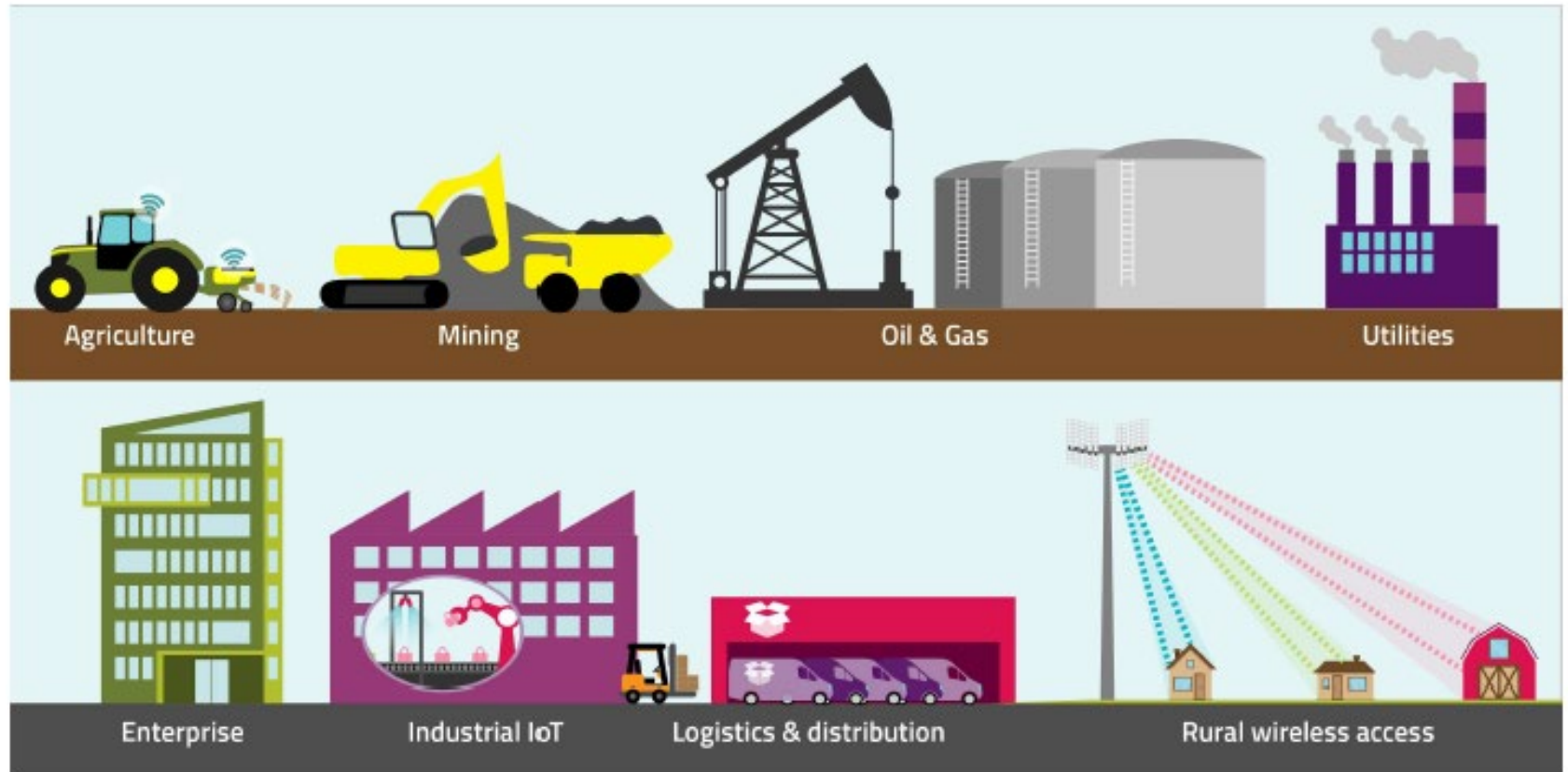


# 5G



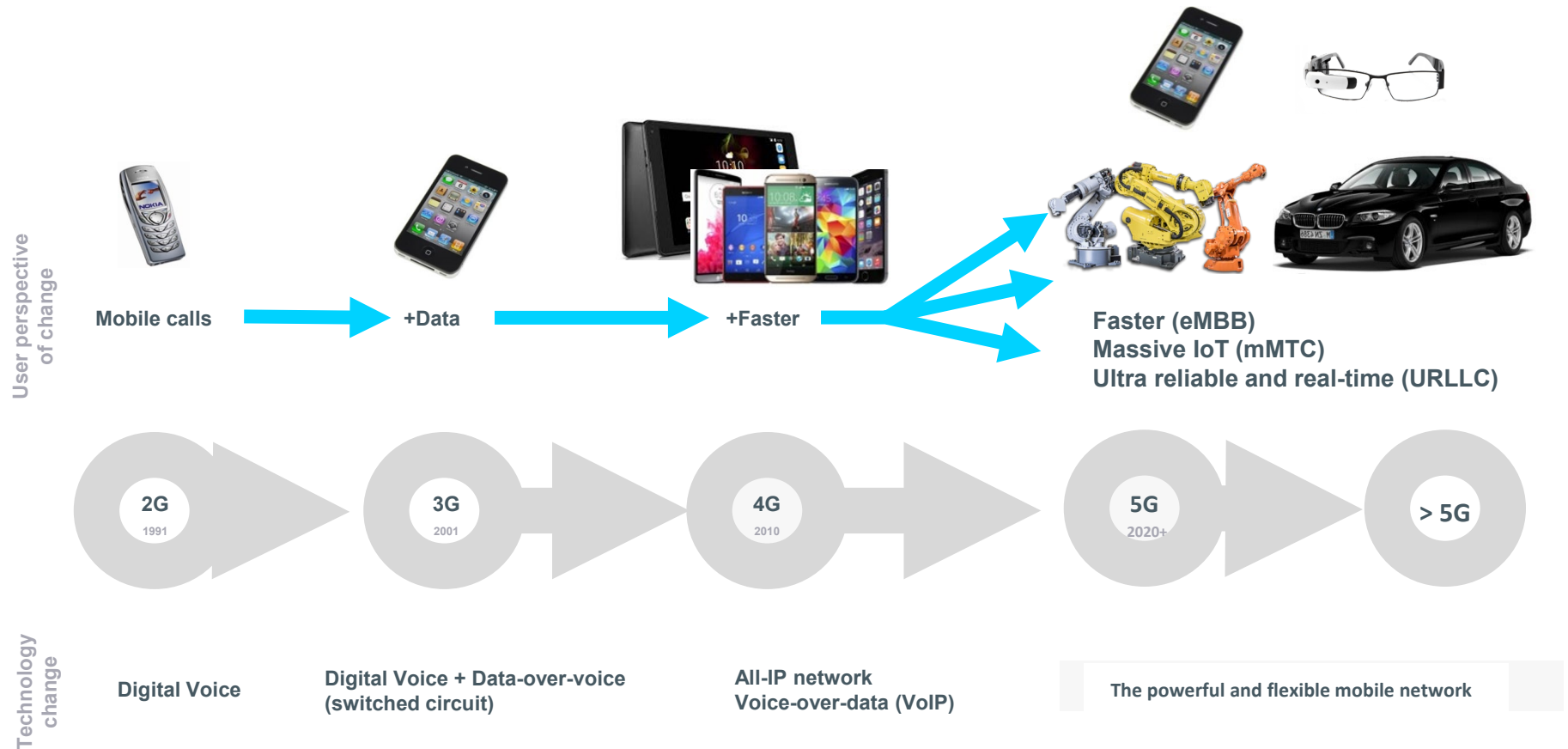
## 5G for Vertical Sectors

Marios Nicolaou: Specialist 5G Strategy & Digital Transformation

