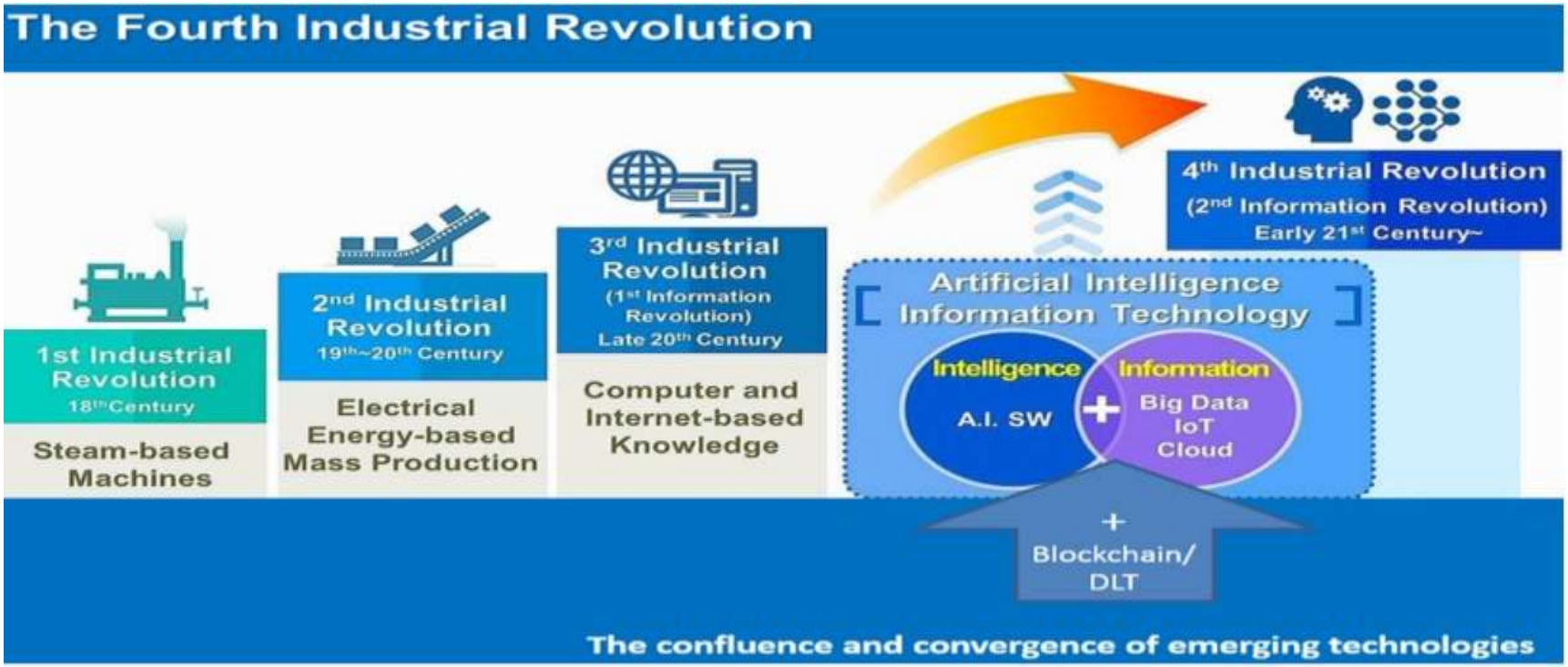
Emerging Technology in the Digital Economy:
Core Technologies of the 4th Industrial Revolution



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0 The Fourth Industrial Revolution

What is fourth industrial revolution ?

= I . C . B . A.

