

5G business value — a use case for Tharsus



A Digital Catapult and Ericsson Industrial 5G Accelerator use case report

Industrial adoption of 5G

Digital Catapult, Ericsson, and Tharsus present this use case demonstrating the technical and commercial benefits of 5G for industry.

It shows how Tharsus could gain an advantage over mainstream competition in the UK by working with those deploying 5G globally to solve industry challenges.

The Digital Catapult Ericsson Industrial 5G Accelerator programme

The Industrial 5G Accelerator programme is a collaboration between 5G technology leader Ericsson and Digital Catapult. The programme is designed to further the accelerated adoption of 5G by UK industry.

As a key technology set to underpin the global transition to Industry 4.0 and drive global economic growth, the Industrial 5G Accelerator is a bespoke, manufacturing-focused programme designed to accelerate the adoption of 5G within UK industries and help companies understand how 5G can transform products and services.

In 2020, Seagate and Tharsus joined as programme partners to co-develop individual use cases that evidence 5G's potential, with the aim of unlocking business efficiencies. This use case explores and presents the learnings and outcomes for partner organisation Tharsus.

5G can address a wide range of use cases, from onsite processes to connected goods. Experimentation can help reduce industries' concerns around cellular technologies for in-factory connectivity, including perceived barriers such as cost, interoperability with existing networks and security considerations. It will also enable new business models and help UK supply chains deliver new services for their customers such as improved health and safety applications, predictive maintenance and remote asset monitoring.

The partnership creates a unique opportunity for UK industry, combining Digital Catapult's 5G expertise and work in the manufacturing sector as the UK's leading advanced digital technology innovation centre with Ericsson, one of the world's leading providers of information and communications technology.

The programme focuses on 5G for manufacturing, producing a series of real-life use cases to prove the potential of 5G and help to build the case for rapid 5G adoption. The aim is to help drive new demand by enabling collaboration and innovation based on 5G, while engaging with industry early adopters.

The Digital Catapult Ericsson Industrial 5G Accelerator programme brings together:

- Challenge owners in manufacturing industry
- 5G vendors, such as Ericsson
- 5G solutions suppliers/developers

There are a series of phases, starting with the definition and selection of use cases to be supported, developed and showcased. This collaborative process leads into prototype development, which will secure internal buy-in from each partner.

Both use case partners worked alongside Ericsson and Digital Catapult to identify smart manufacturing opportunities focusing on improvements for productivity, flexibility and connectivity in an industrial setting. 5G-powered

The smart manufacturing market is set to grow to US\$1 trillion according to a recent report from [ABI Research](#), with 4.3 billion wireless connections predicted by 2030. Over a 5-year period, a U.K.-based warehouse operator that adopts private cellular enabled Industry 4.0 technologies could realize a 13.0% increase in gross profit margin and an operational cost saving of \$220.9 million.

technologies such as robotics, augmented reality (AR), condition-based monitoring, asset tracking and predictive maintenance will be used throughout the individual use cases.

Through this programme, Digital Catapult and Ericsson have developed a business model to help Tharsus expedite efforts to leverage 5G capabilities for its artificial intelligence (AI) training.

Jeremy Silver, CEO, Digital Catapult, said: “We want to ensure that the best aspects of technology adoption continue post-pandemic and drive new value into our economy. Collaboration remains fundamental to successfully achieving this, and with the addition of these three leading industrial businesses, the Industrial 5G Accelerator is in prime position to capitalise on the best of UK manufacturing skills and innovation.

The road to embedding 5G fully into an industrial environment might be a long one, but this project is a big leap forward in terms of demonstrating the transformative capability of 5G for UK industry.”

The company: Tharsus Group

Tharsus Group originated as a small sheet metal manufacturer in 1964. The shift to developing and manufacturing advanced machines and robots started around 10 years ago, resulting in strategic machines designed to help companies such as BT and Ocado solve tough automation challenges and create new business opportunities.

Dave Swan, CTO, Tharsus, says: “As an organisation we are driven by solving real world problems with the most appropriate technology rather than simply finding potential applications for technology. To be effective at this we need to have a broad understanding of what is possible and a strong collaborative network with deep technical expertise to work with. We are excited to be involved in this Industrial 5G

Accelerator programme because it allows us to understand and characterise 5G in a supported environment and with the recognised leaders in the sector. We can experiment and test with it so we become experienced in what makes a good or a poor potential use case for 5G. This will allow to be confident that when a great use case project presents, we and our widened network will deliver”



The challenge: transmitting and analyzing large volumes of video data in real time

Within a modern industrial facility, Tharsus mobile robots can cover a significant area. This makes being able to reliably transfer their video data to a centralized traffic server a challenge — especially as the volume of content captured by the cameras on a moving robot is huge.