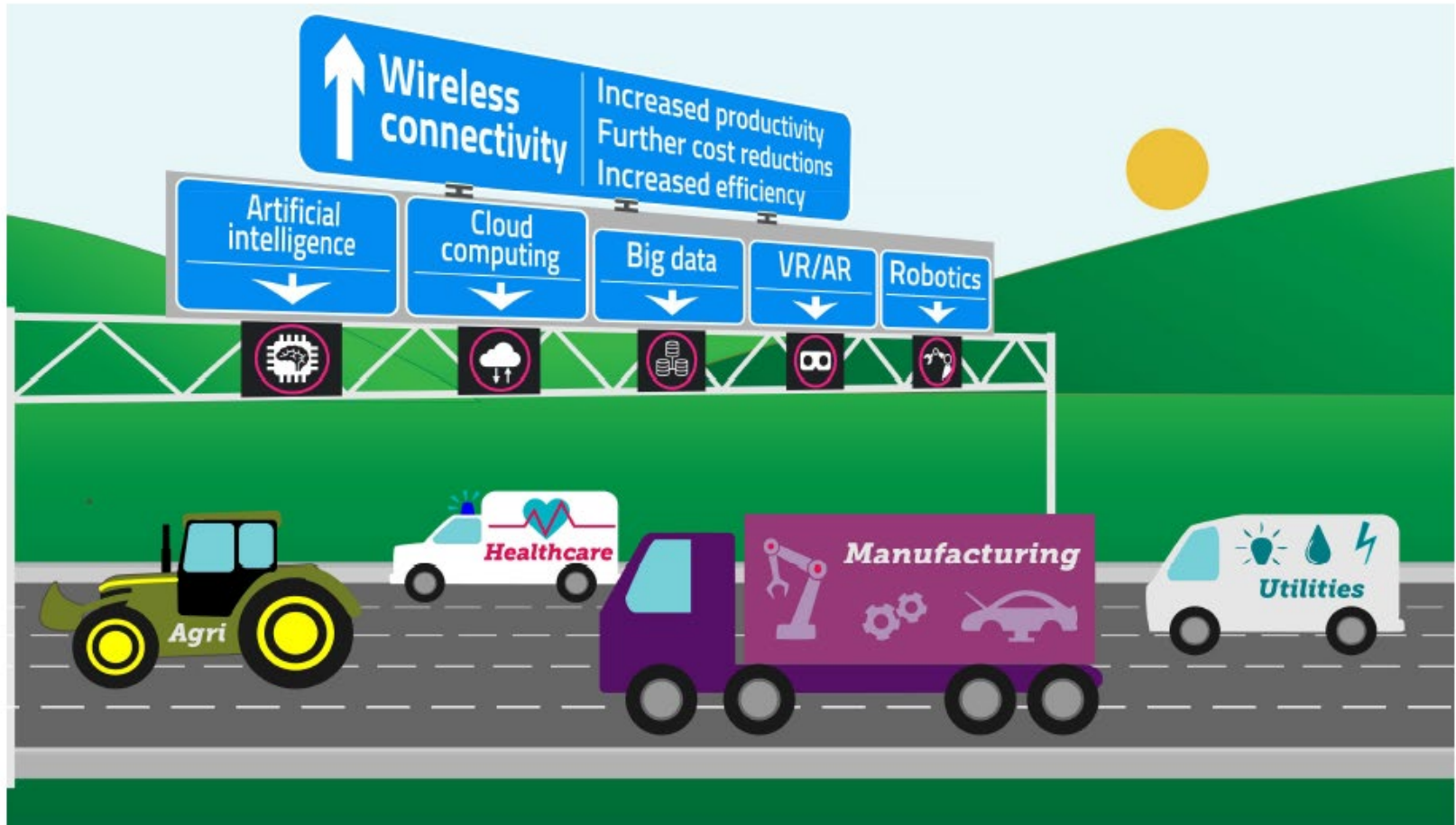
# Agenda

- 5G for Vertical Sectors
- Study from the UK on Industry 4.0 & 5G
- Case Study: Ocado
- Case Study: Smart Tourism
- Case Study: Digital Twins