0 Keywords of today's lecture

① 4th Industrial Revolution

② Smart Factory

③ Internet of Things (IoT)

④ Artificial Intelligence (AI)

⑤ Robo-Advisors

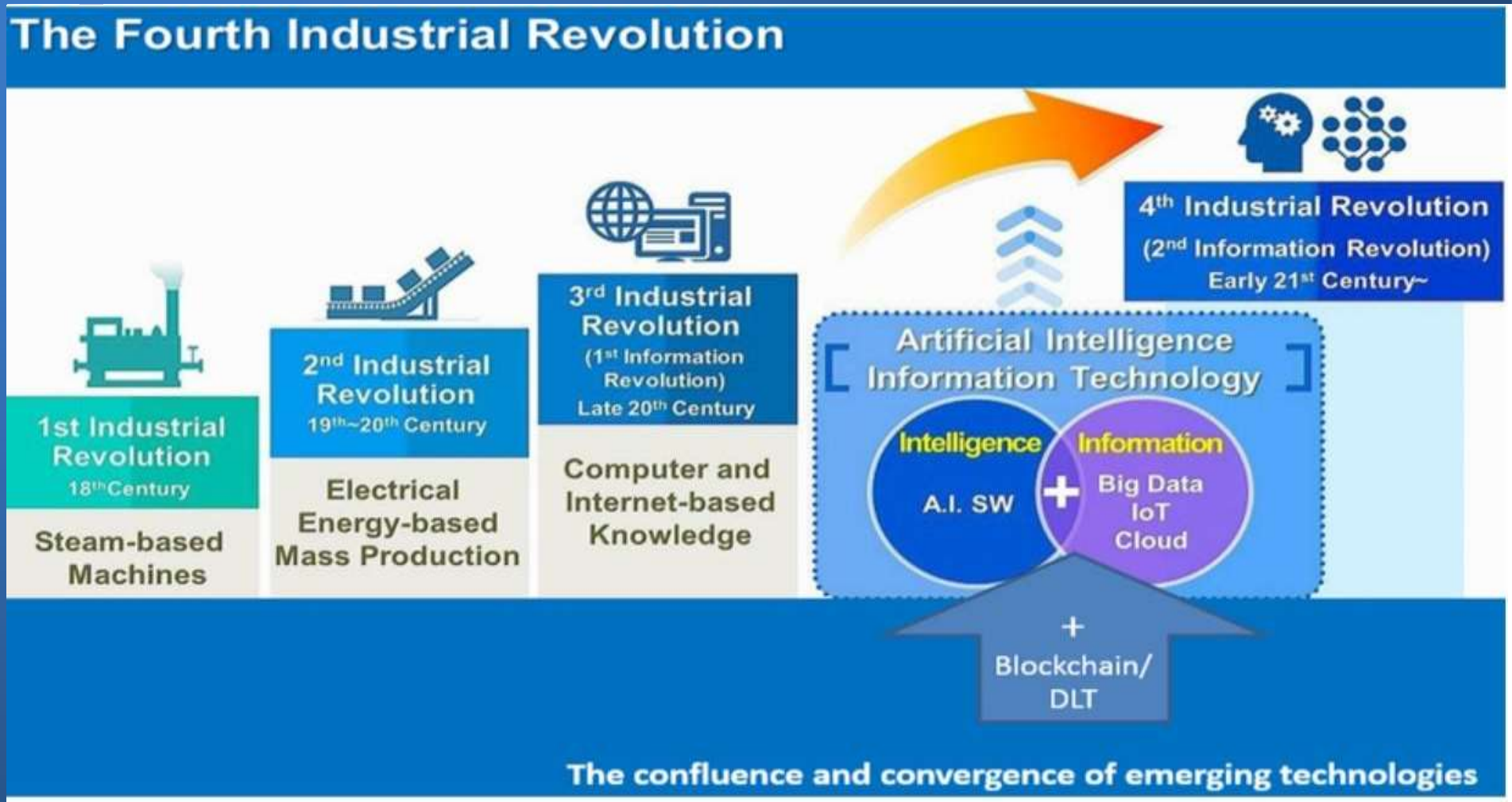
⑥ Big Data

