SMART Factory

Building the factories of the future

"None of us is as smart as all of us".

— Ken Blanchard

What is SMART Factory

"Smart Factory is a manufacturing facility where **intelligent**, **efficient** and **responsive** operations are ensured through **data driven** applications and system."

*It is an **integration** of various technologies and solutions which can **communicate** and **respond in real time** to meet the change in demand and to ensure overall efficiency to "serve the customer better".*

Evolution-It is natural to change
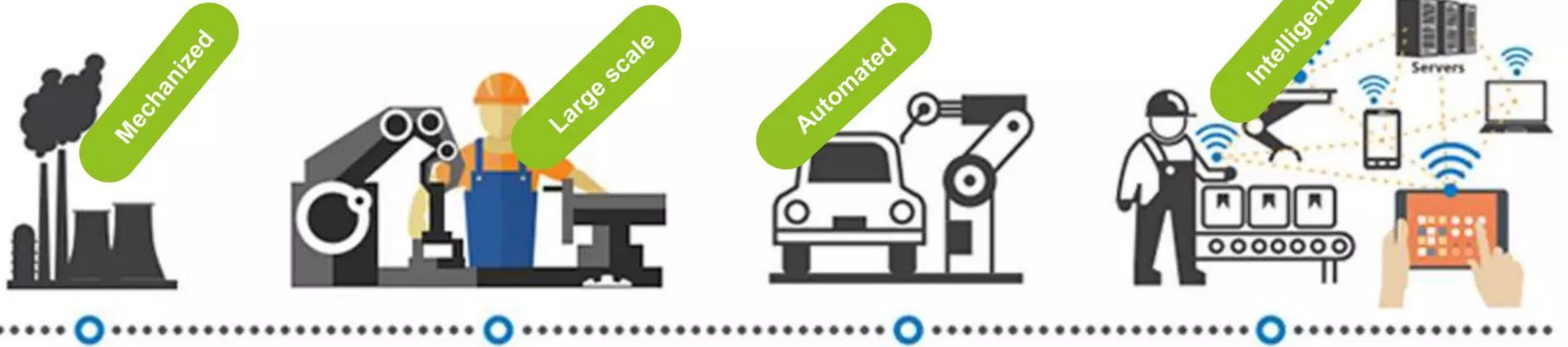

Human
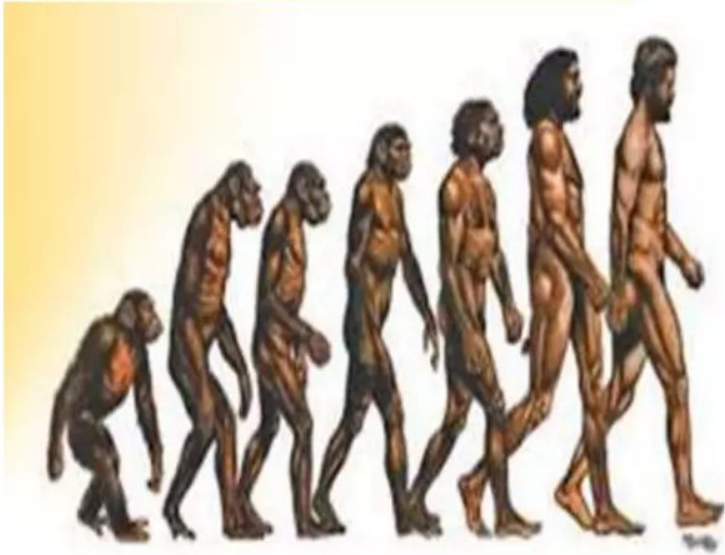
Evolution of telephones

Google Search engine & Navigation system (Data driven)

Transport & self driving car

Industrial ®evolution

Mechanized

Large scale

Automated

Intelligent

Servers

18th Century

19th Century

20th Century

Today

Industry 1.0
Mechanical production. Equipment powered by steam and water

Industry 2.0
Mass production assembly lines requiring labor and electrical energy