# 5G... not just another G

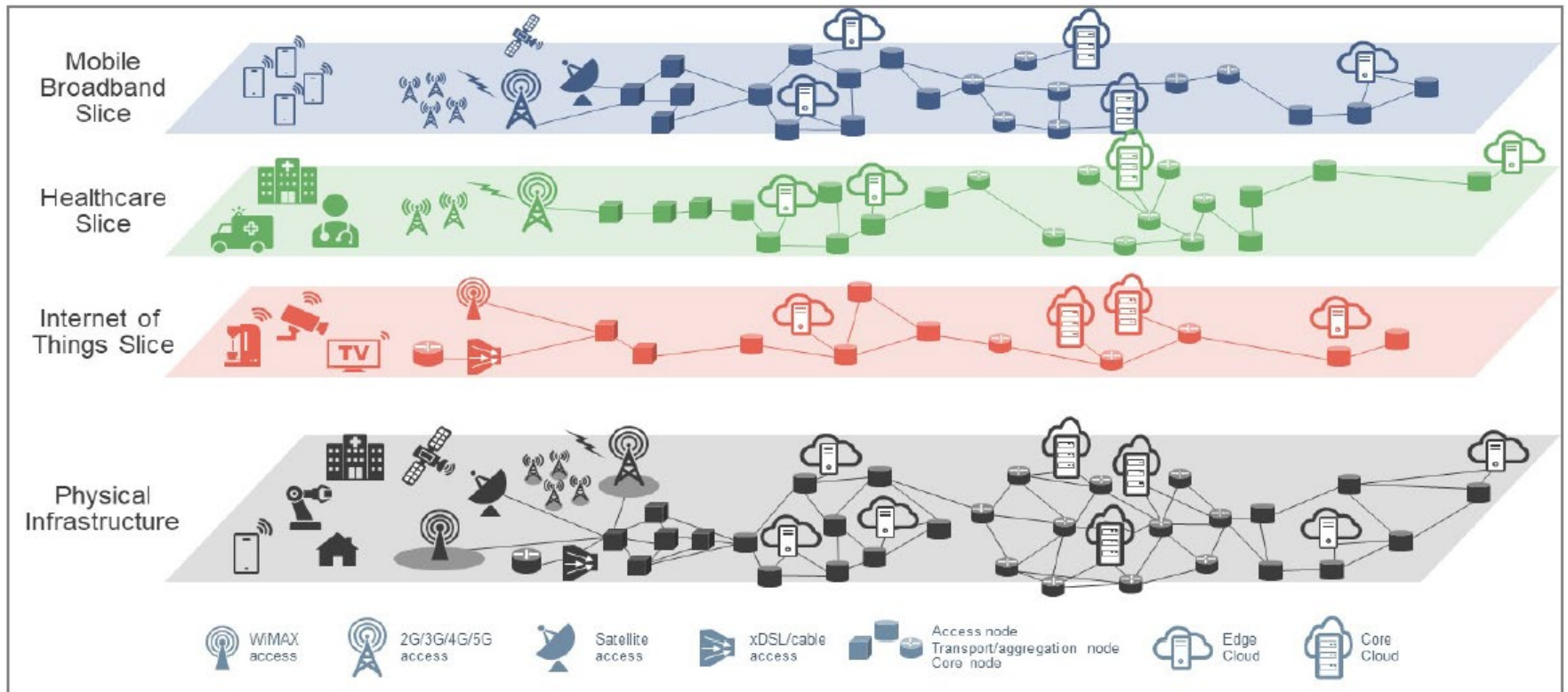


# Industry 4.0 & 5G as enablers

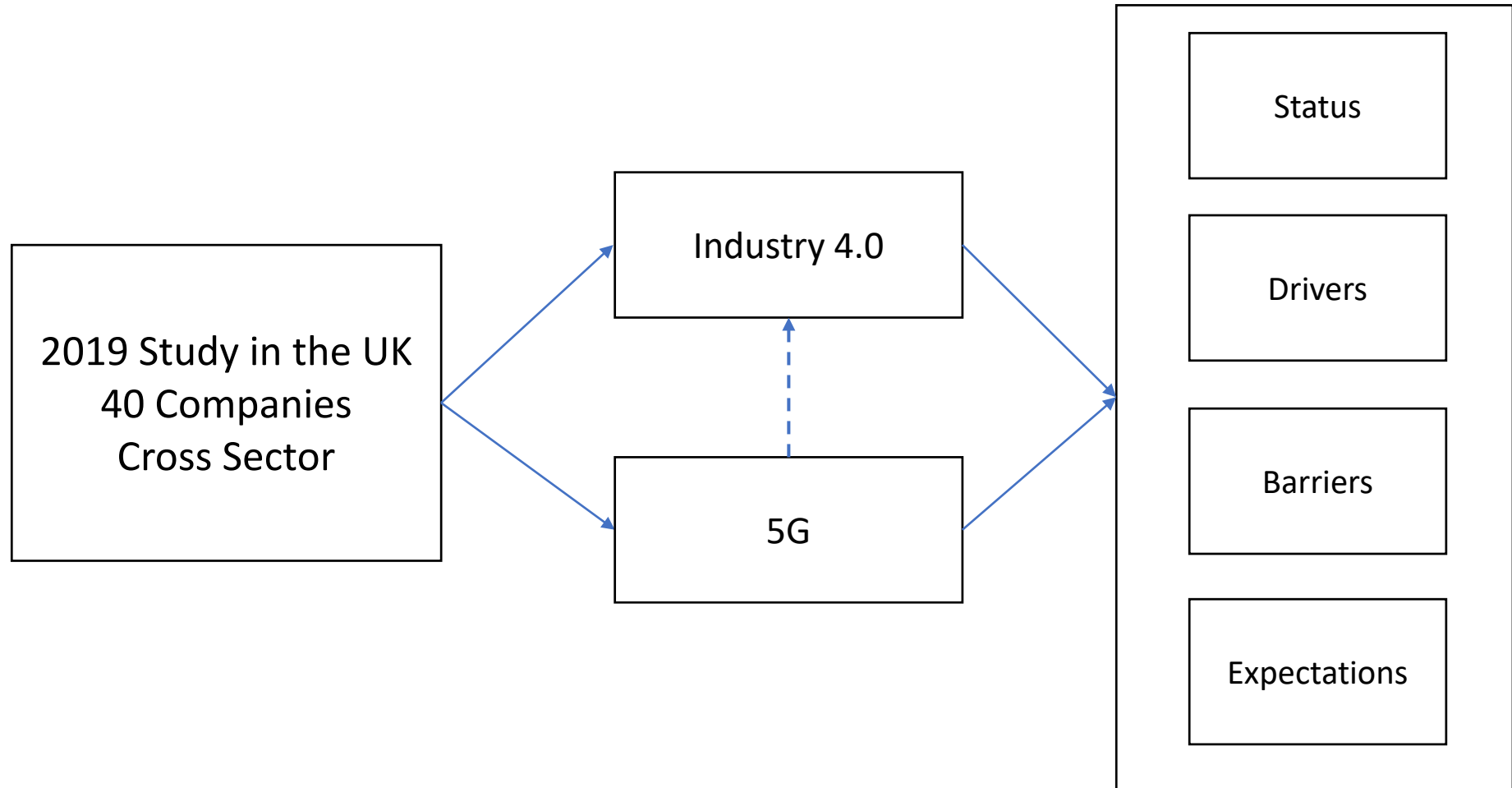


Source: Ofcom 2019

# Dynamic Network Slicing is a powerful capability

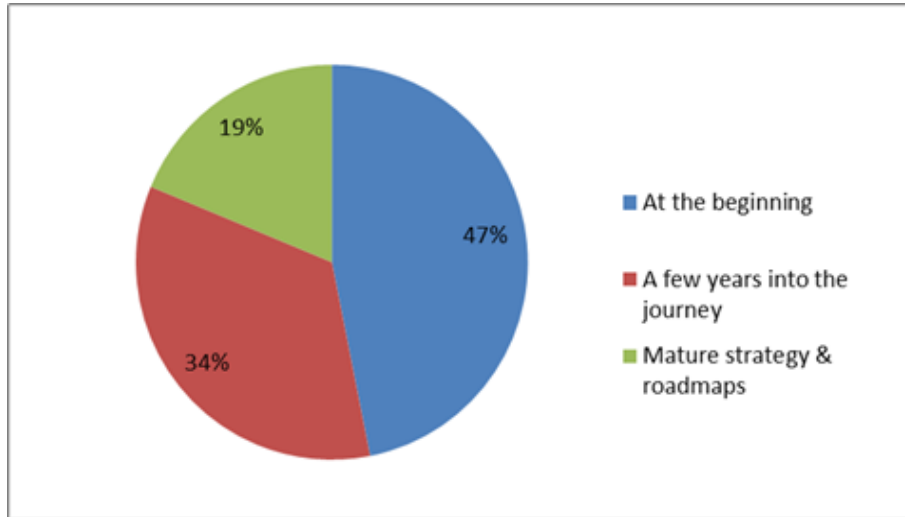


