and broad business perspective areas. For more information on the AICPA Core Competencies see [www.aicpa.org](http://www.aicpa.org). Suggested ways to apply the exercise in various courses are outlined in table 5.

**Table 5: Classroom Application Matrix**

Accounting Course	Teaching Format	Key Learning Skills
Managerial/ Accounting	Groups or Individual Project (written assignment) or In-Class Exercise or Panel Discussion with Professionals	Analytical, Reasoning, Communication, Organizational, and Financial/ Managerial Accounting, Organizational Strategy, and Management Control Systems
Internal Audit	Groups or Individual Project (written assignment) or In-Class Exercise or Panel Discussion with Professionals	Analytical, Reasoning, Communication, Organizational, and Financial / Managerial Accounting
Auditing	Groups or Individual Project (written assignment) or In-Class Exercise or Panel Discussion with Professionals	Analytical, Reasoning, Communication, Organizational, Financial Accounting, and Audit Functions
Special Projects or MBA or Business Seminar Course	Groups or Individual Project (written assignment) or In-Class Exercise or Panel Discussion with Professionals	Analytical, Reasoning, Communication, Organizational, Financial Accounting, and the current business environment

Recommended teaching formats and tools are presented in table 6 while table 7 provides a listing of key business issues addressed. Educators can use tables 6 and 7 to help them promote classroom discussion and develop instructions to meet the

specific objectives they wish to accomplish. All or a combination of the key business issues outlined in table 7 can be used as specific questions or parameters that students should address in preparing their decision report.

**Table 6: Alternative Teaching Format with Recommended Teaching Tools**

Teaching Format	Recommended Teaching Tool
Group Project	Provide a template, which outlines the format for response. For example, provide a template generated from a word processing program, which lists the factors such as managerial accounting implications, internal control risks and profitability issues. Providing a template will standardize the response and facilitate an effective classroom discussion and the educator's overall assessment process.
Individual Project	Provide a list of assumptions and parameters for response (e.g., are the costs noted for the Internal Audit Department inclusive of corporate overhead). This will minimize the degree of variation in responses when assigned on an individual basis. Using the template as stated above in addition to a list of assumptions will provide a supplemental teaching tool.
In-Class Exercise	Prepare the students by assigning readings from business periodicals such as Fortune, Forbes, Business Week or the Wall Street Journal. Preparation of an electronic presentation where the educator demonstrates alternatives (e.g., comparison of different scenarios) would provide an effective medium to challenge analytical and reasoning skills.
All Formats	Require the students to research literature on the topic of outsourcing and integrate their findings into their response. This will provide an opportunity for students to apply current issues into their assignments.



Table 7: Key Business Issues

Category	Business Issue
<b>Financial</b>	<ul style="list-style-type: none"> <li>• Are the costs noted in Table 3 complete?</li> <li>• What cost reductions can you expect from an outside service provider?</li> <li>• What costs should be included in the relevant cost analysis?</li> <li>• What type of contract should the company develop for outsourcing (fixed fee or cost plus or other type)?</li> <li>• Should the outsourcing contract include a performance bonus? If so, how should it be measured?</li> </ul>
<b>Organizational</b>	<ul style="list-style-type: none"> <li>• Who should the contractor report to if the Internal Audit Department is outsourced?</li> <li>• What impact could outsourcing have on the accessibility of internal auditors?</li> <li>• How do you maintain the internal knowledge of operations gained by internal auditors? Will morale within and outside of Internal Audit Department change by outsourcing? What can be done to mitigate any negative ramifications?</li> <li>• Who should make the decision on which contractors will receive offers to bid?</li> <li>• Who will decide on the firm to win the contract?</li> <li>• Who will develop the audit schedule?</li> <li>• If outsourcing occurs, how should management transition from CI's Internal Audit Department to the outsourced internal audit function?</li> </ul>
<b>Technical</b>	<ul style="list-style-type: none"> <li>• What type of firm should provide the internal audit service (Big Four, other public accounting firms, current auditor or consulting firms)?</li> <li>• What criteria should be used for choosing the winning contractor?</li> <li>• Are there any ethical implications of internal audit services being performed by current auditors?</li> <li>• Will technical proficiency be compromised by the outsourcing decision?</li> <li>• What impact will outsourcing have on quality and service delivery?</li> <li>• Should all or just certain functions within CI's Internal Audit Department be outsourced?</li> </ul>
<b>Human Resources</b>	<ul style="list-style-type: none"> <li>• What should happen to CI's existing internal audit staff? Should they receive an opportunity for employment with the new firm or should they be excluded?</li> <li>• Where will future managers be developed? Can they come from the new service provider of the internal audit?</li> <li>• Will outsourcing increase the diversity of staff in terms of skills and experience?</li> </ul>
<b>Capital Markets</b>	<ul style="list-style-type: none"> <li>• How will investors feel about any outsourcing decision?</li> <li>• Will the stock exchange have any influence on the decision?</li> </ul>
<b>Legal</b>	<ul style="list-style-type: none"> <li>• What service levels should be built into the contract?</li> <li>• What should the term of the contract be?</li> <li>• What other clauses should CI try to include in the agreement?</li> <li>• What is the impact of SOX on the sourcing decision?</li> <li>• Should the audit committee be involved?</li> </ul>
<b>Strategic</b>	<ul style="list-style-type: none"> <li>• How will the firm maintain proprietary information from other competitors if the selected service provider also serves other companies in the industry?</li> <li>• Will outsourcing the internal audit meet the value proposition of the Board for reducing costs and focusing on the company's core competencies?</li> </ul>

The case should be presented in one class where the instructor determines which of the formats in tables 5 and 6 will be used i.e. group or individual project and then select some or all or provide their own parameters which become the questions that the students will seek to address in their solution. The instructor should also provide their own submission guidelines i.e. Word and/or PowerPoint and grading or evaluation criteria.

