THE MATURATION OF OFFSHORE SOURCING OF INFORMATION TECHNOLOGY WORK[1]

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Executive Summary

Offshore sourcing of information technology (IT) work – whether to an in-house offshore facility or a third-party located in another country – is increasing for a variety of reasons, including lower costs as compared with domestic outsourcing and an ample supply of qualified labor. Today, U.S. firms are at varying stages of offshore maturity. In our field work, we identified four stages of maturation: Offshore Bystanders are Stage 1 companies that do not outsource offshore at all, but may have a few advocates pushing the idea. Stage 2 companies, Offshore Experimenters, are pilot testing sourcing non-core IT processes offshore. Stage 3 companies take a Proactive Cost Focus and seek broad, corporate-wide leverage of cost efficiencies through offshore work. Stage 4 companies take a Proactive Strategic Focus and view offshore sourcing as a strategic imperative. This paper describes these four stages and the managerial tactics associated with each one. It also examines the dynamics of the global IT labor market, and recommends how to move up the maturity curve.

Offshore IT Sourcing Is Gaining IT Management Attention

Offshore sourcing of IT work is increasingly occupying the attention of IT managers in U.S.-based firms. The term "offshore sourcing" includes both offshore outsourcing to a third-party provider as well as offshore insourcing to an internal group within a global corporation. Note the experiences of three major global U.S. corporations, General Electric (GE), Intel, and Ford:

- GE may be the largest American customer of offshore IT work. GE now has some 7,000 software professionals offshore, responsible for a wide variety of IT functions. In 2000, GE performed $280 million of IT work in India, increasing to $400 million in 2001. While most of GE's offshore work is performed in India, the firm also has two offshore development centers in Mexico and recently opened a center in China.

- "Intel Corp. opened [a software lab in 2000] in the central Russian city of Nizhny Novgorod. The chip maker employs 100 local programmers at the lab, plus another 100 contractors elsewhere in the country."[2]

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[2] Chazan, G. *"Now Available from Russia: Software Programming," The Wall Street Journal,* August 6, 2001, page B1.

- "Ford [will] shift much of its computer-aided design and manufacturing (CAD/CAM) development, e-mail processing, and application development tasks to a subsidiary it is setting up in Chennai, India. Although Ford already has limited IT operations in that country, the latest effort is expected to help the automaker cut its costs by an additional $30 million to $60 million per year because IT labor costs in India are a fraction of those in the U.S."[3]

IT managers are being pressured, above all, to contain costs in addition to ramping up projects quickly, finding experienced staff in fast-moving technologies, and innovating constantly with IT. To acquire the IT competencies that address these challenges, IT managers can choose one of two strategies: either outsource to a domestic supplier or go offshore. Our recent research has focused on this latter strategy of U.S.-based firms.

What has enabled foreign sourcing of IT work to grow? There are many reasons. One, the increasingly modular design of software production has reduced transactions costs – that is, the cost of coordinating software development and support work between two or more parties. More modular software production eases the burden of synchronizing, communicating, traveling, monitoring, providing feedback, and enforcing software development contracts.

Two, technologies for managing and coordinating work across geographic distances have matured considerably.

Three, offshore organizations (both internal and third-party) have improved their software development and project management capabilities.

The result, we believe, is that offshore sourcing of IT work will continue to grow because demand pressures persist, enabling factors are improving, and, as we discuss later, an increasingly professional global IT labor supply is emerging.

To better understand this offshore-sourcing phenomenon, and its underlying decision-making dynamics, we interviewed executives responsible for global IT sourcing decisions in 13 of the largest and most influential U.S.-based firms (see Appendix for study meth-

odology). We spoke with executives in manufacturing and service sectors (whose IT organizations support internal needs only) and in technology companies (whose primary business is building software or providing professional IT services to others). We asked these executives:

- What is driving the offshore phenomenon in your corporation?
- Where are you going and why?
- What internal organizational impediments do you face?
- How are you overcoming these impediments?

Their experiences suggest that offshore IT sourcing follows a stage model, based on increasing maturity and sophistication in the offshore effort. This model can be used by IT executives to benchmark their own activities. Furthermore, based on this research, we make recommendations for managers seeking to leverage offshore resources in delivering their IT solutions.

