Executive Summary World Robotics 2019 Industrial Robots

Robot Installations 2018: Now beyond 400,000 units per year

In 2018, global robot installations increased by 6% to 422,271 units, worth USD 16.5 billion (without software and peripherals). The operational stock of robots was computed at 2,439,543 units (+15%). This result came as a surprise because the main customer industries, automotive and electrical/electronics, had a difficult year and two of the main destinations, China and North America, have been starring in a trade conflict, spreading uncertainty to the global economy. Nevertheless, the automotive industry remains the largest customer industry with 30% of total installations, ahead of electrical/electronics (25%), metal and machinery (10%), plastics and chemical products (5%) and food and beverages (3%). Note that for 19% of the robots there is no information on the customer industry. This figure is five percentage points higher than the year before.

Since 2010, demand for industrial robots has risen considerably due to the ongoing trend toward automation and continued technical innovations in industrial robots. From 2013 to 2018, annual installations increased by 19% on average per year (CAGR). Between 2005 and 2008, the average annual number of robots sold was about 115,000 units, before the global economic and financial crisis caused robot installations to fall to just 60,000 units in 2009 with lots of investments being postponed. In 2010, investments made leeway and drove robot installations to 120,000 units. Until 2015, annual installations had more than doubled to almost 254,000 units. In 2016, the mark of 300,000 installations per year was crossed and in 2017, installations surged to almost 400,000 units.

Europe and America growing strongly as Asia stagnates

Asia[2] is the world's largest industrial robot market, although growth slowed down substantially in 2018. A total of 283,080 units were installed in 2018 just 1% more than the year before but still a new peak for the sixth year in a row. Two out of three robots (67%) newly deployed in 2018 were installed in Asia. From 2013 to 2018, annual robot installations rose by 23% on average per year. 2018 reveals a differentiated picture for the three largest Asian markets: Installations in China (154,032 units; -1%) and the Republic of Korea (37,807 units; -5%) declined, while installations in Japan (55,240 units; +21%) increased considerably. Robot installations in the second-largest market, **Europe**, increased by 14% to 75,560 units – a new peak for the sixth year in a row. The annual average growth rate from 2013 to 2018 is 12%. The growth rate was even higher in **the Americas**: About 55,212 robots were installed in 2018. This is 20% more than the year before and – like in Asia and Europe – represents a new peak for the sixth year in a row. The average annual growth rate since 2013 is 13%.

74% of global robot installations in five countries

[2] including Australia and New Zealand

There are five major markets for industrial robots: **China, Japan, the United States, the Republic of Korea, and Germany**. These countries account for 74% of global robot installations.

China has been the world's largest industrial robot market since 2013 and accounted for 36% of total installations in 2017 and 2018. In 2018, 154,032 units were installed. This is 1% less than in 2017 (156,176 units) but still more than the number of robots installed in Europe and the Americas combined (130,772 units). For more details, see chapter 3.3.1.

In 2018, robot installations in **Japan** increased by 21% to 55,240 units (a new peak). The average annual growth rate of 17% since 2013 is remarkable for a country which already has a high level of automation in industrial production. For more details, see chapter 3.3.4.

For the eighth year in a row, robot installations in the **United States** reached a new peak level (40,373 units; +22%). Since 2010, the automation of production processes in all the country's manufacturing industries has been the ongoing trend. Regarding annual installations, the United States took third position from the Republic of Korea in 2018. For more details, see chapter 3.2.2.

In the **Republic of Korea**, annual robot installations have been declining since they reached a peak level of 41,373 units in 2016. In 2018, 37,807 units (-5%) were installed. Installation figures for this country strongly depend on the electronics industry, which had a tough year in 2018. Nevertheless, installations have increased by 12% on average per year since 2013. For more details, see chapter 3.3.5.

Germany is the fifth-largest robot market in the world. In 2018, the number of robots installed surged by 26% to a new peak of 26,723 units. Installation figures in this country are mainly driven by the automotive industry. For more details, see chapter 3.4.11.

