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Research Opportunities in Offshoring

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Our medical scans are interpreted in Bangalore, our service calls are answered in Delhi, our garments are made in Indonesia, our coding is done in Russia, and our chairs come from China. This paper addresses the trend of offshoring from a research perspective. We define offshoring as the outsourcing of manufacturing and service jobs, tasks, and business processes to overseas locations, both third party and self-owned. We first offer brief overview trends in offshoring. Next we identify and discuss specific offshoring concerns that have potential for scholarly investigation.

Industry statements reinforce the message. "There is no job that is America's god given right anymore," said H-P CEO Carly Fiorina (*Wall Street Journal*, 2004). Erstwhile 'safe' occupations such as surgery, dental, diagnostic, legal, 3-D animation, publishing and printing, and journalism are now under threat (*Wall Street Journal*, 2004; *Outsource2india.com*). These trends provoke friction, debate, and reaction. Academia has a central and useful role to play in understanding and interpreting these unfolding events—and below we identify several areas in which operations researchers can make valuable contributions.

Some Facts About Offshoring

Table 1 lists some of the occupations and anticipated numbers underlying Forrester Research Inc.'s oft-quoted estimate of 3.3 million jobs moving abroad in the next 10 years (Engardio, Bernstein & Kripalani, 2003).

Research Opportunities: Offshoring and the Job Economy

Evaluating the true and real impact of offshoring is a challenge. The benefits to corporations are obvious and center on cost, quality, and time gains. Less



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Job	2005	2010	2015
Office support	295,000	791,000	1,700,000
Computer	109,000	277,000	473,000
Business operation	61,000	162,000	348,000
Management	37,000	118,000	288,000
Sales	29,000	97,000	227,000
Architecture	32,000	83,000	184,000
Legal	14,000	35,000	75,000
Life sciences	3,700	14,000	37,000
Art, design	6,000	14,000	30,000
TOTAL	588,000	1,591,000	3,300,000

Data: U.S. Dept. of Labor, Forrester Research Inc. All numbers have been rounded off.

Table 1: U.S. jobs moving offshore to low-cost countries.

apparent and less diligently investigated are the overall effects of offshoring on the U.S. job economy. The job churn in this economy of about 130 million full-time jobs is about 15 million; in other words, about 15 million jobs are eliminated annually (Bernanke, 2004). In previous years, new job creation balanced the loss. But currently there is an imbalance in the job loss and job creation numbers. Much of the blame for the imbalance is being attributed to offshoring. However, several factors are known to have contributed to this state of affairs. The end of the technology boom has seen companies continue to shed excess fat from the overhirings of the past few years. Low interest rates also account for some of the lag in new hiring. With practically zero percent borrowing rates, businesses that expand operations prefer to invest in capital rather than labor. Another reason for slow job creation is increasing worker productivity and, consequently, a reduced need for workers. The U.S. steel industry produced 102 MT of steel in 2003 compared to 75MT in 1982, with 75 percent fewer workers (Zuckerman, 2004). Systems integration eliminates intermediaries. Companies such as Home Depot are seeking total integration with their supply chains, with stores ultimately being able to talk directly to production machinery at supplier plants. Such initiatives, and recent innovations such as e-tailing, would remove or diminish entire mediating layers from the order fulfillment process, most notably the need for middlemen, wholesalers, and inventory managers. The combined effect of these factors on job loss would be considerable, and surely has not gone unnoticed. Figures indicate that of the approximately 2.7 million manufacturing jobs lost over the past three years, about 300,000 have been offshored, other factors accounting for the remaining losses (*Business Week*, 2004). Why then is offshoring considered the villain of the piece?

There are some valid reasons. For one, the gradient of the offshoring trend has climbed steeper in a short period of

time. Manufacturing losses were distributed over the 1980s and 1990s. The pace of offshoring has picked up dramatically over the past two years, and, as a result, has left little time and room for social, financial, or psychological absorption and adjustment. Also, recent job offshoring has occurred in the high knowledge, high-skilled white-collar worker segment, which is a much more visible and politically vocal group relative to manufacturing workers. Add to that the reality of job quality degradation and the lack of alternative employment, especially compared to laid-off manufacturing workers who found alternative employment in the service sector in earlier times, albeit at reduced pay and benefits. Unemployed service workers have no alternative destination. These days, it is not uncommon to hear stories about computer systems analysts who are seeking work in department stores. Increasingly, for the unemployed white collar worker, there is seemingly no feasible place in which to make a transition. The cumulative influence of these factors has clouded perceptions of the true impact of offshoring on the U.S. job economy. Separating fact from fiction would allow us to evaluate the precise impact of offshoring on national employment, identify affected skills and areas of expertise, and make informed decisions about operational issues such as future hiring, business process location, capability sourcing, worker re-training, and value-partitioning. Thus, we recognize the following opportunity:

