

Offshoring: Implications for the Engineering Workforce and Profession

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**Workshop on the Offshoring of Engineering:
Facts, Myths, Unknowns, and Implications**

**National Academy of Engineering
24 October 2006**



Base Order Observations

1. **Offshore outsourcing of engineering services is an almost inevitable outcome of the globalization trends created by basic economic forces of share-holder value, efficiency, productivity enhancement and free flow of capital.**
2. **Offshore outsourcing occurs for a number of reasons, all of which are grounded in basic business logic. Cost is a major component, but even as cost-margins narrow, there will still be strong incentives for offshoring.**
3. **The engineering profession in the U.S. is not monolithic. Offshoring doesn't affect each engineering discipline in the same way, at the same pace, or to the same degree.**

Troubled Backdrop for Engineering

- The Dot.Com bust (2000-2001) and contraction of the high-tech sector (500K+ jobs lost).
- Productivity enhancements that drive economic growth are also reflected in the engineering services sector (fewer engineers needed to do the same job)
- Pace of technology change creates imperative for continuing education and forces new career paths.
- Barriers to entry into the profession are getting higher/more expensive
- An aging workforce and looming Baby-Boomer retirements.
- The fundamental relationship between engineers and employers has changed

The Offshoring Trend: It's Not Just Low Level Work

- Considerable evidence is available that high level research and design work is moving overseas at an accelerating rate.
- Last May, Booz Allen Hamilton and Insead surveyed companies on innovation R&D dispersion. 77% of new R&D sites planned through 2007 slated for either China or India. By the end of 2007, China and India's share of global R&D staff is projected to jump from 19% to 31%, replacing Europe as the most important location for foreign R&D for U.S. companies.
- A more recent study by Booz Allen Hamilton conducted for the National Association of Software and Service Companies (NASSCOM) estimates that \$10-15 billion of engineering services are currently being offshored, with projected growth to \$150 -225 billion by 2020.

Where Will Engineering Jobs Remain?

- **Engineering jobs tied to creating and maintaining geographical infrastructures.**
- **Companies will keep some level of R&D and design work close to their U.S. markets.**
- **Engineers with an entrepreneurial sensibility and a bright idea will create their own opportunities.**
- **Higher-level research jobs will be found around federal laboratories and academic research centers as long as federal R&D dollars continue to flow.**
- **It seems likely that job opportunities will remain in the defense and homeland security sectors that involves sensitive or classified work.**
- **Hopefully, new and emerging technologies will also drive job creation in the U.S. as they are commercialized.**

Innovation Leadership is Crucial

- **IEEE-USA believes that the offshoring issue is inextricably tied to the broader issue of preserving our national competitiveness and technological leadership in an increasingly global economy.**
- **IEEE-USA also believes a coordinated national strategy is needed to sustain U.S. technological leadership and promote job creation in response to the concerted strategies being used by other countries to capture U.S. industries, jobs and markets.**
- **The National Academy’s “Gathering Storm” report has helped draw attention to the competitiveness challenges facing the nation, challenges inextricably linked to the engineering and the engineering profession and to offshoring and other trends.**

The Current Policy Consensus is Necessary, But Not Sufficient

- a renewed federal commitment to support front end research and development to enhance innovation.
- permanent extension of the federal R&D tax credit.
- programs or tax incentives to aid human capital development/worker training.
- improvements in K-12 science, technology, engineering, and math education in the United States to ensure a technologically literate workforce.

IEEE-USA's Offshoring Position

- The Federal Government must collect and publish reliable statistics on the kinds and numbers of manufacturing, R&D and service jobs that are being moved offshore.
- New/improved workforce assistance programs are needed to help displaced high-tech workers regain productive employment
- New/improved incentives are needed to help engineers and other professionals tackle the challenge of mid-career education.
- It is appropriate for government procurement rules to favor engineering work done in the United States absent compelling reasons to do it elsewhere.
- Policy-makers need to take a systematic look at U.S. immigration policy and its implications for the global trade in services. The United States will benefit more from a system that encourages permanent immigration into a competitive labor market than one based on exploitation of guest workers.

Some Related Needs

- We need to look more closely at what will incentivize qualified American students to consider technical careers in this new reality.
- As a nation, we need to better understand and address the barriers faced by U.S. engineers seeking to work abroad and consider how best to prepare U.S.-born engineers to work in the global engineering services market.
- Engineers as individuals and as a profession need to become more effective and more proactive participants in the public policy process and in public discourse about technology-related issues.

Other Engineering Community Policy Concerns

- The American Society of Mechanical Engineers: the need to secure America's job-intensive manufacturing base.
- The American Society of Civil Engineers: homeland security issue as non-U.S. architects and engineers have increasing access to information concerning U.S. facilities and infrastructure.
- The National Society of Professional Engineers: implications of offshore engineering for the engineering licensure system used by U.S. states to protect the public safety.

Closing Notes

- The professional engineering societies, including IEEE, will quickly lose relevance if we don't do a good job of enabling our members to thrive in their profession, providing them with better tools and direction to deal with the challenges posed by globalization.
- During my tenure as President, IEEE-USA is focusing on enhancing member value, emphasizing mid-career education and the importance of lifelong continuing education, providing innovation leadership, and enlisting engineers to help support K-12 education for future technologists.