

2. Research Approach

Differences in economic growth among countries are leading to shifts in research and development (R&D) capabilities among major regions of the world. In particular, growth of the regional economies of Western Europe and the Pacific Rim nations is facilitating greater rates of growth in their civilian research programs compared to the growth rate for U.S. civilian research programs (National Academy of Sciences 1990, p. 4).

This report focuses on the human dimensions of R&D in six Asian countries—the People’s Republic of China (China), India, Japan, Singapore, the Republic of Korea (South Korea), and the Republic of China (Taiwan). Data on academic degrees in the natural sciences and engineering are examined together with demographic and macroeconomic data in an attempt to identify trends in human resources for science and technology (S&T) in the Asian region. Asian trends are compared with trends in the United States to illustrate potential similarities and differences in the area of human science and engineering resources.

The report provides a consistent data base on human resources for science in the above-mentioned six Asian countries. In addition to data on population, education, and S&T personnel, the 15-year time series also include gross domestic product (GDP) and R&D expenditures in purchasing power parity dollars (\$PPPs). These data provide the basis for identifying time trends in human S&T resources as well as key

indicators of their future growth and demand for scientists and engineers. A final section of the report discusses prospects for the future and implications for the United States created by this Asian growth in science and technology.

Several caveats are in order. First, data are compiled from numerous national and international sources and may not be strictly comparable. In addition, degree categories in different countries may not be academically equivalent.² Finally, some data series do not cover complete periods, and missing data were estimated to compile a regional series. Although these data problems are not trivial, every attempt has been made to develop trends that are approximately equivalent at the broad aggregate level. The degree data were verified country by country through national educational statistics (see Bibliography). Educational statistics for each country were categorized by broad fields of science. American and foreign scholars familiar with higher education in each country translated documents and reconfigured university departments’ statistics to the universally accepted classification scheme, the International Standard Classification of Education (ISCED), and the U.S. Classification of Instructional Programs (CIP).³

² This report does not deal with the quality of education in Asian or U.S. universities.

³ See section 8, Methodology and Notes on Data Series.