# National UK Study: Industry 4.0 & 5G

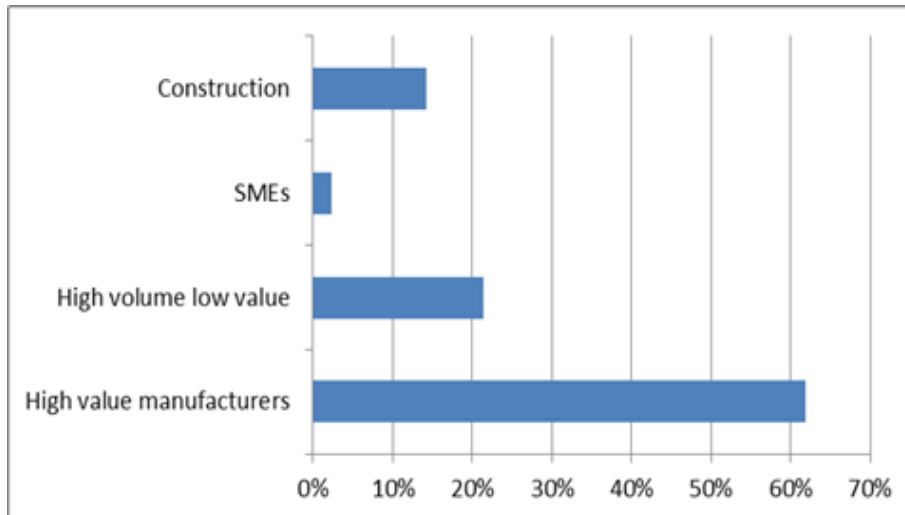


# Industry 4.0 Status

How far are we in the journey of Industry 4.0?



Who is adopting Industry 4.0 faster?

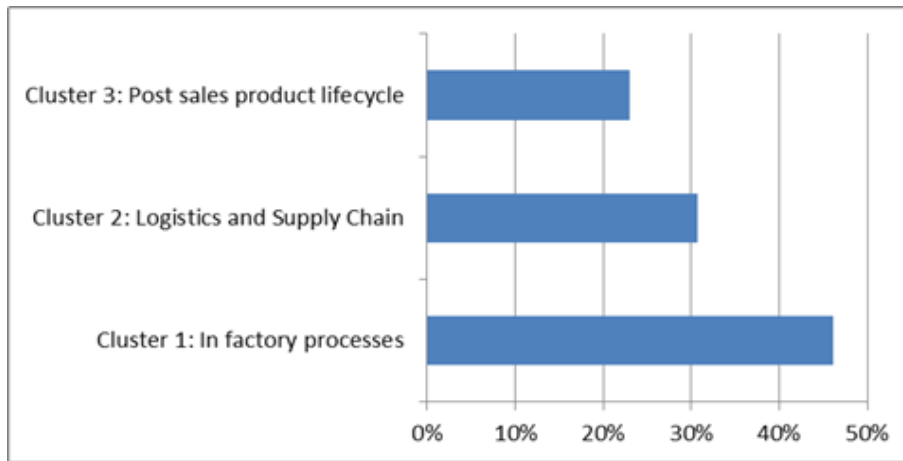


CEO Quotes:

- “We are the beginning but there is no way back”
