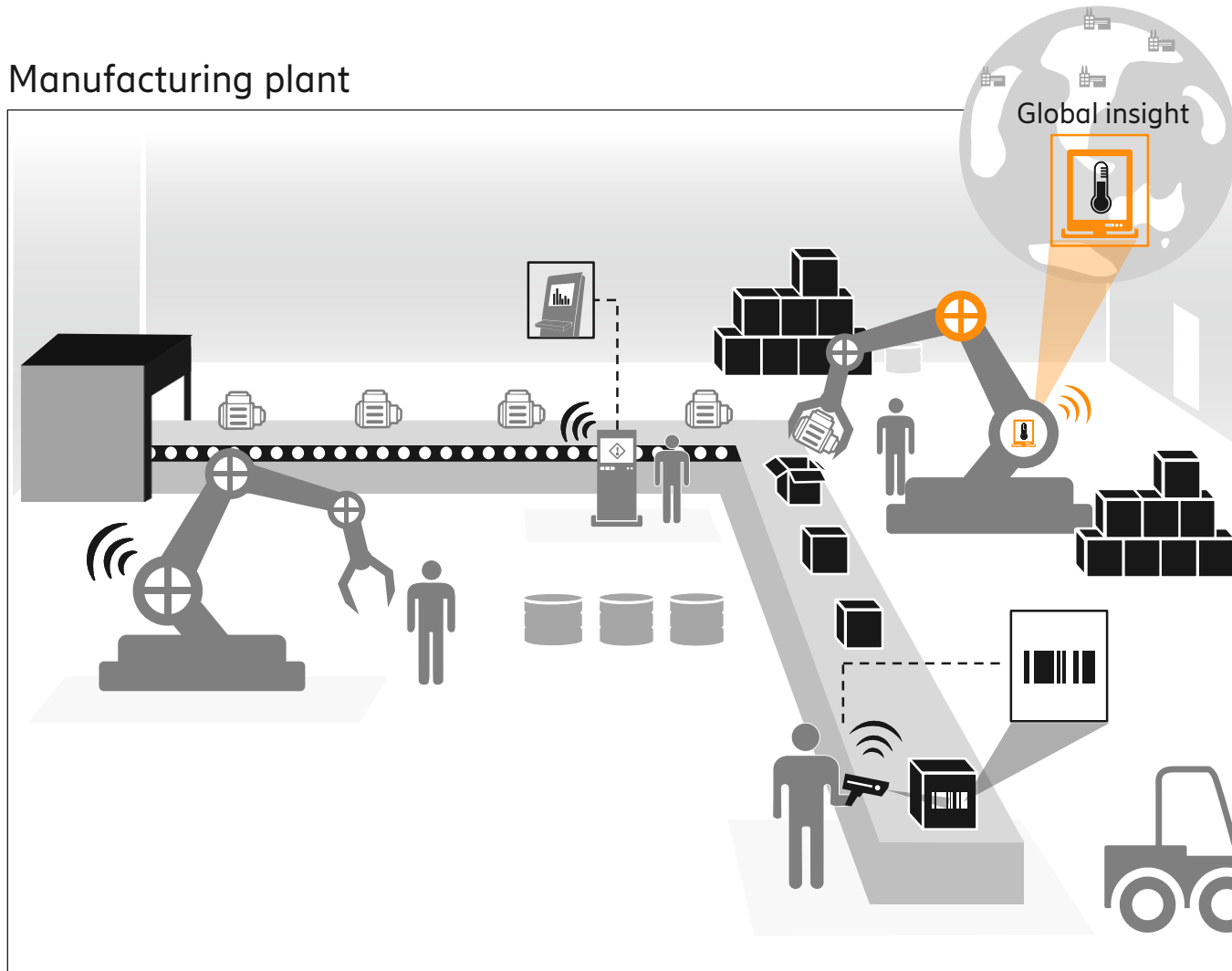


# Lessons from 5G Smart Wireless Manufacturing

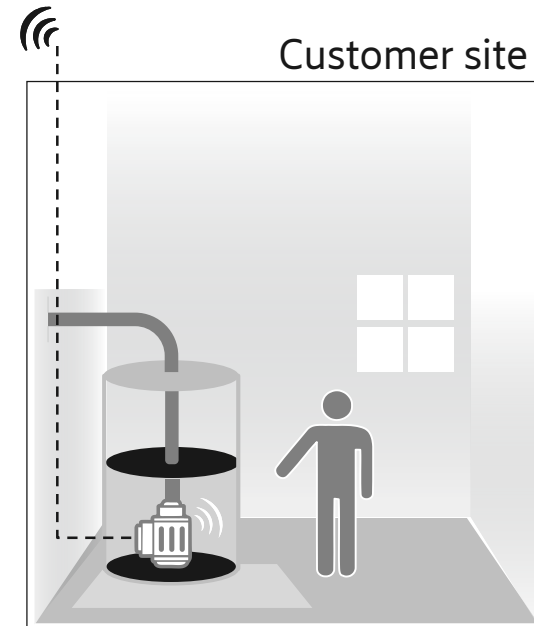
Dongjoo Park  
Technical Director

# The Industry 4.0 factory of the future

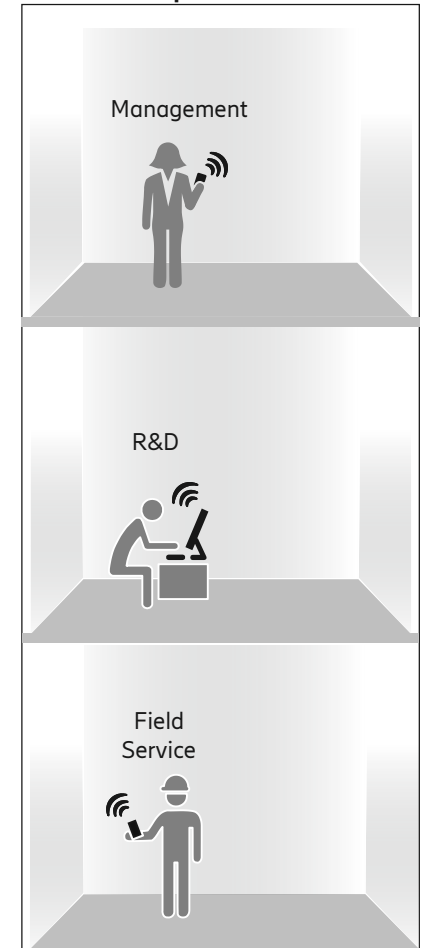
Manufacturing plant



