

# Analysis chronicles changes in US investment in R&D

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The distribution of U.S. investment in research and development (R&D) across countries and industries has undergone a dramatic shift since the 1990s, with R&D becoming less concentrated geographically and growing rapidly in less developed markets such as China and India. The phenomenon of R&D globalization is also distinguished by its concentration in the domains of software and information technology (IT). In this context, a new analysis examines how changes in innovation within firms and a shortage of human capital in the United States in the fields of software and IT have driven U.S. multinational companies to establish and expand new innovation hubs abroad.

The analysis, by researchers at Carnegie Mellon University and Georgetown University, was published as a working paper by the National Bureau of Economic Research. "Our findings support the view that the globalization of U.S. multinational R&D has reinforced the technological leadership of U.S.-based firms in the [information technology](#) domain," notes Lee G. Branstetter, professor of economics and public policy at Carnegie Mellon University's Heinz College of Information Systems and Public Policy, who led the study. "And that multinationals' ability to access a global talent base could support a high rate of innovation even in the presence of the rising human resource cost of frontier R&D."

The analysis documents three important issues: the growing globalization of R&D, the increasing importance of software and IT to firms' innovation, and the rise of new R&D hubs and the differences in the

types of activity done there. The researchers argue that these are not separate issues but are closely related, and that the shift toward increasing reliance on software and IT in innovation is driving multinational corporations abroad in search of scarce talent.

Based on their analysis, the researchers conclude that the United States is experiencing constraints on the supply of human capital in the fields of software and IT, which limit the possibilities for U.S.-based multinational firms to be innovative. Global flows of investment, people, and ideas could help relax these constraints to some extent, they suggest, raising growth, productivity, and consumption possibilities worldwide. However, since the 1990s, the U.S. labor market has become more closed to immigration, which, in some cases, has spurred firms to shift some of their R&D to the places from which they had recruited engineers. Education policies could also expand the supply of IT and software workers in the United States, they suggest.

The authors also document a sharp rise in outbound foreign direct investment focused on R&D at a time when U.S. and other political leaders have assailed such investment for weakening U.S. production, employment, and growth. In contrast, the authors' work suggests that the globalization of R&D by U.S. multinationals will strengthen these U.S.-based firms, by enabling them to continue to innovate in the face of human capital constraints.

"To the extent that the rapidly growing investments in global R&D networks are rational, they provide a new reason for worry that policymakers around the world are rejecting globalization," according to Britta M. Glennon, Ph.D. student at Heinz College, who coauthored the study. "If a greater globalization of R&D is required to maintain a flow of innovations in the domains where technological opportunity is greatest, then de-[globalization](#) could have severe consequences for the future trajectory of growth and living standards."

Provided by Carnegie Mellon University

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