Four Stages of Offshore IT Sourcing

The companies we studied had different experiences as they proceeded offshore. Some chose vertical integration, while others used strategic alliances and partnerships. Some struggled to begin, while others made great progress. Are there discernible patterns in their experiences? We believe there are. We call this maturation the SITO stage model – short for "Sourcing of IT work Offshore." We derived the model from our own research as well as from the non-IT sourcing model of Monckza and Trent.[4]
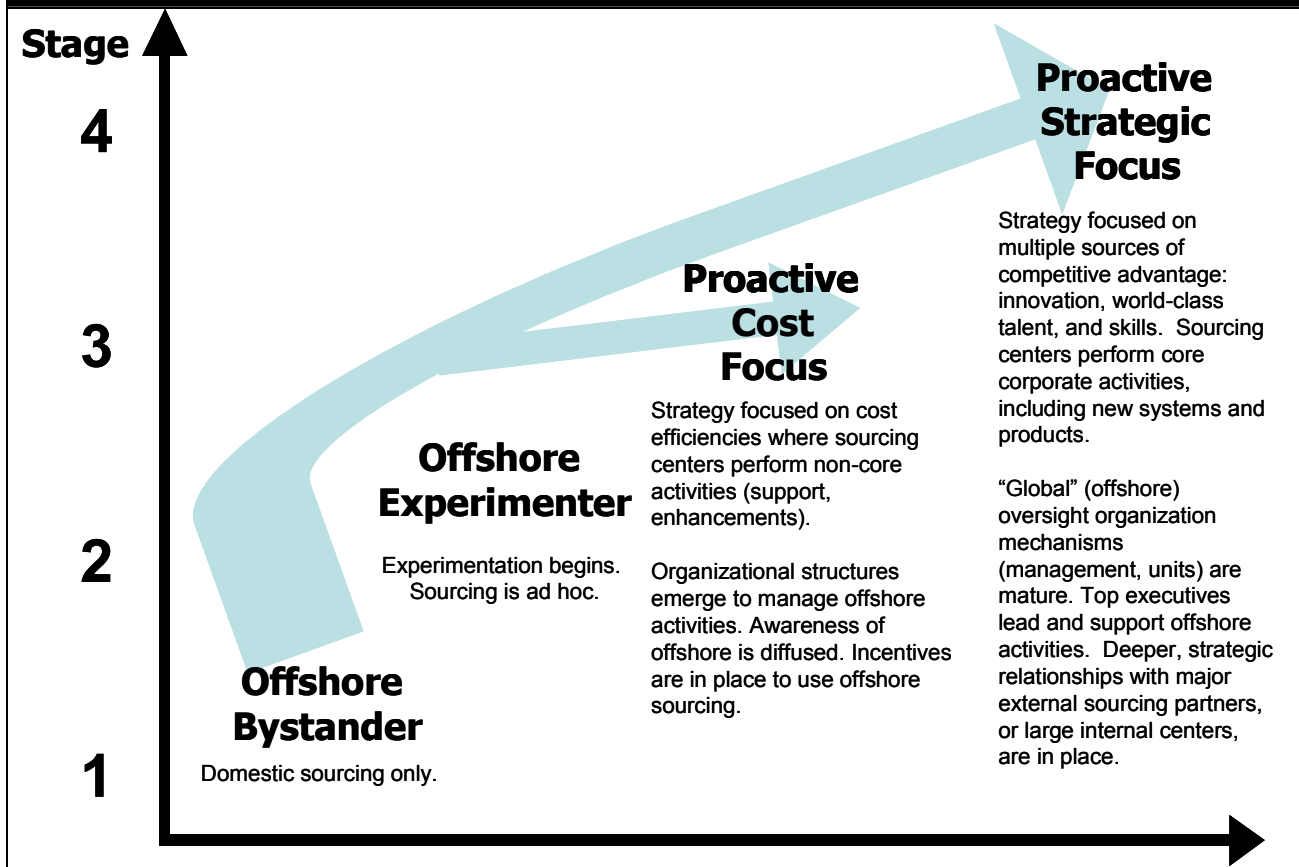
SITO has four stages:

- Stage 1: Offshore Bystander – No offshore sourcing; domestic sourcing only.
- Stage 2: Offshore Experimenter – Experiments with offshore sourcing on an ad hoc basis.
- Stage 3: Proactive Cost Focus – Sourcing of non-core work is encouraged at offshore centers, with the goal of cutting

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[3] Copeland, L. "Ford Opens IT Hub in India to Save Millions," *Computerworld*, March 19, 2001.

[4] Monckza, R.M. and Trent, R.J. "Global Sourcing: A Development Approach," *International Journal of Purchasing and Materials Management*, Spring 1991, pp. 2-8.

Figure 1: Sourcing of IT Work Offshore (SITO) Stage Model

Stage

4

3

2

1

Proactive Strategic Focus

Strategy focused on multiple sources of competitive advantage: innovation, world-class talent, and skills. Sourcing centers perform core corporate activities, including new systems and products.

"Global" (offshore) oversight organization mechanisms (management, units) are mature. Top executives lead and support offshore activities. Deeper, strategic relationships with major external sourcing partners, or large internal centers, are in place.

Proactive Cost Focus

Strategy focused on cost efficiencies where sourcing centers perform non-core activities (support, enhancements).

Organizational structures emerge to manage offshore activities. Awareness of offshore is diffused. Incentives are in place to use offshore sourcing.

Offshore Experimenter

Experimentation begins. Sourcing is ad hoc.

Offshore Bystander

Domestic sourcing only.

costs; offshore management mechanisms emerge.
- Stage 4: Proactive Strategic Focus – Core IT work is sourced to offshore centers, with the goal of achieving competitive advantage; distance management mechanisms are mature.

Each stage in this model is characterized by a set of strategic imperatives and internal firm dynamics, as described below.

Stage 1: Offshore Bystander

In this stage, there is no offshore sourcing of IT work; all sourcing is domestic to the U.S. While nearly 100 percent of U.S. *Fortune 500* firms were at this stage in 1990, we estimate that only 30-50 percent are still here in 2002. Firms remain at this stage because they have an ample supply of domestic IT labor or because the offshore option is not in the managers' mental models. However, this latter condition is diminishing.

These firms remain bystanders – even with the significant media attention focused on offshore sourcing –

mainly because of their managers' significant pushback against offshore work. Both IT project managers and IT product managers are reluctant to send work offshore. "Nobody wants to move their work," said one offshore executive of the managers he encounters.

We found two reasons for pushback: a domestic mindset and inexperience in managing from a distance. A domestic mindset refers to corporate (or divisional) culture. For example, one corporation was characterized as "having a U.S.-centric model." Another was used to doing all its IT work only at its California sites. A third had a conservative culture; its employees were not used to diversity or foreign accents. And in a fourth, which performs defense-related projects for the government, managers were concerned about "atomic bombs in India."

The second pushback factor is inexperience in managing geographically dispersed projects. Some managers are simply more comfortable "managing by walking around." As one executive from an IT professional services firm pointed out, when IT managers become

responsible for a project, they tend not to look beyond their own staffs for labor.

Some managers believe, somewhat erroneously, that offshore projects are characterized by minimal communication between offshore provider and the U.S. client. As a result, they assume all system requirements must be specified up front and very precisely in writing for the offshore sourcing to be successful. Precise specifications are difficult, so their reasoning justifies their avoiding the offshore route. (A corollary is that some managers are comfortable only sourcing low-level tasks offshore.)

We observed that pushback from software product engineers stemmed from their strong sense of product ownership. They proudly created these products, so they are unwilling to delegate responsibility offshore. They believe no one else can learn quickly enough to develop the products as well as they can.