Customer site



Global operations



Third-party logistics

# Ericsson (as a manufacturer) at a glance

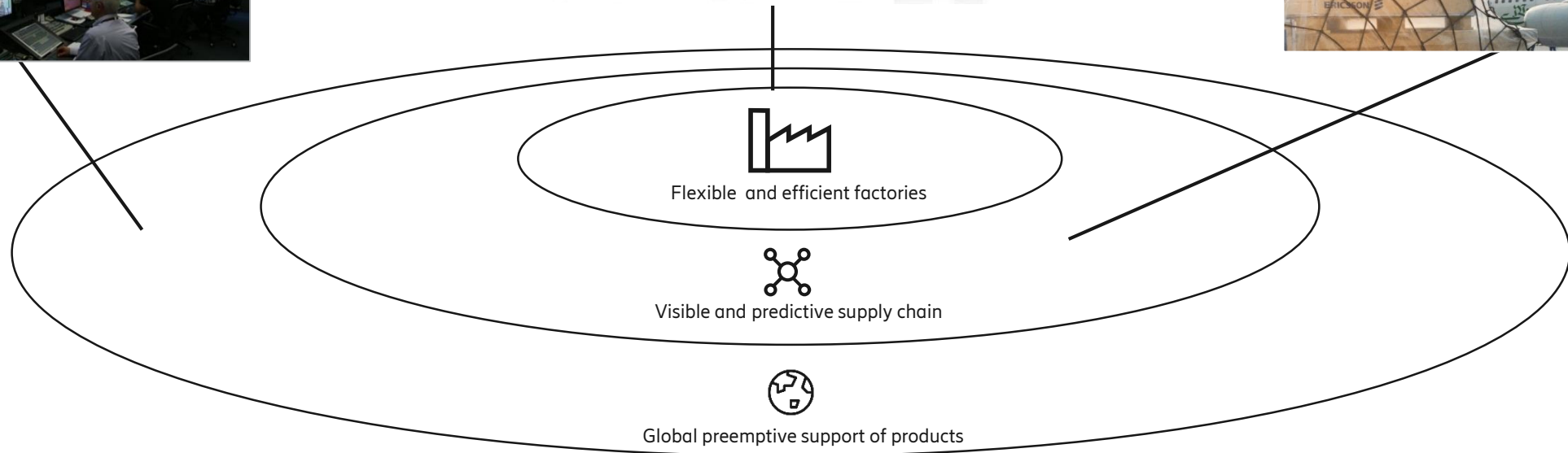
**40%** Of mobile traffic through our networks  
**2.5 billion** Subscribers supported by us  
**1 billion** Managed supported by us