⑦ Data Mining

⑧ Cloud Computing

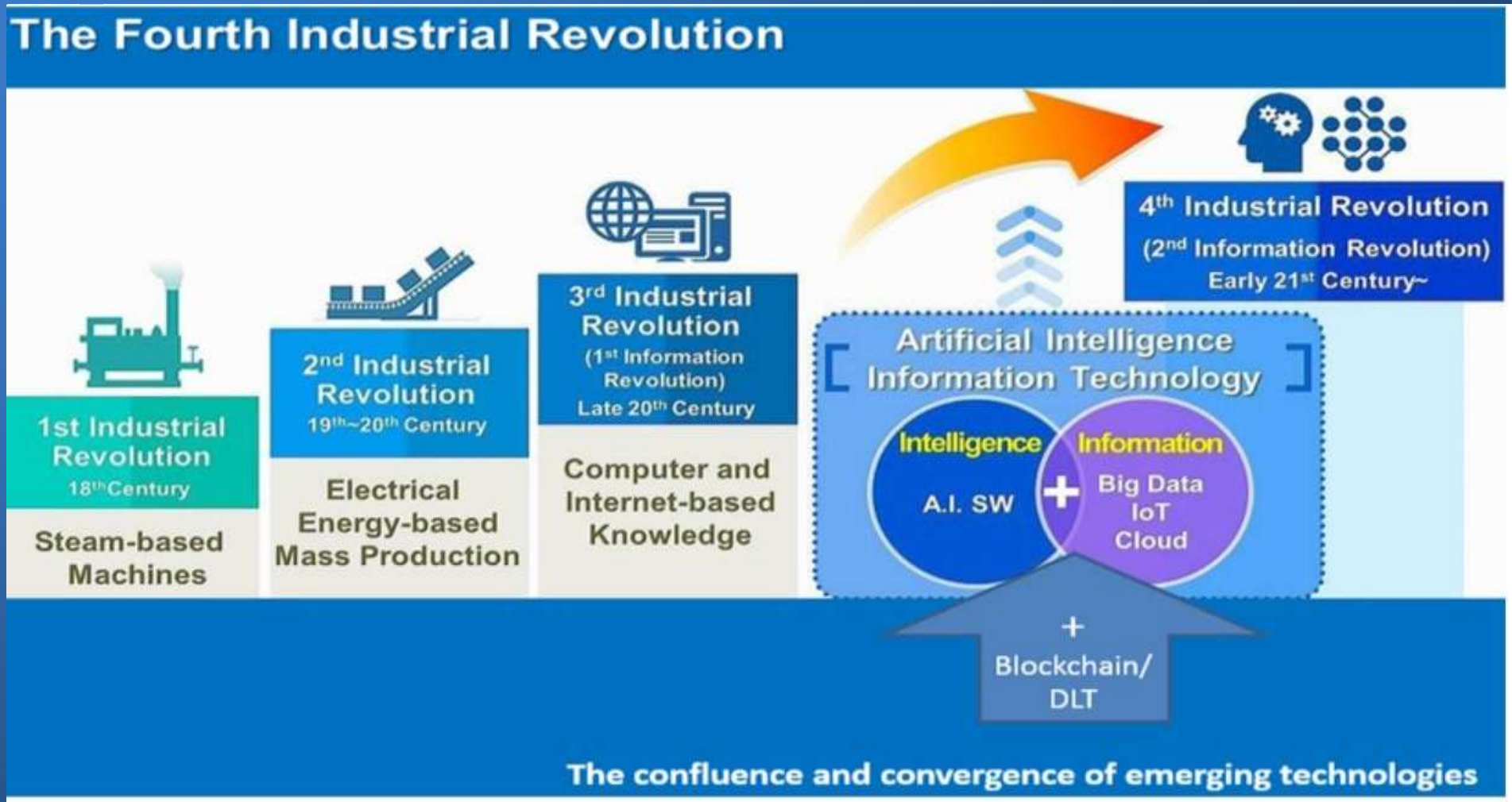
⑨ SaaS, PaaS, IaaS

⑩ Blockchain Technology



✈ The **First** Industrial Revolution used water and steam power to mechanize production.

