

# Outsourcing: US Career Prospects

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## **1. Executive Summary**

United States experienced recession starting in 2001 with the Internet bust and the public perception was that tech jobs were lost because of offshoring/outsourcing to emerging economies like India. This term paper investigates careers lost in United States, career prospects and if employee benefits have decreased as a result of outsourcing. The paper also highlights the professional skills needed to succeed in sourcing environment in United States and discusses job strategies for MBA's. The main papers/reports included for study (comparison) includes ACM (Association of Computing Machinery) 2006 report, 2006 SIM (Society of Information Management) Advocacy Research Team white paper.

The fundamental question is if reduction of tech jobs was due to outsourcing or recession in 2001. The author's conclusion is that initially more jobs were lost due to recession. But the outsourcing trend is also a factor for tech job loss in US and has also slowed the creation of new jobs. This will be catastrophic for the creation of white collar jobs and would have a tremendous impact on US economy in the years to come. Globalization has also caused the erosion of wages for the US middle class. Employee perks have reduced or completely eliminated for many tech jobs. The employee benefits more or less remained the same. The careers lost in US include many tech jobs like programming and even software design. Even though intermediary jobs (jobs that bridge outsourcer to buyer) could rise in the short term that could also be outsourced, since internet and telecommunications provide accessibility to understand and learn about US culture and makes virtual touch good enough for direct client contact. If one looks at the day of an average middle class worker, the person take kids to school, goes to office, works a lot and comes back home, go grocery shopping, and gets to know about US from TV, Internet or News papers. This entire information medium is available to citizens of other countries by media access.

The career prospects of tech jobs look bleak since only highly innovative jobs are supposed to be retained in US. Recently, research and development has also been offshored. There is talk about creation of high value jobs, but no one has seen the beginning of that that yet after about 5 years from the recession of 2001<sup>1</sup>. The majority of job creation due to economic recovery is being initially felt in the emerging economies. The US jobs market has been left with only any spill overs. The short term rise in demand of intermediary jobs like project managers could also be eventually outsourced depending on industry and improvement in telecommunications. The white collar jobs that require customer touch could also be refined to reduce the number of client facing employees (For example, pizza providers could offshore some aspects of ordering operations). As per Global Insights, by 2008 financial services companies will actually increase their U.S. work force by more than 32,000 employees as a result of IT offshoring. Such offshoring by all U.S. companies will add more than 300,000 net jobs here<sup>2</sup>. It remains to be seen.

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<sup>1</sup> The Outsourcing Bogeyman, Daniel W. Drezner, Foreign Affairs Magazine, May/June 2004.

<sup>2</sup> In Brief: Offshoring Added U.S. Jobs, Study Says, Steve Bills. American Banker. New York, N.Y.: Mar 31, 2004. Vol.169, Iss. 62

## 2. Comparison of outsourcing studies

Appendix-II lists the summary of study by Rudy Hirschheim, Claudia Loebbecke Mike Newman and Josep Valor. The authors conclude that the extent of offshoring is hard to measure and the use of indirect metrics including trade in services, employment data and skill based approach could result in skewed results. Trying to measure offshoring by using trade data could be skewed in the case of India, as it is a difficult job to establish clear numbers between IMF Balance of Payments categories "computer and information services" and "other business services." This trade data can even include construction. Measuring offshoring using employment data can also be skewed even though most other OECD economies experience relatively lower churning rates than the United States. It is still the case that even the largest projections of jobs "lost" to offshoring are still small in comparison to annual churning, and most job terminations are not related to offshoring. The part of jobs decline may be the result of international sourcing, but some occupations are likely to disappear anyway as they will increasingly become digitized and/or automated. The attempts to successfully measure the impact of offshoring using trade, employment and/or skilled-based data is hence questionable. Clearly, one could selectively choose and interpret the data to "support" whatever position one takes on offshoring. The authors conclude that a broader cost-benefit appraisal may tip the balance against offshoring or offshoring may become a selective, cherry picking activity.

The study sponsored by society for information management looked at the mix of sourcing options organizations use, such as in-house staff, independent contractors and third-party providers. The study also inquired as to what IT skills and capabilities are critical for 2005 and 2008, how skills are acquired by organizations and what they look for in hiring new and experienced employees. The results of this in-depth research have implications for the role various sourcing strategies play in providing organizations access to skills, how organizations recruit for and develop skills, and consideration of what skills universities should be instilling in their graduates. The different levels of skill set identified by the study are core (ones that companies need to keep in house), Non-core, prerequisite and essential (ones that companies look for in entry levels, but is often outsourced (Appendix-III).

ACM study questions the number of IT jobs lost due to offshoring and suggests that key enablers of this growth are information technology, the evolution of work and business processes, education, and national policies. The study suggests that outsourcing is not hampering US job prospects and that safety-net programs for personnel displaced by offshoring are difficult to implement. The advice for job hunters include becoming familiar with other cultures, and managing their careers so as to choose work in industries and jobs occupations less likely to be automated or sent to a low-wage country. The study suggests that business and national security risks are magnified by offshoring.

### 2.1 Differences between ACM and SIM studies

Topic	Differences
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Outsourcing enabling jobs (Intermediary jobs)	ACM proposes that project management can also be outsourced, while SIM study suggests that PM will be a growing area in the future.
Future of tech jobs.	SIM suggests that more and more low level jobs like programming would be send offshore, While ACM argues that there will still be jobs in US in these areas ten years from now.
Focus of job types under study	ACM focused on software systems job compared to SIM which focused on tech jobs overall.
Country Perspective	ACM study has international outsourcing perspective compared to SIM's US focus.

### 3. Survey of Tech careers in decline

The U.S. software industry lost about 16 percent of jobs from March 2001 to March 2004, the Washington-based Economic Policy Institute found. The Bureau of Labor Statistics reported that information technology industries laid off more than 7,000 American workers in the first quarter of 2005<sup>3</sup>. The U.S. share of worldwide high-tech exports has been in a 20-year decline from 1980 to 2001 (share fell from 31 percent to 18 percent)<sup>4</sup>.