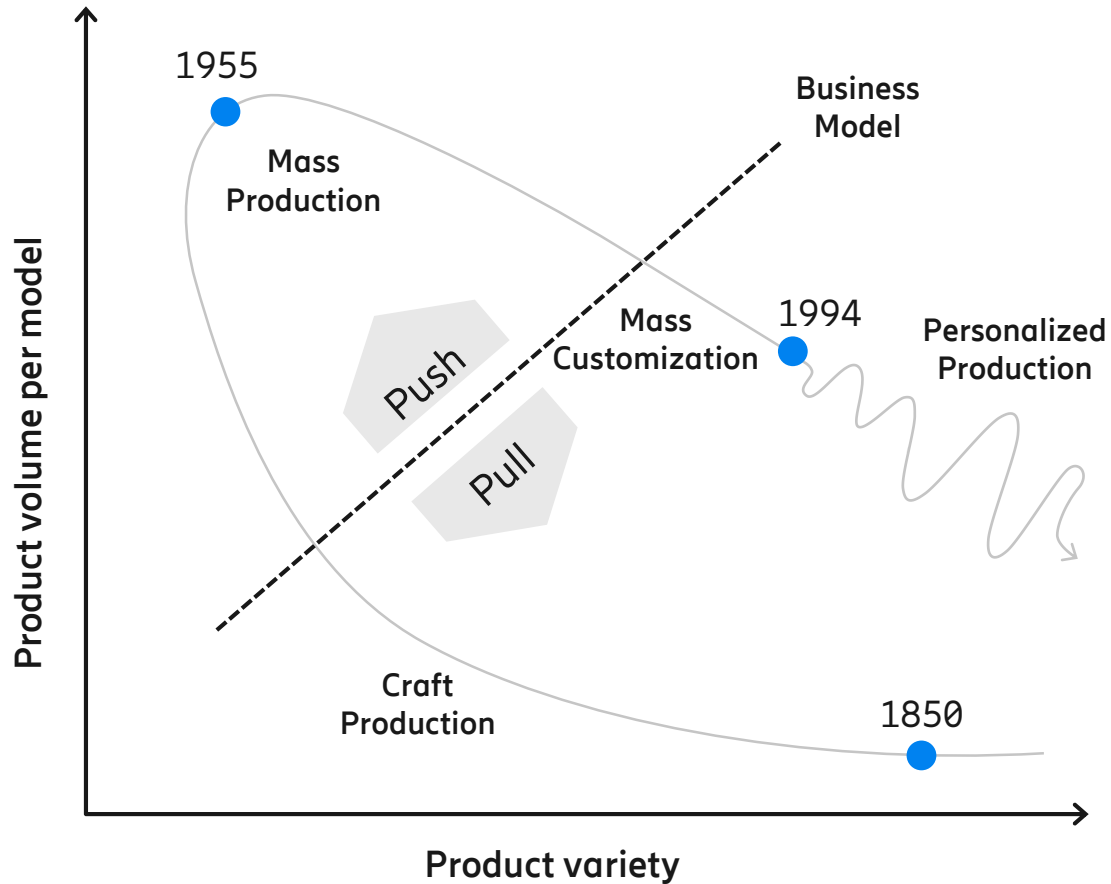
**39 000** Patents  
China, Estonia, Brazil, India, Sweden Production/assembly sites  
**10%** Of Estonia's export



**185** Countries in distribution network  
**~2100** International destinations  
**~ 265** Shipments per day



# Manufacturing needs wireless to enable flexibility and customization



## Flexibility needs

- Greater agility to manufacture more custom products
- Faster time to market to meet tight market windows
- Increase safety/security to lower risk
- Enhance operational efficiency
- Boost productivity to lower cost, increase profitability

## Wireless solutions

- Move from wired to wireless to eliminate cabling
- Autonomous robots bring materials where needed
- Remote control of machinery in dangerous locations
- AR: factory workers see digital twin to eliminate errors
- Collaborative robotics to optimize production

# Factory pain points & challenges to address

## Growth & Innovation

Increase in production line commissioning rates

Future product mix require simple production line customization

Future massive onboarding of devices and sensors

## Managing risk

Infrastructure Security, Data integrity

Personnel safety & Human/Machine interaction

Latency disturbances

## Operational excellence

Workflow interruptions and inefficiencies

Inefficient scheduled maintenance plans

Integration of new and old processes

## Managing complexity

Aggregating data flows from multiple complex systems

Extracting data from multiple vendors / machines to one platform

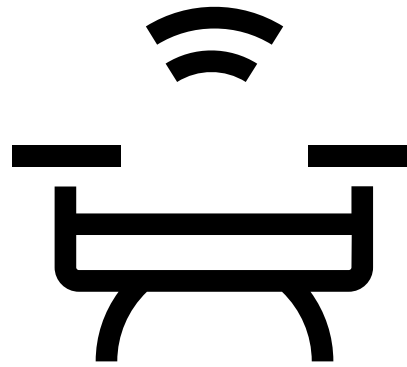
No complete digital overview of internal and external processes