The authors have noted from their respective institutions that the case appears to be more effective in an MBA managerial class rather than an undergraduate cost accounting (management accounting course for accounting majors who are juniors or seniors) or advanced auditing or internal auditing. Our observations suggest that the undergraduate curriculum is already too intense and this case requires at least one full class for introduction which may not be available. In contrast,

most graduate courses lend themselves to projects and exercises which are case driven. Instructors are advised to determine if there undergraduate courses are suitable for this case, i.e. some schools such as Howard University place their students in an intense business orientation course as freshmen, which requires them to do a full year of group projects with a corporate sponsor such as Citigroup or General Electric. In addition, some business students at Howard University would have completed two internships by the time they take senior level courses and thus, they may be more able to navigate through the mature topics presented in this case. Therefore the instructor will have to make that decision. We are in full agreement that this case is appropriate at the graduate level.

The materials have been designed to promote flexibility as well as creativity on the part of the educator

and the student. The guidelines provided are general, allowing educators to integrate their philosophies and teaching practices to frame the responses and applications they desire. Educators are encouraged to determine the appropriate degree of effort which a solution should require. The points allocated should dictate the level of response. If used as a normal individual homework assignment, the response should be limited to one page. If assigned to a group as a major project then a decision report should range from five to ten pages. If used as an in-class exercise, the discussion should not exceed thirty minutes. If used as a panel discussion, then the duration depends on whether groups or individuals make presentations in front of a panel. One suggestion to minimize class time for panel discussions is to use an accounting organization's venue such as Beta Alpha Psi to invite professionals to discuss the topic of outsourcing and the related decision process. This will broaden the audience and also provide an opportunity to bring professionals to the classroom.

This situation described in the illustrative materials is not deterministic and thus does not have a unique official solution. The responses will vary as a function of the assignment format (e.g., groups or individual), the selection of assumptions and key issues, and changes in the global marketplace. In the real world, there are not simple answers to questions that you have faced on multiple choice exams or even with some problems and essays. Some decisions seem to be more strategic and appear to be appropriate in the near-term but could be disastrous in the long-term. Students need to understand the dynamics and the challenges of the decision making process.

**Hubert Glover** is the chair of the accounting department at Howard University. He received his Ph.D. in accounting from Texas A&M University. He is a certified internal auditor, certified management accountant, and certified public accountant. He has published numerous articles for trade publications, professional organizations and academic journals in the areas of organizational change, auditing and business education.

**Jeffrey McMillan** teaches accountancy and legal studies at Clemson University. He received his Ph.D. in accounting from University of South Carolina. He is an active researcher in auditing and market valuation. He has published in *Accounting Review*, *Journal of Business Issues*, *Journal of Accounting and Finance Research*, *Journal of Business Ethics*, and among others.

**Jean Wells** is an assistant professor of business law at Howard University. She received her J.D. from George Washington University. She was a manager in Deloitte's Washington national tax policy services group where she covered IRS, treasury, and legislative tax developments. Professor Wells is a member of the American Institute of Certified Public Accountants.

## REFERENCES

- AICPA Core Competencies.** [www.aicpa.org](http://www.aicpa.org): Educators Resource Center
- Bendor-Samuel, P. 2004. Outsourcing in 2003: How offshoring is changing the industry. **Outsourcing Journal**, (January): Online.
- Hardesty, D. 2003. **Practical guide to corporate governance and accounting: Implementing the requirements of the Sarbanes-Oxley act.** Warren, Gorham & Lamont, New York: Introduction, Section 100 to 1100.
- International standards for the professional practice of internal auditing.** [www.theiia.org/iaa/index.cfm?doc\\_id=1499](http://www.theiia.org/iaa/index.cfm?doc_id=1499).
- McClarren, T., Head, M., & Yuan, Y. 2002. Supply chain collaboration alternatives: Understanding the expected cost and benefits. **Internet Research**, Fall: 348-365.
- Morse, C. 2000. USAF outsourcing model. **Armed Forces Journal International**, August: 1-16.
- Sarbanes-Oxley Act of 2002.** [http://www.aicpa.org/info/sarbanes\\_oxley\\_summary.htm](http://www.aicpa.org/info/sarbanes_oxley_summary.htm)
- Sheridan, J., & Liebs, S. 1999. Managing the chain. **Industry Week**, September: 50-63.
- Swartz, N. 2004. Compliance is not cheap, some companies say. **Information Management Journal**, April/May: 9-13.