2 ✈ The **Second** used electric power to create **mass production**.



- The **Third** used electronics and information technology to **automate production**.

3 - The **Fourth** is building on the Third, the **digital revolution.**

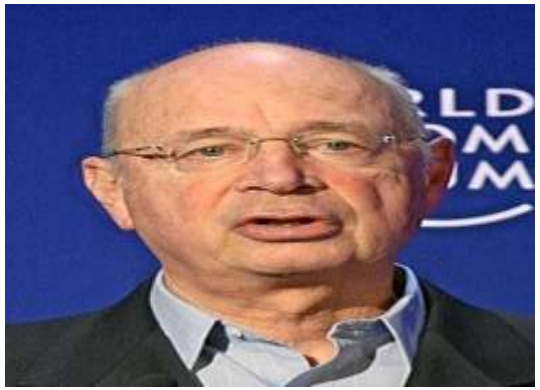
1 Components of the 4th Industrial Revolution

- The 4th industrial revolution is currently in progress today, the core technologies of which include **Internet of Things**, **Cloud Computing**, **Big Data**, **Blockchain**, and **Artificial Intelligence**.

1 The 4th Industrial Revolution

- At the **World Economic Forum** held in 2016, we anticipated the arrival of the era of the "**4th Industrial Revolution**" based on the fusion of technologies such as AI, IoT, Big Data, and Cloud.

- The 4th Industrial Revolution is a combination of **cyber and physical systems (CPS)**, which will bring together the digitization and physical integration of the supply chain including manufacturing.



1 Industry 4.0 and Industrial Revolution

- '**Industry 4.0**' is commonly referred to as the fourth industrial revolution.
- Industry 4.0 is the current trend of automation and data exchange in manufacturing technologies.
- Industry 4.0 includes cyber-physical systems, Internet of things, cloud computing and cognitive computing.