Research Opportunity #1: Isolate and quantify the impact of offshoring on U.S. manufacturing and service job losses, on a product and industry specific basis.

The Offshoring Value Proposition

The economic value proposition of offshoring builds mainly from labor cost arbitrage, with gains up to 70 percent (Forrester Research, 2004). Longer term continuities in job prospects and per-

ceptions also contribute to the proposition. Tax preparation in the U.S., for example, is a highly seasonal hirer, with bulk hires of temps during tax peak season. In contrast, tax preparation in India engages mostly graduates that are able to accumulate experience and expertise because they are not subjected to the hire-train-fire-hire-train-fire cycle of the U.S. tax industry. Good career prospects attract quality staff with excellent absorptive capacity, and high-volume business allows leveraging the experience curve. Technical knowledge is shared across multiple project teams, and the customer benefits by accessing a single source of knowledge base. Faster turnaround time utilizing time zone differences allows 24x7 services and accelerates design/manufacturing projects. Productivity rises, quality improves, and costs decline. However, initial infrastructural costs and offshoring specific maintenance costs, such as additional security and monitoring measures, can dilute the offshoring value proposition substantially.

Offshoring value is also created by the option to “pay by the drink” in contracts with third-party providers. Some immediate gains include flexibility in adjusting volume without disrupting operations or home morale, and the absence of technology lock-ins.

In addition, strong non-economic factors strengthen the offshoring value proposition. The positive press on offshoring’s economic value added to the corporation has developed expectations in the business community. Firms without a visible offshoring strategy are unlikely to attract serious investment (Thottam, 2004). Wall Street analyst expectations and shareholder value are closely tied to productivity and cost gains, pushing companies to increase offshoring initiatives. From a strategic perspective, companies want a presence in emerging markets, establishing roots and visibility, with some biding their time until purchasing power increases in new markets.

The offshoring value proposition is thus a complex function of factors and develops differently for different prod-

ucts and industries. For the medical scanning industry, for example, obtaining quicker turnarounds on routine X-rays can be as important a source of competitive advantage as low costs. Tax preparation, on the other hand, may tolerate longer task times. Industries need to understand and prepare industry-specific offshoring value propositions from a total cost perspective. The offshoring value proposition dynamic also merits attention. Speculations have been made about "natural limits to offshore outsourcing" (Baldo, 2004). Security concerns, potential for intellectual property loss, capability hollowing out fears, and future wage and exchange rate movements are some factors that could impose limits to the evolution of the offshoring trend. Research can anticipate the shape and natural limits of the trend (similar to technology 'S' curves).

Research Opportunity #2: Develop industry and product specific comprehensive offshoring value propositions.

Risk Evaluation in Offshoring

Offshoring creates additional risks. The macro threats include geo-political instability or military risks in host countries, hostile government legislation in both host and domestic countries, weak intellectual property laws and lax execution of such laws that exist, foreign exchange volatility and flow restrictions, weak legal climate, ethical challenges, and varied infrastructural, temporal, and cultural issues (Gartner Research Inc., *US News & World Report*, 2004). Significant concerns at the micro level include the danger of leakage of sensitive technology and process development and management capabilities, the gradual loss of technical and tacit process know-how, security and privacy of data issues, integration frictions with home operations, fragmented use of IT/MIS systems, lack of cost transparency, uneven quality standards, and the possibility of forward integration by the offshore party (Engardio et al., 2003; Busch, Connell & Lee, 2003).

Quantification of risks is a promising area. Risks could be accumulated into a single or a few broad composite risk indices with predictive value. A discriminant function or similar methodology could be explored. Opportunity also exists for developing risk-based products. Risks can be categorized and bundled into packages that can be structured and priced as a marketable commodity in the insurance business. Reliable qualitative assessment methods for risks of the more tacit kind, such as supplier opportunism and geo-political risk, are also needed. In addition, risk evaluation can play an important role in effective supply chain design and balancing, with alternative sources and back-ups in separate locations.

