

Lessons in Global Information Technology Sourcing

Successful information technology sourcing decisions require customers to identify their IT needs, know the sourcing market, and develop significant contract-crafting and relationship management skills.



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More than 13 years have passed since Kodak signed its landmark information technology outsourcing decisions with IBM, Business Land, and Digital Equipment Corp. Much has happened since those bellwether deals: Research firms estimate the current global outsourcing market to be as high as US\$500 billion. The number of external IT outsourcing suppliers has swelled to the thousands, far exceeding the small number of suppliers dominated by IBM, EDS, and Computer Science Corp. (CSC) in the early 1990s. The most notable change, however, is how well customers have learned to exploit the IT services market.

For more than a decade, my colleagues—Leslie Willcocks of Warwick University, David Feeny of Oxford University, Thomas Kern of Erasmus University, and Rudy Hirschheim of the University of Houston—and I have studied emerging sourcing practices in 543 large and small organizations worldwide.¹⁻⁴ We have gathered case studies and performed surveys of companies that use exchange-based, traditional IT sourcing; organizations involved in joint ventures; and businesses that net-source their IT support. We have also studied insourcing cases, which serve as a control group. A key feature of our research is that we measure actual outcomes against expected outcomes, which lets us draw conclusions about practices associated with success and failure and analyze results over time.

The lessons our IT sourcing research offers

should help both customers and suppliers avoid sourcing pitfalls and establish contracts and relationship management capabilities that will benefit both parties.

LESSONS FOR IT SOURCING

Early sourcing deals were fraught with problems, such as cost overruns, declining service levels, and lack of innovation, with only 48 percent of customers achieving expected results from outsourcing, as Table 1 shows. Fortunately, customers developed better sourcing skills over time, and the success rate has increased to 73 percent in more recent years.³

Since 1992, customers have learned to better assess their IT portfolios, evaluate supplier capabilities, craft contracts, and manage supplier relationships. Although many customers view these outsourcing activities as sequential, as Figure 1 shows, they are actually continual and concurrent processes. Even within a customer-supplier relationship, customers frequently revisit a deal's scope and recraft contracts.

We have identified 12 customer lessons we consider most important for managing these four processes.

Evaluating market options

Organizations should stay abreast of market options, even if they are currently insourcing exclusively. At a high level, managers should track supplier capabilities and practices for four general IT outsourcing models:

- time and materials,
- exchange-based or traditional IT outsourcing,
- netsourcing, and
- joint ventures.

Organizations often blend the models—for example, a company that uses a joint venture component to structure a shared risk and reward could use traditional IT outsourcing for operational delivery. In general, each model best suits a particular type of IT activity, as Table 2 describes.

Lesson 1. Consider time and materials contracts when business or technical requirements are uncertain. In the time and materials model, supplier capabilities supplement customer capabilities under in-house management. For example, an organization might hire consultants to help the in-house team implement an enterprise resource planning (ERP) system. The customer can learn IT support techniques from suppliers during project development, such as how to support the ERP system after implementation. Because requirements are uncertain, the customer cannot negotiate a detailed contract, thus a variable price based on time and materials is appropriate.

The time and materials model is the most common model, and indeed it poses the least risk to customers. Because the scope of such work is often

short-term, however, many people do not consider it true outsourcing. Traditional exchange-based IT

Table 1. IT outsourcing success rates over time. Numbers in parentheses are percentages.

Contract year	Total outsourcing	Met most customer expectations	Did not meet most customer expectations	Mixed results
1984-1991	29	14 (48.3)	12 (41.4)	3 (10.3)
1992-1998	56	41 (73.2)	8 (14.3)	7 (12.5)
Total	85	55 (64.7)	20 (23.5)	10 (11.8)

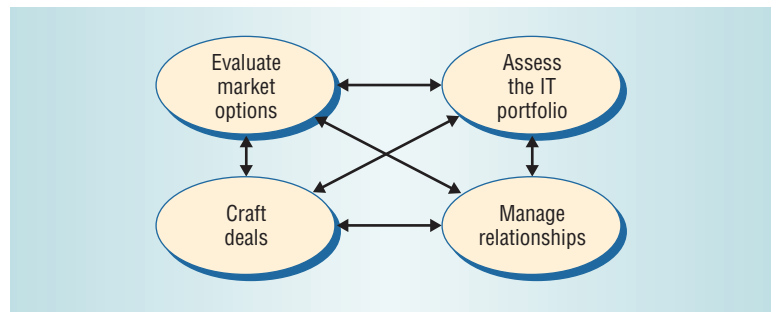


Figure 1. Learning and feedback in effective IT sourcing processes. Customers should continually check market options, reassess their IT portfolios, revisit contracts, and manage supplier relationships.