# How cellular connectivity enables industry 4.0



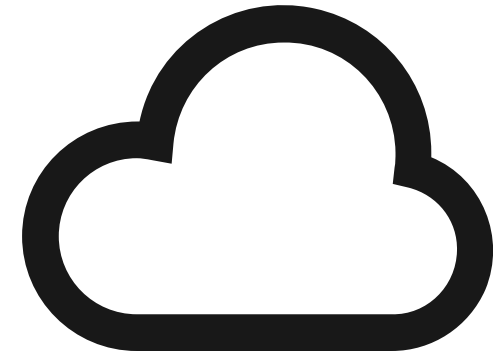
## Global

- Multi-country
- Global ecosystem
- Common platform



## Cellular

- Stable
- Secure
- Simple



## IoT

- Low Latency
- High bandwidth
- Massive computing

# The perfect storm

## 5G



10-100X  
Connected Devices

10X  
Battery Life



Create digital twins and predictive maintenance



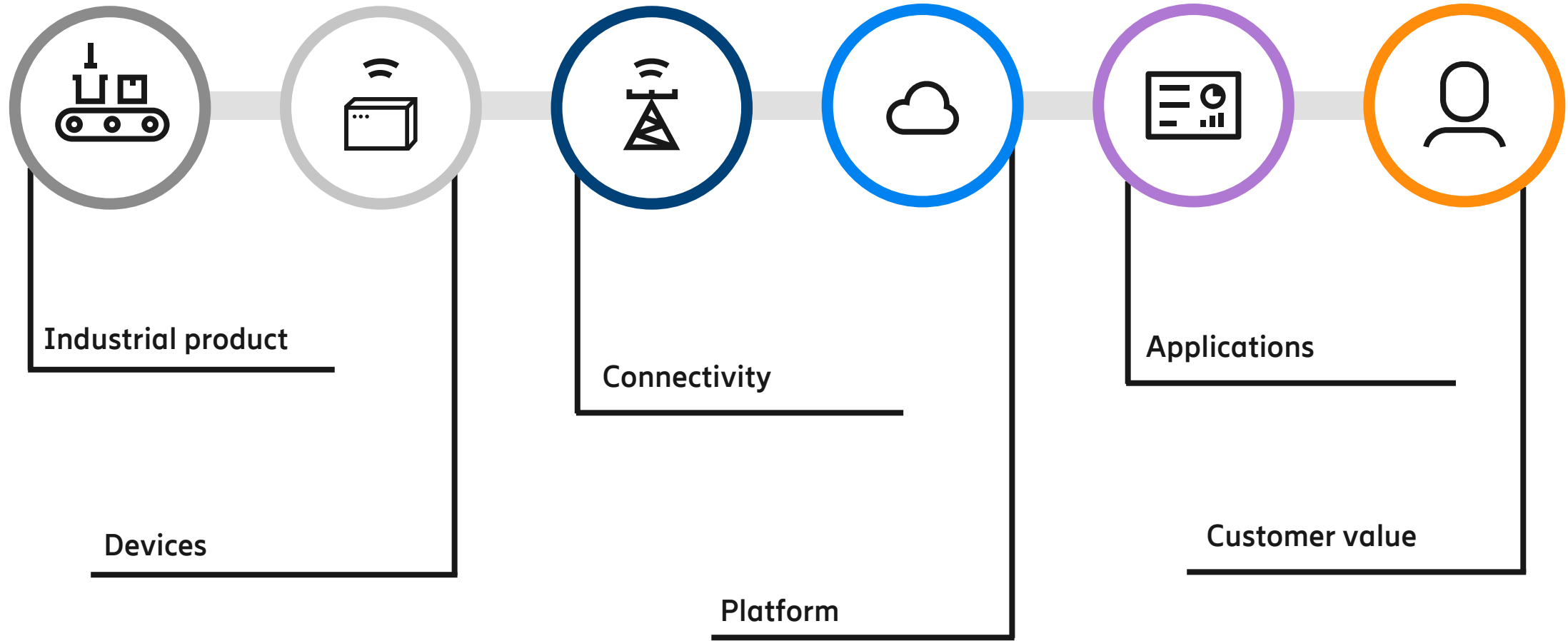
1000X  