#### 3.a Statistics, type of job positions that are outsourced

The types of job positions that are outsourced include the following:

- Programming, software testing, and software maintenance, IT research and development
- High-end jobs such as software architect, product designer, project manager, IT consultant, and business strategist (the extent to which these jobs have been offshored is debatable).
- Physical product manufacturing including semiconductors, computer components, computers
- Business process outsourcing/IT enabled services/knowledge process outsourcing (e.g. insurance claims, medical billing, accounting, bookkeeping, medical transcription, digitization of engineering drawings, desktop publishing, and high end IT enabled services such as financial analysis for Wall Street and reading of X-rays)
- Call centers and telemarketing.

Appendix-1 shows the careers in decline as published by Bureau of Labor Statistics. For example, computer operators' jobs show a decline of 32.6%.

The general consensus among the industry experts is that any job that can be standardized or commoditized can be offshored. This primarily includes low level programming jobs (standard modules, industry known methods and techniques). In short, jobs that can be clearly defined to follow certain steps can be outsourced or automated.

<sup>3</sup> <http://www.nctimes.com/articles/2005/06/20/business/news/61905200729.txt>

<sup>4</sup> The Bridge, Linking Engineering and Society. National Academy of Engineering, Fall 2005.

In my opinion, outsourcing will continue to prevent rapid generation of new tech jobs in US. After recession, higher number of jobs would be created at the low wage level. Since the low services level category employment has seen structural reduction as opposed to reduction due to lean demand, economic improvement is not creating same level of new jobs in the service sector. Jobs in demand are contractor and temporary jobs. The primary job growth will be for intermediary/liason jobs specializations like project manager and business analyst. But technology can further bring down distance barriers in outsourcing. Enhanced video capability (with possible holography) and even faster internet access can bring down hindrances to outsourcing that needs customer touch.

### **3.b Analysis of how outsourced job positions could impact US innovation in the long run**

Outsourcing has eliminated many entry level tech jobs that nurture future leaders. Outsourcing has also graduated from manufacturing to research and development (R&D). Major industrial players like Dell, Motorola and HP are outsourcing not just the manufacturing, but also the design of new products to offshore companies. For example, Dell laptop computers are designed by a Taiwanese company called Quanta<sup>5</sup>.

By outsourcing R&D offshore, original equipment manufacturers (OEMs) can significantly reduce portion of their R&D budgets while growing their product offerings. Even R&D powerhouses such as IBM, HP and Motorola have reduced their R&D budgets since 2000.

But there may be a downside to all this reduced R&D spending. Some economists say the outsourcing of manufacturing and now design is a long-term trend toward reduced innovation and competitiveness among U.S. companies. As OEMs turn over the development of new products to outsourcers, it could have a diminishing effect on these companies' ability to innovate (create the next breakthrough). Spending on R&D by U.S. companies declined by 3.9 percent in 2002 (downward trend) since the National Science Foundation began tracking the number in 1953. Meanwhile, government spending on R&D has also been dropping over the same period. The changing mix of R&D spending in the United States could have a major impact on U.S. competitiveness over the long term. Faster product cycles and the increased focus on efficiency and productivity have made it harder for companies to have a long-term vision at their own peril.

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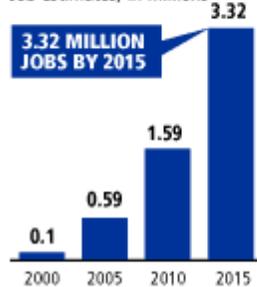
<sup>5</sup> <http://www.cio.com/archive/011505/outsourcing.html>

## OUTSOURCING: FIGURES AND FEELINGS

At least 40 percent of Fortune 1,000 companies are dabbling or fully engaged in sending U.S. jobs overseas. Cheaper labor in countries such as India is making doing business abroad attractive to companies' bottom lines. But what about the American workers left unemployed? More than 40 percent of U.S. executives surveyed said that outsourcing wouldn't be good for business. And with the majority of Americans doubting the concept benefits them, the issue is already being addressed by public officials up for election this year.

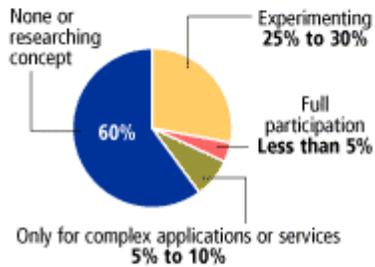
### U.S. outsourcing trends

Job estimates, in millions



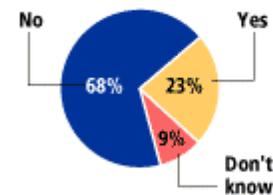
### Company participation

Percent of Fortune 1,000 companies



### Is it good for Americans?

1,019 adults surveyed Feb. 4



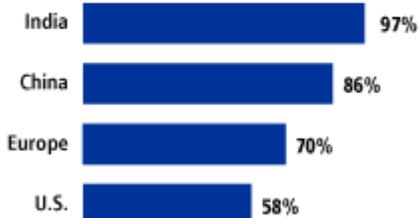
NOTE: Margin of error was plus/minus 3 percentage points.

Sources: Forrester Research, McKinsey & Co., Pollingreport.com

### Is outsourcing good for business?

7,300 senior executives surveyed globally

#### Executives who say "Yes"



JEN MYSTKOWSKI/SEATTLE POST-INTELLIGENCER

The optimistic look suggests that higher value jobs will replace outsourced jobs. Outsourcing figures and feelings survey by leading institutes are shown above.<sup>6</sup> While many of manufacturing personnel changed careers to work in tech industry, the higher number of laid off tech workers are not finding comparable careers (equally or well paying) to switch to. As we go higher, even though the view becomes beautiful (bigger paychecks), there will be lesser number of jobs (there are less project managers than regular employees) that are available.

There seems to be no reciprocity in outsourcing (unlike trade which is a two way street), only the export of domestic jobs. Since there are no given endowments because business know-how, capital and technology are globally mobile, the advantage lies with countries with untapped pools of educated and skilled low-wage labor. The advantage increases with the absence of IRS, EPA, OSHA, EEOC and other regulatory bureaucracies<sup>7</sup>.

<sup>6</sup> Outsourcing's long-term effects on U.S. jobs at issue, By JOHN COOK AND PAUL NYHAN SEATTLE POST-INTELLIGENCER.