Table 2. Four IT outsourcing models.

Model	Resource ownership: Infrastructure and people		Customer-supplier relationship	Supplier staff location	Typical customer-supplier contract	IT activities best suited for this model
Time and materials	Supplier	Customer	One-to-one	Customer site	Time and materials	Core or noncore capabilities; customized products and services; uncertain business or technical requirements
Exchange based—traditional IT outsourcing	Supplier	Supplier	One-to-one or one-to-some	Mixed: Some supplier staff on customer site, others at supplier site	Highly customized contract defining customer-specific costs and service levels	Noncore capabilities; customized products or services; stable business and technical requirements
Netsourcing	Supplier	Varies	One-to-many	Supplier site	Generic contract specifying rental costs and minimal service guarantees	Noncore capabilities; standard products or services; stable business and technical requirements
Joint ventures	Venture	Supplier investor	One-to-one: Customer is both investor and first major customer	Mixed: Some supplier staff on customer site, others at venture site	Highly customized for operations delivery; broadly defined for revenue sharing	Customer noncore, supplier core capabilities; significant market for venture's product and services

Netsourcing promises to deliver best-of-breed, scalable, and flexible business applications to customer desktops.

outsourcing is the most common recognized outsourcing model.

Lesson 2. Consider exchange-based contracts for stable, noncore activities requiring some customization. In the exchange-based outsourcing model, the customer pays the supplier for a customized product or service. In this model, the customer typically transfers its IT assets, leases, licenses, and personnel to the external supplier. The supplier manages the resources and provides the customer with a set of products and services governed by a one-to-one contract.

Our studies of IT outsourcing revealed that customers often had naïve expectations about this model. For example, many customers expected to save 25 percent on IT costs by signing a 10-year, fixed-price contract for a set of baseline services. These deals were often disastrous because

- suppliers charged excess fees for services customers assumed were under the baseline umbrella;
- fixed prices exceeded market value over the long term;
- service levels failed to improve or declined, due primarily to poor contractual definition of service levels;
- contracts did not adapt to changing business and technology needs;
- suppliers held monopoly power over the customer's IT;
- customers did not manage the user-supplier interface.

Many customers renegotiated, terminated, or switched suppliers midstream. For example, one survey found that 32 percent of respondents had terminated at least one IT outsourcing contract.³ Of those, 51 percent switched suppliers, 34 percent brought the function back in-house, and the remainder eventually reinstated their initial suppliers due to prohibitively high switching costs.

But the good news is that more than a decade of research supports the lessons for assessing which activities to outsource, evaluating suppliers, and negotiating exchange-based contracts. The model continues to be the dominant form—for example, exchange-based contracts still make up 90 percent of EDS's deals.³

Lesson 3. Consider netsourcing for highly standardized, noncore activities. In the netsourcing model, the customer pays the supplier for a standard product or service delivered over the Internet or other net-

work. Netsourcing promises to deliver best-of-breed, scalable, and flexible business applications to customer desktops for a low monthly fee based on the number of users or transactions. Customers can rent most popular independent software vendor products, including ERP packages from SAP, Oracle, and PeopleSoft; customer relationship management packages from Siebel and Convergys; personal productivity and communications software from Microsoft, Netscape, and Lotus; and e-commerce and e-business packages from CommerceOne, E.piphany, and Requisite Technology. This model suits customers who want lower costs and will accept standardized solutions.

This space still generates only modest revenues, estimated at US\$1-2 billion. Preliminary research shows that early adopters are primarily small to mid-sized enterprises. Most worrying, these early adopters are not following proven sourcing practices—for example, netsourcing contracts are flimsy and leave the customer completely vulnerable.⁴ Thus, netsourcing adopters have an immense opportunity to learn proven practices from more experienced outsourcing customers.

Lesson 4. Consider joint ventures only if a proven market for the partners' complementary capabilities exists. In the joint venture model, the supplier and customer create a new company. The customer investor typically provides personnel, becomes the new company's first major customer, and shares future profits if the venture attracts external customers.