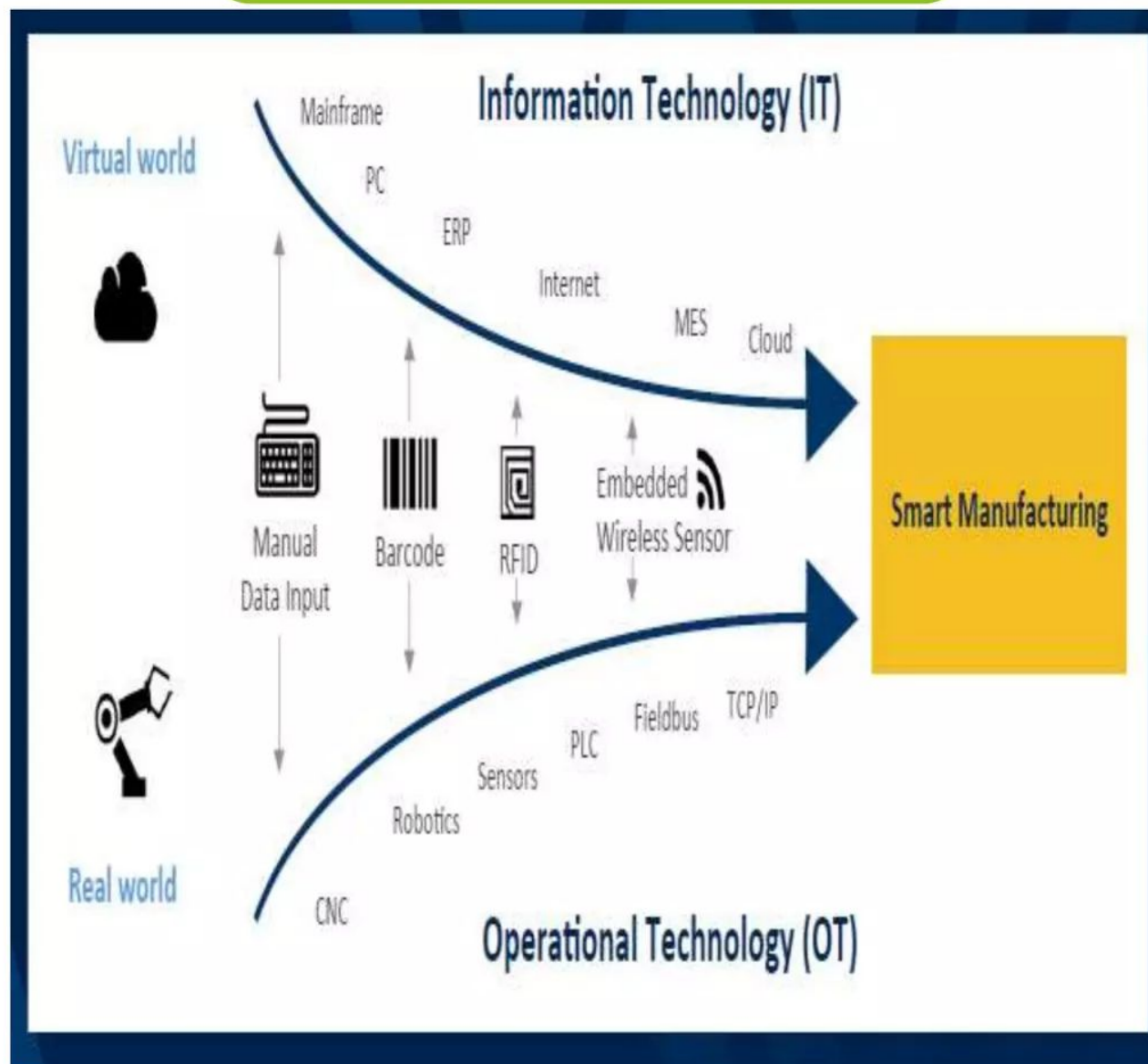**Industry 3.0**
Automated production using electronics and IT

Industry 4.0
Intelligent production incorporated with IoT, cloud technology and big data

It's supposed to be automatic, but actually you have to push this button.