<sup>7</sup> <http://www.newwork.com/Pages/Opinion/Raynor/Outsourcing%20Consequences.html>

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According to Ron Hira, many U.S. policies are actually accelerating outsourcing compared to a 'natural' economic process. US guest-worker policy enables companies to import cheap foreign labor. Companies then force their American workers to train their foreign replacements, transferring know-how, before laying off the American workers. The foreign workers then take this knowledge back to their countries and perform the work from there.<sup>8</sup>

There is growing evidence that US innovation has been affected by effects of outsourcing. American team had dismal showing in prestigious ACM International Collegiate Programming contest held on April 12<sup>th</sup> 2006. As per the MIT team "We're the worst of the best of the best". Software programmers are the seed of the corn of the information economy, but less number of students are seeking this profession. A 2005 survey of freshmen showed just 1.1% planned to major in computer science<sup>9</sup>. The output of American computer science programs is plummeting, even while that of Eastern European and Asian Schools is rising. Computer science is considered a key subset of engineering. As per Richard Florida, "If our talent base weakens, our lead in technology, business and economics will fade faster than any of us can imagine"<sup>10</sup>.

#### **4. Survey of Careers in demand associated with outsourcing**

As per SIM report the following careers have become more important as a result of outsourcing boom:

- *IT Governance*: This would include Sarbanes Oxley (SOX) compliance and regulatory issues and managing compliance within outsourcer organization. SOX can be considered as an opportunity to make the organization more efficient.
- *Managing third party providers*: This becomes more important as the outsourcing trend is towards multisourcing<sup>11</sup> and managing multiple vendors to work cohesively is vital for outsourcing strategy to work. Multisourcing causes a complex environment where more services are delivered externally. So retaining strategic planning and architecture design responsibilities in-house becomes very important<sup>12</sup>.
- *Sourcing strategy*: The companies that floundered outsourcing projects usually did not had a well defined outsourcing strategy. GE is an exception in which well defined outsourcing strategy allowed tremendous savings. Contract and legal skills are also important.
- *Project management*: This area has been suggested by most outsourcing experts to have the highest job growth. The author is skeptical about this claim, since many aspects of project management can also be outsourced<sup>13</sup>. For

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<sup>8</sup> Outsourcing America: What's Behind Our National Crisis and How We Can Reclaim American Jobs, by Ron Hira and Anil Hira.

<sup>9</sup> A red flag in the brain game, By Steve Hamm, BusinessWeek, May 1 2006

<sup>10</sup> The Flight of Creative Class, By Richard Florida

<sup>11</sup> Outsourcing Market Now Favors Multisourcing, CIO Says, Patrick Thibodeau. Computerworld. Framingham: Apr 3, 2006. Vol.40, Iss. 14

<sup>12</sup> Multisourcing Adds to IT Management Load, Patrick Thibodeau. Computerworld. Framingham: Apr 10, 2006. Vol.40, Iss. 15.

<sup>13</sup> [http://www.pmsolutions.com/articles/pdfs/outsourcing/outsourcing\\_pmservices.pdf](http://www.pmsolutions.com/articles/pdfs/outsourcing/outsourcing_pmservices.pdf)

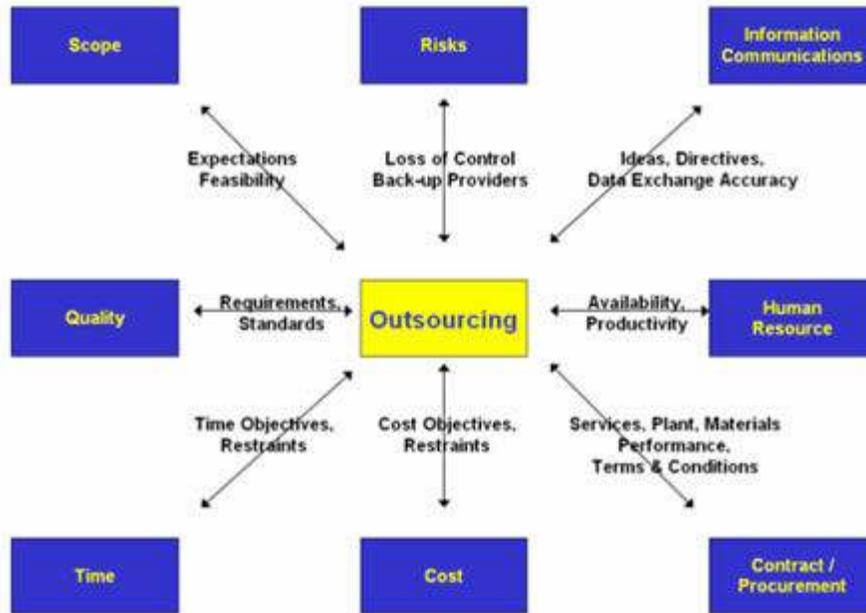
example, distance is not a barrier due to improvements in telecommunications in finding out status and milestones about a project and could be conducted by personnel in captive centers in low wage countries. Program management, where multiple projects are to be managed could be a possible area for career growth. But this function again comes closer to executive management and executive management jobs are few if not none.

- *Risk Management*: As firms are usually exposed to more risks with outsourcing, risk management will play a crucial role and risk manager careers will see significant growth. The author believes that portions of risk management functions can also be outsourced as the job functions becomes more commoditized and in some cases can also be automated.
- *Customer relationship management*: The primary argument for outsourcing is to keep the jobs with customer touch to remain in US. But call centers are part of CRM and has been outsourced. Direct client contact jobs would remain in US, but a segment of this could also be outsourced if improvements in telecommunications technology can allow virtual touch with customers more effective.

## **5. Professional skills in demand associated with outsourcing**

The primary conclusion of my research is that the following professional skills will be critical for organizations.

- *Industry / Functional Domain Knowledge*: Many organizations requires industry / functional area knowledge (business domain knowledge) to facilitate change management in outsourcing projects. The skill set expected will be premium and would require candidates to be the leading experts in the field. One could argue how a country can have leading experts, if there are no job tracks available at the junior level. The solution would be more immigration, but businesses would like temporary worker visas to keep wages down.
- *Project Management*: As shown in the outsourcing value chain figure, project management plays a major role in ensuring that outsourcing objectives are on track. The skill set of this profession focused for outsourcing would include communicating effectively across cultural differences (Indian culture compared to Chinese) in addition to occupational (talking to programmers compared to business analysts) differences.



