Industrial IoT: opportunities for operators

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RESEARCH

About this report

The opportunity to apply IoT to the industrial sector is growing as enterprises in the industrial sector are developing their digital transformation strategies.[1] This report examines operators' opportunity to address the demand from the industrial sector for new networks, the potential role of 5G in addressing requirements and early operator initiatives to address industrial IoT with existing technologies prior to 5G commercialisation.

The research is based on several sources including interviews with key stakeholders and Analysys Mason's internal research on IoT and industrial automation.

KEY QUESTIONS ANSWERED IN THIS REPORT

- What is driving the demand for new networks in the industrial sector?
- What networks (and network models) are emerging to support industrial IoT before 5G is commercially available?
- How will 5G enable operators to better address the networking requirements of the industrial sector?
- What steps should operators take to address the opportunity?
- What ecosystem models and partnerships are necessary to fulfil the industrial IoT vision?

WHO SHOULD READ THIS REPORT

- Executives within operators that are exploring the industrial IoT opportunity, especially with a view to offering LTE and 5G networks (private and public) to the manufacturing sector and other relevant sectors (such as logistics, transport hubs, oil and gas and mining).
- Business and product strategy executives in vendor companies that offer or develop 5G hardware and software.
- Business and product strategy executives in vendor companies that offer or develop industrial IoT hardware and software solutions.
- Officials in open-source or standards organisations that focus on industrial IoT or networking technologies.

[1] For the purposes of this report, 'industrial' includes primary and secondary sectors (such as mining, oil and gas and manufacturing) as well as some tertiary sectors such as warehouses and transport hubs.

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Executive summary

Operators have struggled to address the requirements of the industrial IoT (IIoT) sector using cellular networks, particularly in the in-building and campus domains. Operators should work to understand the industrial sector and experiment with LTE until 5G is available.

Digital transformation and the need for new networking capabilities are increasing the awareness of 5G within the industrial sector. Operators are developing 5G to meet industrial requirements, but there are still challenges to overcome. They must develop solutions for the industrial sector that prove the case for cellular connectivity in the in-building and campus domains until new 5G capabilities become available.

KEY RECOMMENDATIONS

1. Operators should understand how digital transformation is changing the connectivity needs of the industrial sector.

2. Operators should manage customers' expectations and experiment with LTE until 5G technology for industrial IoT becomes commercially available.

3. Operators should develop early initiatives to target the industrial sector prior to the launch of 5G.

Figure 1: The three domains in the industrial IoT sector[1]

Source: Analysys Mason
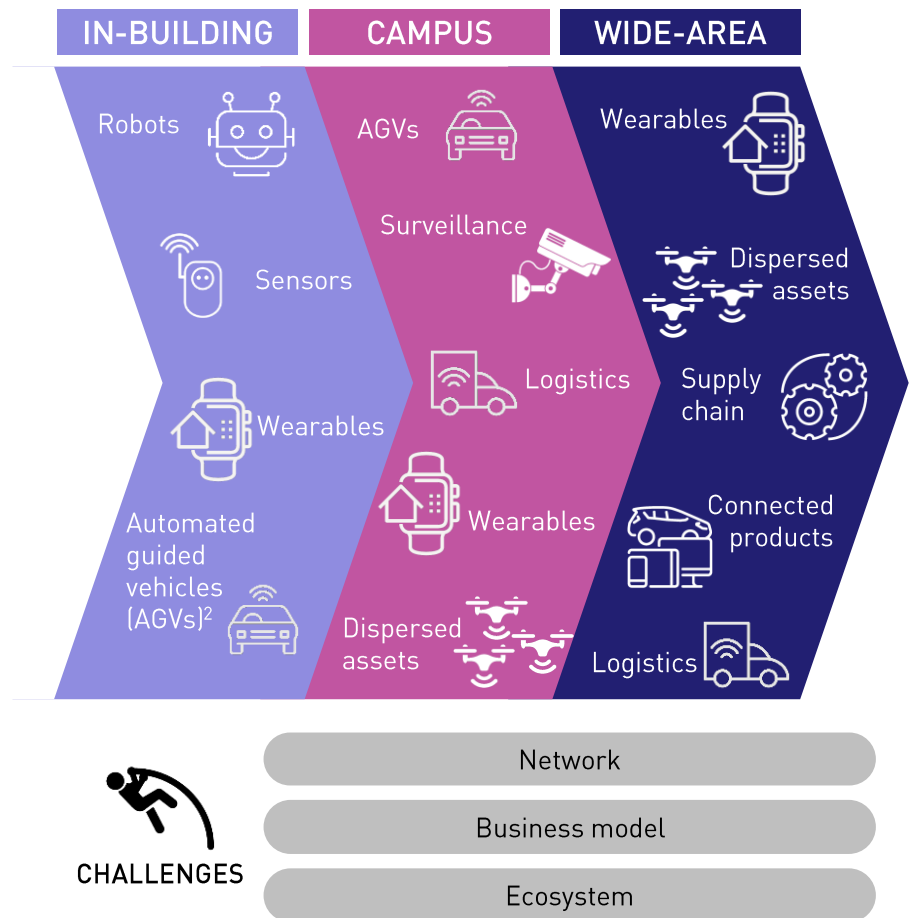
[1] Definitions of each domain, including commentary on the connectivity requirements, are on slides 33, 34 and 35.
[2] For more information, see the glossary in Figure 20.

