SIDEBAR

Global S&E Labor Force

The rising emphasis on developing S&E expertise and technical capabilities is a global phenomenon. S&E work is not limited to developed economies; it occurs throughout the world. However, much of the work is concentrated in developed nations, where a significant portion of R&D also takes place. The availability of a suitable labor force is an important determinant of where businesses choose to locate S&E work (Davis and Hart 2010). Highly skilled S&E workers have become increasingly mobile and nations have adapted their immigration policies to make it easier for these valued workers to relocate and work in their countries. These changes indicate an accelerating competition for globally mobile talent (Shachar 2006).

Data on the global S&E workforce are very limited, which makes it difficult to analyze the precise size and characteristics of this specialized workforce. Internationally comparable data are limited to business establishment surveys of industry that provide basic information about workers in S&E occupations or on workers with training in S&E disciplines. Additionally, although surveys that collect workforce data are conducted in many Organisation for Economic Co-operation and Development (OECD) member countries, they do not cover several countries—including Brazil and India—that have high and rising levels of science and technology capability, and they do not provide fully comparable data for China.

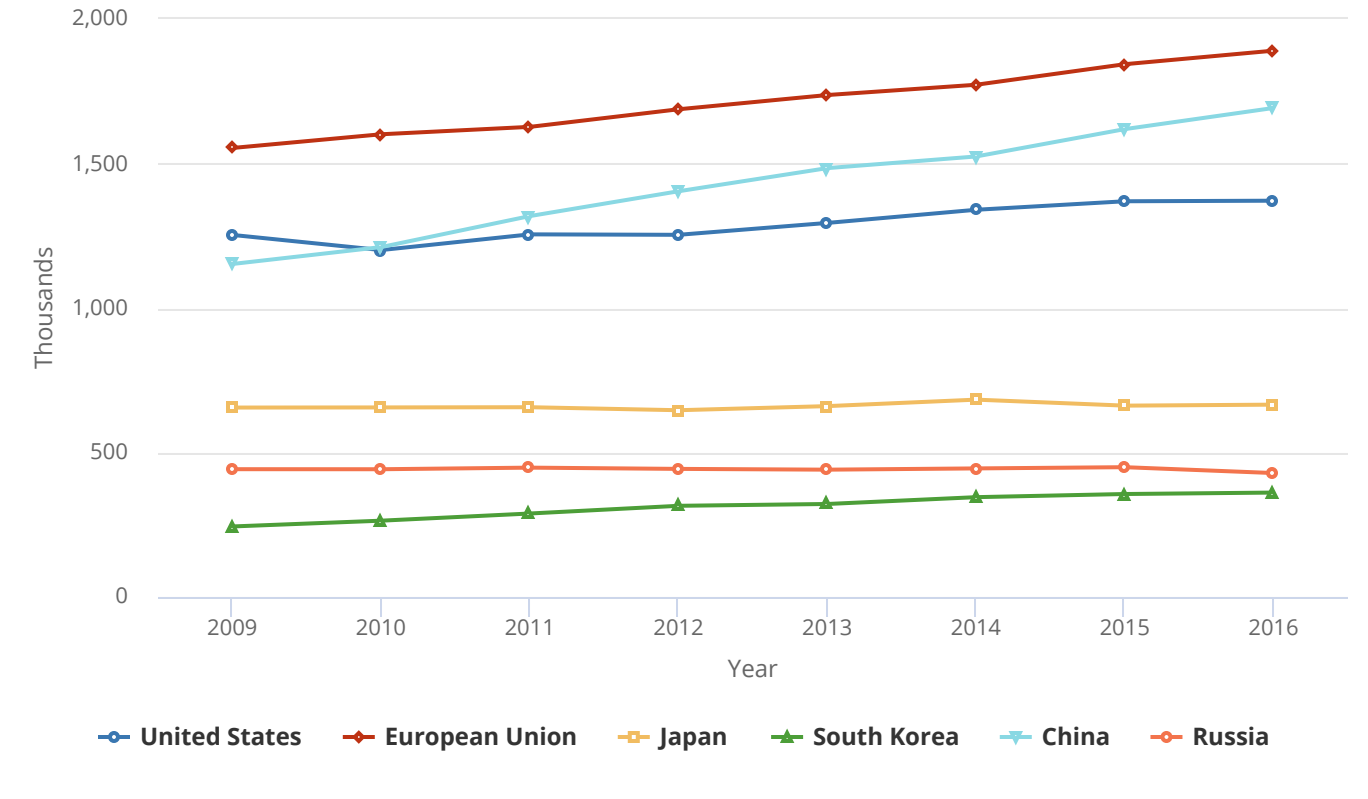
OECD data covering substantial, internationally comparable segments of the S&E workforce provide strong evidence of its widespread, although uneven, growth in the world's developed nations. OECD countries, which include most of the world's highly developed nations, compile data on researchers from establishment surveys in member and selected nonmember countries. These surveys generally use a standardized occupational classification that defines researchers as "professionals engaged in the conception or creation of new knowledge" who "conduct research and improve or develop concepts, theories, models, techniques instrumentation, software or operational methods" (OECD 2015). Because this definition can be applied differently when different nations conduct surveys, international comparisons should be made with caution.

OECD reports an estimated increase in the number of researchers in its member countries from 4.1 million in 2009 to 4.8 million in 2016. OECD also publishes estimates for seven nonmember economies, including China and Russia. Adding these seven to the OECD member total for 2016 yields a worldwide estimate of 7.2 million researchers. However, numerous uncertainties affect this estimate, including (but not limited to) lack of coverage of countries with significant R&D enterprise as well as methodological inconsistencies over time and across countries. For example, some nonmember countries that engage in large and growing amounts of research (e.g., India, Brazil) are omitted entirely from these totals. In addition, for some countries and regions, including the United States and the European Union (EU; see Glossary for member countries), OECD estimates are derived from multiple national data sources and not from a uniform or standardized data collection procedure. For example, China's data from 2009 onward have been collected in accordance with OECD definitions and standards, whereas the data before 2009, although not shown here, are not consistent with OECD standards. South Korea's data before 2007 exclude social sciences and humanities researchers and are therefore not consistent with the data from 2007 onward.

Despite these limitations for making worldwide estimates of the number of researchers, the OECD data provide a reasonable starting point for estimating the rate of worldwide growth. For most economies with large numbers of researchers, the number of researchers has grown substantially since the end of the recession in 2009 (Figure 3-B). China and South Korea both reported nearly 50% more researchers in 2016 than in 2009. The United States and the EU experienced steady growth but at a lower rate; the number of researchers grew 9% in the United States and 22% in the EU between 2009 and 2016. Exceptions to the overall worldwide trend include Japan (which experienced a relatively small change of about 2%) and Russia (which experienced a decline; see also Gokhberg and Nekipelova [2002]).

FIGURE 3-B

Estimated number of researchers in selected regions, countries, or economies: 2009–16



Note(s)
Researchers are full-time equivalents.

Source(s)
Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, 2018/2 (2019).

Science and Engineering Indicators