Undoubtedly, globally dispersed projects are more difficult to manage than co-located ones.[5] U.S. executives we interviewed who were active offshore users identified numerous problems they faced early on. Many of the problems have persisted, including:

- Cultural differences that lead to miscommunications and a lack of trust
- Time zone differences
- Poor English language skills
- Strange foreign work-hour regulations
- High employee turnover in India
- Difficulties in arranging visas for foreign professionals to the United States
- An offshore unit's lack of domain knowledge
- An unreliable telecommunications infrastructure.

Collectively, these obstacles deter Offshore Bystanders and frustrate those who may have moved further along. These obstacles also become handy excuses for firms unwilling to learn how to overcome them. All of them can certainly be managed, although not completely eliminated.

We identified three Offshore Bystanders in our study. Each of these large firms had a different reason for not shifting IT work offshore. One felt its hands were tied because it was involved in a broad, long-term out-

sourcing contract with a major U.S. outsourcing company. The second company was fortunate enough to be situated in an American metropolitan area in which the supply of IT labor was sufficient for its needs. The third, deeply involved in defense contracts, assumed that moving IT work offshore would compromise the security of its defense work.

However, all three companies were taking small, initial steps offshore. And as is common, all three had their eyes primarily on India. One was allowing Indian firms to bid on four IT projects. Another had conducted some studies, but had not taken action yet. The third had begun a very small engagement with an Indian company, with three Indian professionals working on an experimental project. This third firm could be classified as transitioning into Stage 2.

In nearly all 13 firms in our study, no matter their stage, we found an "offshore champion" who advocated a new offshore approach within the corporation. This champion is the catalyst who creates momentum within the complex political environment of a large U.S. corporation. Champions see their mission as expanding offshore sourcing and are frustrated, or stymied, when they do not succeed in this mission. At one corporation stuck in Stage 1, the stymied champion said, "We missed the boat on India."

Typically, Offshore Bystanders have a history of choosing domestic partners for any outsourcing activity, not just for IT. They also generally have a conservative culture (e.g., a domestic mindset). Turning to an offshore unit would represent a significant shift in corporate values. The conservatism arises from a variety of factors, including a subtle distrust of foreigners and, in some instances, concerns about security. Even with one or two champions who advocate moving IT work offshore, the firms remain Offshore Bystanders because the champions' views are not widely shared among other corporate executives and IT managers.

Stage 2: Offshore Experimenter

Offshore Experimenters take an ad hoc approach to sourcing. Pockets of offshore IT activity emerge inside the corporation, but there is little coordination or knowledge sharing across divisions. In short, they do not coordinate or manage vendors, site selection, or acquisitions.

Firms transition from Stage 1 to Stage 2 when their offshore champions begin to be heard. Typically, firms move into and through Stage 2 beginning with pilot projects. We estimate that 10 to 20 percent of

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[5] Carmel, E. *Global Software Teams: Collaborating Across Borders and Time Zones,* Prentice Hall PTR, Upper Saddle River, NJ, 1999.

U.S. *Fortune 500* firms are in Stage 2 today. For many, this experimentation phase began in the early to mid-1990s, lasted several years, and then the firms moved into Stage 3.

In the past, many Offshore Experimenters were reactive because their experimentation was motivated by years of cost pressures and a tight U.S. IT labor market. With this combination, managers saw little choice but to go offshore to meet their IT needs. They went offshore for Y2K remediation projects, for instance. But since 2000, this reactiveness has subsided. Today, firms are motivated to become Offshore Experimenters to diversify, cut costs, or simply join the bandwagon (everyone is doing it).

Most business cases for offshore IT sourcing focus on cost savings. More than 90 percent of the firms in our study stated they were sourcing offshore, at least in part, to save money. In fact, 70 percent said cost savings was their sole reason or a key reason for doing work offshore:

> *"Our IT budget is under constant pressure. It has shrunk to half, therefore, the move to India makes perfect sense."*

> *"We [in the offshore units] are now doing SAP [....]. We used to think that only $125/hr [American] consultants could do that. We knocked that off."*

As observed earlier, Offshore Experimenters are characterized by ad-hoc offshore efforts. They choose offshore vendors without necessarily performing sophisticated comparisons. Or they let the location of offshore suppliers be dictated by short-term convenience. Or they set up an internal offshore unit without a high-level mandate. The managers in these companies view their approach as appropriate because they do not see offshore sourcing as a long-term activity. However, these ad-hoc efforts generally do not deliver the full potential of offshore sourcing.

Stage 2 is actually a transition stage; it is not sustainable in the long run. Offshore Experimenters either move on to Stage 3 or regress to Stage 1 – but no firms in our sample had regressed. Companies move on because Stage 2 outsourcing creates a momentum that propels firms to develop structures, roles, and processes to leverage offshore resources. That is, once exposed to successful experiments, companies look to develop a strategy to garner any missed benefits – moving them to Stage 3.

Stage 3: Proactive Cost Focus

The transition from Stage 2 to Stage 3 is marked by moving from a reactive to a proactive stance. Management shifts its view of offshore sourcing, seeing it as a viable, acceptable strategy. Companies in Stage 3 still focus on saving money. In fact, that view becomes widely recognized and accepted within the company.

In Stage 3, managers develop internal capabilities and expertise to manage their offshore relationships. If these relationships are with third-party vendors, the managers expand their knowledge about supplier and site performance as they learn how to manage these long-term relationships. Generally, the offshore tasks are non-core and structured, such as maintaining current systems, performing quality assurance on new development, testing new applications, or porting applications to new platforms.

Given the focus on cost, firms just entering Stage 3 often find they already have a large number of external suppliers because different divisions have sent their IT projects overseas without central coordination. Rather than seek long-term, deep relationships with a small number of vendors, the different groups separately "shop around" for the lowest-cost bidder for each IT project.