Challenge: the industrial IoT network landscape is complex, and operators have not typically been able to address its requirements using cellular technologies

The challenges to providing network solutions to the industrial sector are multi-fold, and cellular connectivity has not featured prominently.

The industrial IoT sector contains a range of companies of various sizes that are operating in different verticals and are often at very different stages of digital transformation. The challenges to providing connectivity for operators include the following.

Heterogenous domains. The industrial IoT landscape has three heterogenous domains (in-building, campus and wide-area), each with different networking requirements. Brownfield environments also have very different requirements to greenfield environments. Operators have been unable to address the network requirements in two of the three domains (in-building and campus) due to the technical and commercial constraints of cellular connectivity.

Perceptions of cellular networks. Some enterprises in the industrial sector are dismissive of cellular networks due to problems with coverage, resilience and cost, despite previous successes in the wide-area domain.

5G. The technical and commercial viability of 5G has not been fully demonstrated because the 5G market is immature. Scepticism of cellular connectivity needs to be overcome before some enterprises will consider using 5G.

Industrial ecosystem. Operators are not visible in the IIoT ecosystem and are not typically considered as credible partners.

Figure 2: Suitability of cellular connectivity to address the requirements of the three IIoT domains
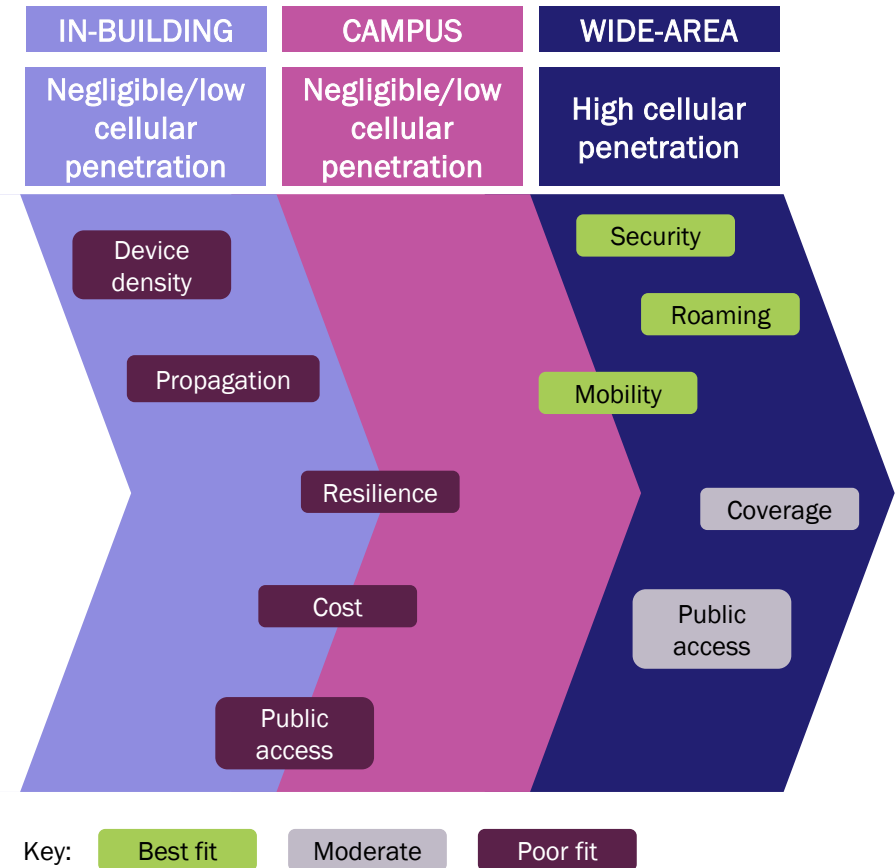
Source: Analysys Mason

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Solution: operators need to understand the revenue opportunity associated with industrial IoT, and should start with LTE to build momentum before the arrival of 5G