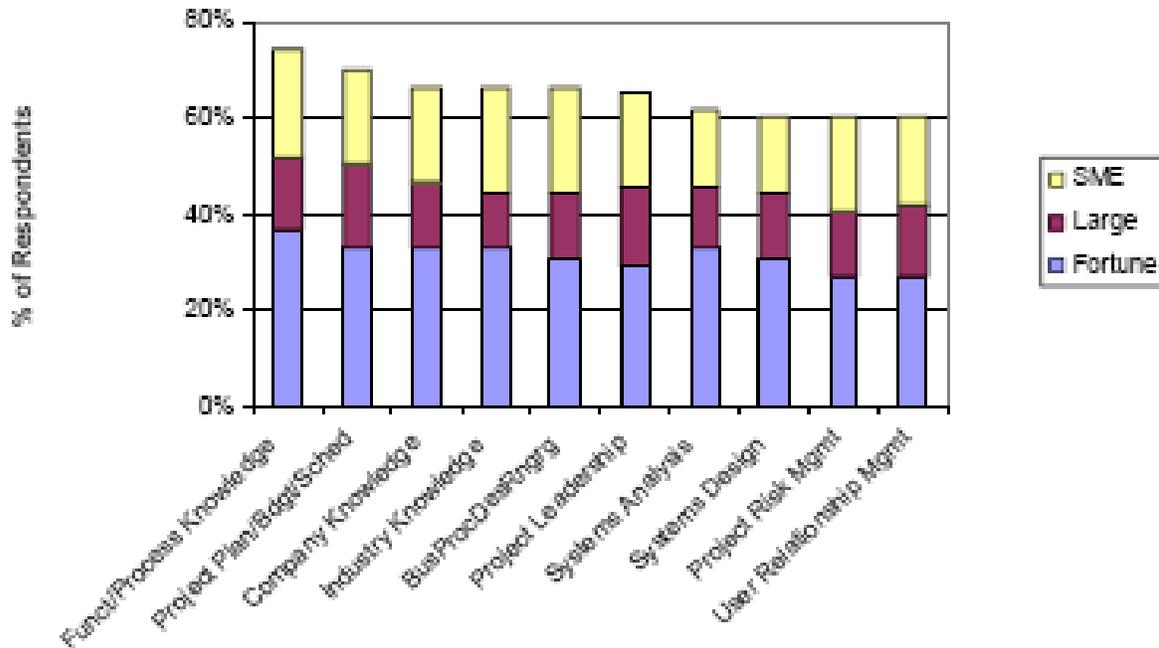
Outsourcing value chain<sup>14</sup>

- Risk Management:** Outsourcing introduces additional risk compared to managing projects internal to a company. So risk management professionals would be highly needed for the outsourcing industry in US. In addition to using IT support tools, these individuals have to ensure that the project mission can be assured. One could argue that some of the risk management functions can also be automated or outsourced (multiple intermediaries) as IT telecommunications technology evolves.

In short, outsourcing industry seeks experts in different domains to ensure that outsourcing strategy makes sense and add value to company bottom line. Intermediary job functions like project and risk managers are necessary for operations aspect of outsourcing management. Even though one could argue that there will be technical skills required for jobs in United States, the author believes that other than for defense and regulation restricted jobs, outsourcing/offshoring will erode tech jobs.

Top skills recommended to be kept in-house by SIM Advocacy group is shown below:

<sup>14</sup> <http://www.projectmanagement.ie/articles/outsourcing.htm>



PMP (Project Management Professional) certification has now become the industry standard for project managers. There were 84,302 PMP's by the end of June 2004. There are PMP's in more than 120 countries throughout the world now. A major milestone occurred in 1999 when PMI's (Project Management Institute) certification program department became the first professional certification program department in the world to attain ISO 9001 recognition<sup>15</sup>.

COP (Certified Outsourcing Professional) certificate is also gaining importance and its goal is to demonstrate that an individual possesses the experience and knowledge required to design, implement, and manage outsourcing initiatives that have a high probability of achieving an organization's intended outcomes<sup>16</sup>.

## 6. Organizations/Industries that showed decline in Tech jobs

The types of organizations that showed decline in tech jobs include multinationals to start-ups.

- *Multinationals*: More U.S. engineers used to be employed in Electrical Engineering and Computer Science than any other fields of engineering. According to BLS 2005 data, more than 2 million persons were employed in computer fields (and related) including computer programmers, support specialists, systems analysts, database administrators, network and computer systems administrators, network systems and data communications analysts, and other types of computer specialists. In terms of employment, software and computer engineering is the most important engineering job category, mirroring the technical strength of the U.S. economy. Many scholars and selective media thought that the activities being offshored would be routine, low-end work, such as data entry and programming, jobs that the United States could afford to lose.

<sup>15</sup> Information Technology Project Management, Fourth Edition, By Kathy Schwalbe.

<sup>16</sup> <http://www.outsourcingprofessional.org/content/23/152/1205/>

A recent survey (Highest degree required in job descriptions of Five Multinational Corporations operating in China and India, February 2005) of multinational hiring contradicts this view<sup>17</sup>.

CISCO						
	None	Technical	Bachelors	Masters	PhD	Total
Shanghai	0	0	17	19	0	36
Beijing	2	0	7	3	0	12
Bangalore	10	0	28	65	0	103
INTEL						
Shanghai	10	9	61	55	9	144
Beijing	1	0	7	6	1	15
Bangalore	11	7	39	112	10	179
HP						
Shanghai	6	2	7	29	1	45
Beijing	5	0	25	28	0	58
Bangalore	15	3	62	42	34	156
MICROSOFT						
Beijing	2	0	0	1	0	3
Bangalore	2	0	13	5	0	20
Hyderabad	17	3	57	14	3	94
ORACLE						
Beijing	0	0	0	2	0	2
Bangalore	9	1	63	16	0	89
Hyderabad	0	0	62	35	13	110

Sources: Adapted from information on the Cisco, Intel, HP, Microsoft, and Oracle websites.