Interesting possibilities exist for studies of cultural risk. Attitudes towards time, authority, and conflict carry managerial risks. Indians are conditioned to a lower level of conflict than Americans, which makes Indian call center workers more inclined to offer credits to customers (Knowledge@Wharton, 2002). Given that cultural factors can affect performance, opportunity exists to operationalize and examine the effects of culture on relevant aspects of offshoring operations. Research can provide guidance not only on the extent of country culture fit with U.S. home operations but also suggest culture-task pairings. Collection of overdue accounts may perhaps not be a good fit for Indian workers, but entrusting the same people with technical desk support responsibilities would be eminently appropriate. Such distinctions have been recognized and actioned by some companies.

Research Opportunity #3: Identify and quantify the incremental risks of offshoring, and develop appropriate response mechanisms.

Metrics for Offshoring

Currently, offshoring faces the need to develop reliable and implementable metrics for performance evaluation. The

outputs of some processes are quantifiable. Ravi Aron of Wharton (Knowledge@Wharton, 2003) reports that process outcomes in medical transcription, in-bound call support, and data transformation (from paper to digitized data stored in a database) can be measured clearly and definitively. However, he adds, processes such as customer analytics, MIS reporting, or yield analysis do not lend themselves well to measurement of output quality or productivity. For example, market analysis calls for reports to track and interpret customer pricing and product information for management. Should the offshore provider's performance be considered a function of the number of reports produced, or the timeliness of reporting, or the utility of the information presented? The first metric may be clearly inappropriate since frequency of reporting is no guarantee of quality, or may, in fact, reflect an inability to synthesize information. Similarly, measuring report timeliness will not provide any information on the accuracy or utility of the reports. As Aron observes, a report may be both accurate and timely, but fail to provide the specific information required by current conditions.

Designing comprehensive service level agreements (SLA's) is only possible when metrics are developed to prewarn, flag, and provide an audit trail for performance-related items. Metrics are also required in less tangible areas such as ethical compliance and customer interaction quality.

Research Opportunity #4: Develop reliable and actionable metrics and measurement processes for evaluating offshore provider performance.

Besides the research opportunities identified above, issues such as organizational structure, transitioning from home to offshore operations, ethical concerns such as child labor and workforce exploitation, environmental compliance, logistics organization, and

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to increase the systems building and programming skills in students. Hands-on lab, practical exercises using measurement, and monitoring tools (such as globus for Grid) will be essential towards a deep understanding of e-Science.

The scientific community and, increasingly, the business world are welcoming e-Science and Grid technologies with the sort of excitement inspired by the Internet not long ago when the TCP/IP standards created universal connectivity, hyperlinked access to incredible content, and new e-business models for generating revenue. The recent past developments have been breath-taking and remarkable. Today, IT has engrossed itself into our daily lives to the extent that we take it for granted. Some have even gone on to propose that "IT does not matter" (Carr, online). As e-Science heads towards mass adoption, what an incredible world it would be. Arthur Clarke once said that as technology advances, its complexity gets hidden from its users, and it seems like

magic. Let us all work together to be a part of this magic.

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terrorism counter-measures have generated considerable business interest and attention. For example, offshore organizational structures range from wholly captive operations to pure third-party providers. Recently, a trend towards blended forms has been observed, wherein hybrid arrangements between U.S. and Indian companies combine complementary but different strengths. Captive centers are generally better at delivering quality, while BPO providers are generally better at lowering costs. Proprietary technology can be safeguarded through captive offshore centers, whereas non-core processes can be handled by third-party providers. Research can provide useful decision guidelines on the appropriate organizational form for a particular operational context and offshoring stage. Best practice studies could also provide insights and foundations for improved performance.

Concluding Remarks

Every industry may eventually face a compelling case for offshoring. Success at home and abroad depends on the skilful management of a mosaic of domestic and foreign factors. Operations management researchers can provide valuable insights and guidance to companies engaged in this difficult process of transition, adjustment, and progress. Research in offshoring will also serve to direct OM research to frontline issues, enhancing our discipline's scholarly visibility and business reach in the coming years.

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