

Industrial Robot Market Trends in the United States

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The automotive industry in the United States accounts for most of the demand of industrial robots, but other industries are adopting automation in their production facilities. U.S.-based firms that produce industrial robots are not on the same scale as their foreign counterparts. However, the United States is a major exporter partly because of foreign owned subsidiaries. This briefing describes the market for industrial robots in the United States.

Industrial robots are designed to perform repetitive tasks efficiently, work for long periods of time, and reduce labor costs. New research and product development has expanded the use of industrial robots in various manufacturing applications in the United States (box 1). However, the automotive industry has historically been a major driver of demand for industrial robots, most commonly articulated robots, and this trend continues in the industry.

The major manufacturers of industrial robots in the United States are foreign-owned. One large manufacturer, Adept Technologies, Inc., based out of California, was a leading domestic producer of industrial robots until 2015, when OMRON Corporation (Japan) purchased the company.¹ However, U.S.-based firms are competitive in supplying services for robots, like robot systems integrators, and as a supplier of parts for robots. Robot systems integrators are companies that analyze a firm's robotic needs and provides a plan to integrate those robot needs in their manufacturing facility.² Foreign firms like FANUC (Japan), ABB Group (Switzerland), and KUKA AG (China, formerly of Germany) have production facilities in the United States. These firms are leading global manufacturers of industrial robots – most notably for the automotive industry. It is because of these partnerships that the United States is a major industrial robot exporter.

Export trends in the United States

The United States was one of the largest exporters of industrial robots in 2018 and NAFTA partners were the main markets for these exports (figure 1). The automotive industry drives demand for robots, which in North America is highly connected, making Canada and Mexico accessible markets for industrial robots from the United States. These robots are widely used in automotive manufacturing because of their welding, handling, and heavy payload capabilities.

Box 1. Types of industrial robots and their applications

There are several types of industrial robots and their applications vary. International trade data on industrial robots for multiple uses are reported under HTS subheading 8479.50. Examples of industrial robots include:

Cartesian robots have an arm with three prismatic joints with axes correlated with a Cartesian coordinate system. This robot type is often used in plastic molding, packaging, picking and placing, and fixing/press-fixing.

Selected compliance assembly/articulated robot arm (SCARA) robots have two parallel rotary joints to provide compliance in a plane. This robot type is often used in assembly applications, cleanroom applications (semiconductor manufacturing), and handling operations.

Articulated robots have at least three rotary joints. This robot type is most commonly used in welding, handling, dispensing, and processing, and the automotive industry is the major adopter of these robots.

Parallel robots have arms with concurrent prismatic or rotary joints. This robot type is often used in packaging, picking and placing, and material handling.

Cylindrical robots have axes that form a cylindrical coordinate system. This robot type is often used in cleanroom activities (semiconductor manufacturing).

Source: International Federation of Robots (IFR)

¹ OMRON Corporation. *OMRON Completes Acquisition of Adept Technology*. October 24, 2015. [Accessed](#) August 20, 2019

² RobotWorx. *What Are Robotic System Integrators?* [Accessed](#) August 20, 2019.

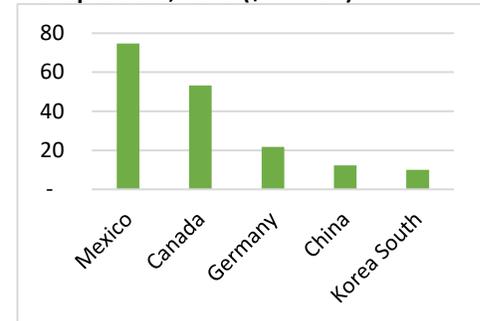
Increased foreign direct investments (FDI) from non-NAFTA car manufacturers in North America has also increased the use of industrial robots within the region. Mexico in particular has become a desirable location for automotive sector FDI in the last 4 years, leading to positive effects on the robotics industry. Since 2015 in particular, foreign car manufacturers have increased capital spending in Mexico and built manufacturing facilities; BMW announced plans to build a plant in Mexico in July 2015³ and Audi started production of its Audi Q5 and SQ5 SUVs the following year.⁴ Subsequently, Mexico saw a dramatic increase in total shipments of industrial robots in 2015.⁵ In 2017, total shipments of industrial robots to Mexico's automotive industry were more than 4,800 units, which accounted for 76 percent of all robots shipped to Mexico.⁶