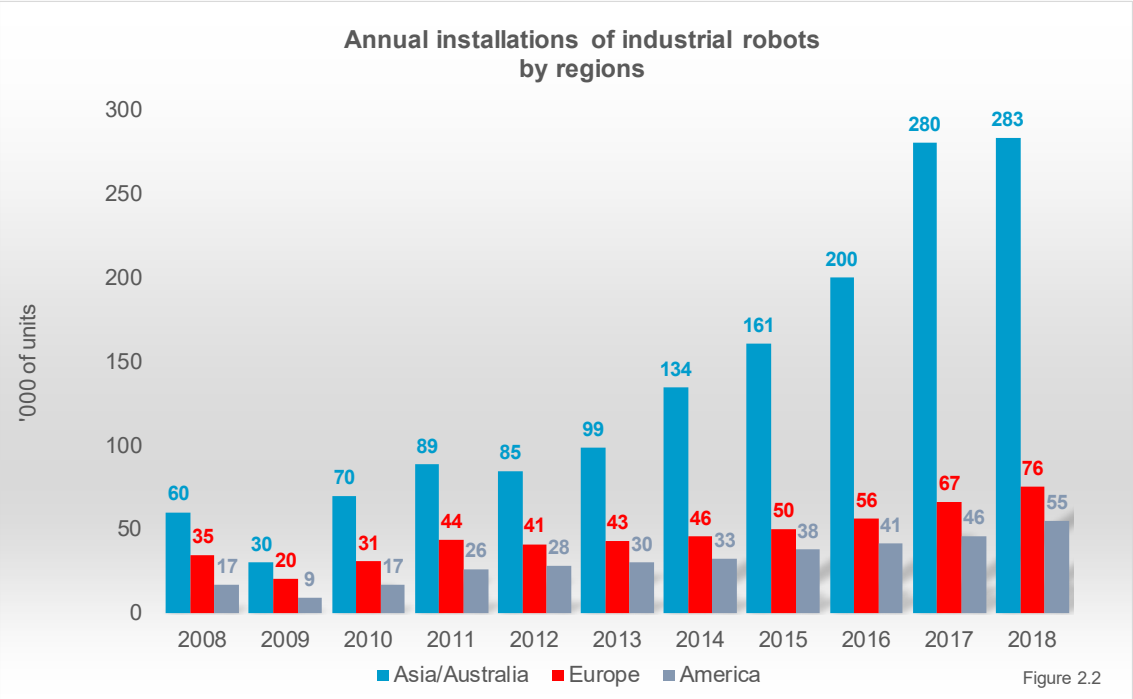

Figure 2.2

Steady robot installations in the automotive industry

The **automotive industry** is the most important customer of industrial robots. Almost 30% of all industrial robot installations take place in this industry. After a very strong 2017 that saw a 21% increase in installations to 123,439 units, this level was maintained in 2018. In fact, a slight increase of 2% set a new peak level of 125,581 robot installations. From 2013 to 2018, annual installations in the automotive industry increased by 13% on average each year (CAGR). After the economic crisis in 2008/2009, car manufacturers started to restructure their businesses. Since 2010, investments in new production capacities in emerging markets and investments in production modernization in major car producing countries have driven the demand for robots. Using new materials, developing energy efficient drive systems and high competition in all major car markets pushed the demand for investments despite the existing overcapacities. Automotive parts suppliers were heavily affected by the restructuring of the car industry after the economic crisis in 2009. They needed to follow suit after motor vehicle suppliers started to carry out their own investment plans. Therefore, the supply of robots to automotive part suppliers gained momentum only in 2011. Note that due to improvements in reporting, as of 2018, most of the units previously assigned to IFR industry class 299 – "automotive unspecified" – could be either assigned to a more specific industry class or at least to class 2999 – "parts and accessories unspecified".

Robot installations in the **electrical/electronics industry** (including computers and equipment, radio, TV and communication devices, medical equipment, precision and optical instruments) have been increasing by 24% on average each year since 2013. In 2017, they accounted for 31% of total installations and were about to replace the automotive industry as the most important customer industry. However, in 2018, global demand for electronic devices and components substantially decreased. This customer industry is probably the one most affected by the China-US trade crisis as Asian countries are leaders in manufacturing electronic products and components. Robot installations in this industry declined by 14% from their peak level of 121,955 units in 2017 to 105,153 units in 2018.