Both object detection technology and AI reside on the server. Feeding the AI and machine learning (ML) algorithms with massive data helps them to train and learn to recognize more objects.

The faster and more accurately the video frames can be transferred, the more AI can learn, which will ultimately improve the quality of object detection and operational efficiency within a manufacturing or similar environment.

5G is the technology that best meets this requirement, with extremely low latency, high reliability and security, and high capacity for different applications over a larger area of coverage.



The accelerator programme in action

As advanced digital technology specialists and experts in future networks, the Digital Catapult team recognized the opportunities that 5G would bring Tharsus, and so it initiated its introduction to the Digital Catapult Ericsson Industrial 5G Accelerator programme as well as the creation of a business use case for 5G.

In addition to working collaboratively with Tharsus and Ericsson to determine a viable 5G solution through the program, Digital Catapult created a robot model that actively demonstrated the power and potential of 5G as a means of feeding large volumes of data into AI/ML technology.

The opportunity for Tharsus:

- to test the capabilities of 5G without having to invest and pay upfront
- to be part of a showcase alongside significant industry players
- to be one of the early adopters of industrial 5G and improve operational efficiency
- to build internal expertise and enhance its AI/ML capabilities
- to showcase the evolving capabilities of 5G provided by Digital Catapult, Ericsson, and their partners

Additional benefits for Tharsus:

- obtaining an in-depth understanding and first-hand experience of 5G capabilities, including its reliability, security, and latency
- being able to determine how much better and faster their central AI/ML algorithm would perform when fed with object recognition using 5G connectivity
- experiencing first-hand the performance improvements of 5G over Wi-Fi, such as a reduction in the number of dropped frames and an increase in the quality of object recognition
- access to more data to learn from, with multiple cameras all capturing different objects while moving
- the opportunity to apply this solution to other use cases within the company's production line

Value for business

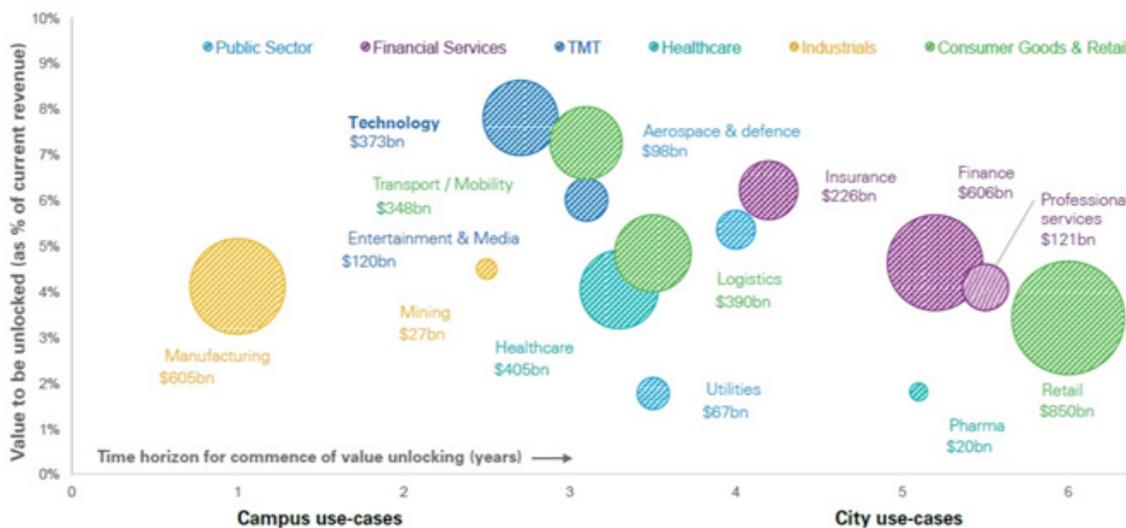
The Unlocking the Value of Industry 4.0 research study published by the ABI Research Group forecasts a significant increase in connections for factories and warehouses. 5G will eventually support layer 1–2 performance, such as scheduling, latency, and jitter. It will also enable time-critical robotic motion control, with a 2ms (millisecond) cycle time and a low error rate.

Machine vision video and simultaneous location and mapping (SLAM) processing will be outsourced to the Cloud, with the bandwidth and latency

provided by 5G enabling real-time navigation and route optimization capabilities for autonomous mobile robots.