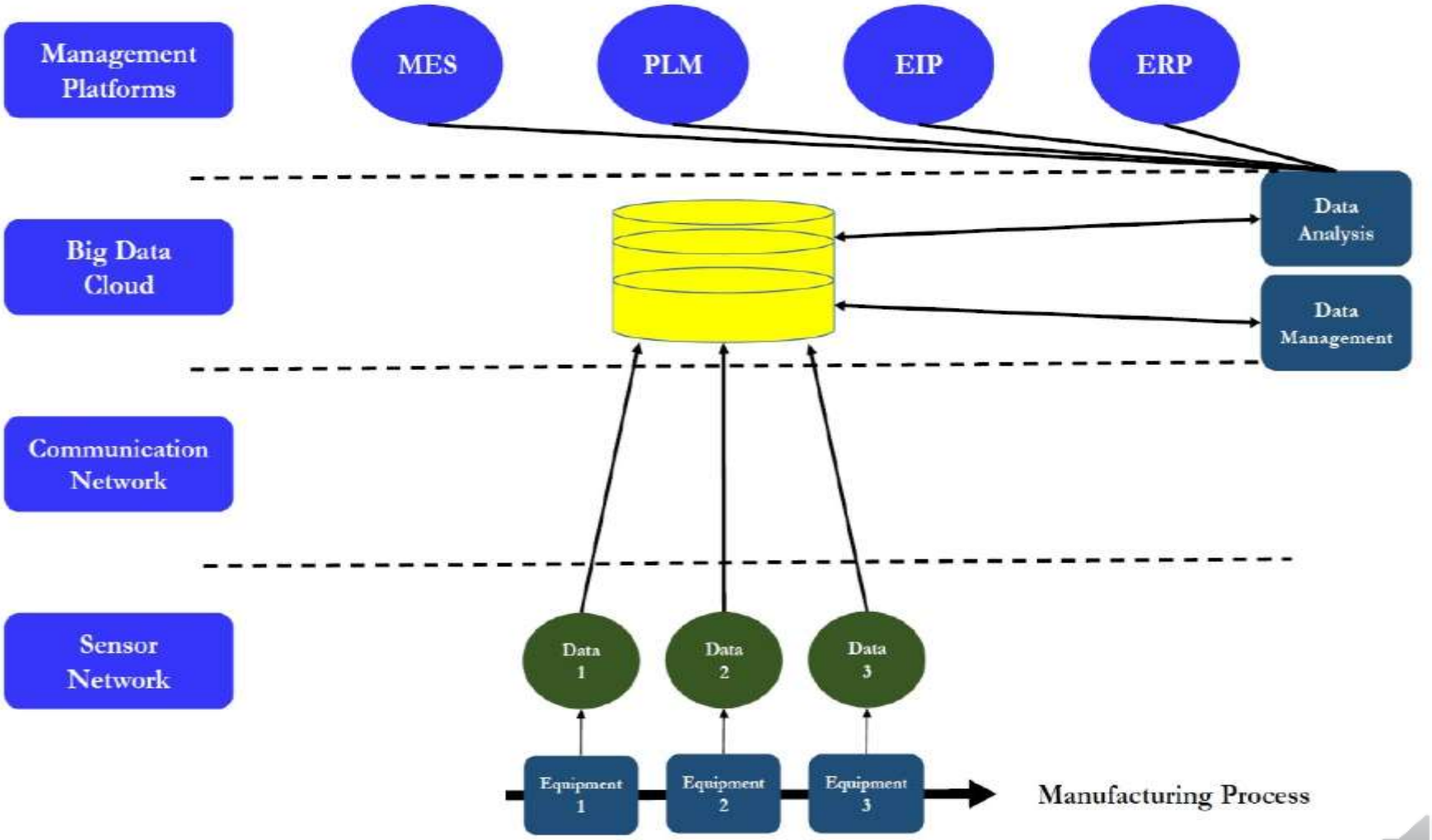
1 Industry 4.0 and Smart Factory

- The 4th industrial revolution is defined as the process of digitizing the manufacturing process based on the **cyber physical system (CPS)** and **Internet of Things (IoT)**.

- In 2012, **German** government launched 'Industry 4.0' policy, and started to support many related R&D projects, such as 'Smart Factory'.

- **Smart Factories** could be regarded as a result of the integration of various key technologies of the 4th industrial revolutions.