- **Startups:** Recently, start-up companies have begun planning for global growth from its inception. In response to pressure from venture capitalists to reduce cash burn rates, start-up companies are creating offshore facilities even before their head counts reach significant number (usually 100). This offshoring decision lowers the cost of starting a firm and thus encourages entrepreneurship. And it also allows a firm to shift mundane work to low-cost locations and reallocate its budgets to new product development. In an extreme case, the leadership and marketing team might remain in the United States while other employees are located abroad.

Small and Medium Enterprises (SME's) did not had significant decline in jobs due to outsourcing/offshoring as the increased overhead of managing multisourcing was a disadvantage.

The industries primarily affected by outsourcing include:

<sup>17</sup> The Bridge, Linking Engineering and Society. National Academy of Engineering, Fall 2005.

- *Medical industry:* For example, x-ray diagnosis is regularly outsourced to medical personnel in India. This is likely to increase as higher medical costs in US will continue to pressure medical services organizations to find ways to cut costs. Call centers and transcription services are staple items for outsourcing.
- *Automotive industry:* GM lead the pack in outsourcing IT services. In 2005, the Renault-Nissan alliance outsourced IT services contracts worth approximately \$600 million to two U.S. firms, Hewlett Packard and Computer Sciences Corporation, and a French firm, Atos

Table A. Mass layoff events and initial claims for unemployment insurance from the private nonfarm sector

Year	Mass Layoff Events			Mass Layoff Initial Claimants		
	Total	Extended	% total	Total	Extended	% total
2001	19,449	7,375	37.9	2,346,584	1,457,512	62.1
2002	18,212	6,337	34.8	2,069,713	1,218,143	58.9
2003	16,821	6,181	36.7	1,721,985	1,200,811	69.7
First three quarters of 2004	10,418	3,478	33.4	1,079,148	591,482	54.8

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- *Software and other IT services:* This is the industry core that has seen the most outsourcing and companies like TCS (Tata Consultancy Services), InfoSys are the leading outsourcing providers. The second phase of outsourcing involves outsourcing (offshoring) by outsourcing (offshoring) giants itself. TCS has already opened offices in Budapest, Hungary and Hangzhou, China<sup>19</sup>.

The job candidates in US in any industry can be subjected to the effects of outsourcing. Even though regulation can temporarily save an industry, the market forces would eventually catch up to stabilize the industry fundamentals. Either the employee has to be in the top talent list in the industry to work in his or her domain area or need to have an intermediary job like project manager, managing global teams. Even though advances in telecommunications will increase the outsourcing of services that needs customer touch, jobs requiring direct client contact will be insulated from offshoring.

As per CareerJournal, outsourcing creates jobs but widens wage gap between highly educated and skilled to low skill jobs (which could be outsourced or automated)<sup>20</sup>. The job search site suggests that the U.S almost certainly isn't going to run out of jobs, even though history shows that it's impossible to predict what new jobs will replace those that are outsourced or automated.

<sup>18</sup> Mass Layoff Statistics Data in the United States and Domestic and Overseas Relocation, Sharon P. Brown, Chief, Division of Local Area Unemployment Statistics, Bureau of Labor Statistics, U.S. Department of Labor.

<sup>19</sup> Offshoring the Offshorers, By Kerry A. Dolan, FORBES, April 17, 2006

<sup>20</sup> <http://www.careerjournal.com/myc/survive/20040413-wessel.html>

## 7. Has employee benefits decreased because of outsourcing? (Primary Research)

<http://www.archive.org/> website provides snapshots of company websites in the yester years. This feature was used to verify if employee benefits for selected (sample of tech and defense) fortune 100 companies in US have decreased or not. The following patterns were used for the study:

- Tone of the employee benefit description: Is it inviting with teaser statements or is it too conservative or refer potential employees to directly contact HR?
- Actual employee benefits provided now compared to yester years. Are there any employee benefits/perks that were highlighted in the past, which has been eliminated? Medical plan is not considered as the costs have increased forcing many companies to trim medical benefits. In addition, medical benefits cuts cannot be usually assessed from website postings.

Company Name	Main changes	Comments
Intel Corporation	Home PC program perk is no longer available (Jan 1. 2001 vs. Apr 14 2006)	Company perks for salaried employees have reduced.
Microsoft	Paid Infant care leave, free admissions to local attractions and events has been dropped (Jan 4 2001 vs. Apr 14 2006)	Company perks have reduced.
Northrop Grumman Corporation	No change (Apr 18 2004 vs. Apr 14 2006)	Benefits remained the same.
Honeywell Corporation	No change (Jan. 18 2001 vs. Apr 14 2006)	Benefits remained the same.
Johnson Controls	No change (Oct 2004 vs. Apr 14 2006)	Benefits remained the same.
Hewlett Packard	Cash Profit-Sharing is no longer provided. (June 2000 vs. Apr 14 2006)	Benefits has reduced
Verizon	No change (Jan 2001 vs. Apr 25 2006)	But there were several hot jobs listed in 2001 at \$100K, which could be considered as perks compared to these days.

From my limited observations using website archives, it seems employee perks have reduced if not eliminated (For example, computer for every employee initiative at Intel) but other employee benefits more or less remained the same.

The reasons cited for reduced employee benefits, if any are the following:

- H-1b and L-1 visas utilized to bring temporary workers to United States push down employee wages, since employers can tell US citizens that they can hire temporary workers at low wages. They can tell temporary workers to

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work for low wages as they could be sent back from US if higher wages are insisted.

- The recession and outsourcing has also caused reduction in employee perks. In the above list, defense companies who has seen their margins improve because of Iraq war has maintained the employee benefits same.

## **8. Case study on technology education at University of Maryland (UMD) at College Park (Primary Research)**

This case study was focused on technology education at electrical and computer science engineering department of University of Maryland. Dean Dr. Manor Franklin was interviewed for this purpose. The objective of this case study was to understand what student can expect for tech education in the light of outsourcing boom and what proactive steps University of Maryland has taken so far.