Customer-supplier joint ventures, although not common in IT, are making headlines, particularly in the business process outsourcing (BPO) industry. The UK-based startup, Xchanging, for example, has created three joint ventures with customers:

- *Togethr*, with British Aerospace, provides human resource management BPO. As the venture's first customer, BAe signed a 10-year, £250-million contract and transferred 430 human resources employees to the venture.
- *Procur*, also with BAe, provides procurement BPO. Again, BAe is the venture's first customer, and they signed a 10-year, £800-million contract.
- *Ins-sure*, with Lloyd's of London, provides claims-processing BPO. Lloyd's signed a 10-year, £400-million contract with Ins-sure.

In these ventures, BAe and Lloyd's are guaranteed undisclosed cost savings on the business process and will share the ventures' future profits. The success of these deals depends on Xchanging's

ability to deliver on the contracts and attract external customers.

In the US, Exult's equity relationships with British Petroleum and Bank of America have warranted significant attention. In 10-year contracts valued at more than US\$2 billion, these investors transferred more than 1,000 employees to Exult in exchange for guaranteed cost savings and a share in Exult's profits. Thus far, Exult has won significant contracts beyond its two partners, including a US\$700 million contract with Prudential Financial and a US\$600 million contract with International Paper.

When past joint ventures failed to attract external customers, the partners redefined their relationships as exchange based. Examples include partnerships between Delta Airlines and AT&T, Xerox and EDS, and Swiss Bank and Perot Systems.

Problems arose among such deals because the parties thought they could sell homegrown customer IT systems externally. But the customer's IT systems were too idiosyncratic for commercial delivery in highly competitive markets, and the reality of delivering daily IT services to the customer devoured resources. Xchanging and Exult are different because their Web-enabled software provides one-to-many delivery and because a clear market demand for BPO exists. Gartner estimates that BPO revenue was US\$119 billion in 2000 and will swell to US\$234 billion by 2005.

Lesson 5. Compare requests-for-proposals to internal bids. Merely identifying a sourcing model does not mean a company will find suppliers worthy or willing to engage in a relationship. There are many ways to assess supplier capabilities against in-house provision, but soliciting bids from both external suppliers and in-house IT teams is the most proven. Including internal bid teams creates a more competitive environment because suppliers must demonstrate value beyond what is available in-house.

Our research shows that customers who invited internal IT bid teams to compete with external suppliers made successful sourcing decisions 83 percent of the time. Customers who did not invite in-house bids but only compared existing costs to one or two supplier bids had only a 42-percent success rate.³

Internal bids are infeasible in some situations. For example, rather than using its own capital to invest in much-needed IT renewal, DuPont wanted a supplier to make the investment upfront in exchange for variable usage-based fees. Clearly, an internal bid team could not compete with the US\$4-billion deal DuPont subsequently signed with CSC and Accenture.

Assessing the IT portfolio

Other ongoing processes evaluate the IT portfolio for current and future business advantages and assess the sourcing models for other aspects of the portfolio. Three important lessons focus on such assessments.

Lesson 6. Insource core capabilities. A rich theoretical foundation for make-or-buy decisions in IT outsourcing exists, including resource dependency theory, resource-based view, auction theory, game theory, institutional theory, and, by far the dominant theory, transaction cost economics.

TCE is in many ways the ideal theoretical foundation because it specifically addresses make-or-buy decisions based on generic asset attributes and describes appropriate ways to govern customer-supplier relationships.⁵ For example, TCE posits that transactions with high asset specificity, high uncertainty, or high frequency are best managed internally, while other transactions should be outsourced. Indeed, a number of empirical IT outsourcing studies have found that asset specificity—the degree to which a company can redeploy assets elsewhere without losing value—is a significant factor.^{6–8}

The resource-based view is the second most widely applied theory in IT outsourcing.⁹ RBV suggests that managers keep valuable, rare, nonimitable, and nonsubstitutable strategic assets in-house, while potentially outsourcing the rest.¹⁰ Both TCE and RBV guide managers to treat the entire IT function as a portfolio of transactions and capabilities—some that must be insourced and others that can be outsourced.

David Feeny and Leslie Willcocks¹¹ articulated the most direct assessment of IT services as a portfolio. They defined four core IT categories that customers must keep in-house, even if they intend to outsource nearly all of IT:

- IT governing;
- eliciting and delivering business requirements;
- ensuring technical ability and architecture; and
- managing external suppliers.