1 Architecture of Smart Factory Platform

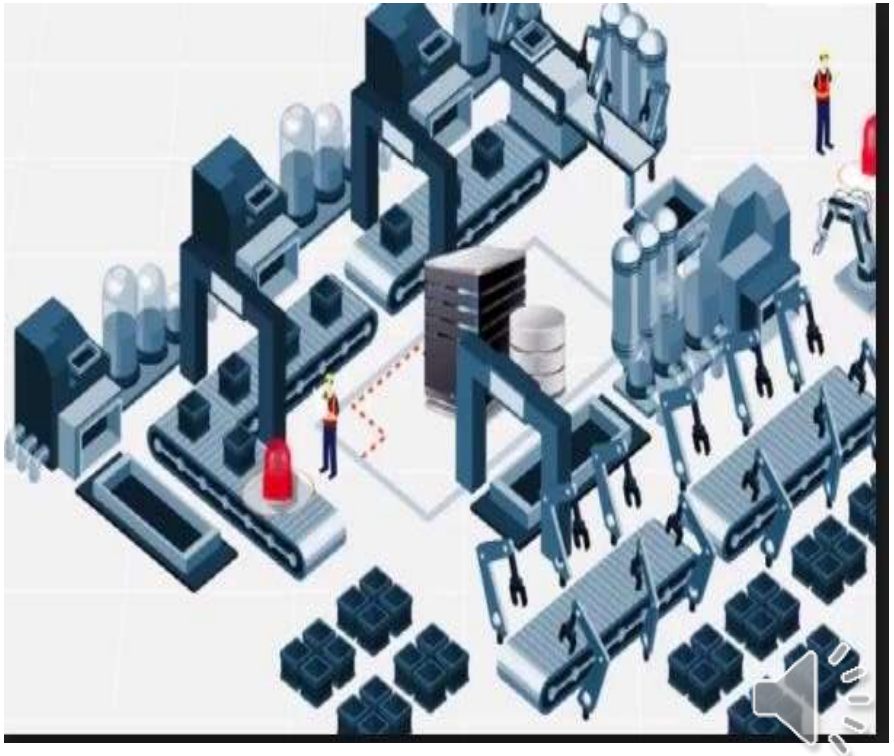


1 Intelligent Plant: Smart Factory

Siemens Smart Factory - Electronic Works Amberg

1 Adidas Speed Factory (Smart Factory)

- The main point of smart factory is the convergence between manufacturing and information technologies such as CPS, MES, 3D Printer, IoT, and AI.