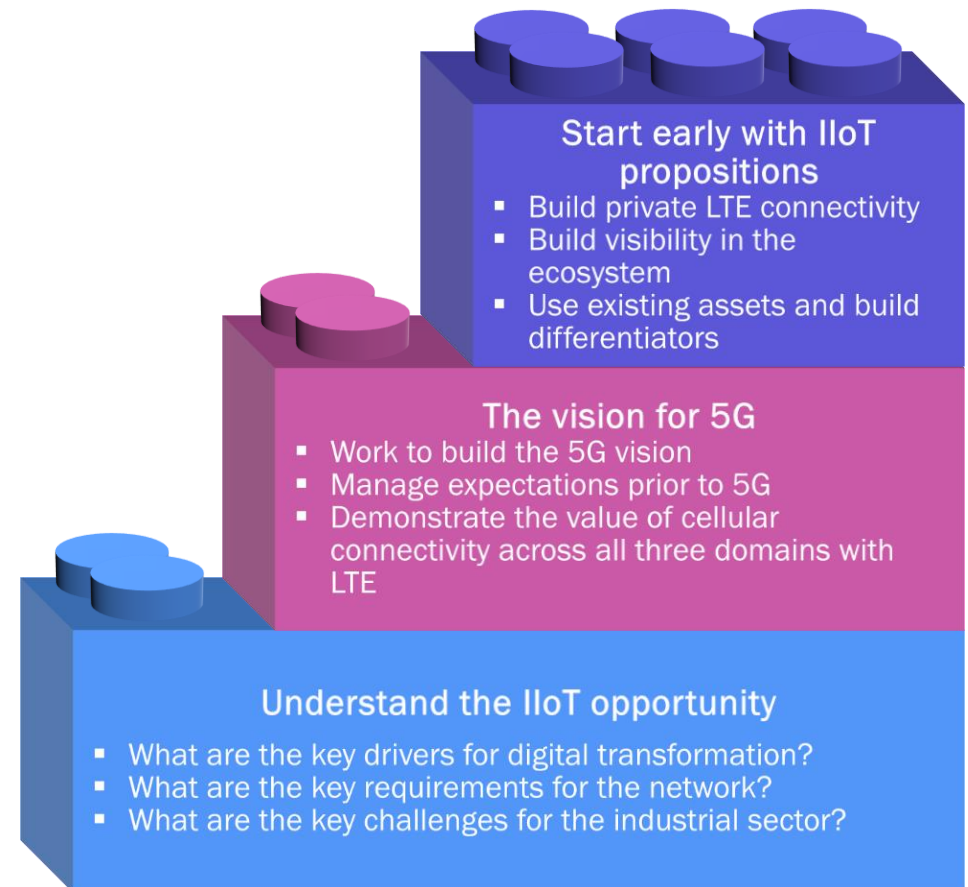## There is great potential for 5G in the industrial sector.

5G will enable operators to provide a homogenous network experience across the three domains of industrial IoT. It will be a tangible revenue opportunity for operators and could potentially cut networking costs for enterprises. In this report, we examine the following.

Demand for 5G in the industrial sector. Enterprises are undertaking digital transformation projects, thereby creating an important demand for new networks. Operators need to understand this demand in the context of the pain points for the industrial sector (such as lifecycles, cost and existing network technologies) in order to benefit from new revenue opportunities.

The vision for 5G. The 3GPP is developing 5G networks to meet the requirements of the industrial sector across its three domains. This is a hugely ambitious vision, and many components are not yet fully standardised. Operators need to use private LTE to develop the building blocks for 5G and to showcase the capabilities of cellular connectivity across all three domains.

Early operator IIoT initiatives. Operators need to build frameworks to address IIoT. Early initiatives should focus on the connectivity offering and understanding the ecosystem. Operators should also consider their existing assets that may create value and act as differentiators. Competition will be intense.

Figure 3: The building blocks for IIoT

Start early with IIoT propositions
- Build private LTE connectivity
- Build visibility in the ecosystem
- Use existing assets and build differentiators

The vision for 5G
- Work to build the 5G vision
- Manage expectations prior to 5G
- Demonstrate the value of cellular connectivity across all three domains with LTE

Understand the IIoT opportunity
- What are the key drivers for digital transformation?
- What are the key requirements for the network?
- What are the key challenges for the industrial sector?

Source: Analysys Mason

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Recommendations

1 Operators should understand how digital transformation is changing the connectivity needs of the industrial sector.

The industrial sector is undergoing a digital transformation to improve its agility and the customer experience. Key motivations for the adoption of digital technologies include increased productivity, reduced costs and increased quality, resulting in customer retention and the creation of new revenue streams. Enterprises are considering new network technologies that address all three IIoT domains and provide homogeneity and a reduced TCO.