—John Brunner

IT Meets IoT

https://www.networkworld.com/article/3321018/how-to-add-iot-functions-to-legacy-equipment.html
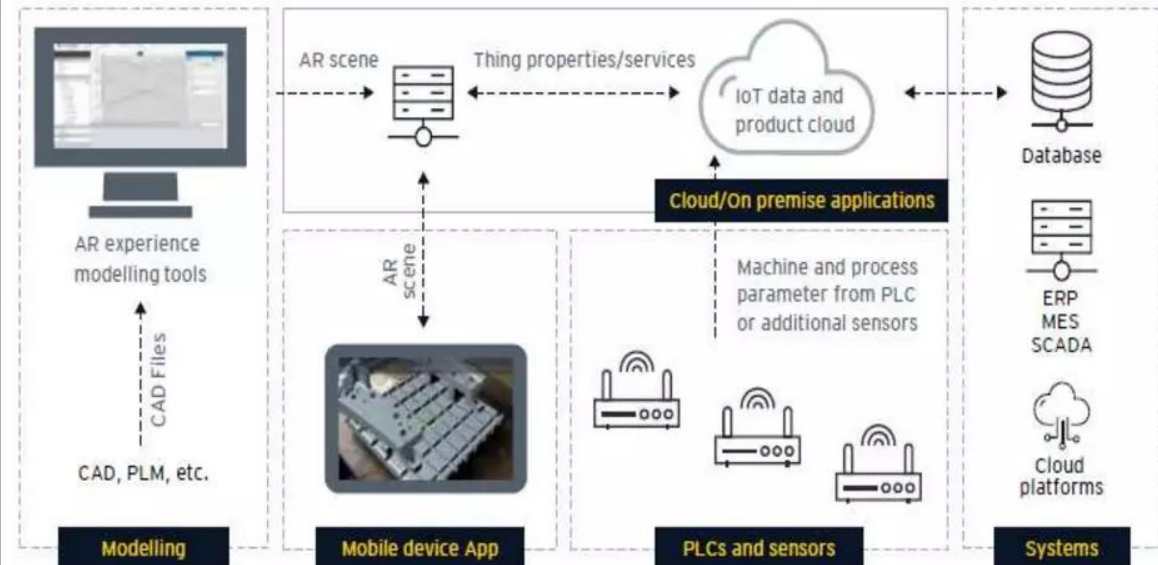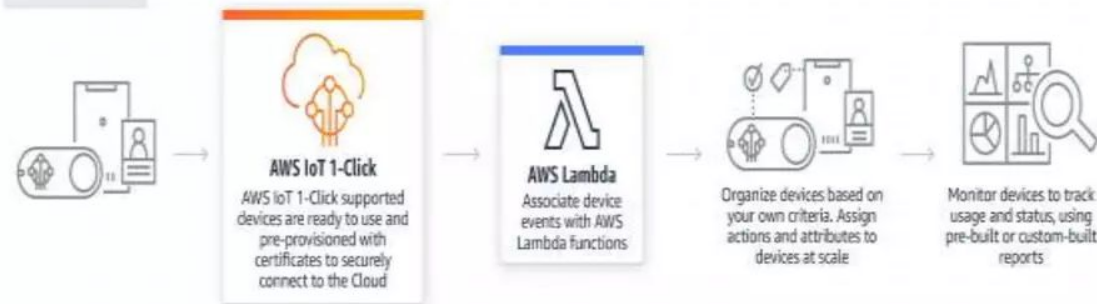
Smart Factory Vision: Machine-as-a-Service
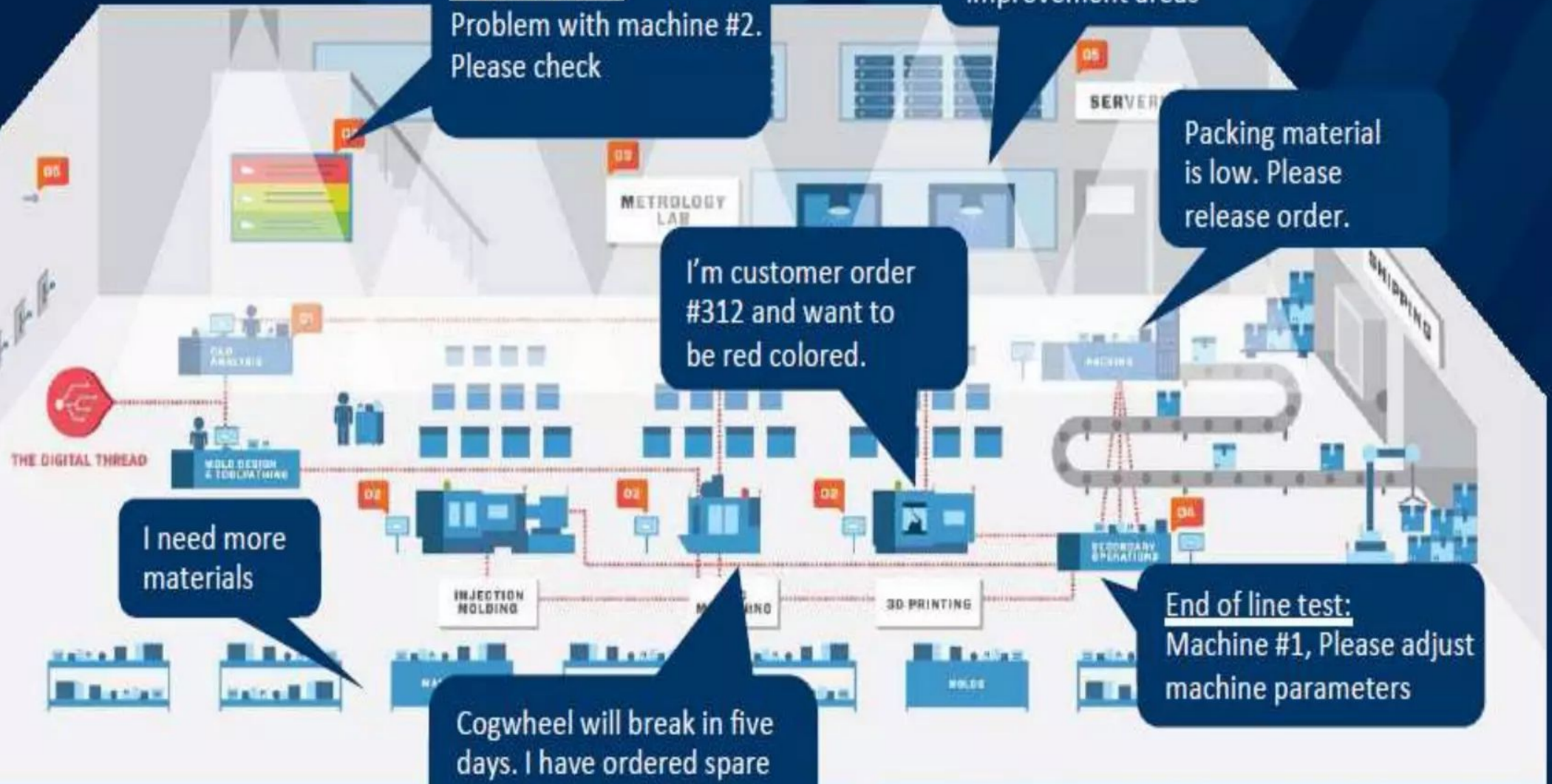
Imagine if a Customer can get status updates throughout the process…or..

