SIDEBAR

The Skilled Technical Workforce in U.S. Knowledge- and Technology-Intensive Industries

Knowledge- and technology-intensive (KTI) industries employ roughly 10 million people and account for 6% of the U.S. labor force (Figure 6-5, Figure 6-6, and Figure 6-9). These include people in different occupations with varying degrees of educational attainment, skill level, experience, and training. The *Indicators 2020* report "Science and Engineering Labor Force" provides a thorough analysis of the U.S. science and engineering (S&E) workforce.

One segment of the S&E workforce that performs important functions to support and advance science and technology is the skilled technical workforce (STW). The STW is composed of individuals who use science, technology, engineering, and mathematics knowledge and skills in their jobs and have a high school diploma, some college, an associate degree, or similar levels of qualification as their highest level of educational attainment.*

In 2017, about 486,000 individuals were employed as skilled technical workers in the U.S. high R&D intensive industries, comprising 16% of the total workforce in these industries (Table 6-A). Among the major high R&D intensive industries, aircraft (23%) and computer, electronic, and optical products (18%) had relatively high shares of skilled technical workers. Software publishing and scientific R&D services had smaller shares (less than 10%). Compared to the overall workforce of U.S. high R&D intensive industries, the STW employed in these industries has a lower share of women and Asians and a slightly higher share of Hispanics (Figure 6-A). The STW in these industries earned more compared to the overall STW in the United States (Figure 6-B).

In U.S. medium-high R&D intensive industries, employment in the STW was about 1.1 million in 2017, representing 19% of the total workforce, higher than that in the high R&D intensive industries (Table 6-B). Two industries—chemicals excluding pharmaceuticals (28%) and weapons (26%)—had relatively high shares of skilled technical workers. IT services had the lowest share (13%). The STW of U.S. medium-high R&D intensive industries has a significantly lower share of women and a slightly lower share of Asians (Figure 6-C). The median salary of the STW in these industries was higher than that of the STW of the entire U.S. labor force (Figure 6-B).

* For more information, see the STW section of *Indicators 2020* report "Science and Engineering Labor Force" and NSB (2019).

TABLE 6-A

Employment of the skilled technical workforce in U.S. high R&D intensive industries: 2017

(Thousands of employees and percent share)

Industry	Total	STW	STW share (%)
High R&D intensive industries	3,044.7	486.4	16.0
Aircraft	717.6	162.7	22.7
Computer, electronic, and optical products	1,097.2	193.6	17.6
Pharmaceuticals	506.5	70.5	13.9
Scientific R&D services	582.2	46.5	8.0
Software	141.3	13.2	9.3

STW = skilled technical workforce.

