

What Global Sourcing Means for U.S. IT Workers and for the U.S. Economy

The result is likely to be increased IT employment diffused throughout the U.S. economy, especially in non-tech industrial sectors.



Every reader of *Communications* likely knows someone who has lost his or her U.S.-based IT job since the technology bubble popped four years ago.

Most of these job losses came when Y2K projects were completed and investment in IT hardware, software, and services plunged. But others have come as some firms have outsourced the production of IT hardware, software, and services to other U.S. firms and to firms in other countries. What are the gains to the U.S. economy and to its IT workers from global sourcing? What are its costs? And what, if anything, should be the policy response?

It may come as a surprise, but global sourcing in the 1990s, by reducing the price of IT hardware, yielded increased investment in IT and more jobs for U.S. workers with IT skills. Going forward, the global sourcing of software and IT services will further reduce the price of these products, yielding a further increase in jobs demanding IT knowledge and skills. The problem of global sourcing, then and now, is that new IT jobs may not require the same skills or be in the same sectors of the economy.

Hardware, the first wave of global sourcing. Hard evidence on the gains from global sourcing is found in patterns of production, investment, and use of IT hardware. Econometric analysis confirms that technological change is the most important driver of IT prices. But global production and sourcing reduced the price of IT hardware some 20% below what it

would have been without global sourcing [2]. Lower prices encouraged disproportionately greater investment in IT throughout the overall U.S. economy, because IT investment increases more than one-for-one with price declines.

Some sectors (such as wholesale trade, electronics products, and financial institutions) have invested relatively more in IT, whereas other sectors (such as health services, business services, and construction) lag in their uptake of IT.

The increase in IT investment throughout the U.S. economy prompted an increase in demand for IT workers throughout the U.S. economy. The sectors with the most intensive investment in IT also employ the greatest number of IT workers, and the sectors that lag in IT investment also lag in IT employment. IT investment and IT jobs go hand-in-hand. By 2002, over 67% of the people employed in IT jobs in the U.S. did not work in the IT sector, but rather designed, modified, and integrated IT for companies outside the IT sector.

For the U.S. economy overall, the widespread use of IT and associated transformation of business activities translates into faster productivity growth. IT accounted for more than half of the acceleration of structural productivity growth in the U.S. in the 1990s, supporting both the robust GDP growth (4%) and low unemployment (3.9%) enjoyed by the U.S. economy in the second half of the decade. This performance was borne out at the sector level, with the sectors with the greatest investment in IT and the greatest number of IT workers also having the great-

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est productivity growth. Based on price declines from global sourcing, U.S. GDP in 2004 is some \$230 billion more than it otherwise would have been, or about \$2,000 for each working person in the U.S.

Software and IT services, the second wave of global sourcing. The U.S. is poised for a second wave of IT investment, growth in IT jobs, and productivity growth, as components of software and IT services are produced more cheaply abroad as part of an international value chain. A key source of the gains to capital investment, jobs, and productivity will come from the diffusion of IT into the sectors that did not take up IT during the 1990s.

Despite the technology boom of the 1990s, large

the functions into design, coding, maintenance, and user interface. Design and interface must be done together with the customer, but coding and maintenance do not require close proximity with customers and can be done by less costly programmers abroad. The higher-wage jobs, involving design and interface, must still be performed in the U.S.

The value to the U.S. economy of cheaper outsourced software and IT services is that it reduces the price of customized software. Econometric estimates are that, to an even greater degree than IT hardware, demand for software and services increases more than one-for-one with reductions in price. Therefore, as prices fall, demand for services and software rises

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sectors in the U.S. economy, including health services (5% of GDP) and education (2% of GDP), along with many small and medium-size enterprises (SMEs), still do not use IT very intensively. Reasons range from cost to culture to regulatory constraints. For example, the SME culture requires more tailored solutions and customer care, whereas in health services, regulatory issues are important in designing software and services. These issues have interacted with the higher relative cost of software and services to put IT further out of reach for these firms. As hardware prices fell, the importance of software and IT services rose as a proportion of spending on the total IT package of hardware, software, and services from \$1.40 per \$1 on hardware (1993) to \$2.20 per \$1 on hardware (2000).