2 Operators should manage customers' expectations and experiment with LTE until 5G technology for industrial IoT becomes commercially available.

The telecoms industry is promoting 5G as a ubiquitous networking solution that will unify the three domains of industrial IoT and support diverse requirements. However, the standard is not yet finalised and commercial products are not available. Operators need to work with existing technologies to address the sector's needs and demonstrate the capabilities of cellular connectivity in the run up to 5G roll-outs.

3 Operators should develop early initiatives to target the industrial sector prior to the launch of 5G.

Operators need to start developing initiatives to address the IIoT sector early on, and should initially focus on connectivity. Partnerships and ecosystem visibility are important factors for operators to consider; they need to build credibility in the industrial ecosystem in order to create revenue opportunities. Some operators will have existing IoT and ICT capabilities that they can exploit to create non-connectivity revenue streams and early differentiators.

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About the authors

Michele Mackenzie (Principal Analyst) is an analyst for Analysys Mason's *IoT and M2M Services* research programme, with responsibility for M2M and LPWA forecasts. She has 17 years of experience as an analyst. She produces reports and forecasts on M2M and IoT in industry sectors such as transport, healthcare and smart cities, and analyses the impact of IoT network technologies such as LPWA networks. Prior to joining Analysys Mason in February 2014, Michele was a freelance analyst with a focus on M2M and IoT technology and trends. She has written reports for Machina Research and produced research for other clients in areas such as mobile broadband and digital media.

Caroline Chappell (Research Director) co-ordinates Analysys Mason's digital transformation research and contributes to the *Digital Infrastructure Strategies* research programme. Her research focuses on service provider adoption of cloud, and the application of cloud technologies to fixed and mobile networks. She is a leading exponent of SDN and NFV and the potential that these technologies have to enhance business agility and enable new revenue opportunities for service providers. Caroline investigates key cloud and network virtualisation challenges, and helps telecoms customers to devise strategies that mitigate the disruptive effects of cloud and support a smooth transition to the era of software-controlled networks.

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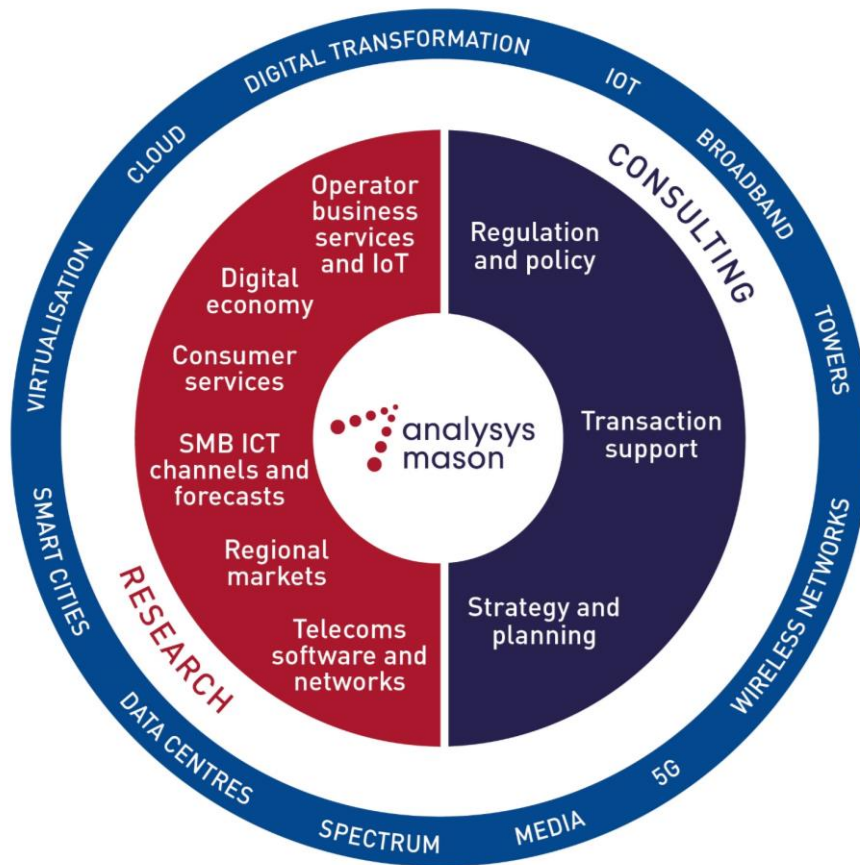
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