KPMG's recent MWC 2019: Unlocking the benefits of 5G study predicts that the greatest benefits of 5G are likely to be seen in the enterprise market. The study predicts that over the next seven years, an estimated GBP 3.35 trillion in value will be unlocked through use cases across the government, finance, healthcare, and manufacturing sectors.

KPMG's DNA of 5G enterprise value



5G investments are also expected to impact the following areas:

- machine-enhanced decision making, minimizing human error and improving the quality of decision-making
- data richness, unleashing new business models through vast amounts of additional data from sensors
- visualisation, providing operations personnel or customers with deep knowledge and experience overlays
- agile automation, providing automation with minimal trade-off in terms of customization, flexibility and quality
- intelligent efficiency, bringing ubiquitous access to data and computer power while reducing friction and waste and enhancing quality
- trusted connection, providing critical services and products with security data and network uptime

Other applications of 5G

5G will also have a crucial role in driving and unleashing AI/ML as well as internet of things (IoT) capabilities by serving as a platform for fast transfer of the massive amounts of data that these technologies so desperately require.

For IoT to fulfill its potential as the key generator of massive data — and for AI to absorb, analyse, and digest that data — a third technology in the middle, 5G, is needed to transfer that data across.

The fusion of 5G, AI and IoT defines the intelligent connectivity that will drive and enhance efficiency in Industry 4.0 and manufacturing.

Maximizing the 5G advantage

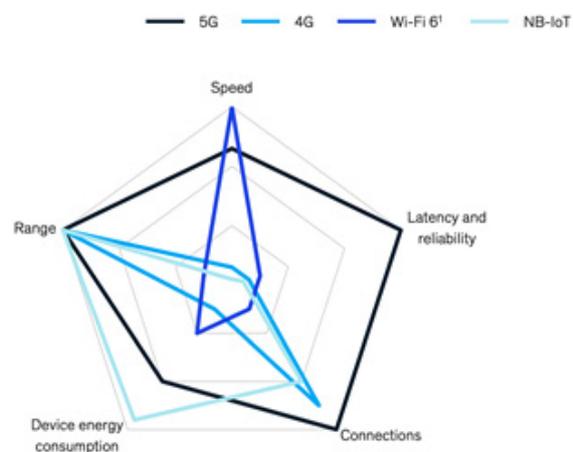
According to McKinsey & Company's The 5G era: New horizons for advanced electronics and industrial companies, 5G will result in:

- 100 times faster speeds than LTE, with 1–10 gigabits per second
- 100-fold increase in the number of supported devices, reaching 1 million devices per km sq
- improvement from 20ms to <1ms
- 99.999 percent reliability
- 90 percent reduction in power consumption

Manufacturers wanting to gain a competitive advantage using 5G need to create a list of potential B2B use cases, noting whether they are distinctive or designed to satisfy new standards.

McKinsey suggests that they should then prioritize distinctive use cases with the highest value — additional use cases can be rolled out after 5G coverage is widely available.

5G offers many advantages over other wireless technologies



Market leaders have already started their 5G B2B partnerships; for example, Ericsson has signed an agreement to implement 5G technology in Audi Production Lab, while Volkswagen is working with AWS to build an industrial cloud for IoT devices.

In this environment, industrial partnerships that create internal 5G teams to assess potential partners and their offerings may have an advantage.

Future prospects

5G technology will play a crucial role in creating the factory of the future, where applications in which <1ms latency is essential will be found. Combined with the almost limitless processing and data storage available in the Cloud, 5G communications will take robots in next-generation manufacturing environments way beyond current capabilities. The exchange of large amounts of information between robots and factory workforces will revolutionize the factory floor, and capability, safety, and performance will be further

enhanced by other 5G-enabled devices, such as wearables and technologies like augmented reality (AR).

This business use case was created by Digital Catapult in collaboration with Tharsus and Ericsson.

Digital Catapult is the UK's leading advanced digital technology innovation center, driving early adoption of technologies to make UK businesses more competitive and productive and grow the country's economy.

Digital Catapult provides physical and digital facilities for experimentation and testing that would otherwise not be accessible for smaller companies.

As well as breaking down barriers to technology adoption for start-ups and scaleups, our work de-risks innovation for large enterprises and uncovers new commercial applications in immersion, future networks, and artificial intelligence technologies.

www.digicatapult.org.uk

Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans Networks, Digital Services, Managed Services, and Emerging Business and is designed to help our customers go digital, increase efficiency, and find new revenue streams. Ericsson's investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. The Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York.