Other firms want to reduce the number of suppliers, so they seek longer-term, deeper relationships with a small number of vendors for substantial chunks of their IT project portfolio.

Regardless of the number of suppliers, in all cases within our study, the Indian units were either the sole or major units involved in offshore sourcing. Often, these units were one or two large offshore IT professional services firms. In fact, two of the four Stage 3 companies in our sample sourced from just one large Indian firm, a third sourced from two Indian firms, and the fourth sourced from a U.S.-based IT professional services organization that subcontracts its offshore work to India. All these relationships were significant, involving tens or even hundreds of millions of dollars each year.

In Stage 3, both business and IT executives view offshore sourcing as an important mechanism for exerting market pressure on internal IT units. In-house IT units have often been characterized as monopolies that restrict free choice among captive internal clients.[6]

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[6] Lacity, M.C., Willcocks, L.P., and Feeny, D.F. "IT Outsourcing:

Sending IT work overseas to less expensive destinations creates a natural incentive for domestic internal IT units to utilize resources as effectively and efficiently as possible. For instance, at a number of corporations in our study, the offshore units bid competitively against domestic internal units for internal projects.

Offshore units also offer increased cost flexibility. One unit in our study offers a menu of monthly contracts, short-term contracts, pricing by the hour, and bids on complete jobs.

The following quotes from our interviews demonstrate both the cost efficiencies of offshore sourcing and the ways management promoted this activity. Both are illustrative of the Stage 3 mindset:

- Corporation A set a target of sourcing 10 percent of its IT work offshore within the next few years. Managers had numeric quotas to meet, and each received an annual "balanced scorecard" that specified the offshore staff level. The managers met these offshore quotas about 80 percent of the time, and the strong budget controls helped drive work offshore.

- At Corporation B "… for every new application there is a [standard] checklist of how many global [offshore] resources you should be using, and if not, why not?"

Stage 3 or 4 companies often have fairly sophisticated labor-costing models, which they use to compare the cost of an individual IT professional in California with one in Kansas City, Bangalore (India), and Stockholm. One estimate we heard often was that an offshore Indian professional has a loaded cost of 30-50 percent relative to a U.S. professional. This finding is consistent with similar studies.[7] However, some offshore wage comparisons that appear in the trade press over-emphasize cost savings because they ignore the other indirect costs of offshore IT work.

Interestingly, although Canada is not a nation that first comes to mind for offshore IT work, it is well worth considering, partly because of the currency differential. Canada now has a cost advantage for its IT professionals of about 30 percent relative to the U.S. In fact, it is on a par with Brazil and Ireland.

Cost efficiencies are not the only benefits of Stage 3. The discipline and rigor of the development methodology used by Indian firms benefited three companies in our sample. For American companies, the best-known quality yardstick is the Capability Maturity Model (CMM),[8] and a number of Indian IT firms have attained world-class levels of quality by implementing CMM processes.

Stage 3 companies also shift low-value, monotonous, and boring work offshore to focus internal IT units on more interesting, higher value-added tasks. IT managers appreciate this benefit because it has become increasingly difficult to hire and retain domestic software professionals to perform the low-value tasks, especially in high-wage metropolitan areas.

We estimate that 30 to 60 percent of U.S. *Fortune 500* firms are in Stage 3 in 2002. For some, the proportion of offshore IT headcount to total IT staff is between 10 and 20 percent.[9]

While the types of firms in Stage 3 vary significantly, they typically make intensive use of offshore third parties (primarily in India) for internal support functions (e.g., information systems). They were the early offshore adopters, beginning their Stage 2 experimentation in the early to mid-1990s. Thus, by 2002, they have accumulated a relatively long history of offshore work and have many employees with experience and confidence in this approach. In fact, this confidence is a key factor underlying the transition to Stage 4.

Stage 4: Proactive Strategic Focus

In our estimation, no more than 10 percent of U.S. *Fortune 500* firms have reached Stage 4 – where management no longer views offshore options as simply sources of low-cost work or suppliers of lower-valued work.[10] Rather, management views offshore IT sourc-

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Maximize Flexibility and Control," *Harvard Business Review* (73:3), May-June 1995, pp. 84-93.

[7] Arora, A., Arunachalam, V.S., Asundi, J.M., and Fernandes, R.J. *The Globalization of Software: The Case of The Indian Software Industry*, Final Report, February 2000, Heinz School, Carnegie Mellon University, http://www.heinz.cmu.edu/project/india/. Accessed on June 19, 2002

[8] Software Engineering Institute Capability Maturity Model Integration, http://www.sei.cmu.edu/cmmi/. Accessed on April 23, 2002.

[9] The ratio of IT headcount results from our own data. Separately, the proportion of the IT budget for those firms doing so-called selective IT outsourcing (both domestic and offshore) is typically 15-30 percent according to Lacity, M. C. and Willcocks, L.P. *Global Information Technology Outsourcing: In Search of Business Advantage*, Wiley, New York, NY, 2001.

[10] Barthelemy, J. "The Hidden Costs of IT Outsourcing," *Sloan Man-*

ing as an important and attractive strategy for achieving a range of strategic objectives.[11,12] In addition to cost advantages, Stage 4 companies utilize offshore units to increase business innovation, spur technology innovation, develop new products, gain access to new markets, and grow globally.[13] In short, offshore sourcing becomes embedded in the firm's culture.

A key distinction between Stage 3 and Stage 4 is that the offshore partners of Stage 4 companies also routinely develop *new* IT products or systems, take ownership of entire IT systems or software products, and assume responsibility for end-to-end IT systems. In Stages 2 and 3, new development is rarely sent offshore. In Stage 4, it occurs regularly.

This transition to entrusting new systems to an offshore unit is significant because developing new systems involves domain expertise (or often, "business knowledge"). That domain expertise could mean understanding a financial modeling system of a bank, the consumer Web page of a retail company, or a new network management software package. One executive from a leading Wall Street firm told us that his company planned to send complex, turnkey projects offshore. The entire lifecycle – from requirements gathering through implementation and support – would be handled by the offshore IT professionals. In practice, such turnkey outsourcing is usually facilitated and managed by an onshore "bridge" organization established by the offshore vendor.