Update to Customer on each stage

Customer places the order

Customer get the product
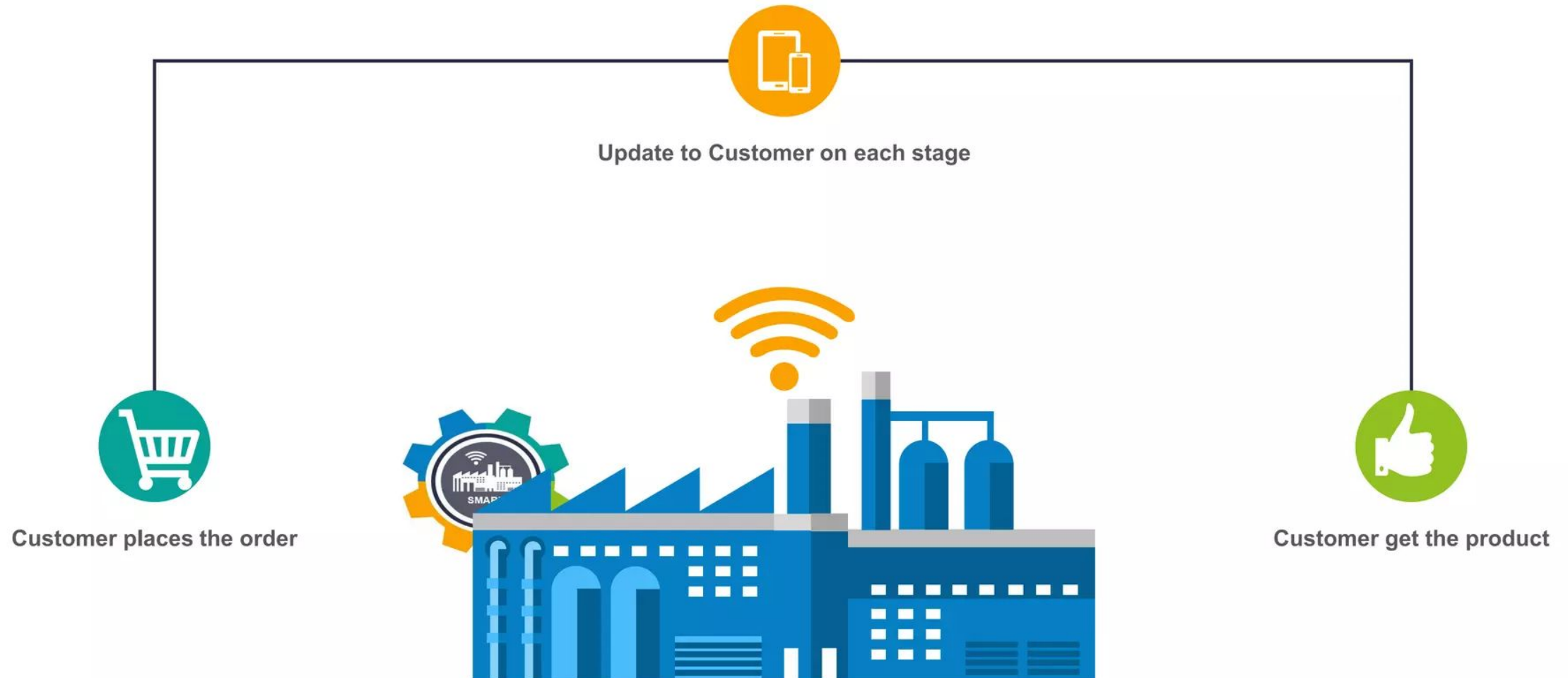
