



SMALL STEPS LEAD TO GIANT LEAPS: SMART START FOR 5G MANUFACTURING

Global challenges such as reducing environmental impact and the increasing shortage of skilled personnel in all segments are impacting the industrial landscape. These are paired with ever increasing volumes and the trend for customisation of individualised products at large scale that require an agile and flexible production process.



Tools and technologies that enhance the production capabilities to work smarter, faster and safer can help to master these new circumstances. The tools can be summed up as ICT-enabled production tools. They enable the industrial metaverse which leverages the use of enhanced software technologies like Artificial Intelligence (AI), video recognition and analytics or augmented or virtual reality. Furthermore, they can be used to build digital twins, solutions for remote control of machines, robots and vehicles and automated guided vehicles (AGV) or autonomous mobile robots (AMR). In order to close the communication loop between the physical and virtual world, many of those

connections are wired today. But due to the need for flexibility in production, 5G as a wireless technology catering for high reliability comes in.

A smart start to automation is possible both in greenfield and brownfield scenarios. Especially for new sites, it is important to choose the connectivity infrastructure that makes the integration of intended use cases possible whilst planning and building their shop floor on a green field. Besides that, many manufacturers are acting in a brown field needing retrofitting instead of planning a new plant. Most factories have deployed wired connectivity, but these fixed assets make it difficult to reconfigure the facility, whether

to create individualised products or simply shift to a new product. That is where the advantages of mobility come in because the ability to adapt quickly and be flexible is vital if factories are to successfully compete in ever-demanding modern markets.

5G private networks: the enabler

This is a task that can be solved and 5G private networks can be the key enabler. First step to automation is the ability to collect data, process it and make decisions. Only then will manufacturers have the insight into operational performance to automate

processes and drive greater efficiency across the shop floor. A 5G private network refers to a dedicated cellular network that utilizes 5G technology to provide wireless communication within a limited geographical area, typically designed, owned, and operated by a single organisation or entity. Manufacturers are increasingly seeing the value of a private network to make their business more agile because they can leverage the network capabilities and tailor them towards their specific needs. This is achieved by introducing highspeed connectivity, predictable low latency, and strong performance in high device density environments. This combination of high data volume and low latency can create the business edge needed to optimise operations. A private network also offers the needed level of security. End-to-end security is built-in from core to edge down to the device level, ensuring that data is more secure and inaccessible to outside parties.

Choosing the right use cases – Small steps...

Before heading to space with a 5G-connected factory, the project owners must decide, which is the most relevant use case for them. We have identified five types of use cases, that will enable manufacturers to conduct their operations more efficiently:



Autonomous mobile robots (AMR) for real-time production chain automation.



Collaborative robots for more efficient operations.



Augmented Reality (AR) for efficient quality inspections and remote experts.



Asset condition monitoring for increased uptime.



Digital twins for optimised operations.

...leading to giant leaps

The question, which use case has the largest impact with the simplest implementation can only be answered on a very individual basis. Various factors like the degree of digitisation in the company shall be considered. It helps if those responsible for production are involved in the process at an early stage. Otherwise, the manufacturer runs the risk of developing a prototype for a smart application that goes far beyond the actual needs and capabilities. Another tip on the way to a productive solution is to leave the R&D lab as early as possible and validate the solution extensively on the shop floor. This is the only place where possible challenges - such as the interplay with established production processes or certain local environmental factors - can be seen unfiltered. This paves the way for using the solution in commercial operations.

Sometimes the key to success is not a single use case, but a combination of different approaches. To find this out, tools such as the Smart Manufacturing Value Calculator from Ericsson help to calculate the potential ROI of the use cases mentioned above depending on relevant company key parameters. Finally, it is important not only to focus on the here and now – but to look into the future: What kind of use cases may be relevant in five years? To answer this, consultancies can support additionally.

With this advice in mind the implementation of a use case for smart factory will perhaps not be as easy a walk on the moon for an astronaut, but at least become a manageable task. Building or retrofitting smart manufacturing is crucial for economic success in the future. Relying on a 5G private network will enable the manufacturers to implement the right use case for their company and prepare them for many future competitions.



Test before investing:

Experience 5G at Fraunhofer Innovation Platform for Advanced Manufacturing at the University of Twente (FIP-AM@UT) or at the 5G-Industry Campus Europe

A lot of manufacturers are ready for takeoff – but don't have a rocket yet. They perhaps want to head to the **Ericsson Private 5G area at Fraunhofer Innovation Platform for Advanced Manufacturing at the University of Twente located at 701 Hengelosestraat, Enschede** where companies can test new technologies before having to invest in the infrastructure and without impacting their day-to-day production processes. Potential use cases should ideally answer questions about the suitability of a local 5G network for companies and their applications around connectivity and mobility.

Companies may also use the capabilities of the **5G-Industry Campus Europe** in Aachen, Germany. It is the first site in Europe with a comprehensive 5G network to explore and test new applications for 5G in production environments under real-world conditions. With an outdoor network of around 1 km² and a shop floor of 8000 m², the network covers the area of the RWTH Aachen Campus Melaten and the entire machine hall of the Fraunhofer IPT. ■

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