*7.a Has the percentage of graduate and undergraduate students seeking higher studies tech/IT areas declined during the years from 2000 to 2006? Any figures that I can use with respect to University of Maryland?*

Applications for undergraduate studies have been decreasing by about 7% per year since 2002. For graduate studies, the number of applications peaked in 2002 and 2003 and then dropped by about 60% in 2003. The graduate applications have started to pick up slightly in 2005-06. There is no reasonable explanation for the increase in applications in years 2002 and 2003.

*7.b What are the computer topics/areas that are sought by students these days considering job prospects?*

Computer hardware areas especially chip design (For example, designing the next chip like Pentium) still provides job opportunities for students. Software job opportunities are getting scarce because of outsourcing / offshoring. This tells us that jobs that require break through innovation is still being done in United States.

*7.c What are the companies mainly hiring from computer science department and for what kind of jobs? Has there been any situation in which companies were willing to transfer candidates from US to India or other emerging economies?*

The companies that usually hire from UMD are Microsoft, Advanced Micro Devices (AMD), Intel, and Texas Instruments (TI) for hardware design jobs. So far there has not been any report of students offered jobs in locations outside US.

*7.d What do you think lies ahead for the future of computer science field / students in US?*

Year 2003 and 2004 was a tight year for finding IT jobs. 2005 and 2006 surprisingly seems to be a good year. We are not seeing opportunities that we used to have for the Internet boom. Jobs that require innovation would still be available in US at least for the short term.

*7.e Has the computer science department made any changes in its operations/strategy because of outsourcing boom in US?*

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Outsourcing is not been given much consideration yet for operations or strategy changes at UMD since top caliber students are still finding employment.

*7.f What could a computer science student take / develop in terms of classes/internships to make him marketable job candidate in US?*

Students should have wider domain knowledge instead of focusing on one aspect of tech areas like programming. This will allow them to manage different kinds of tech work.

*7.g Has there been a reduction in Government research (NSF, DARPA) funding for computer science programs in general?*

National Science Foundation (NSF) funding for traditional computer science areas (compiler programming, hardware development, cad tools) has reduced drastically by as much as 40-50%. There are still funding available for computer vision and other futuristic technologies. DARPA funding, which are large awards is usually for product oriented research and has not changed much.

*7.h Do you believe offshoring and outsourcing is causing US to loose its tech leadership? What can we do to maintain US innovative edge? What can governments do? What can business leaders do?*

US has not lost its technology leadership yet. But if the current outsourcing trend continues, it can. As more capital flows to emerging economies, the brains that can cause innovation would have much better chance. There is a huge momentum in transferring technology jobs and driving venture capital to emerging economies. This will boost the infrastructure of emerging economics to enable them to compete with US even in technology innovation. US education should instill in tech students wider domain knowledge to be competitive for jobs that require innovation.

## **9. Conclusion**

### **9.a Future of Tech employment in United States due to outsourcing**

The career of the engineer of the future is likely to take one of two directions. Engineers employed in organizations will necessarily be required to coordinate projects having global workforces. A typical U.S. engineer will have to become a project manager early in his or her career and will be coordinating the work of people stationed around the world, either within the parent organization or in contractor organizations. Entrepreneurship will require engineers to move in a different direction. The heart of entrepreneurship is creating new knowledge and actualizing it in the marketplace. Engineer-entrepreneurs must not only understand how to design good products, but also how to design good business ventures. Entrepreneurial engineers need not only a rigorous engineering education, but also an understanding of the elements of entrepreneurship. There are advantages to being located in a developed country with sophisticated markets that often set the pace for consumers, and young engineer-entrepreneurs must know how to take advantage of the knowledge in US marketplace.

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In the future, most engineers will experience mid-career changes. Thus, the existing model of the engineer who necessarily receives all of her or his training while young, usually soon after high school, must give way to a model of engineers who may choose to enter the field much later in life, perhaps after working in related fields, such as the pure sciences, for several years. New curricula must be developed that allow them to complete their educations over a longer period of time, perhaps while working part time.

Engineering is a crucial contributor to US economy to entrust its future solely to market forces in the belief that a positive outcome will result. A positive response is to try to determine the skills future U.S. engineers will need and then make educational system changes to provide them. Only then will U.S. engineers be capable of creating new value to US economy.

Baby boomer retirements could potentially create high tech employment especially for government and defense industry where offshoring may not be an option. The jobs will be a prized possession for short term, till the dearth of potential candidates could cause crises in the long run. Immigrants are the obvious choice in this regard to fill the gap.

From my research and interview, it is clear that outsourcing could eventually cause US to loose its technological edge. If venture capital flows into emerging economies to fund innovation, brilliant minds are sure to capitalize the opportunity. Defense and regulation can only delay the job creation process not stop it.

### **9.b Job strategies for MBA students seeking employment in outsourcing industry**

People who have the expertise to tie together technology and business will continue to be marketable in the US. The future of MBA's (especially tech MBA's) lies in people management whether they are on the service side or the buyer side, which is a key aspect of change management<sup>21</sup>. Outsourcing creates more opportunities for managing resources which includes people, vendors and outsourcing partners. MBA students seeking employment can either be on the buyer side or on the services side. Some job titles are listed below:

*Executive level job:* Chief Resource Officer (CRO: The CRO ensures that the right outside relationships are established, maintained and nurtured. This is considered a progression of CIO job.<sup>22</sup>)

*Middle management:* Service Manager, Resource Manager, Outsourcing Vendor Manager. This job deals with multi-operations aspect.

*Entry level to middle level:* Project Managers, Business Consultants, Technology Consultants. This job deals with day to day operations per site or location.

*Strategies for jobs in buyer side:* Multilingual candidates would have an edge as they would be able to understand the culture of the emerging economies better and enable effective communication with personnel of service providers (even

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<sup>21</sup> Jobs at risk, Network World, Jul 5, 2004. Vol.21, Iss. 27, By Jennifer Mears.

