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Developing the smart wireless manufacturing market

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Combining cellular networks with Industrial IoT (IIoT) will make manufacturing more effective and flexible – challenging the traditional connectivity paradigm.

Cellular network capabilities are evolving from the support of massive IoT to extreme low-latency IoT applications – meeting the requirements of IIoT. Currently, most use cases on manufacturing sites are based on wired connections. However, as the evolving cellular capabilities are challenging industrial ethernet solutions, cables will in many cases become redundant, introducing opportunities for more flexible production and expanded digital operations.¹

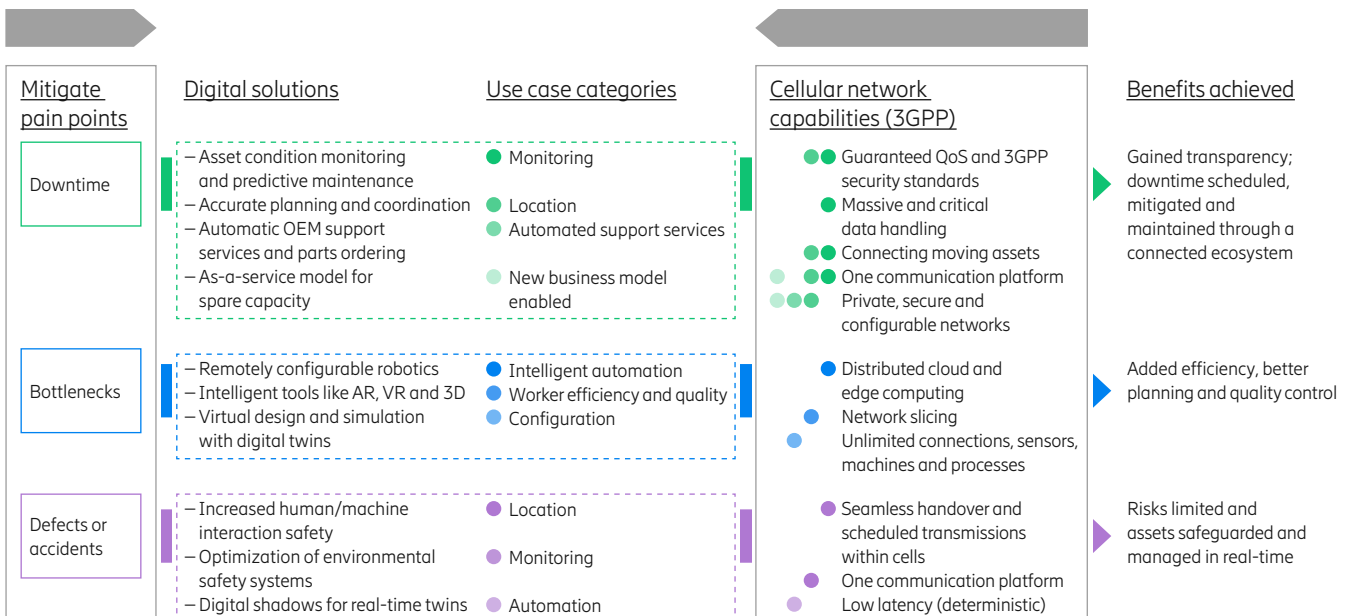
Introducing smart wireless manufacturing

Eventually the currently installed fixed network technologies will be incapable of effectively managing the use case requirements in advanced manufacturing. However, the ability of communications service and network technology providers to create a new market for smart wireless