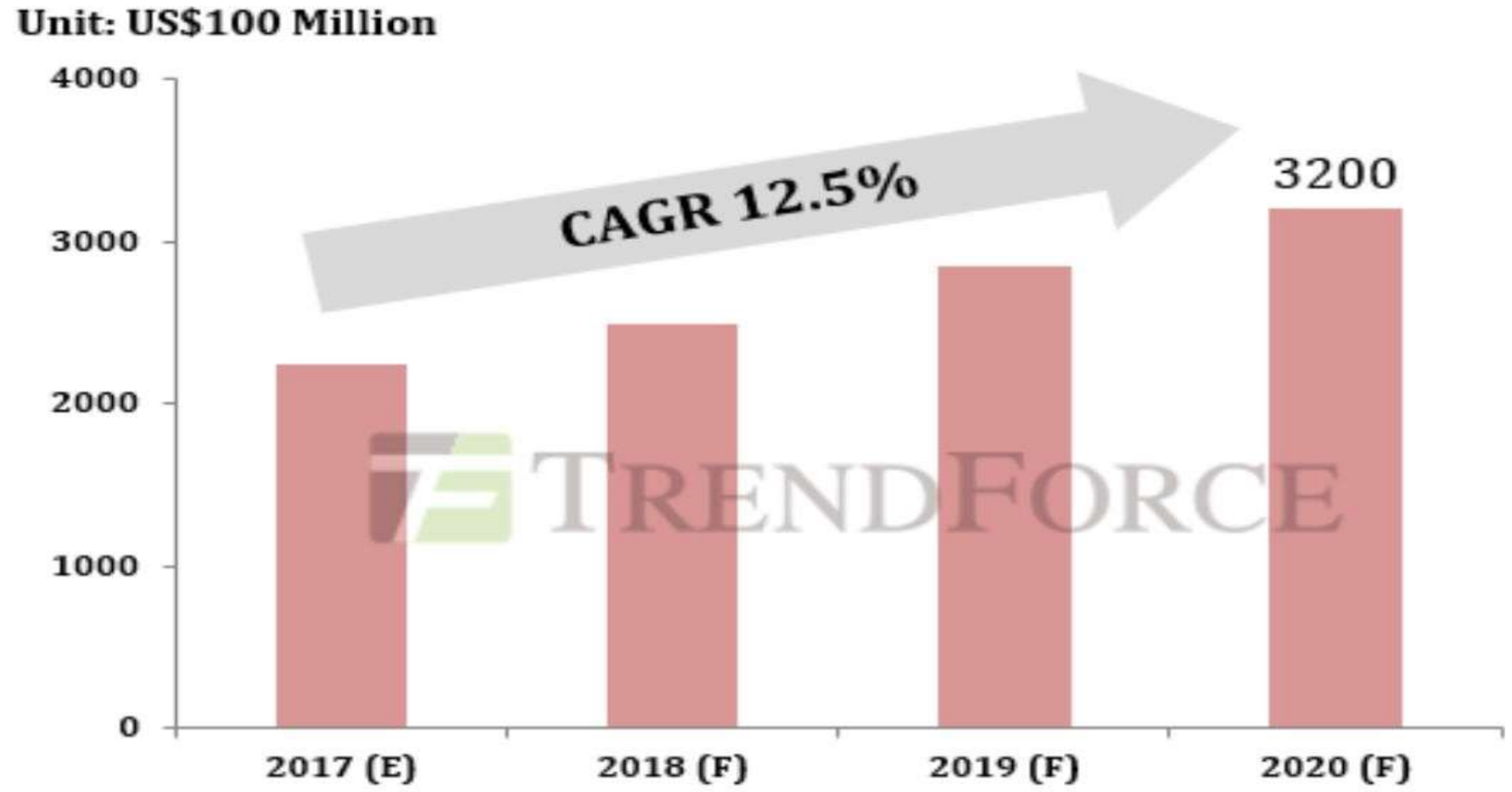


1 Core Technologies of the Smart Factory

- In smart factory, the **IoT** is applied to capture the data generated by the production facility, store and analyze data generated in real time using **Big Data** technology.

- In addition, **3D printers** are used to print expensive and complex parts, industrial robots supply materials and parts to the production site, store finished products in warehouses.

1 The Market Size of Smart Factory



Source: TrendForce, Jul., 2017

https://www.marketsandmarkets.com/PressReleases/smart-factory.asp

1 'Industry 4.0' and Smart Factory

- Germany is pursuing an '**Industry 4.0**' strategy to build an automated production system through **IoT** and **AI**.
- China is working with Germany to become a manufacturing powerhouse and is running '**Made in China 2025**'.
- The United States is adopting smart factories based on the ICT industry, with private and government cooperation.
- Korea is pursuing '**Manufacturing Innovation 3.0**' through Smart Factory Project Team.

PART II The Internet of Things (IoT)

2 The Internet of Things (IoT) (1/3)

- **Internet of Things (IoT)** means that all things such as people and objects are connected and all information is created and utilized.

- IoT is the core infrastructure business of the 4th industrial revolution because it can create new value and lead the technology development by utilizing the information collected through internet.

2 The Internet of Things (IoT) (2/3)

- IoT is an **intelligent infra-system** which is based on an open internet network where people, things, data, and processes are interconnected and exchange data and communicate.

- IoT is the fastest growing technology with development possibility in the era of convergence and all countries of the world is concerned about IoT to realize **Hyper Connected Society**.

- IoT is applied such as urban, environment, water resources, measurement, security, medical, industrial control, agriculture, health, etc.

2 IoT and Wearable Devices

2 The Internet of Things (IoT) (3/3)

- IoT can produce and supply with innovative items in many fields such as **home networking**, smart-grid to building maintenance, **intelligent transportation**, virtual power plants, **health-care**, security control and so on.

- The development of IoT has a very close relationship with a big data, clouding computing, and AI robotics.

2 The major issues of the IoT

- IoT will be widely used across the full spectrum of society and in the IoT context, everyday physical objects that surround us collect, process, and exchange personal data without our interaction and recognition.

- Those devices communicate mutually to send information and they are exposed to various ***security threats***.

- With the increased connectivity between devices, the risks to security and privacy becomes greatly multiplied.

2 Innovation Resistance and Deactivating Factors of IoT

- **IoT experts** suggested four technical and institutional factors required to stimulate the IoT market including:

(1) improvement of technical skills and integrated platform for IoT security,

(2) the need to legislate IoT industry promotion act and IoT activation councils,

(3) the need to nurture specialists such as IoT security and privacy information protection, and

(4) developing and refining components in IoT security governance framework.