<sup>22</sup> Resource management, *Fryer, Bronwyn*. Computerworld. Framingham: Oct 24, 1994. Vol.28, Iss. 43

though English will be the primary language). Project management skills would help in enabling successful outsourcing relationships and successful projects. Risk management would also be a critical part of managing multisourcing. MBA's with International Business focus would have an advantage in managing global risks and mitigation strategies. Business Process Improvement skills will also be important and so will be change management. A look at an executive outsourcing job posting is shown below<sup>23</sup>:

**Career Path**

## Outsourcing Job of the Future

Outsourcing is not only a tool for changing your organization. It may itself be a stimulus for further change. Mike Corbett, director of research at The Outsourcing Institute in New York City, says you can expect to see ads like this as outsourcing continues to take hold:



**CHIEF RESOURCE OFFICER**  
Large global corporation seeks senior executive to spearhead company's redefinition and redesign around core competencies and outside relationships.

**ASSISTANT MANAGER**

**"CHIEF RESOURCE OFFICER: Large global corporation seeks senior executive to spearhead company's redefinition and redesign around core competencies and outside relationships. Proven track record required in developing and managing strategic relationships with service providers. Responsibilities include applying state-of-the-art methodologies for strategic analysis of core competencies and benchmarking of existing operations; defining, negotiating, and managing ongoing relationships with outside providers; monitoring their performance and implementing corrective actions where needed. Compensation package includes incentives based on overall corporate financial performance."**

Prepare yourself well and wisely. It would be better if your company didn't have to look outside when the time comes, wouldn't it? —CD

*Strategies for provider side:* Job candidates should have good knowledge and implementation experience at managing best practice processes like CMMI, SEI and ISO 9000(X). This would be essential for the service provider to compete well and as hallmark for buyers. Another requirement would be global travel and need for frequent job location changes and skill in customer relationship/value management.

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### **Definition of terms and concepts:**

**Tech jobs:** Implies jobs belonging to the following categories:

- Computer programmers
- Computer scientists and database administrators
- Computer software engineers
- Computer support specialists and systems administrators
- Computer systems analysts
- Engineers
- Engineering technicians

**Outsourcing:** The concept of taking internal company functions and paying an outside firm to handle them. Outsourcing is done to save money, improve quality, or free company resources for other activities. Outsourcing was first done in the data-processing industry and has spread to areas, including telemessaging and call centers. Outsourcing is the wave of the future.

**Offshoring:** is defined as relocation of business processes to another country, especially a country overseas which can be part of outsourcing also. This includes any business process such as production, manufacturing, or services.

## Appendix-1 (Occupations with the largest job decline, 2004-14)

[Numbers in thousands]

2004 National Employment Matrix code and title	Employment		Change		Quartile rank by 2004 median annual earnings <sup>1</sup>	Most significant source of postsecondary education or training <sup>2</sup>
	2004	2014	Number	Percent		
11-9012 Farmers and ranchers .....	1,065	910	-155	-14.5	H	Long-term on-the-job training
43-5081 Stock clerks and order fillers .....	1,566	1,451	-115	-7.3	VL	Short-term on-the-job training
51-6031 Sewing machine operators .....	256	163	-93	-36.5	VL	Moderate-term on-the-job training
43-4071 File clerks .....	255	163	-93	-36.3	L	Short-term on-the-job training
43-4151 Order clerks .....	293	230	-63	-21.4	L	Short-term on-the-job training
43-9051 Mail clerks and mail machine operators, except postal service .....	160	101	-59	-37.1	L	Short-term on-the-job training
43-9011 Computer operators .....	149	101	-49	-32.6	H	Moderate-term on-the-job training
43-6014 Secretaries, except legal, medical, and executive .....	1,934	1,887	-48	-2.5	L	Moderate-term on-the-job training
51-4031 Cutting, punching, and press machine setters, operators, and tenders, metal and plastic .....	251	208	-43	-17.2	L	Moderate-term on-the-job training
41-9041 Telemarketers .....	415	373	-42	-10.0	L	Short-term on-the-job training
43-9022 Word processors and typists .....	194	165	-30	-15.3	L	Moderate-term on-the-job training
43-4041 Credit authorizers, checkers, and clerks .....	67	39	-27	-41.2	H	Short-term on-the-job training
53-7063 Machine feeders and offbearers .....	148	122	-27	-18.0	L	Short-term on-the-job training
51-6063 Textile knitting and weaving machine setters, operators, and tenders .....	46	20	-26	-56.2	L	Long-term on-the-job training
51-6064 Textile winding, twisting, and drawing out machine setters, operators, and tenders .....	53	29	-24	-45.5	L	Moderate-term on-the-job training
43-5041 Meter readers, utilities .....	50	27	-22	-44.9	H	Short-term on-the-job training
43-9071 Office machine operators, except computer .....	100	78	-22	-21.9	L	Short-term on-the-job training
51-4021 Extruding and drawing machine setters, operators, and tenders, metal and plastic .....	89	70	-19	-21.3	L	Moderate-term on-the-job training
43-2011 Switchboard operators, including answering service .....	213	195	-19	-8.8	L	Short-term on-the-job training
41-9091 Door-to-door sales workers, news and street vendors, and related workers .....	239	221	-18	-7.4	L	Short-term on-the-job training
51-9132 Photographic processing machine operators .....	54	38	-17	-30.7	VL	Short-term on-the-job training
45-2092 Farmworkers and laborers, crop, nursery, and greenhouse .....	611	595	-16	-2.7	VL	Short-term on-the-job training
41-2022 Parts salespersons .....	239	223	-16	-6.6	L	Moderate-term on-the-job training
51-4072 Molding, coremaking, and casting machine setters, operators, and tenders, metal and plastic .....	157	142	-15	-9.5	L	Moderate-term on-the-job training
51-2022 Electrical and electronic equipment assemblers .....	221	207	-14	-6.4	L	Short-term on-the-job training
43-2021 Telephone operators .....	39	25	-14	-35.7	L	Short-term on-the-job training
51-9061 Inspectors, testers, sorters, samplers, and weighers .....	508	494	-13	-2.6	L	Moderate-term on-the-job training
43-5021 Couriers and messengers .....	147	134	-13	-8.6	L	Short-term on-the-job training
51-8091 Chemical plant and system operators .....	60	49	-11	-17.7	VH	Long-term on-the-job training
53-6021 Parking lot attendants .....	122	111	-11	-8.7	VL	Short-term on-the-job training

<sup>1</sup> 1 The quartile rankings of Occupational Employment Statistics Survey annual earnings data are presented in the following categories: VH=very high (\$43,600 and over), H=high (\$28,580 to \$43,590), L=low (\$20,190 to \$28,570), and VL=very low(up to \$20,180). The rankings were based on quartiles using one-fourth of total employment to define each quartile. Earnings are for wage and salary workers.