In Stage 4, managers also recognize their need to establish a global network of coordinated sourcing nodes, and then leverage that network to orchestrate new development and key support functions globally. For example, one company in our study set up IT centers around the world to provide 24/7 software engineering support. Each center has its own unique capabilities, talents, and timelines so that together the centers can fulfill any information systems need of the company in a timely manner.

Typically, software R&D organizations have units in many nations. Information systems units, on the other hand, tend to develop deep and intensive relationships with just one or two strategic outsourcing vendors,

which they then call *preferred vendors*. Indeed, some preferred offshore vendors have such tight relationships with their American clients that they have special bidding rights on projects and receive other inside-access privileges. In essence, they become extensions of their clients' internal IT units. This structure, which represents a significant departure from the traditional view of organizational boundaries, is similar to the network organization forms,[14] business models, and governance arrangements of such celebrated companies as Dell and Cisco.[15]

Global coordination of resources also accelerates time-to-market. In a hyper-competitive global marketplace, there are compelling pressures to quickly bring new products and services to market. One-third of the large American corporations we surveyed noted that *ramp-up* time has become an important factor in their offshore decisions; significantly, the technology firms were the ones most concerned about this factor. Ramp-up is critical to project-level decision-makers because once a project is approved, they want the work to begin immediately. That means those people need to be available. Unlike U.S.-based human resources, the offshore units can staff quickly.

To manage their networks of corporate-wide offshore sourcing centers, the Stage 4 companies we interviewed established specific oversight units, with titles that include the term *global*, such as *global engineering* and *global services*. The term *global* is chosen because, as one of the executives quipped, the term *offshore* has some negative connotations.

These global oversight units amass and house the capabilities to manage the offshore activities, such as in-depth knowledge about offshore suppliers, about their relative strengths and weaknesses, and about the pros and cons of insourcing versus outsourcing offshore centers. In some instances, these oversight units implement new measurement and reward systems that encourage project-level decision-makers to find the best software resources – inside or outside the corporation.

agement Review (42:3), Spring 2001, pp. 60-69.

[11] Ballon, M. "U.S. High-Tech Jobs Going Abroad," *Los Angeles Times*, April 24, 2000.

[12] ITAA. *Bridging the Gap: Information Technology Skills for a New Millennium*. Washington D.C.: Information Technology Association of America, April 2000.

[13] Kotabe, M. *Global Sourcing Strategy*, Quorum Books, New York, NY, 1992.

[14] Useem, M. and Harder, J. "Leading Laterally in Company Outsourcing," *Sloan Management Review* (41:2), Winter 2000, pp. 25-36.

[15] For instance, Cisco utilizes contract manufacturers extensively for product development, and maintains close relationships with them. Likewise, Dell executes its direct-to-customer business model through a variety of deep relationships with component manufacturers and logistics providers.

Tech Insourcers: One Type of Stage 4 Firm

We initially expected technology companies to be in Stage 4 and to have different organizational structures and mechanisms than the other companies. In general, technology companies have been more active in offshore work than non-technology companies. For example, as far back as 1974, IBM spent about 30 percent of its R&D budget on offshore R&D.[16] We therefore expected these firms to have accumulated considerably more experience in offshore IT sourcing. Indeed, we did find the technology companies behaving differently: They usually preferred to *own* their IT units.

Many of the Stage 4 firms are technology firms building wholly owned offshore development centers. We call them *Tech Insourcers* (insourcing because they fundamentally source from within their firms). Four companies in our sample fit this pattern. Three had global oversight organizations, usually headed by the corporate offshore champion – who traveled a great deal. One champion we interviewed had headed the global oversight organization for 10 years. Another made a deep personal commitment to the success of the new India center; he personally interviewed every candidate, out of several hundred!

In our sample, the size of each of the wholly owned offshore facilities was substantial – 400, 500, 1,000, and 2,000 professionals offshore. And all four offshore organizations were growing aggressively. Three had an extensive network of offshore development and support sites – 6, 9, and 16 sites, respectively. The fourth firm focused primarily on a large center in India.

Once Tech Insourcers build their offshore facilities, they use a variety of approaches to market their services. All four in our sample proactively sold their offshore services throughout their companies. Although this practice is common in most IT organizations, active and aggressive marketing is critical for offshore organizations because they are not part of the domestically located core IT function. To sell their offshore services to the various divisions within their corporation, they conducted seminars, set up Web pages, organized workshops, employed salespeople, and distributed brochures (one read "Leveraging Worldwide Engineering Talent").

The offshore groups at two Tech Insourcers were also creating internal "marketplaces" to match "customers" (internal product/program managers worldwide) with "suppliers" (internal offshore staff). These "marketplaces" potentially could create greater internal efficiencies.

The offshore sites used classic sales tactics to gain favor with promising internal IT customers by, say, pricing a project as a "loss leader" or using so-called *staff augmentation* as initial inducements. Staff augmentation is a label for importing inexpensive labor from low-wage nations. Though more expensive, it is easier to sell to reluctant managers because it does not require them to work with distant offshore units. In this respect, staff augmentation serves as an important bridgehead for advocating offshore outsourcing: Once these customers gain confidence working with the foreign staff on site, they will be more willing to work with the distant offshore staff.

Surprisingly, some of these giant tech insourcers used their offshore IT units for three quite distinct organizational functions: software product R&D, internal information systems work, and providing IT professional services to other firms. One firm supported all three streams of software work within its offshore units; another handled both software product R&D and internal information systems work.

Why were technology firms building their own offshore facilities rather than outsourcing to third parties? After all, American managers have become accustomed to outsourcing to third parties.[17] Indeed, the high transactions costs that drove vertical integration for much of the 20th century have become less relevant as the coordination costs of managing over distance and over organizational boundaries have declined. However, the managers we interviewed saw some clear advantages to *internal* offshore sourcing. Their rationales resemble the classic "build versus buy" argument that firms have used for decades. They prefer having vertical integration and an internal locus of control.