- “Industry is a Global game. You can not view it locally”
- “SMEs are being left behind and they could be cut-out of the value chain”

# Industry 4.0 Clusters & Use Cases

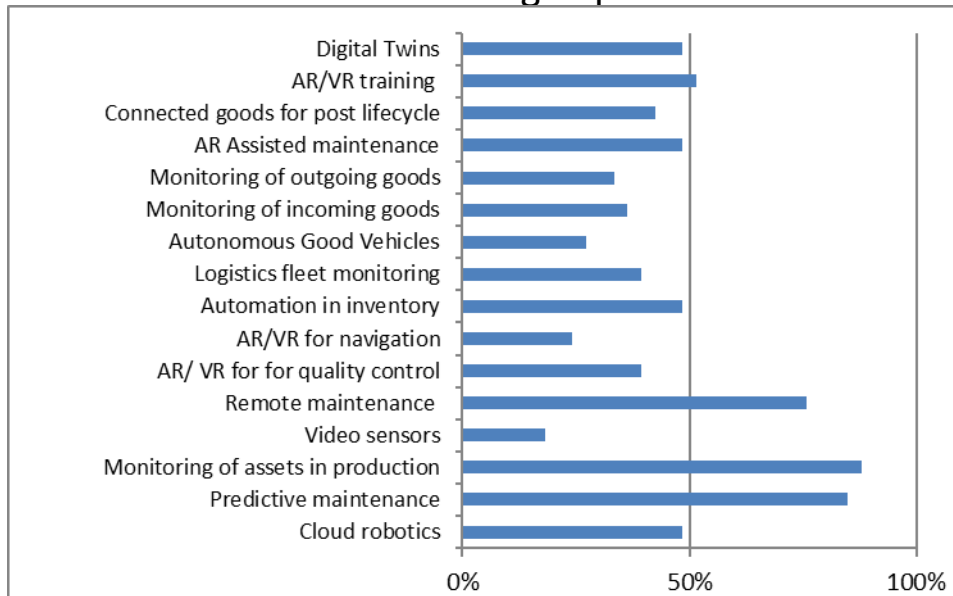
Which clusters are implementing I4 faster?