Mobile Data Volumes

5X  
Lower Latency



Intelligence orchestration and remote control

# The quest for easy – Industrial IoT



# Ericsson Panda: The world's first cellular IoT-based smart factory

Optimizing tool maintenance



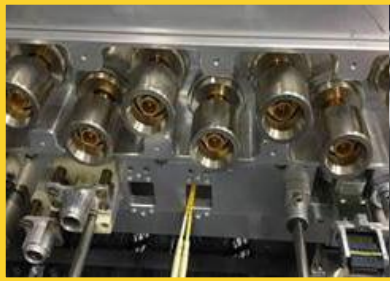
Monitoring content of material boxes



Monitoring output of workstations



Optimizing test fixtures

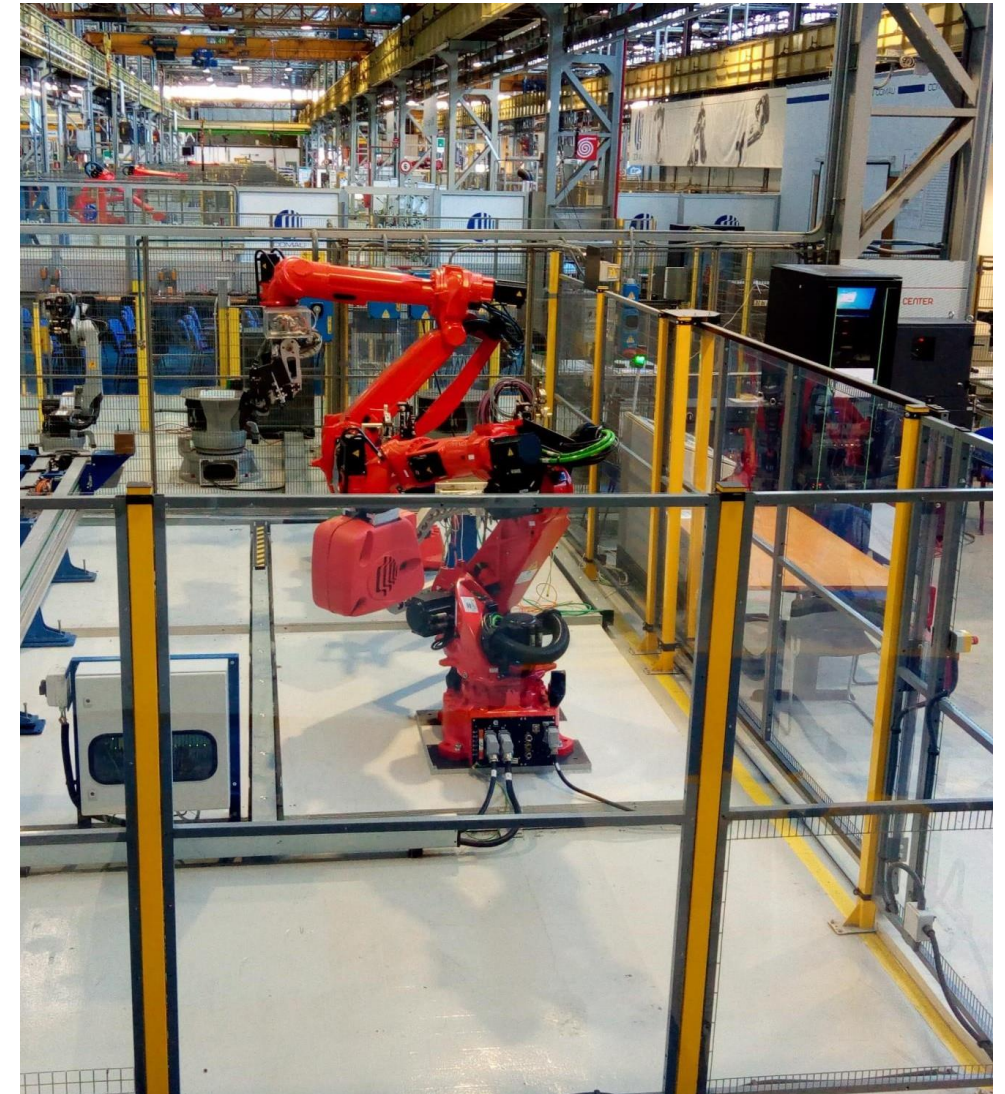
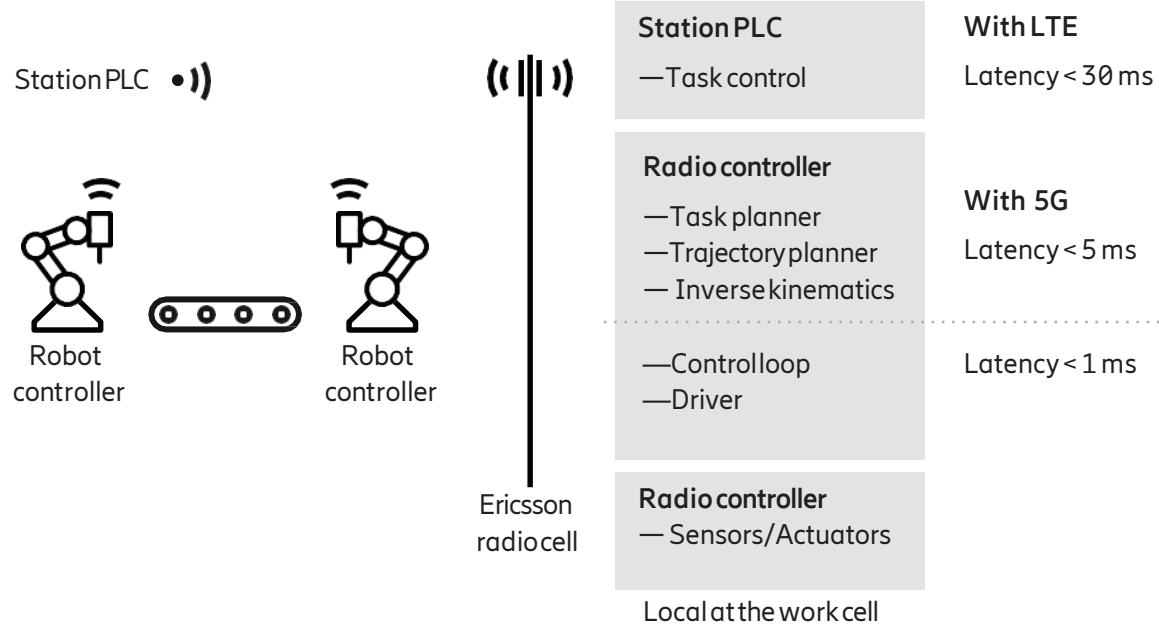