Canada, like Mexico and the United States, is a major car producing country. Foreign investments in the automotive industry increased throughout 2016 and 2017 with major car manufacturers announcing plans to invest in expanding or upgrading existing plants in Canada.⁷ As a result of these investments, Canada experienced a similar increase in total shipments of industrial robots for the automotive industry in 2015.⁸ In 2017, total shipments of industrial robots to Canada for the automotive industry were approximately 2,500 units. This accounted for 62 percent of 2018 robot shipments to Canada, and the United States' position as a global exporter allowed it to benefit.

Import trends in the United States

Similar to NAFTA partners, the automotive industry drives demand for industrial robots in the United States. Robots from Europe and Japan account for most of the imports to the United States (figure 2). European industrial robots, by value, accounted for 39 percent of 2018 imports. Japan and Canada accounted for 16 and 9 percent, respectively. As mentioned above, production facilities of foreign manufacturers of robots from these countries are located in the United States. FANUC America, a subsidiary of FANUC (Japan), announced an expansion of its production headquarters in Rochester Hills, Michigan, that would increase its capacity from 6,000 to 11,000 units per month.⁹ Although foreign manufacturers of industrial robots have production facilities in the United States, U.S.-based production capacity does not supply all demand in U.S. market. Therefore, U.S. firms in the automotive industry import robots. Tesla uses robots from KUKA AG – although owned by the Chinese firm Midea Group, Kuka AG's headquarters and major robot production facilities are located in Germany – to build its cars.¹⁰

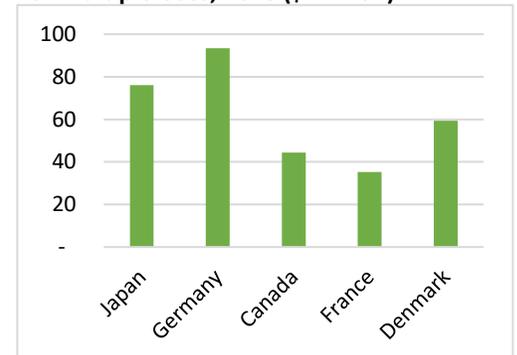
Figure 1: U.S. Exports of Industrial Robots for Multiple Uses, 2018 (\$ million)



Source: Global Trade Atlas

Note: The HTS six-digit statistical reporting number for industrial robots for multiple uses is 8479.50.

Figure 2: U.S. Imports of Industrial Robots For Multiple Uses, 2018 (\$ million)



Source: Global Trade Atlas

Note: The HTS six-digit statistical reporting number for industrial robots for multiple uses is 8479.50.

³ The Wall Street Journal. *Why Automakers Are Building New Factories in Mexico, not the U.S.* Accessed August 21, 2019.

⁴ Audi MediaCenter. *AUDI AG opens automobile plant in Mexico.* Accessed August 21, 2019.

⁵ Robotic Industries Association. *Mexico, Land of Automatization Opportunity.* May 22, 2016. Accessed August 21, 2019.

⁶ International Federation of Robotics. *World Robotics Industrial Robotics 2018.* p. 95.

⁷ Global Affairs Canada. *Invest In Canada: Canada's Competitive Advantages, Automotive Sector.* 2018. Accessed August 21, 2018.

⁸ International Federation of Robotics. *World Robotics Industrial Robotics 2018.* p. 95.

⁹ FANUC America. *FANUC Marks Production of 500,000th Robot.* November 30, 2017. Accessed August 26, 2019

¹⁰ Vox. *The company that builds the robots that make Teslas wants to build home robots.* June 19, 2017. Accessed August 22, 2019.

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