In particular, they underscored three advantages to vertical integration. First, ramp-up time is shorter because internal contracting is simpler. Second, insourcing has advantages in the areas of security, confidentiality, and maintaining proprietary knowledge. With an internal offshore unit, all professionals with access to

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[16] Ronstadt, R.C. *Research and Development Abroad By U.S. Multinationals*, Praeger, New York, NY, 1977.

[17] DiRomulado, A. and Gurbaxani, V. "Strategic Intent for IT Outsourcing," *Sloan Management Review* (39:4), Summer 1998, pp. 67-80.

internal systems are inside the security firewall. Thus, disclosure concerns are mitigated. Third, the internal IT professionals use standard software engineering tools, methodologies, and work processes, which reduce the project management burden. In addition, there is an unspoken reason for resisting outsourcing IT: Not surprisingly, technology companies want to maintain strong in-house technical capabilities.

U.S. Firms Will Move Up the Maturity Curve

Is this model deterministic? That is, do we expect a majority of large U.S. firms to transition to Stages 3 or 4? Our answer is "Yes." We believe the trend in offshore IT work parallels the labor shifts in other industries – most recently in electronics, textiles, and automobiles. The economics of sending IT work offshore is compelling, from both a production and transaction cost perspective.[18] More importantly, movement to Stage 3 or 4 is likely to occur due to broader economic forces: the elimination of trade barriers, the improvement of technologies that transcend time and space barriers, and the push for globalization coupled with the associated shift in corporate culture away from a domestic mindset.

Most firms will not evolve to Stage 4, though. We expect firms in which IT is not a significant source of competitive advantage to progress only to Stage 3 and reach a steady state there. For them, the additional advantages of developing the sophisticated internal mechanisms for Stage 4 are questionable.[19] Thus, firms in industry sectors such as energy, chemicals, and agriculture are more likely to stop at Stage 3.

By contrast, firms where IT is a significant source of competitive differentiation – either due to the cost efficiencies that IT offers or the business strategies that IT enables, or because IT is a core component of the firm's products and services – are likely to progress to Stage 4. These firms include those that compete on the basis of IT, such as financial services and retail, and, of course, technology firms, which create IT products.

Offshore IT Sourcing by U.S. Firms Will Continue to Grow

Offshore momentum was very strong into 2000, through the peak of the technology boom and the so-called "IT labor shortage" in the U.S., which also peaked in 2000. The U.S.-based ITAA estimated the U.S. shortage at 850,000 in 2000, dropping to 425,000 in 2001. Other geographies also experienced shortages in 2000. Europe's shortage was estimated at 1.7 million, Canada's was 50,000.

Our assessment is that growth will continue in sourcing IT work offshore for a number of years to come. While the growth rate slowed somewhat in 2001-2002, corporate pressures to reduce costs remained strong. However, putting a figure on the global offshore picture is difficult. Adventis, a research firm, estimates that U.S. firms will spend some $7 billion on third-party offshore IT work in 2002. Narrower figures give more guidance: Forrester, a U.S. research firm, found that 44 percent of U.S. firms with more than $1 billion in revenues performed IT activities offshore in 2001, and Forrester estimates that percentage will grow to 67 percent by 2003 (for comparison purposes, a *Fortune 1000* firm has $1.2 billion in revenue). Note, though, that these estimates do not include offshore sourcing to wholly owned facilities. Furthermore, offshore sourcing is but a small slice of the global market in IT outsourcing (both domestic and offshore), which is estimated to be more than $100 billion (and again, this figure does not include insourcing).[20]

The increasing prevalence of offshore sourcing is further supported by our qualitative field data. In our sample, 11 of the 13 corporations expected to grow their offshore IT workload aggressively. Several even mentioned double-digit growth. Many of the 13 planned to move much – but not all – of their systems support and software product support functions abroad, mainly to India. One corporation estimated spending $1 billion offshore. All these companies were investing in the infrastructure to grow their offshore work. The technology firms were focusing on building their wholly owned facilities offshore.

One technology firm planned to increase the size of six of its many offshore centers. Another hoped to triple the size of its India center in one year's time,

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[18] Ang, S. and Straub, D. "Production and Transaction Economies and IS Outsourcing: A Study of the U.S. Banking Industry," *MIS Quarterly* (22:4), 1998, pp. 535-552.

[19] In both Stage 3 and Stage 4, offshore sourcing does not necessarily imply that a majority of the IT work is outsourced, or to use the term common in outsourcing – *total* outsourcing (more than 80 percent of IT budget). Rather we are describing an evolution in which only some of the firm's IT work is sourced offshore.

[20] Lacity, M. C. and Willcocks, L.P. *Global Information Technology Outsourcing: In Search of Business Advantage*, Wiley, New York, NY, 2001.

expand its workforce in Russia, and establish a new site in another country as well. Finally, recent anecdotal evidence (from our on-going research) suggests that the growth in offshore sourcing is not limited to large corporations; small and medium-sized enterprises are turning their sights offshore to find lower-cost, high-quality IT talent.

What are the limits, if any, to offshore outsourcing of IT? To answer this question we first consider the case of domestic outsourcing. Numerous forecasts point to increased IT (domestic plus offshore) outsourcing. But as Lacity and Willcocks[21] observe, the proportion of firms that engage in *total* outsourcing (more than 80 percent of their IT budget) is relatively small – and many have had a mixed record of success. Similarly, Agarwal and Sambamurthy found that a completely outsourced IT function is not a sustainable organizational model.[22] We believe the case for offshore IT sourcing is not substantially different. To meet their IT needs, firms must retain some core innovative development functions, such as strategic planning functions and the architectural blueprint of their overall IT portfolio. For technology firms, core innovative activities often will not be delegated offshore either. So there is a limit to both the types as well as the magnitude of IT activities that will migrate afar.