Get to work without morning meetings.
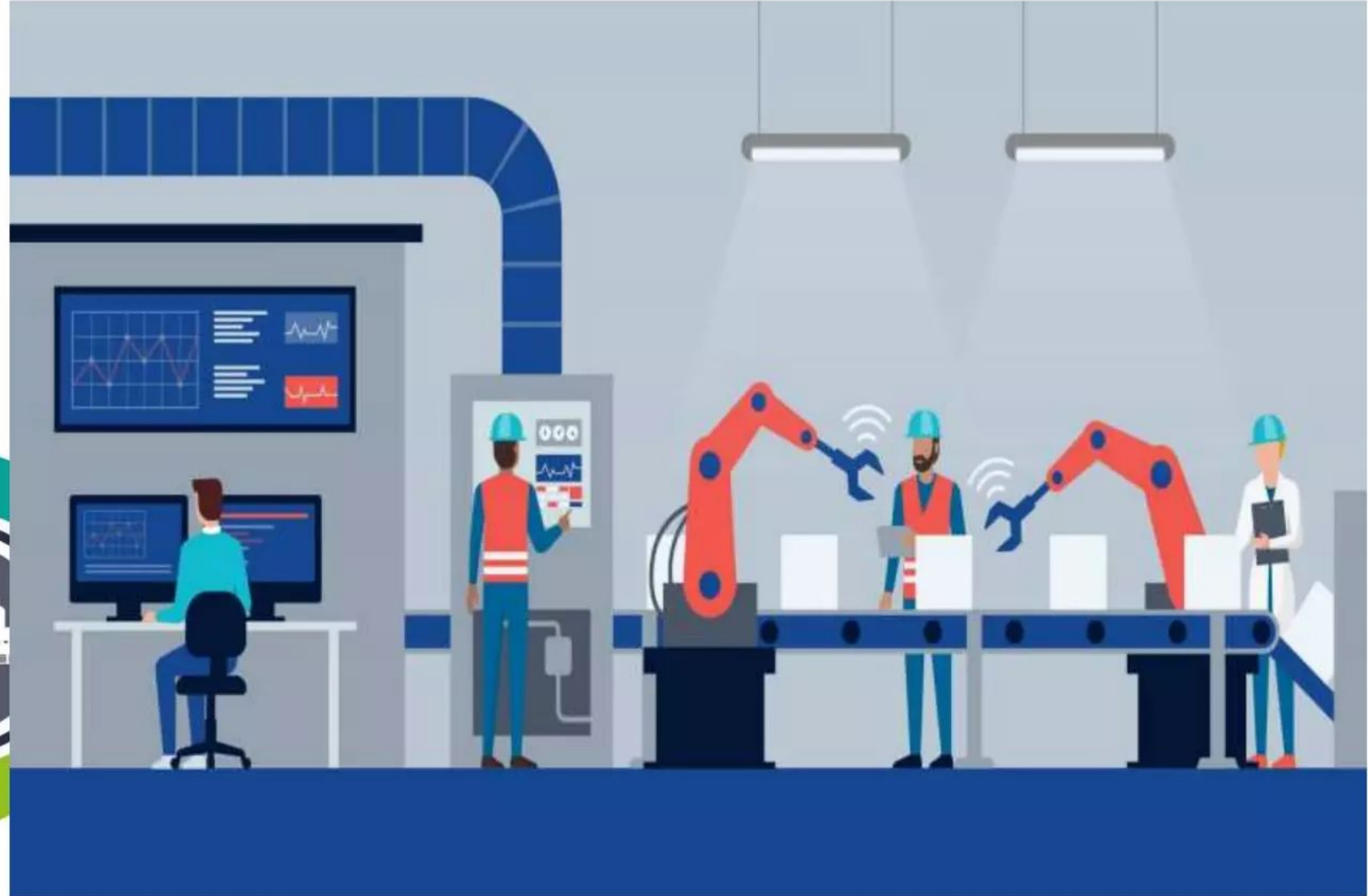
Opportunities