Several factors have now enabled production of software and services to be reorganized into a value chain, with some components traded internationally. The raw technology of the Internet, along with lower prices for telecommunications and IT hardware, including personal computers, create linkages between U.S. businesses and foreign-trained labor that simply did not exist before the Internet-based value chain was available. Technological change in software programming modularizes and decomposes

more than one-for-one, diffusing IT into the lagging sectors and deepening the use of IT in the leading sectors, thus increasing demand for workers with IT skills in all sectors.

Meanwhile, U.S. IT jobs continue to move up the IT skills ladder. Demand increases for workers with the skills needed to design, customize, and utilize IT applications, particularly in the lagging sectors and among SMEs. Some of the transformation in types of IT jobs in response to global sourcing of software can be seen in detailed occupation data from the U.S. Bureau of Labor Statistics. From 1999 to 2002 (last available data), the number of “programming” jobs in the U.S. earning on average \$64,000 fell by some 71,000. But jobs held by application and system software engineers earning on average \$74,000 increased by 115,000. Thus, even as it increases the number of IT jobs, global sourcing of software and services changes the nature of IT jobs, moving them up the skills ladder and diffusing them throughout the U.S. economy.

Responding to Global Sourcing

Despite the positive overall prospects for IT jobs in the U.S. over the next decade, challenges remain for the federal government, for the IT industry, and for

individual IT workers alike. In particular, rapid technological change and focused educational programs abroad (along with lower wages there) mean U.S. workers' computer skills, once unique, are now available abroad. How should the U.S. government, the IT industry, and individual IT workers respond to the challenges of technological change and global sourcing? A two-pronged strategy of responses should focus on adjustment and training at home while opening markets abroad.

Opening international markets. Data on international trade in proprietary services shows the dominance of U.S. providers in IT services (such as database services) and in non-IT services that are increasingly internationally traded (such as financial services and business and professional services). Moreover, econometric analysis shows that exports of these services rise disproportionately with increases in foreign GDP. Promoting foreign macroeconomic growth, along with trade negotiations to open foreign markets to U.S. services, are key to continued IT job growth back in the U.S.

On the domestic side are two complementary strategies, one focusing on workers whose jobs have been eliminated by trade, technology, or other factors, and the other focusing on the skills pipeline for IT workers. For the first set of workers, extended unemployment benefits (providing more time for adjustment), training assistance, wage insurance, and portable health insurance are all ways to ease the transition to new jobs and careers.

A human-capital-investment tax credit is a policy for achieving a better-functioning skills pipeline of IT workers, for incumbent as well as for entry-level workers [1]. Not only is a skills pipeline important for the IT sector, the benefits of ongoing skills development in the IT sector would propagate throughout the overall U.S. economy. An investment tax credit recognizes two realities of the marketplace for skills. First, firms that engage in substantial training of their own workers, moving their skills up the ladder beyond the threat of outsourcing, face the disincentive of "free-riding" by other firms that do not train. Second, an internship credit recognizes the first job on the IT-career ladder for workers just out of school may no longer be a job in the U.S. IT workers and firms

engaging in incumbent training or internships would receive a tax credit when the training or internship is completed and the next step on the job ladder assured. Tax credits are routinely used by governments to spur physical capital investment and for research and development. In today's knowledge economy, people represent the U.S.'s most valuable asset.

Conclusion

The positive effects of the global sourcing of IT are undeniably real and substantial but depend on an environment of strong and continuing public, business, and worker relationships. Breaking these relationships—by restricting technology change, tempering global sourcing of IT, or failing to improve the skills of U.S. workers—risks the prospects for U.S. economic growth and job creation for IT, as well as overall.

Skilled IT workers represent the most critical ingredient for the U.S. to be able to benefit from outsourcing. People with up-to-date IT skills must continue to be distributed more widely throughout the economy, particularly in health care and SMEs. Lower prices for software and services will promote IT investment in these sectors and increase demand for workers with IT skills. People with broad IT skills need to develop, market, and integrate products for these underserved sectors, enabling them to enjoy IT-induced business transformation and productivity growth.

A human-capital-investment tax credit would give workers and firms the incentive they need to generate and upgrade U.S.-based IT skills to fill the need for more local IT workers. ■

References

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