Streamlining the Andon system

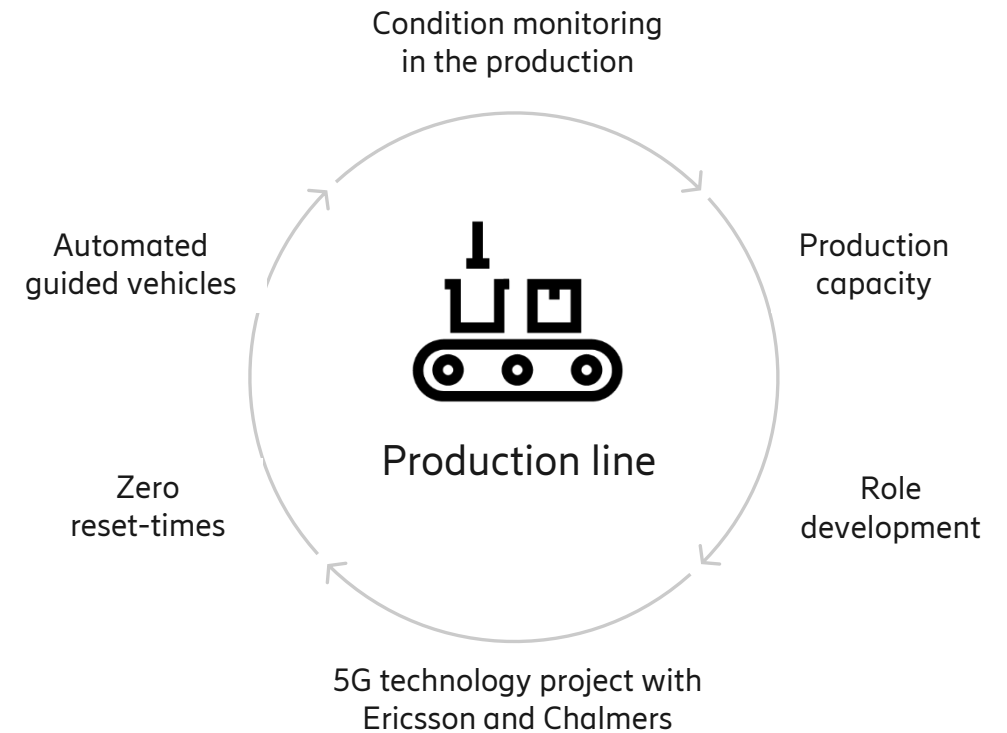
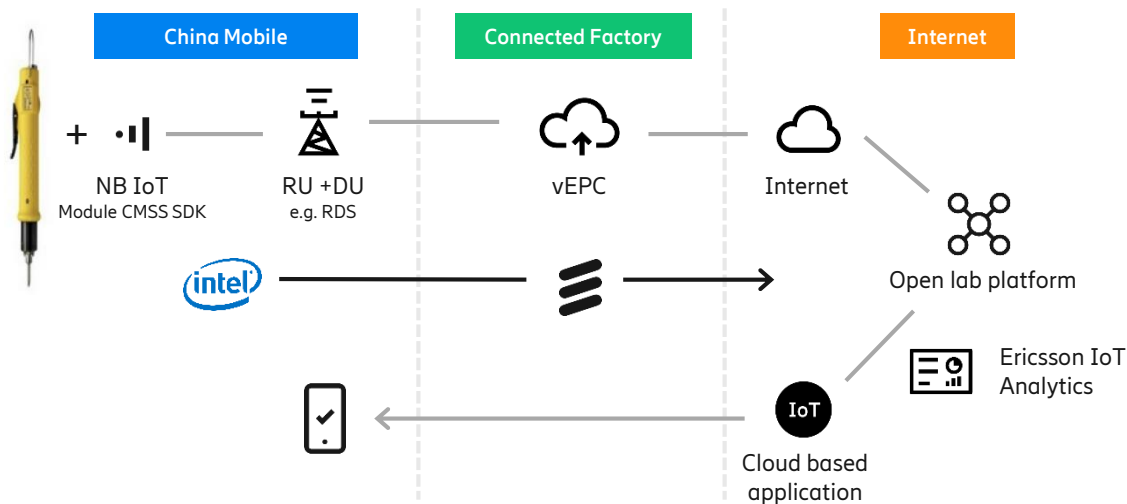