Table 3 summarizes these insourcing activities for the different theories.

Lesson 7. Best source noncore capabilities. After identifying core IT assets or capabilities, the customer must decide how to source the remaining noncore capabilities. Customers who consider additional business, economic, and technical factors of noncore capabilities are more likely to be happy with their sourcing decisions.¹²

Soliciting bids from both external customers and in-house IT teams creates a more competitive environment.

Table 3. IT portfolio assessment perspectives: What should an organization keep in-house?

Transaction cost economics	Resource-based view	Core IT capabilities model
<i>High asset specificity:</i> The physical or human IT assets are nonredeployable for alternative uses or users	<i>Valuable:</i> IT activities can be used to exploit strategic opportunities or ward off threats	<i>IT governance:</i> IT strategy, mission, and coordination
<i>Highly uncertain:</i> IT activities cannot be clearly defined for effective third-party contracting	<i>Rare:</i> Few competitors offer the IT activities	<i>Business requirements:</i> Understanding business needs as they relate to IT and fostering relationship building among management, users, and IT
<i>Frequency:</i> Insource transactions occur frequently and are highly asset-specific because they may be less costly than outsourcing	<i>Nonimitable:</i> It is difficult or costly for competitors to imitate the IT activity	<i>Ensure technical ability:</i> The architecture operation may be outsourced, but the customer maintains control over architecture design
	<i>Nonsubstitutable:</i> The IT activity has no equivalents	<i>External supplier management:</i> Customers must make informed buying decisions, monitor and facilitate contacts, and seek added-value opportunities from suppliers

From a business perspective, current noncore IT capabilities can become core in the future. Outsourcing a noncore function now may impede its strategic exploitation in the future. For example, one organization outsourced its Web site design and hosting in 1995. Initially, the Web site served as a marketing tool. With the addition of online sales and customer service, the site became increasingly important to the organization's business strategy, and the outsourcing relationship impeded the company's exploitation of the Web. The organization subsequently terminated the relationship with the supplier at a significant switching cost and brought the function in-house.

From an economic perspective, customers can more efficiently insource some noncore IT activities. Several case study participants were willing to outsource their large data centers, for example, but could not find suppliers to manage the centers at a lower cost.

From a technical perspective, the integration of some noncore IT capabilities with other core activities makes outsourcing extremely difficult. One organization we studied outsourced factory

automation but found that the supplier could not adapt to the sales department's rapid redirections, let alone manage the supply chain implications. The organization eventually paid a significant early termination fee and brought the system back in-house.

Assuming noncore capabilities pass these litmus tests, the customer must still evaluate market options to further validate an outsourcing model and identify viable suppliers.

Lesson 8. Involve senior and IT management in sourcing decisions. Multiple stakeholders must be involved in IT sourcing decisions. In 102 of our sourcing case studies, 76 percent of decisions made jointly by senior executives and IT managers were successful, while senior executives acting alone were successful only 43 percent of the time. Our data shows that in 68 percent of responding organizations, at least two stakeholders drove sourcing decisions—most frequently the IT director and lawyers or the IT director and senior executives.³

Crafting deals

Assuming an organization has identified an appropriate sourcing model and a viable supplier, the parties must still negotiate a contract. Two practices for crafting contracts have proved most successful.

Lesson 9. Detail contracts, including parties' responsibilities and change mechanisms. Unlike the 20-page agreements that sealed Kodak's IT sourcing deals, current exchange-based contracts are exceedingly detailed. Our data shows that detailed contracts had a success rate of 75 percent, whereas loose contracts or standard off-the-shelf supplier contracts had only an 18-percent success rate.³ Survey data shows several types of customer-added contract clauses:

- costs (100 percent of respondents),
- confidentiality (95 percent),
- service-level agreements (88 percent),
- early termination (84 percent),
- liability and indemnity (82 percent),
- change contingency (65 percent), and
- supplier nonperformance penalty (62 percent).

Increasingly, contracts also include matrices that outline customer and supplier responsibilities. This innovation recognizes that customers sometimes cause suppliers to miss service levels. For example, the supplier in one of our case studies did not connect new customer employees to the network within the contractual time limit because the customer systematically failed to properly authorize new accounts.