CEO Quotes:

- “Logistics are slower to adopt but we think the bigger value maybe there”
- “Automating production can double the output capability”
- “Most of our investment is going in AI and Digital Twin”
- “We have huge volumes of data which should be processed locally to avoid high costs”
- “Digital twins, sensorization, and AR/VR are the first cases where we see benefits”

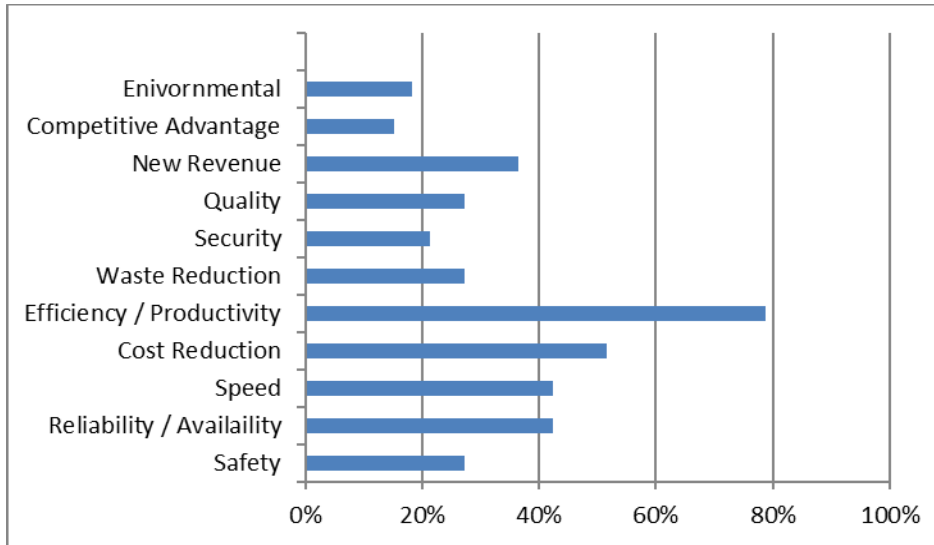
Which use cases are being implemented?



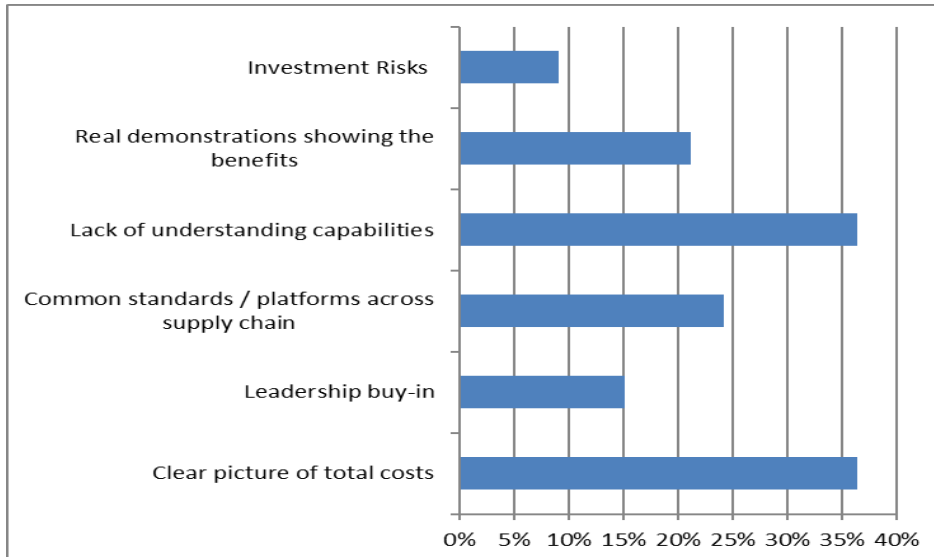


# Industry 4.0 Benefits & Barriers

Which are the main objectives for implementing I4?



Which are the main barriers for accelerating I4?

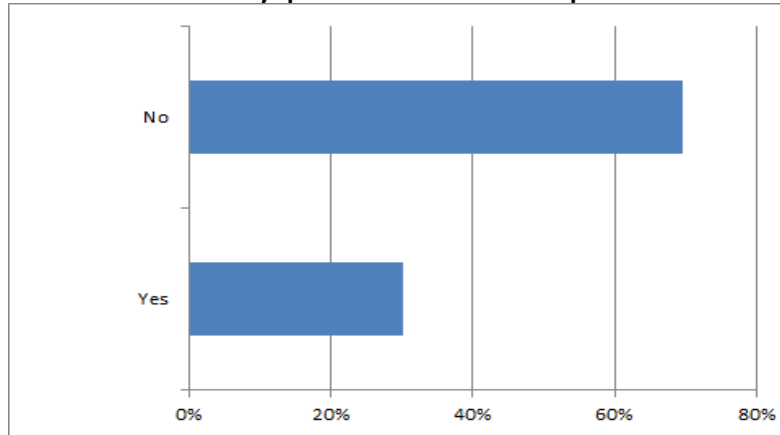


CEO Quotes:

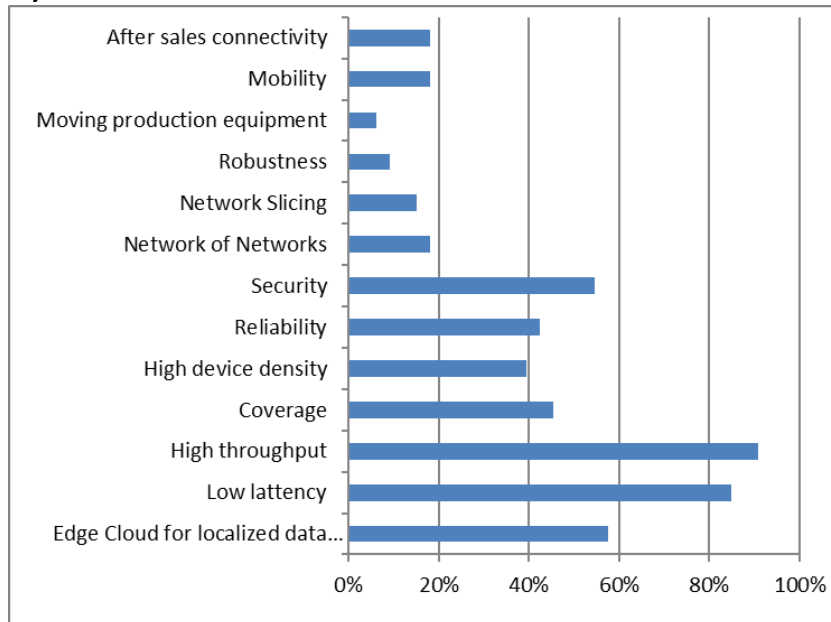
- “Moving from scheduled to preventive maintenance can save 80%”
- “We reduced maintenance costs by 40% by monitoring products post sales”
- “Removing humans from hazardous situations can save more than 20% on maintenance costs”
- “Video monitoring improved speed by 30%”
- “Use of sensors is improving energy efficiency by 20%”
- “Industry leadership is conservative and they must see clear benefits before investing”

# Connectivity & 5G

Is connectivity part of the R&D process or an afterthought?



Which capabilities of 5G are more relevant to your needs?

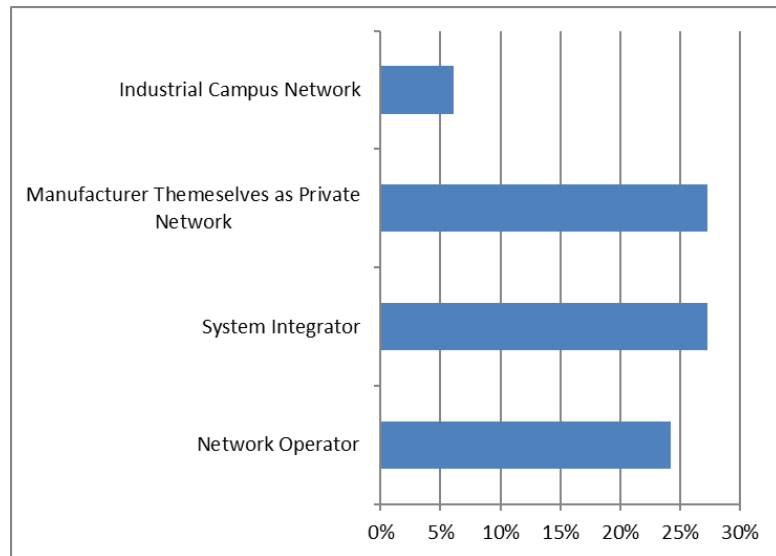


CEO Quotes:

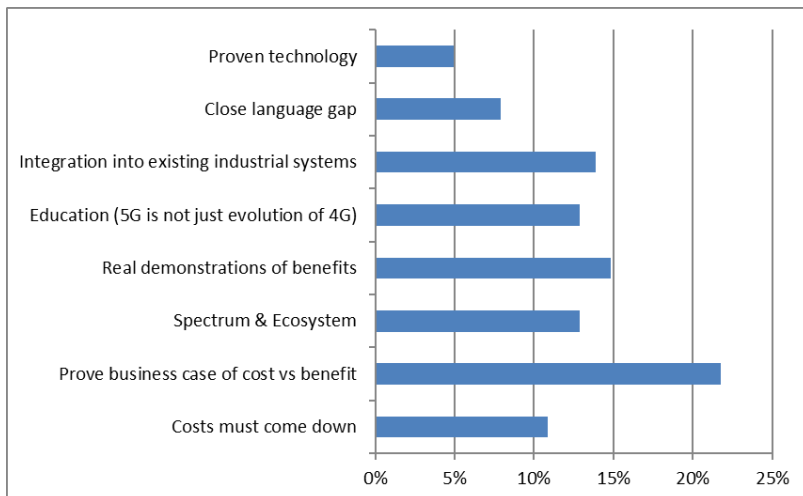
- “We don’t usually include connectivity as part of our innovation process”
- “Big number of new sensors are needed and they will generate huge data volumes”
- “Coverage is an issue in big sites. Only wireless can do it”
- “Wifi, Bluetooth, and 4G is not adequate to cover needs for coverage, throughput and latency”
- “Network slicing is interesting but we need to understand and test it”
- “Security of our data and assets is paramount and if 5G can help we need to check it”
- Network of networks is powerful for our global operations

# Network Business Models

Who is best suited to deploy 5G in Industry?