# Flexible robotics

- Reduction of cabling in new plants or existing plants with help of cellular
- Remote monitoring of robots for preventive maintenance
- Move nodes computing to reduce installation costs (remote virtual PLC)



# Future cases with Massive / Critical wireless



## Case type: Massive wireless

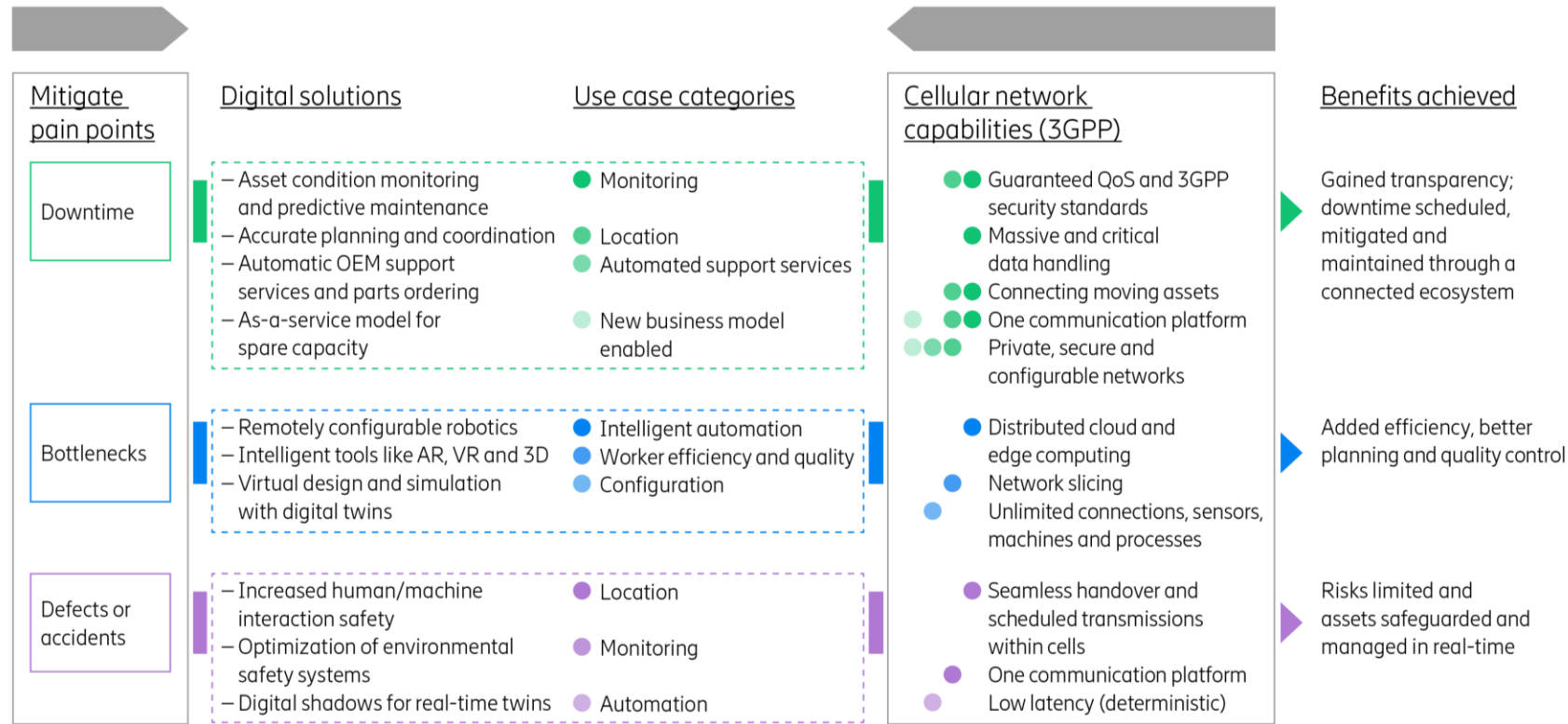
- Monitor assets
- Usage, status and maintenance
- Higher availability, less downtime, correct maintenance and predictable production