No matter how detailed contracts become, requirements can change. Many contracts now have change mechanisms, such as

- planned contract realignment points (typically every few years) at which to adapt the contract,
- contingency prices for fluctuating volume of demand,
- negotiated price and service-level improvements over time, and
- external benchmarking of best-of-breed suppliers to reset prices and service levels.

Lesson 10. Keep contracts short enough to retain relevancy and control, but long enough for suppliers to generate a profit. Our evidence clearly shows that customers benefit more from short-term contracts than from long-term contracts.³ Suppliers, however, clearly prefer long-term relationships, which help them recoup excessive transition and investment costs. DuPont's transition from in-house provision to CSC and Accenture, for example, lasted more than 18 months as the contract became operational in 22 countries, serving nearly 100,000 users. CSC made a massive investment in IT infrastructure for DuPont, which it could only recoup over the long term.

Managing relationships

For all the sourcing models, contracts are inherently adversarial in that every dollar out of the customer's pocket is a dollar in the supplier's pocket. This is even true for joint ventures because the customer investor is also the venture's primary or even sole paying customer. If customers follow best practices up to contract signing, they should be sufficiently protected from the devastatingly negative consequences experienced in the early days of IT sourcing.

Suppliers who negotiate favorable deals should be able to deliver on the contract and still earn a profit. Even under the most favorable circumstances, however, relationship management is difficult.

Lesson 11. Establish core customer capabilities to protect customer interests and foster supplier success. Feeny and Willcocks¹¹ define three core customer capabilities for managing outsourcing.

- *Contract monitoring*, which ensures that the supplier delivers on the contract. This capability also monitors emerging best-of-breed costs and services to motivate and negotiate improved supplier performance over time.

- *Contract facilitation*, which provides a vital liaison between suppliers, customers, and business communities to ensure supplier success. The contract facilitator role ensures that the user community understands the supplier's contractual obligations to prevent unrealistic performance expectations, for example. Contract facilitation helps suppliers implement vast change programs such as consolidation, standardization, and rationalization. The role also evaluates user demand to harness spending beyond the baseline.
- *Supplier development*, which goes beyond a contract's legal requirements to explore new ways customers and suppliers can engage in win-win activities. This capability is usually not evident until the transition period ends and operations stabilize.

Lesson 12. Embrace relationship dynamics. Even with these capabilities in place, customer and supplier relationships are sometimes adversarial. Customers and suppliers may disagree about a monthly bill or a contract interpretation, for example, but maintain a good relationship overall. Rather than seeking to extinguish such disputes, the best relationships embrace their dynamics.

In addition to adversarial relationships, we identified three other customer-supplier interaction types—tentative, cooperative, and collaborative—based on the extent of goal alignment for the task at hand.

- *Tentative* interactions occur when goal alignments are unknown, such as during the bidding process. At such times, each side tends to exaggerate its strengths and hide its weaknesses.
- *Cooperative* interactions occur when goals are complementary, as when the customer wants the service and the supplier wants the payment.
- *Collaborative* interactions occur when both sides share goals, such as educating the user community on what it can expect from the contract.

Each side must have equal power to achieve equitable outcomes. Each party's aim should be fairness, not domination or exploitation. Again, a common playing field can only exist if the customer has successfully executed the IT assessment, supplier evaluation, and contracting processes.

Suppliers who negotiate favorable deals should be able to deliver on the contract and still earn a profit.

The ideal customer has significant experience with outsourcing activities, crafting contracts, and ensuring supplier success.

LESSONS FOR SUPPLIERS

Four suppliers—EDS, IBM, CSC, and Accenture—were involved in nearly all of our exchange-based case studies, with deals worth US\$500 million or more. These suppliers are among the few organizations with a global presence significant enough to service such large deals.

The deals' success varied significantly. Given that the suppliers are the same, we can assume that the customer makes the difference. Put simply, good customers make for good relationships. The ideal customer has significant experience with outsourcing activities, crafting contracts, and ensuring supplier success.

Three lessons stand out as viable ways to educate, inform, and attract good customers, primarily through superior supplier integrity.

Supplier lesson 1. Educate your customer as early as possible. Increasingly, we advise suppliers to help educate naïve customers on the issues we discuss here. For example, after receiving the Feeny and Willcocks core IT capabilities, a supplier who was bidding on a significant US government contract advised the government agency to reduce its RFP's scope and retain more supplier management capability. The agency revised its RFP and subsequently selected this supplier.