Global IoT market — Witnessing exponential growth leading to significant revenue opportunities across the ecosystem

Global IoT connections forecast (Billion)
- 2017: 7
- 2025: 25
- CAGR: 17%

Global IoT market revenue by 2025*
US$1.1t (Billion)

Global IoT connections by region (Billion)

Region	2017	2025E
Asia-Pacific	2.8	10.9
North America	1.9	5.8
Europe	1.7	4.9
Latin America	0.4	1.3
MENA	0.3	1.1
CIS	0.2	0.6
Sub-Saharan Africa	0.1	0.3

Share of IoT revenue in 2025 (Billion)
- Platforms, applications and services: 68%
- IoT professional services: 27%
- Connectivity: 5%

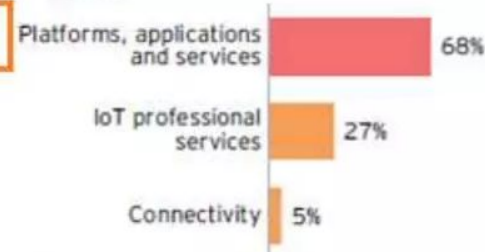Platforms, applications and services segment spans multiple IoT layers such as platforms, application services, cloud, data analytics and security.

IoT professional services include system integration, managed services and consulting.