## Case type: Critical wireless

- Real-time control
- Minimal latency

# Developing the smart wireless manufacturing market

Bridging the gap between a factory's functional pain points and cellular capabilities



## Bridge the perceived value gap

To convey the value of cellular connectivity, a common language for use cases and network terminology needs to be established between industry players and the service and network technology providers.

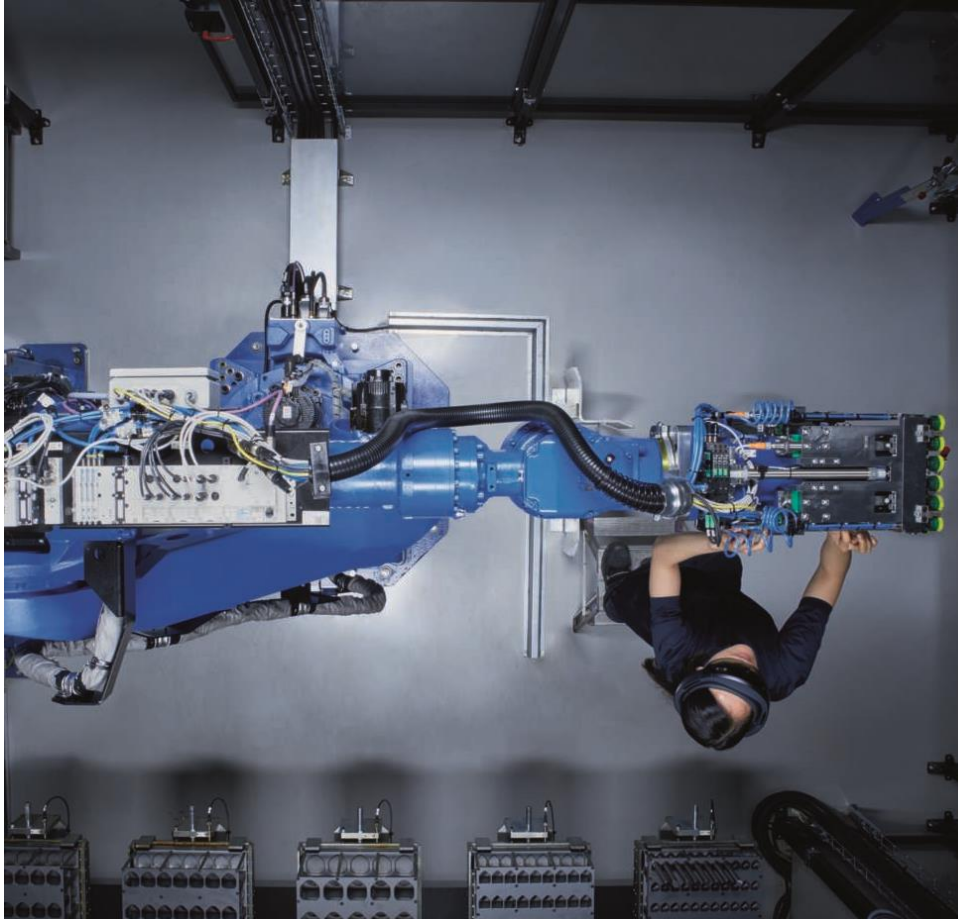
## Address the right pain points

Identifying and mitigating classic manufacturing pain points with cellular capabilities will more than offset the switching costs, proving the new networks' practical and business value.

## Build horizontal and scalable solutions

Solutions that suit small scale networks as well as highly diverse subsectors are needed in order to address cost, deployment and spectrum issues.

# Developing the smart wireless manufacturing market



## Focus areas to drive engagement:

- Processes requiring mobility, such as shop floors with automated vehicles and assembly warehouses, which need secure and precise management as well as tracking of traffic, data flows and assets.
- Low-volume and high-variance manufacturing cases, where wireless machine line configuration is simple and flexible compared to cabled machine lines.
- Processes that cannot be monitored and controlled via cables but require wireless, real-time critical data transmission and a stable, deterministic network performance (bandwidth and latency) to operate.
- Processes susceptible to human error, or advanced manufacturing that requires tacit knowledge and skills transfer, where digital tools will be widespread to mitigate for errors and encourage faster learning.
- Processes where coordination of factories, resources and components is time-sensitive or crucial for the result (e.g. product quality and timely delivery)

