The Evolution of the Modern Factory

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Digital technologies are changing the factory floor. Additive manufacturing, augmented reality, industrial robots, machine learning, and the ever-growing Internet of Things are providing a manufacturing landscape of connected devices, digital data, and predictive analytics that will create a more efficient and productive manufacturing process. Here is how the evolution of the factory floor may look like in the years to come.

Leading consumer countries of machine tools are China at **29.2%** and the US at **11.6%** for 2018.

Caterpillar leads all machinery manufacturers in 2018, with over **$54 million** in sales.

1

The process begins with the production of subparts for assembly via either CNC machining or additive machines, including 3D printers.

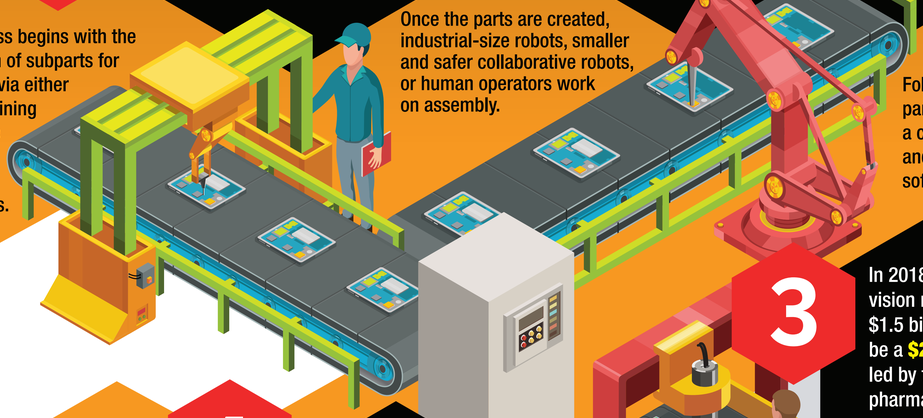
2

Labor productivity increases with robot sales. In 2018, **38,000** industrial robots were sold, and labor productivity increased to **2.1** from 1.7 labor output per hour from 2017.

Collaborative robots are growing, and by 2021 will own **24%** of the market for industrial robots.

Once the parts are created, industrial-size robots, smaller and safer collaborative robots, or human operators work on assembly.

Following assembly, parts are verified using a collection of sensors and visual technology software.



3

In 2018, the machine vision market was over $1.5 billion. By 2025, it will be a **$2.5 billion** industry, led by the automotive and pharmaceutical sectors.

4

Internet of Things sensors keep track of part production and production efficiency.

The sensor market for IoT is continuing to grow as the factory becomes more digitally enabled. The IoT sensor market will reach **$65.8 billion** by 2027, and the sensors will be used to collect data on production efficiency and preventative maintenance.

5

Smart conveyor systems handle multiple packages varying in size and type in real-time.

By 2025, the Asia-Oceania region of the world will lead the conveyor system market with **$3 billion** in revenue.

The top three use cases for augmented reality in the factory are employee training and education (**52.8%**), IoT enabled operations such as machine performance and productivity (**52.2%**), and communications between employees (**46.3%**).

6

Delivery of product using robots and exoskeleton suits for labor purposes.

Exoskeletons will help workers perform everyday manual labor tasks more safely and reduce possible injuries. Assistive exoskeletons will account for **more than 50%** of the market by 2028.

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