Asia-Pacific region is forecasted to become the largest global IoT region in terms of both connections and revenue by 2025.
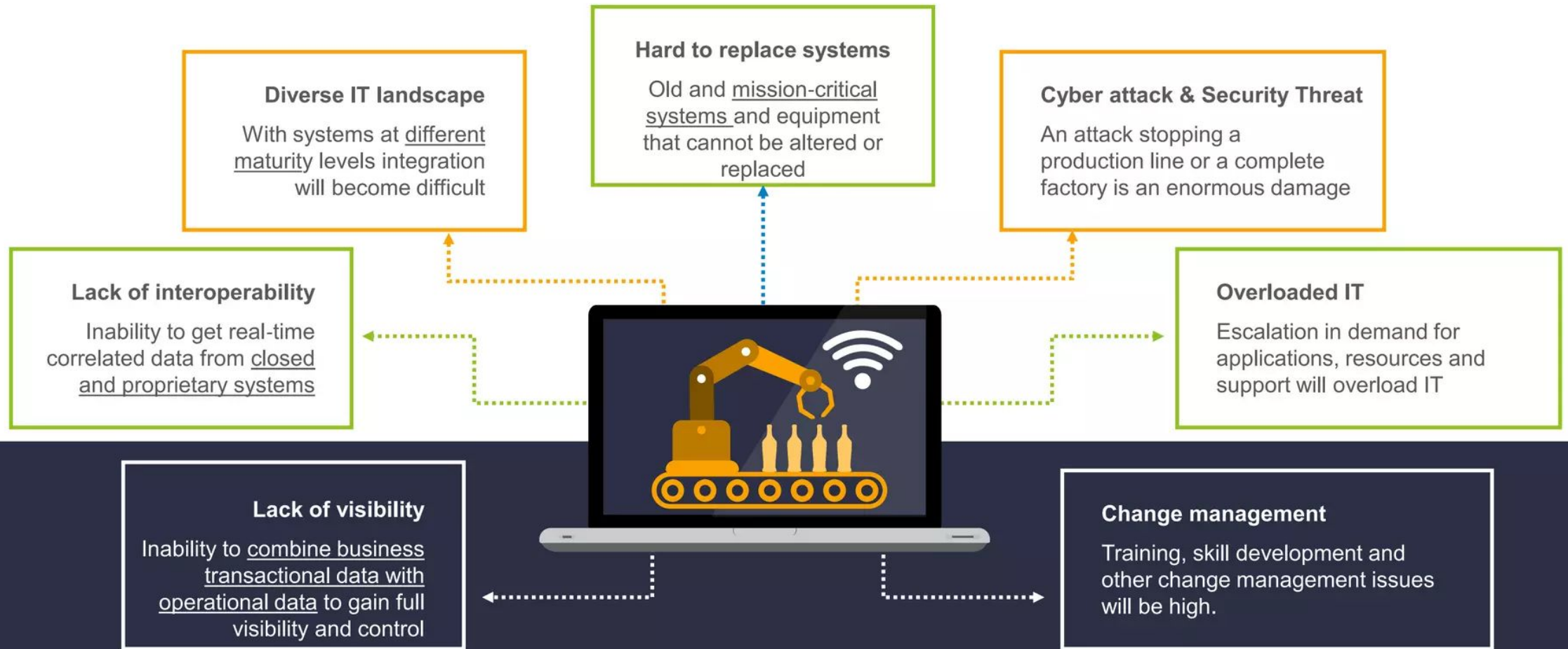
IoT connections (cellular and non-cellular) may be driven largely by growth in the industrial IoT market, accounting for more than 50% of the connections.

IoT market's **value shifts** from connectivity to platforms, applications and services.

Licensed cellular IoT connections is expected to reach 3.1 billion by 2025, accounting for 12% of total IoT connections

Source: GSMA, IDC, *Note: Excluding IoT hardware revenue (device, module and chipset)

- Improving efficiency & productivity (by improved material handling)
- Creating new business opportunities (thro data analytics)
- Ability to sell products as a service(Subscription model)
- Reducing downtime
- Maximizing asset utilization (By Reduced down time)
- Reducing asset lifecycle costs
- Enhanced worker safety(Automatic Safety controls)
- Enhancing product innovation process (RCA thro Big Data)
- Better understanding of customer demand(Flexible & Agile Process knowledge)

Challenges

Diverse IT landscape

With systems at <u>different maturity</u> levels integration will become difficult

Hard to replace systems

Old and <u>mission-critical systems</u> and equipment that cannot be altered or replaced

Cyber attack & Security Threat

An attack stopping a production line or a complete factory is an enormous damage

Lack of interoperability

Inability to get real-time correlated data from <u>closed and proprietary systems</u>

Overloaded IT

Escalation in demand for applications, resources and support will overload IT

Lack of visibility

Inability to <u>combine business transactional data with operational data</u> to gain full visibility and control

Change management

Training, skill development and other change management issues will be high.

Is Smart Factory achievable?