The Global IT Labor Supply Will Grow and Mature

Asserting that offshore IT sourcing will continue to grow is supported by the maturation of the global IT labor supply. The offshore vendors are expanding their competencies beyond programming to such areas as relationship management with U.S. firms, domain knowledge of key business functions, and sophisticated project and process management techniques.

There is also evidence that this labor force will grow in size. While labor markets in industrialized nations tightened in the 1990s, they grew rapidly in other countries. Through roughly 1,000 offshore vendors, the Indian offshore IT industry employed approximately 170,000 software professionals in 2002, and the country is producing 122,000 software engineering graduates a year. Russia has between 100-200 offshore vendors, several thousand software profession-

als working in these firms, and countless other scientists and engineers working (and moonlighting) as programmers.

U.S. firms now outsource IT work to the four corners of the globe: near-shore to Canada, Mexico, and the Caribbean, and faraway to such locations as the Philippines, Russia, China, and most of all, India. The firms in our study had development and support units in 26 of the nations of Figure 2.

All our study companies had some activity in India. Indeed, India dominates the mental model of U.S. executives because it combines low-cost, high-quality work processes, a large supply of qualified labor, and an English-speaking workforce.

India also dominates the offshore scene because it has built a cadre of highly professional IT services firms. Tata Consultancy Services, Infosys, and Wipro are the three largest. They compete with such American global powerhouses as EDS, Accenture, and PwC. The Indian firms have positioned themselves to compete with U.S. outsourcing vendors by building large "onshore/offsite" centers in many U.S. cities. Of the 23 firms in the world that have been awarded CMM-5 status for the quality of their software engineering processes (the highest such level), 15 of them are Indian.[23] Finally, India offers another advantage that few other nations can match – scalability. Indian firms have the potential of growing offshore software centers to hundreds or thousands of IT professionals, if desired, due to their country's large educated labor force. Only two other large nations have this scale *potential* – China and Russia – and these two nations currently lack the managerial resources to grow large-scale global businesses as the Indians have done successfully.
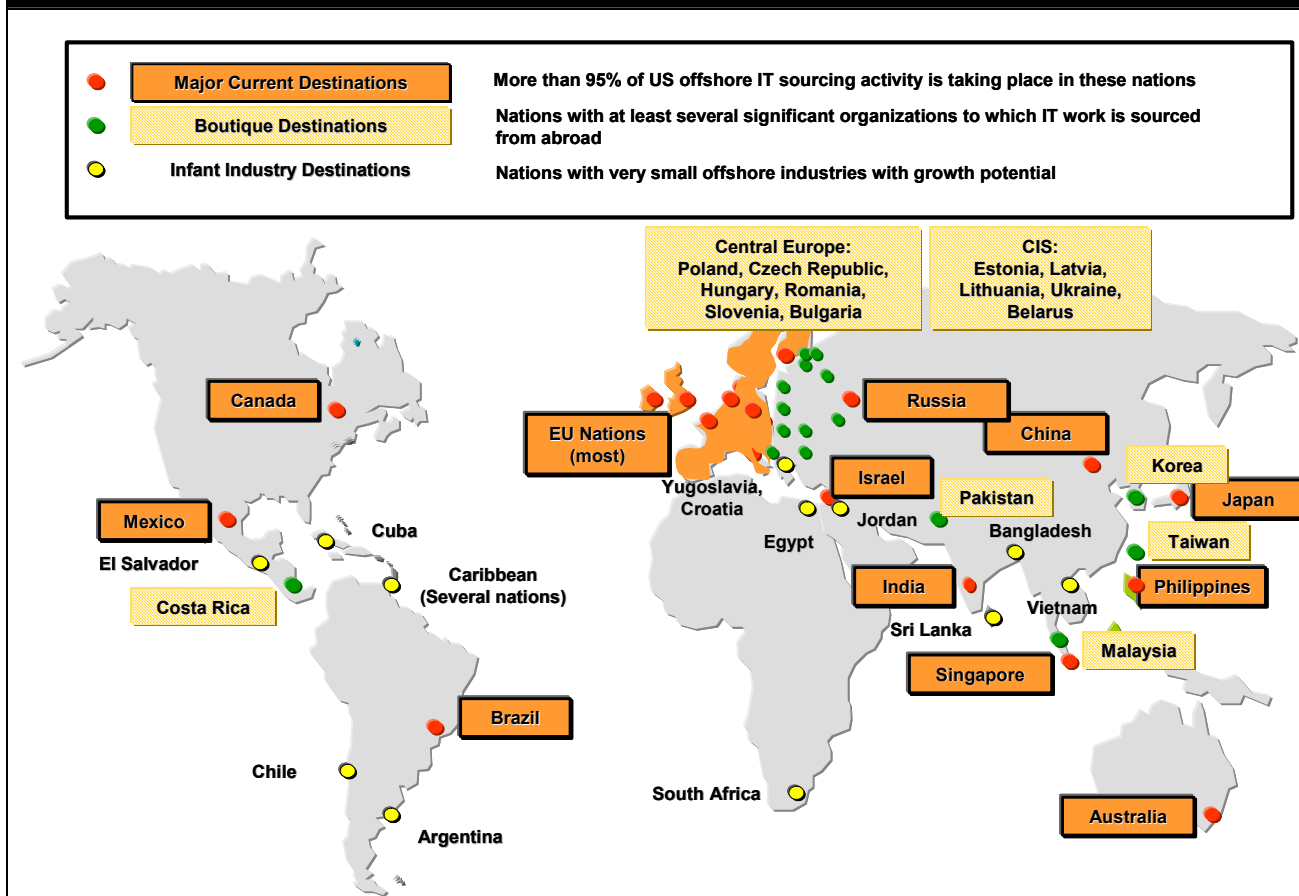
In summary, CIOs and CTOs will soon have an even larger set of offshore options. The traditional locations for offshore talent are being supplemented by a variety of boutique and emerging destinations. Stage 1 and Stage 2 firms just beginning to learn about offshore IT sourcing should probably start with a "major offshore destination" because their maturity will offset the client's *in*experience – increasing the likelihood of a good first experience. In contrast, Stage 3 and Stage 4 firms can be more adventuresome and seek to develop relationships with firms in emerging potential destinations because their managers have enough

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[21] Lacity and Willcocks, ibid.