<sup>2</sup> 2 An occupation is placed into one of 11 categories that best describes

the postsecondary education or training needed by most workers to become fully qualified. For more information about the categories, see Occupational Projections and Training Data, 2004-05 edition, Bulletin 2572 (Bureau of Labor Statistics, March 2004) and Occupational Projections and Training Data, 2006-07 edition, Bulletin 2602 (Bureau of Labor Statistics, forthcoming).

## **Appendix-II:**

# **OFFSHORING AND ITS IMPLICATIONS FOR THE INFORMATION SYSTEMS DISCIPLINE**

**By Rudy Hirschheim, Claudia Loebbecke, Newman, Josep Valor**

### **Summary**

In the absence of official statistics on offshoring, it is necessary to look at indirect measures, such as trade in services, employment data and skill based approach.

Domestic outsourcing is still very much larger than global outsourcing.

offshoring and outsourcing have existed for many years in the manufacturing sector but are now increasingly taking place in the services sector as a result of increased tradability of services, resulting from trade liberalization and rapid technological developments, especially in IT, and the ability to codify and standardize routine IT services tasks. As a result, the production of many service activities becomes increasingly location independent.

For India, it is a difficult job to establish clear numbers between IMF Balance of Payments categories

"computer and information services" and "other business services." This can even include construction. (Page-3)

While most other OECD economies experience relatively lower churning rates than the United States, it is still the case that even the largest projections of jobs "lost" to offshoring are still small in comparison to annual churning, and most job terminations are not related to offshoring

While part of this decline may be the result of international sourcing, some occupations are likely to disappear anyway as they will increasingly become digitized and/or automated.

In sum, attempts to measure the impact of offshoring using trade, employment and/or skilled-based data have been problematic. Clearly one could selectively choose and interpret the data to "support" whatever position one takes on offshoring. But this should not be used as a reason to not study offshoring. Indeed, we believe it still makes sense to conceptually analyze offshoring in an attempt to understand its potential impacts on the IS discipline.

For instance, India's TCS, Infosys, and Wipro, all major Indian software outsourcing companies, are considering or have already opened development centers on the Chinese mainland.

Chinese software companies have a vast domestic market on which to concentrate and so may not be as motivated as Indian companies to seek work abroad (SAM: Why Indian companies buy up China ones?).

Suggest software development was professionalized compared to accountancy where there is state sanctioned monopoly.

shifting from the focus from programming to "higher-level" activities such as business process modeling and IT enabling of business processes.

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For jobs to be offshored/outsourced they have to be separable from the process of which they are a part.

The boundaries of what processes are subject to close geographic constraints are changed as IT evolves. This leads us to ask if these are the modeling skills Western companies are looking for in their recruits.

### ***Offshoring and Information Systems Jobs: What Skills do Companies in the West Want (Page-10)***

Companies that could be classified as SMEs consider that the potential savings by offshoring do not compensate for the increased coordination costs and the uncertainties for dealing with a provider that can not be "seen closely."

There is still a key area where IS can prosper in the West, that is, in the IT enablement of organization/business processes or business process modeling

at least in the short term, it appears that most organizations in the West will likely rely on local talent to undertake such IT process enablement.

business process redesign is a logical extension of the earlier emphasis on methods of information requirements analysis, information systems design, and implementation. It seems logical for Western IS academics to focus their attention on this key core competence. For the West, the focus could be primarily on process modeling and the IT enablement of these processes as well as the implementation of the system when it is complete. The actual coding and maintenance of the modules can be "commodified" and take place in the East.

King (2004), for instance, suggests that the IS curriculum should be revamped so as to focus on three core areas: software interfacing, contract management, and strategic technology assessment. Davis et al. (2004) contend that the IS curriculum should be revised to include offshoring management as a key component, and that new specializations should be added to the curriculum, that is, offshore infrastructure management, offshore systems development management, offshore operations management, and offshore outsourcing management. A number of IS faculty (e.g., Mary Lacity, Beena George among others) and institutions (such as University of Arizona and MIT) have developed outsourcing courses to help undergraduate and graduate business students understand the myriad issues surrounding outsourcing and offshoring.

IT offshoring is the precursor to business process offshoring.

### **Conclusion**

It has arisen in response to the need to cut costs and fill skills shortages, and competition has created a self-reinforcing dynamic. Once a few firms shifted to lower-cost locations and moved the cost/quality frontier, others had to follow. How long this dynamic will be maintained will depend on the availability of skills and relative wage advantage as well as other costs. As activities are being moved offshore, relative wages will adjust and potentially slow down the offshoring process. The extent to which activities can be moved offshore will also depend on the supply of skilled labor overseas, as well as the potential for undertaking service activities at a distance.

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A broader cost-benefit appraisal may tip the balance against offshoring or offshoring may become a selective, cherry picking activity. This we think is a more likely scenario.

## Appendix-IV: Highlights of 2006 SIM Report

<b>Table 8.1 Skills Portfolio</b>			
<b>Core</b>	<b>Non-core</b>	<b>Prerequisite</b>	<b>Essential</b>
Company Specific Knowledge	Continuity/ Disaster Recovery	Programming	Systems Analysis
Functional Area Process Knowledge	Desktop Support/ Helpdesk	Database Design/ Management	Systems Design
Industry Knowledge	Mainframe/ Legacy	System Testing*	IT Architecture/ Standards
Business Process Design/ Re-engineering	Operating Systems	Voice/ Data Telecommunications*	
Change Management/ Organizational Readiness	Operations		
Managing Stakeholder Expectations	Service Hosting		
Project Leadership	System Testing*		
Project Planning/ Budgeting/ Scheduling	Voice/ Data Telecommunications*		
Project Integration/ Program Management			
Project Risk Management			
User Relationship Management			
Negotiation	<i>*appears in two skill areas</i>		