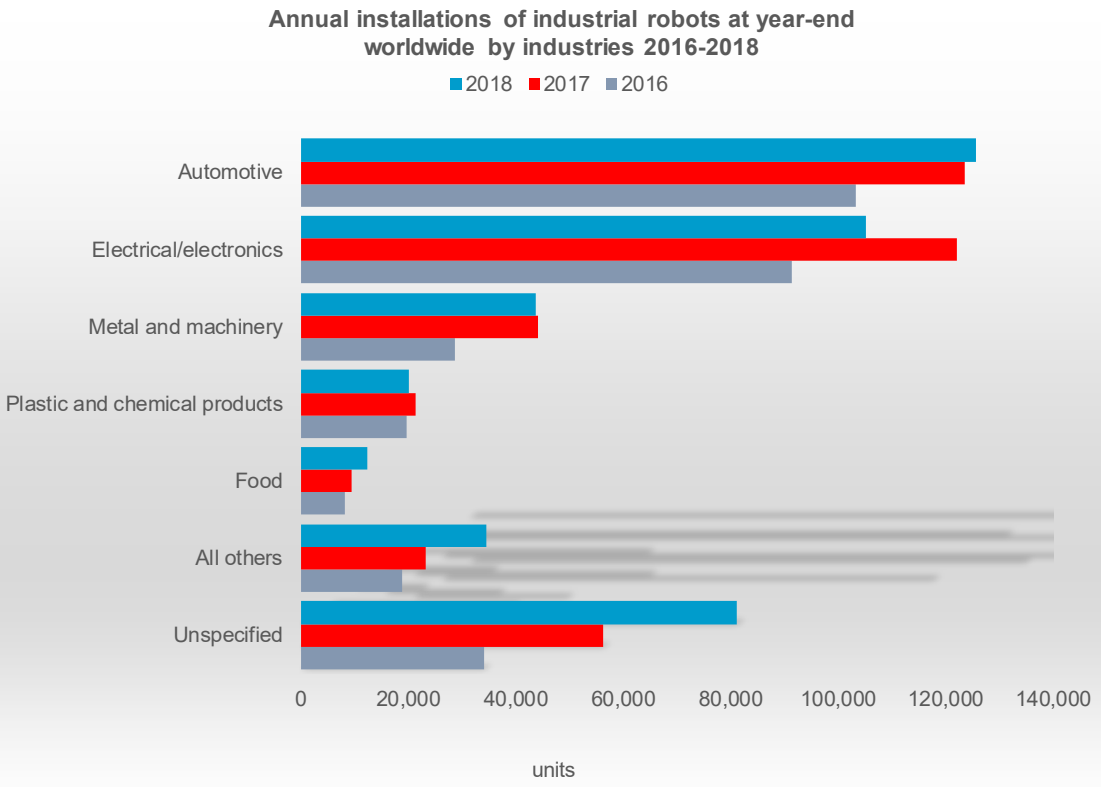

Figure 2.16

Automation of production further increasing

In 2018, the average robot density in the manufacturing industry was 99 robots per 10,000 employees. Note that this global average only includes those countries that have a relevant operational stock. It is therefore overestimated as countries with low robot density are systematically excluded. The same hold for the following figures: Europe is the region with the highest robot density, boasting an average value of 114 units. In the Americas, the value is 99 units and in Asia/Australia it is 91 units. Driven by the high volume of robot installations in recent years, Asia has the highest robot density growth rate and is about to catch up with the Americas. Between 2013 and 2018, the average annual robot density growth rate in Asia was 16%, in the Americas it was 9%, and in Europe it was 6%.

Forecast: 2019 - 2022

Worldwide annual sales of industrial robots:

- **2019: 420,870 units, 0% compared to 2018**
- **2022: 583,520 units, + 12% per year on average from 2020 to 2022**