[22] Agarwal, R., and Sambamurthy, V. *Organizing For Hypercompetition: A Guidebook of Practice for the IT Function,* SIM International, Chicago, IL, 2000.

[23] Field, T. "For a Few Rupees More," *CIO Magazine,* December 1, 2000, http://www.cio.com/archive/120100/rupees.html. Accessed June 19, 2002.

Figure 2: Offshore IT Destinations for U.S. Firms

● Major Current Destinations — More than 95% of US offshore IT sourcing activity is taking place in these nations

● Boutique Destinations — Nations with at least several significant organizations to which IT work is sourced from abroad

○ Infant Industry Destinations — Nations with very small offshore industries with growth potential

Central Europe: Poland, Czech Republic, Hungary, Romania, Slovenia, Bulgaria

CIS: Estonia, Latvia, Lithuania, Ukraine, Belarus

Canada · EU Nations (most) · Russia · China · Korea · Japan · Mexico · Cuba · Israel · Pakistan · Taiwan · El Salvador · Yugoslavia, Croatia · Jordan · Bangladesh · Philippines · Costa Rica · Caribbean (Several nations) · Egypt · India · Vietnam · Sri Lanka · Malaysia · Brazil · Singapore · Chile · South Africa · Australia · Argentina

knowledge and experience to manage relationships with less mature IT sourcing destinations.

Recommendations for IT Executives

Firms go global for many reasons: to expand sales, to acquire resources, to diversify supply sources, and to minimize competitive risk. The relatively recent trend of offshore sourcing of intellectual labor, rather than manufacturing capacity or natural resources, is arguably an inevitable outcome of globalization. Our findings suggest that practitioners not currently sourcing IT work offshore need to examine their IT sourcing strategies. The challenges of offshore work notwithstanding, there are compelling reasons for exploiting location-specific advantages. The leading-edge firms in our study recognized these advantages and have positioned themselves to reap the benefits of overseas resources, while overcoming the structural and cultural barriers.

How can a CIO ease the evolution to Stage 3 or 4? Fundamentally, it involves changing the corporate culture to view offshore work as an acceptable business strategy. We offer three recommendations based on our interviews.

One, give offshore sourcing the same strategic importance and visibility as other strategic initiatives. Support managers who support champions – the ones willing to step up to the risks of advocating a new approach within the company. Most significantly, obtain senior executive commitment and involvement in the initiative. When employees sense that an effort does not have executive backing and support, resistance is more likely to surface.

Two, overcome fears that can derail offshore sourcing. The use of offshore resources creates uncertainty and turmoil among internal staff. Employees believe that the centrality of their roles is being undermined. They may have a hard time "letting go" of their products and projects. They fear reduced responsibilities. Worst of all, they fear being displaced.

Similarly, IT managers worry about how they will manage resources over which they have limited control. They especially fear that the performance of these resources will drive their own evaluations. These impediments and barriers can be overcome through a broad-based communication program, along with clear policies regarding the impact that offshore resources are likely to have on employees.

Three, foster internationalization. Offshore IT sourcing can make divisional and organizational boundaries porous. Many offshore projects co-mingle offshore and onshore resources, including business staff, internal domestic developers, and offshore developers. Such efforts are more likely to fail if employees' attitudes and behaviors are narrow minded and inward looking. IT staff members need to reduce the actual or perceived cultural distances between themselves and their partners. This internationalization can be accomplished in several ways: by increasing diversity in the ethnic backgrounds of employees, through cultural awareness programs, and perhaps even through overseas sabbaticals for key staff.

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Appendix: Study Methodology

The Study Sample

We used a stratified sample from among the largest U.S. firms from both technology and non-technology groups (see Table 1). We chose only U.S.-headquartered firms. We hypothesized that technology companies might be more active in offshore sourcing and might behave differently than non-technology companies.

Data Collection Approach

We interviewed 20 executives from 13 corporations and supplemented these interviews with follow-up messages and conversations. Respondent titles included head of global software engineering, head of enterprise development services, and director of global strategic IS planning. Interviews were conducted between January 2000 and October 2000. Interview data was supplemented with publicly available data about the firms and was analyzed utilizing qualitative methods. Specifically, we analyzed the interview transcripts twice. In the first analysis, we extracted factual answers to questions raised *a priori*, such as the extent of sourcing, decision drivers, rationale for site decisions, and internal corporate dynamics. During this analysis we also discovered additional tactics and processes being utilized by firms – for instance, how offshore work was incented and how projects were controlled and orchestrated. In the second analysis, we sought to ascertain patterns in how the sample firms utilized global sourcing of IT work and the contingencies that appeared to distinguish between the patterns.

Table 1: Sample Summary		
Major Non-Technology Firms	Most of the U.S. *Fortune 200* fall within this category, e.g., financial services, manufacturing, retail.	5 from the 200 largest U.S. non-technology firms (*Fortune 500*, 2000)
Major Technology Firms	These are companies that develop software products that either stand alone or are embedded in larger systems that may include hardware. Typical firms in this category include Motorola, Intel, IBM, Texas Instruments, Microsoft, and Oracle. Some of these firms also offer professional services. In addition, the firms have substantial internal information systems needs.	6 from the 200 largest U.S. technology firms (*Fortune 500*, 2000)
	Some technology firms offer only IT professional services. These companies provide systems services such as consulting, contracting, outsourcing, and system integration.	2 from the 20 largest U.S. IT professional services firms (ranking by *Global Technology Business*, 1999)
Total		13 total, including 3 of the Top 10 in the *Fortune 500*