Supplier lesson 2. Submit realistic, open bids. Some suppliers underbid to secure the contract. Such a strategy was often fruitful in the past because suppliers knew that the customer's needs would change, and upsell opportunities would more than compensate for loss on the baseline contract. But customers are increasingly aware of such strategies and intentionally select other suppliers for add-ons to keep a competitive playing field.

The supplier benefits more from offering a realistic bid and disclosing how it can deliver on the bid and still earn a profit. Such disclosure might entail nonimitable IT infrastructure and capabilities or costs due to economies of scope and scale. For example, Xchanging can boast that one of its process experts implemented General Electric's Six Sigma program, which saved the company US\$54 million. Disclosures also make customers question competitors' unrealistic bids.

Supplier lesson 3. Propose and price value-added options. After the transition period, customers generally find that suppliers can deliver the operational objectives of IT contracts. But customers increasingly expect more technical innovations and even revenue-generating opportunities, even if the deals are essentially exchange based.

Customers express ongoing disappointment on this front:

Sure, the supplier delivers the contract ... but trying to get them to identify the added value we talked about at the beginning, let alone deliver on it, is very difficult.

—IT contract manager, US bank

Yes, the supplier can achieve all the things that were proposed—but where is this famous added-value service? We are not getting anything over and above what any outsourcer could provide.

—IT services director, aerospace company

The value-added supplier proposes and prices options that significantly benefit the customer. By Web-enabling human resource management, creating wireless connections for sales force support, and helping customers use online auctions to reduce procurement costs, suppliers can effect significant cost savings and service improvement.

No one debates whether a company should or should not outsource anymore; instead, customers question how they can best leverage the global IT outsourcing market. The answer is that customers can create stability in their sourcing by developing capabilities in market options evaluation, IT portfolio assessment, deal crafting, and supplier relationship management. Shifting in-house roles from supply delivery to demand management gives customers solid skills for assessing and adopting new technologies, processes, and contracting options that add value to their own idiosyncratic business context. ■

References

1. M. Lacity, L. Willcocks, and D. Feeny, "Information Technology Outsourcing: Maximize Flexibility and Control," *Harvard Business Rev.*, May-June 1995, pp. 84-93.
2. R. Hirschheim and M. Lacity, "Information Technology Insourcing: Myths and Realities," *Comm. ACM*, Feb. 2000, pp. 99-107.
3. M. Lacity and L. Willcocks, *Global IT Outsourcing: Search for Business Advantage*, John Wiley & Sons, New York, 2001.
4. T. Kern, M. Lacity, and L. Willcocks, *Netsourcing: Renting Business Applications and Services over a Network*, Prentice Hall, Upper Saddle River, N.J., 2002.

5. O. Williamson, "Comparative Economic Organization: The Analysis of Discrete Structural Alternatives," *Administrative Science Quarterly*, vol. 36, no. 2, 1991, pp. 269-296.
6. S. Ang and D. Straub, "Production and Transaction Economies and Information Systems Outsourcing: A Study of the US Banking Industry," *MIS Quarterly*, vol. 22, no. 4, 1998, pp. 535-552.
7. K. Nam et al., "A Two-Level Investigation of Information Systems Outsourcing," *Comm. ACM*, July 1996, pp. 36-44.
8. L. Poppo and T. Zenger, "Testing Alternative Theories of the Firm: Transaction Cost, Knowledge-Based, and Measurement Explanations for Make-or-Buy Decisions in Information Services," *Strategic Management J.*, vol. 19, no. 9, 1998, pp. 853-877.
9. D. Straub, P. Weill, and K. Stewart, "Strategic Control of IT Resources: A Test of Resource-Based Theory in the Context of Selective IT Outsourcing," working paper, Georgia State Univ. and MIT Sloan School of Management, 2002.
10. J. Barney, "Firm Resources and Sustained Competitive Advantage," *J. Management*, Mar. 1991, pp. 99-121.
11. D. Feeny and L. Willcocks, "Core IT Capabilities for Exploiting Information Technology," *Sloan Management Rev.*, vol. 39, no. 3, 1998, pp. 9-21.
12. M. Lacity, L. Willcocks, and D. Feeny, "The Value of Selective IT Sourcing," *Sloan Management Rev.*, vol. 37, no. 3, 1996, pp. 13-25.

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