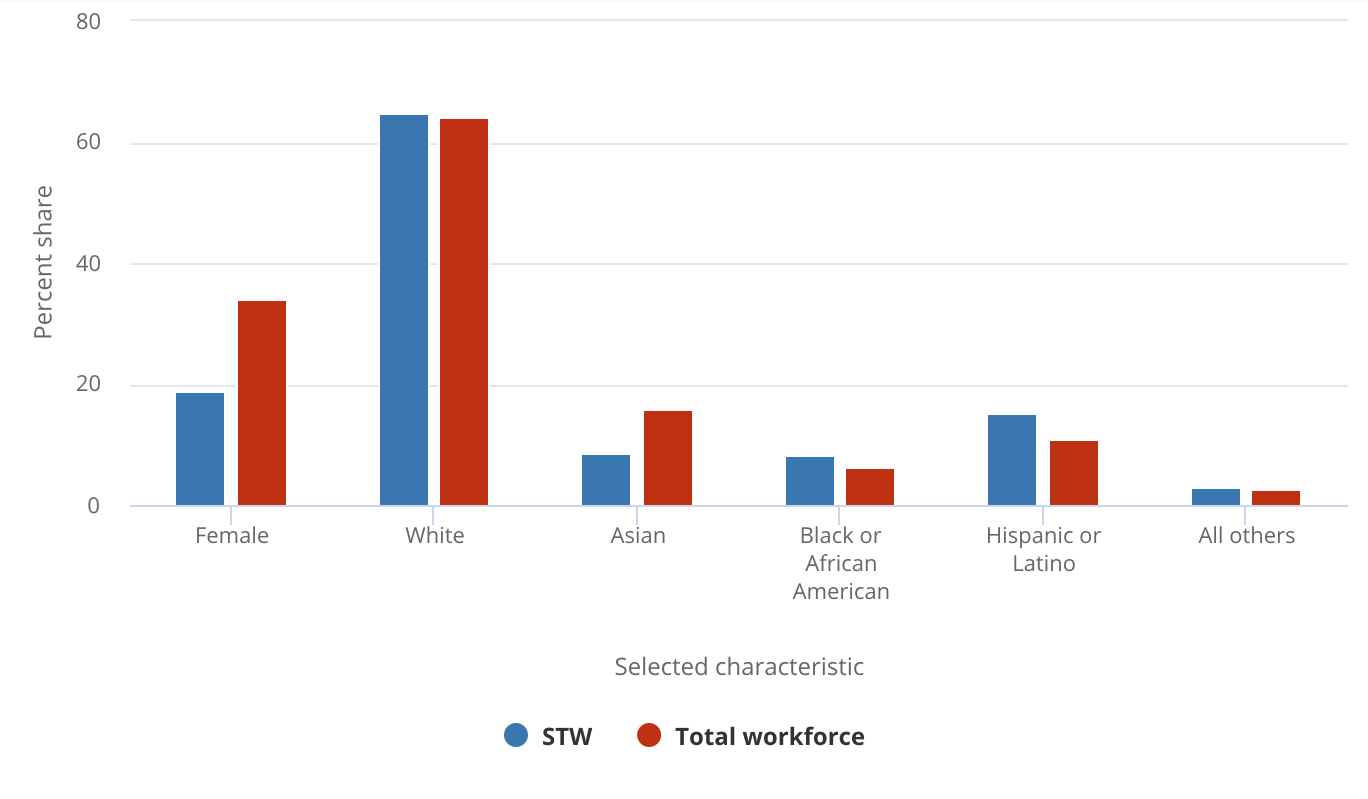
Note(s):
Skilled technical workers are in occupations that employ significant levels of S&E expertise and technical knowledge and whose educational attainment is less than a bachelor's degree. Employment figures are for those aged 25 and older and do not include those employed in military occupations. High R&D intensive industries are classified by the Organisation for Economic Co-operation and Development.

Source(s):
Census Bureau, American Community Survey (ACS) (2018), public use microdata.

Science and Engineering Indicators

FIGURE 6-A

Demographic characteristics of skilled technical and total workforce of U.S. high R&D intensive industries: 2017



STW = skilled technical workforce.

Note(s):

Skilled technical workers are in occupations that employ significant levels of S&E expertise and technical knowledge and whose educational attainment is less than a bachelor's degree. Employment figures are for those aged 25 and older and do not include those employed in military occupations. High R&D intensive industries consist of aircraft; pharmaceuticals; computer, electronic, and optical products; scientific research and development; and software publishing and are classified by the Organisation for Economic Cooperation and Development. Hispanic may be any race; race categories exclude Hispanic origin. All others includes American Indians, Alaska Natives, Native Hawaiians, other races, and multiple races. The sum of ethnicities may not add to 100 because of rounding.