What can be done to accelerate 5G adoption?



CEO Quotes:

- “Over my dead body. The production network and data must be in my control”
- “There are 3 different worlds and languages which need to come together”
- “Private networks are an interesting option but we need spectrum, and self-configuring networks. Can not bear cost of additional connectivity teams”
- “There is a big opportunity for SIs to close the language gap and grab the opportunity”
- “Operators are too busy deploying their own networks”
- “Real-timeness is a competitive advantage”
- “We need clear ownership of risk, strong support guarantees, and agility if we need to change things in real time”

# 5G Enables new Business Models

- Machine as a service
- Robot as a service
- Factory as a service
- Availability as a service
- Hot water as a service with free electricity
- Producer cuts the supply chain and goes straight to consumer
- Extract learnings and sell innovations to other producers
- Selling digital twin capability and roadmaps
- Building management post construction delivery

# Case Study: Ocado

- Private proprietary 4G (for now)
- Deliver maximum warehouse efficiency
- Control 1000s of robots within a fraction of a second
- Most densely packed cellular network in the World
- Robots can assemble a 50 item order in 5 minutes
- Main driver of Ocado's growth
- Opportunity to sell know-how and technology



# Case Study: Smart Tourism (Bath)

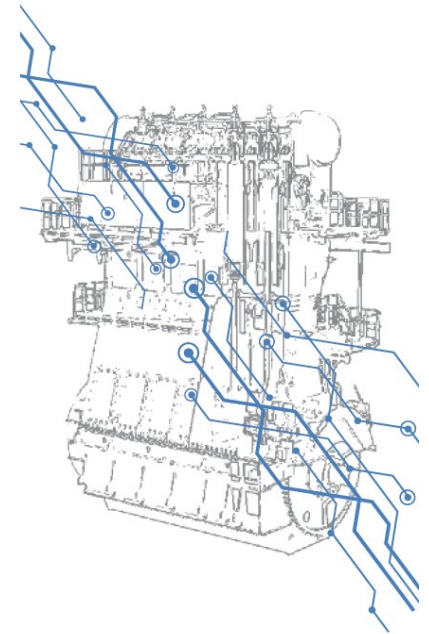
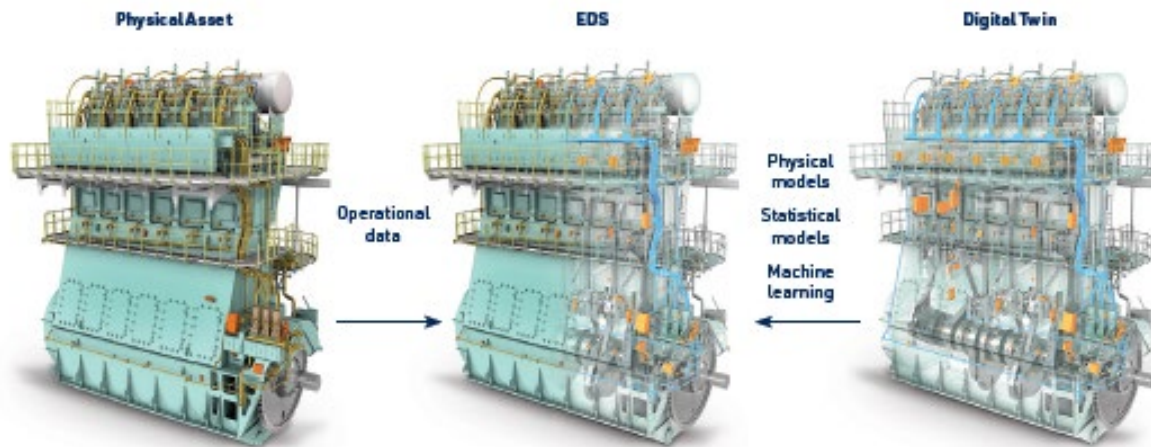
- Solution based on AR/VR
- 5G enabled group tours
- Municipality and local councils involved
- Network slicing being tested





# Case Study: Digital Twins for Ship Engines

- Dynamic monitoring of digital twin
- Thermodynamic envelop digital twin
- Can save significant maintenance costs and reduce faults and delays
- Potential for AR/VR training and remote maintenance
- 5G can enable continuous monitoring



# Case Study: Digital Twins for Real-Estate

- Digital twin can let owners explore and “live” in their property before completion
- Experience design (kitchen, furniture..) solutions to decide
- Great help during final sale handover
- Useful for insurance companies as well
- Sensorization can then be used during maintenance service

The Trilogy



The Neo