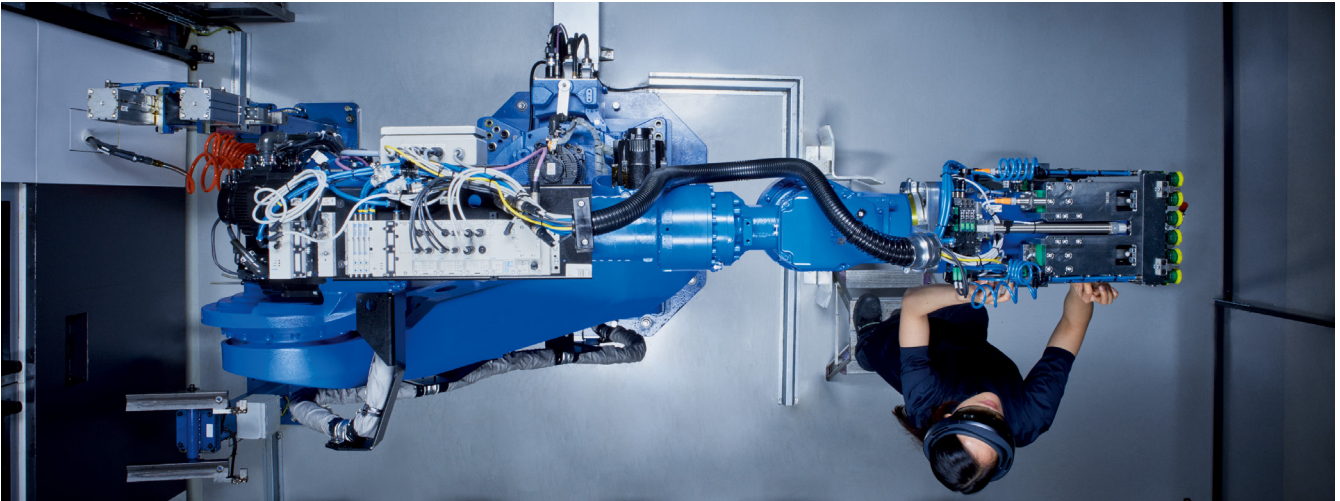
manufacturing depends on three fundamental aspects:

- 1. 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.
- 2. 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.
- 3. Build horizontal and scalable solutions**
Horizontal solutions that suit small-scale networks as well as highly diverse subsectors are needed in order to address cost, deployment and spectrum issues.

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



¹ Ericsson Mobility Report, "Realizing smart manufacturing through IoT" (June 2018)



Mapping manufacturers' needs to the value of cellular connectivity

A more holistic view of a manufacturing company's needs is required to chart and develop the market demand for smart wireless manufacturing. So far, conveying the value of cellular connectivity has focused on specific research and high-end production scenarios. One example from the metal cutting industry is real-time sensor monitoring of complex and hazardous milling processes that cannot be achieved with cables or other wireless technologies. Another use case is moving the intelligence of industrial robot controllers from physical robots to cloud-based applications, by way of a cellular network with edge computing capabilities that is deployed on-site.

The key challenge to position smart wireless manufacturing is that manufacturers do not generally identify connectivity as a pain point. The limitations of the legacy networks and how they will affect future operational ambitions are not sufficiently appreciated. However, a few digitally mature manufacturers are actively searching for wireless alternatives to support their digital transformation goals.

Linking pain points to capabilities

Manufacturers will gradually adopt supportive applications and concepts, from augmented reality to digital twins,² to address operational pain points. Cellular networks have superior capabilities in, for example, mobility, security, availability and reliability, to be able to support different manufacturing use cases. However, there is currently a disconnect between three perspectives among manufacturers: the understanding of cellular capabilities, how they enable different digital solutions, and finally how these solutions address manufacturers' actual pain points.

The figure on the previous page starts with the manufacturing perspective, illustrating the classic pain points experienced by a factory, then giving corresponding examples of digital solutions along with use case categories and the enabling cellular capabilities.³

To drive market engagement for cellular networks and their role in enabling smart wireless manufacturing, it is key to identify manufacturers' main areas of need in relation to cellular networks' strengths.

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)

From value chain to value network

The choice of connectivity will determine the quality and flexibility of a manufacturer's digital foundation, as well as the possibilities and ultimately the value it will bring to their operations. It affects which equipment and operations can be connected, how many assets and processes can run simultaneously, and how well it scales beyond one geographical site. Manufacturing companies that exploit the full value of using cellular networks' global, wide-area capabilities beyond a single manufacturing site will also explore increased internal and external collaboration, creating tighter value networks with partners and other stakeholders. With the expected growth in demand for digital twins and automated, customized, remote, and even mobile production, the need for enhanced wireless network capabilities will only increase.

The adoption of cellular networks for connectivity in the manufacturing industry is dependent on how well their enabling role in smart wireless manufacturing is described in an actual manufacturing context. For service and network technology providers to gain market traction in the industry, it is also important to build relationships with production equipment manufacturers in order to lower entry barriers into factories. Also, given the complexity of the factory environment,⁴ consultancies and system integrators will be necessary channel partners to build the smart wireless manufacturing market.

² "Digital twin" refers to the virtual representation of a physical product, service or process, used to optimize the operation and maintenance of its physical counterpart

³ A complete mapping of the solutions needed to address the pain points is substantial and complex. Accordingly, the mentioned actions and enablers are just some highlighted examples

⁴ It is not unusual to have scores of different vendors with separate IIoT platforms in an average factory environment

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