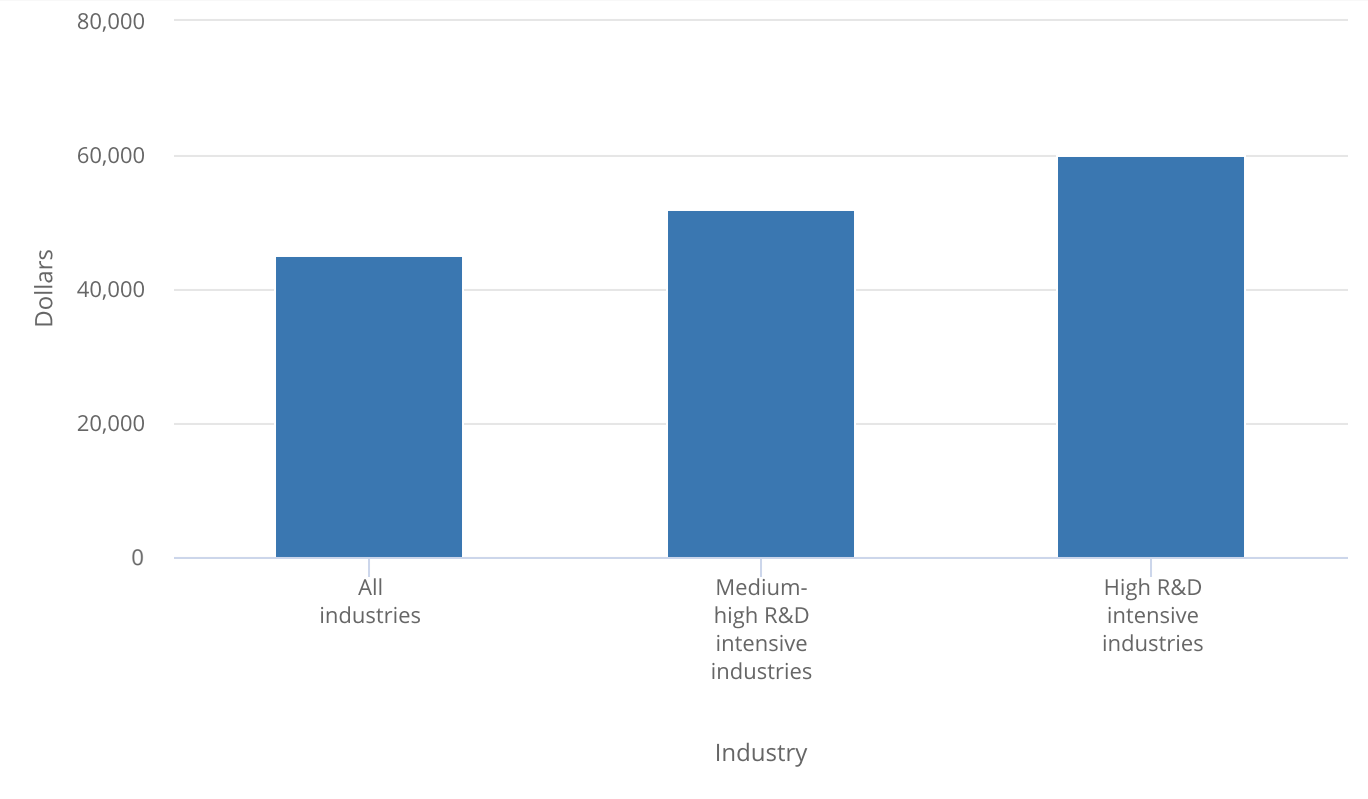
Source(s):

Census Bureau, American Community Survey (ACS) (2018), public use microdata.

Science and Engineering Indicators

FIGURE 6-B

Median salary of STW of U.S. KTI industries: 2017



KTI = knowledge and technology intensive; STW = skilled technical workforce.

Note(s):

Skilled technical workers are in occupations that employ significant levels of S&E expertise and technical knowledge and whose educational attainment is less than a bachelor's degree. Employment figures are for those aged 25 and older and do not include those employed in military occupations. KTI industries include high R&D intensive and medium-high R&D intensive industries classified by the Organisation for Economic Co-operation and Development. High R&D intensive industries include aircraft; pharmaceuticals; computer, electronic, and optical products; scientific research and development services; and software publishing. Medium-high R&D intensive industries include weapons and ammunition; motor vehicles; medical and dental instruments; machinery and equipment; chemicals and chemical products; electrical equipment; railroad, military vehicles, and transport; and IT and other information services. Industries are defined by the North American Industry Classification System (NAICS). The American Community Survey does not cover employment among self-employed workers and employment in private households (NAICS 814). In the employment total for agriculture, forestry, fishing, and hunting, only the following industries are included: logging (NAICS 1133), support activities for crop production (NAICS 1151), and support activities for animal production (NAICS 1152). As a result, the data do not represent total U.S. employment.

Source(s):

Census Bureau, American Community Survey (ACS) (2018), public use microdata.

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TABLE 6-B

Employment of the skilled technical workforce in U.S. medium-high R&D intensive industries: 2017

(Thousands of employees and percent share)

Industry	Total	STW	STW share (%)
Medium-high R&D intensive industries	5,832.5	1,084.6	18.6
Chemicals excluding pharmaceuticals	769.0	212.8	27.7
Electrical equipment	401.1	79.1	19.7
IT services	2,659.5	355.6	13.4
Machinery and equipment	622.9	149.1	23.9
Motor vehicles	1,277.6	265.8	20.8
Railroad and other transportation	62.4	11.9	19.1
Weapons	40.0	10.3	25.8

IT = information technology; STW = skilled technical workforce.

Note(s):
Skilled technical workers are in occupations that employ significant levels of S&E expertise and technical knowledge and whose educational attainment is less than a bachelor's degree. Employment figures are for those aged 25 and older and do not include those employed in military occupations. Medium-high R&D intensive industries are classified by the Organisation for Economic Co-operation and Development.

Source(s):
Census Bureau, American Community Survey (ACS) (2018), public use microdata.

