GLOBAL
STRATEGIC
CAPITAL

Summary Robotics Roundtable – December 5th, 2018

Over the next 3-5 years the robotic market will grow 15% p.a.

(Source: International Federation of Robotics)

- Industry 4.0 will play an increasingly important role in manufacturing
- Global competition requires continuous modernization of production facilities
- Energy efficiency will play a key role in the future

Collaborative robotics, Internet of Things, Machine Learning combined with Artificial Intelligence will lead robotics in the coming years.

The Market

Looking at the market, the richest applications are those that belong to **industrial robotics**, where automation of processes is requiring more and more clever and fast robots for assembling, transporting and supervising any kind of product.

There are five major markets representing close to 75% of the global sales volume. China, South Korea, Japan, the US and Germany.

China has by far the biggest market share of 30% of total supply in 2017. China came close to the total sales volume of Europe and the Americas together.

China is the largest player and the country with the most dynamic growth.

Expected Growth Rates 2018-2020:

China:	22%
South Korea:	5%
Japan:	5%
United States:	15%
Germany:	5%

Source: (International Federation of Robotics)

Market Segments - Applications

Cobots
Collaborative robots (Cobots) will gain a lot of traction in the manufacturing sector. Instead of replacing current employees, these machines work alongside their human counterparts to heighten productivity and increase efficiency.

RaaS
Growth in robots as a Service (Raas) is expected to take of in 2019 and continue for several years. The concept of RaaS is simple. These machines are linked or pay-as-you-go employees. Their functionality is highly specialized and focused.

Humanoids
Combine artificial intelligence and machine learning technologies to give robots human-like expressions and reactions

Cloud Robotics
Robotic deep learning using image classification and speech recognition often relies on huge data sets. These tasks can realistically not be handled on local computer systems. Robots will outsource complicated algorithms to very powerful datacenters. Cloud robotics allows intelligence to be shared across all robots in a connected environment.

Flying Robots
The aerial drone market is expected to explode in the coming years. Drones are useful in many areas of manufacturing. Not only can they transport raw materials and even finished parts from one area to the next, but they can also monitor production lines and count inventory.

Cyborgs
The US government is researching technology that it hopes will turn soldiers into cyborgs, allowing them to connect directly to computers. The US military's Defense Advanced Research Projects Agency (DARPA) has unveiled a research program called Neutral Engineering System Design (NESD) which aims to develop an implantable neural interface, connecting humans directly to computers.

Exoskeletons and Wearable Robotics
Allow users to augment their physical strength, helping those with physical disabilities to walk and climb.

Industrial Robots
Arms, grippers and all of the warehouse robotics used for automation of industrial processes. They are used both for saving money and speed up production.

Telepresence Robotics
Telepresence robots are commonly used to stand in for tour guides, night watchmen, factory inspectors and healthcare consultants. In a distance education class, a telepresence robot can move around the room and interact face-to-face with individual students, just as an on-premises instructor might. In business, a telepresence robot can be used to help an employee whose disability or location prevents him from traveling still have a physical presence in the office.

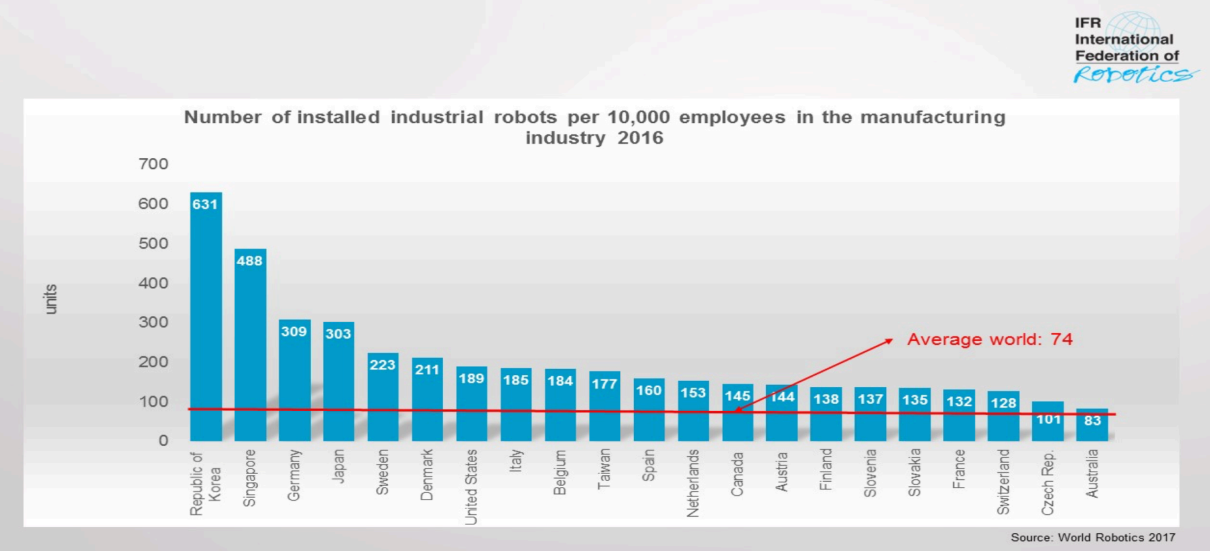
Healthcare Robotics
Robotics used in the context of patient monitoring/evaluation, medical supplies delivery, and assisting healthcare professionals in unique capacities.

Medical and Surgery Robotics
Devices used in hospitals mostly for assisting surgery since they allow great precision and minimal invasive procedures.

Space Robotics
Space robotics is the development of general purpose machines that are capable of surviving (for a time, at least) the rigors of the space environment, and performing exploration, assembly, construction, maintenance, servicing or other tasks that may or may not have been fully understood at the time of the design of the robot.

Housekeeping Robotics
Floors, Pools and Garden

Density



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