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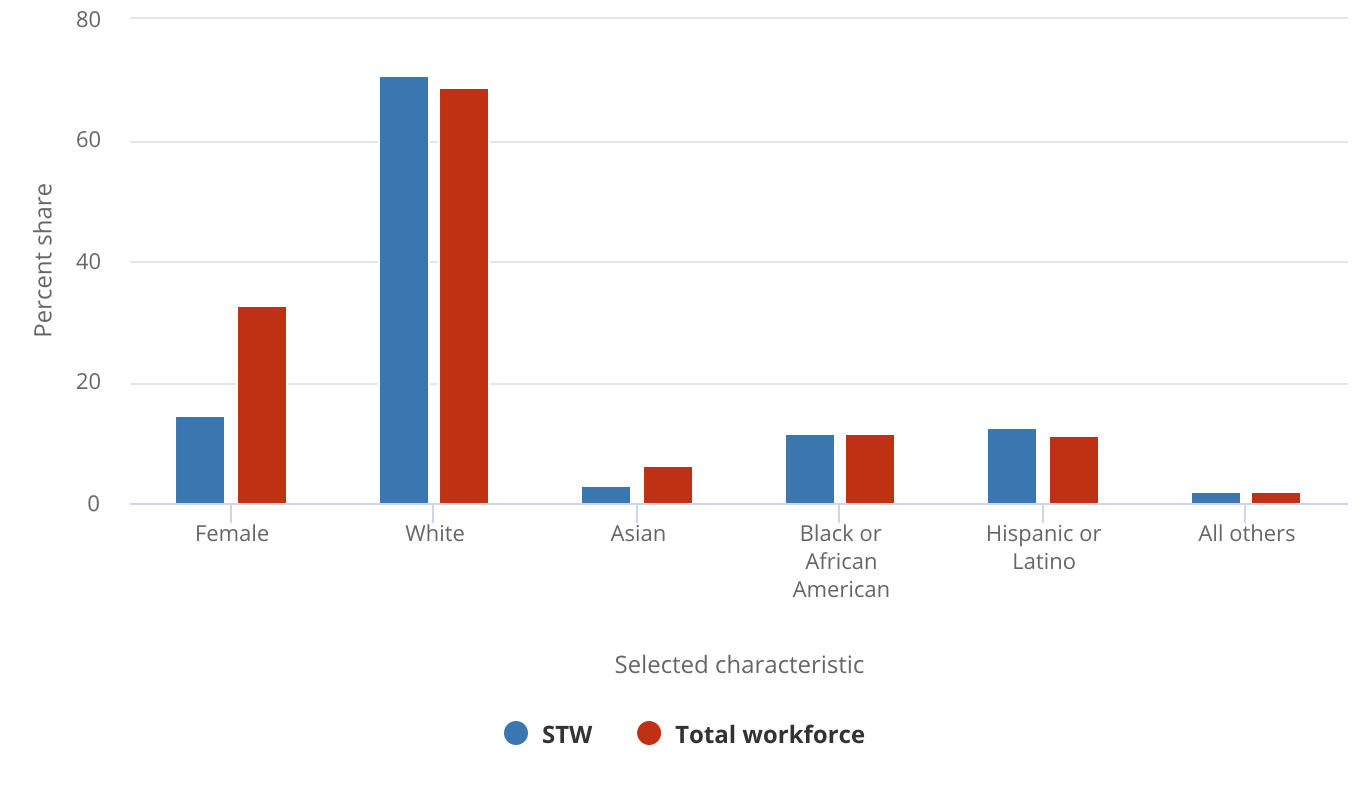
FIGURE 6-C

Demographic characteristics of skilled technical and total workforce of U.S. medium-high R&D intensive industries: 2017



STW = skilled technical workforce.

Note(s):

Skilled technical workers are in occupations that employ significant levels of S&E expertise and technical knowledge and whose educational attainment is less than a bachelor's degree. Employment figures are for those aged 25 and older and do not include those employed in military occupations. Medium-high R&D intensive industries include weapons and ammunition; motor vehicles; medical and dental instruments; machinery and equipment; chemicals and chemical products; electrical equipment; railroad, military vehicles, and transport; and IT and other information services and are classified by the Organisation for Economic Co-operation and Development. Data not available for medical and dental instruments. Hispanic may be any race; race categories exclude Hispanic origin. All others includes American Indians, Alaska Natives, Native Hawaiians, other races, and multiple races. The sum of ethnicities may not add to 100 because of rounding.

Source(s):

Census Bureau, American Community Survey (ACS) (2018), public use microdata.

Science and Engineering Indicators