

The 4 major challenges facing manufacturers

Now is the best of times, or the worst of times – depending on which manufacturer you ask. Numerous sub-sectors are poised to thrive again. Others were in decline before COVID-19 and the disruption to the supply chain was so sudden that by the time they had adapted, demand had moved elsewhere. Some manufacturing firms are responding by relocating facilities, while others are looking to bring back jobs closer to their headquarters.

Manufacturing makes up 15% of the EU's GDP, [according to World Bank numbers](#), significantly less than China's 27% but higher than the 11% seen in the US. Our own research found that globally, 62% of surveyed manufacturers reported declines in revenue during the COVID-19 crisis.

Yet Industry 4.0, the Industrial Internet of Things and smart factories are a reality, or at least in sight. Our same research showed 72% of manufacturers stated that the ability to deploy new technologies has become more important since the outbreak began. This could mean investing in new applications and the network technologies that support these applications in delivering better performance and outcomes.

For manufacturers, unlike some sectors, a prominent investment focus will be the digital technology that transforms their operational technology (OT) capabilities. In order for critical OT applications to deliver better outcomes, the underlying infrastructure must be able to prioritise them.

To achieve this, and to put in place the advanced networking that can also provide better routing and strong security, the IT and OT functions – which have historically operated in parallel – need to work much more closely.

While OT transformation is far from easy, given substantial factories and long supply chains, the effort is worth it, according to Gartner. The analyst house found that [36% of manufacturing enterprises realise above-average business value from IT spending in digitalisation](#).

By transforming OT – using predictive maintenance, automation, remote operations and digital twin applications – manufacturers can overcome the following four challenges:

1. Maintain asset availability and utilisation – predictive maintenance

Manufacturers are successful when they maintain high availability and effective utilisation of their tools and machines, whether it's equipment to distil oil into different types of fuels, or the robots used to assemble cars.

Regardless of where production is happening, the KPIs of availability, performance and quality within production – known as overall equipment effectiveness or OEE – have never been more important.

This is where predictive maintenance could play an important role. Through the use of machine data and analytics, manufacturers can gain an understanding of when machines and individual components might fail or will need to be serviced. With this information, maintenance teams (either in-house or from OEMs) can make suitable repairs or replace components before they cause serious problems. This will mitigate the risk of downtime and costly shutdowns.

2. Improve operational efficiency – automation

Key to OEE is operational efficiency, a goal that will be facilitated through the use of automation and systems integration. The widespread use of automation in manufacturing – more than in other sectors – helps to reduce the time and effort that goes towards manual operations, along with the potential for errors.

Robots have been a fixed staple on automotive production lines for decades, but there are also other, less obvious areas in which automation plays a role. For instance, robots are used for material handling and inspection, as well as automated defect detection with machine vision. They even possess the ability to automatically adjust the configuration of individual components in manufacturing machinery, such as voltage, RPM, or fan speed, to help increase machine lifespan.

While predictive maintenance and automation have clear benefits, implementing them is another matter. The potential of these technologies is sometimes limited by a lack of integration across different OT systems or by legacy network infrastructure that's not flexible enough to meet the specific needs and requirements of industrial applications.

For example, programmable logic controllers (PLC), human-machine interfaces (HMI) and supervisory

control and data acquisitions (SCADA), which are all usually connected, are often not integrated with manufacturing execution systems (MES), nor warehouse management systems (WMS). As a result, humans have to manually manage information between systems, which is not only time-consuming (and therefore expensive) but at times could be error-prone due to manual data entry. For predictive maintenance and automation to succeed, the people, processes and systems – including the data – need to be joined up, and underpinned by agile infrastructure that makes possible the use of advanced analytics, ML or AI applications.

3. Drive manufacturing safety – remote operations

Manufacturing environments can be hazardous places but improvements are achievable. Digital technology helps.

Remote operations provide manufacturers with the ability to control and monitor factory floors or production lines while limiting the number of people physically involved. Whether it's a dark factory where machinery works autonomously 24/7 or more traditional environments, where machines and people coexist, the goal is to increase efficiencies without sacrificing safety. One way technology can help is to automatically alert maintenance and/or safety teams to issues, so they can immediately take action.

Other examples of remote operations include a manufacturing facility where volatile chemicals are in use. Some chemicals may react when in close proximity to each other – potentially causing fires or explosions – so should always be stored at a suitable distance. Sensors can be fixed to chemical containers that will send alerts to operations and safety staff when containers are too close to each other or stored in the wrong place.

Then there is keeping employees safe in the age of COVID-19. Social distancing may need to be observed in factories, so manufacturers can deploy sensors (for contact tracing) or cameras (for thermal or machine vision) to alert management if employees get too close to each other. Worker health, such as body temperature, could also be monitored using infra-red cameras or body sensors.

Another potential safety hazard are the robotic vehicles present in many modern manufacturing facilities for transporting items around the factory floor. Because they represent a risk to employees in the vicinity, robotic

vehicles (including AGVs and forklifts) should be able to recognise objects, and people, to avoid collisions that could damage other equipment, or cause injury or even death.

Manufacturers must also remain vigilant about cybersecurity. If a breach were to take place that interfered with the safe operation of machinery, it could put production at risk. With the right safeguards in place, manufacturers can identify network intrusions and take action to protect their employees and operations before it's too late. This might mean shutting down a machine or isolating equipment from the operations network while the issue is addressed and mitigated.

4. Tap into new revenue streams – digital twin

With the pressures they are under, European manufacturers are looking at ways to add value to their products. Often, this is achieved by providing services tied to the end product, such as remote maintenance or ways for businesses or consumers to make better use of the product in question.

These types of services can be enabled by digital twins, or virtual versions of physical assets that can be used to simulate the impact of changes to their operation, acquire information and even test new functionality.

In car design, digital twin technology enables designers [to create a virtual version of the vehicle and run realistic simulations to improve the car's software, mechanics, electronics and physical behaviour](#). Designers validate each step of development to identify problems and possible failures before real parts are produced. In motorsport, racing car designers use a similar approach to simulate aerodynamic performance before building a physical model for wind tunnel testing.

[Electric cars can be paired with digital twins](#), with information sent to and from IoT sensors on the vehicle to keep track of the car's working condition. This means the manufacturer could detect problems early on to avoid them developing into issues that could lead to costly repairs or recalls.

In the world of aviation, [jet engine manufacturers use operational data combined with a digital twin to enable 'engine as a service'](#), where airlines are charged for maintenance of engines fitted to their aircraft based on hours flown.

The role of advanced networking

For manufacturers to address these challenges with these approaches, a secure and application-aware network infrastructure is vital. Such infrastructure enables the IT and OT applications to leverage capabilities that directly impact their performance on both the business, and the operations side. Capabilities like Quality of Service (QoS), automated – and secure – traffic prioritisation, edge analytics, strong reliability and low latency, are enabling Industry 4.0 transformation alongside system and process integration efforts.

When it comes to making architecture decisions to support advanced manufacturing and industry 4.0 use cases, OT and IT teams put forward their respective domain expertise and collaborate with partners to ensure that the infrastructure underpins the business and industrial applications alike. In other words, they make sure the infrastructure provides these applications with the resources they individually need to deliver better performance, driving better outcomes.

Verizon's expertise in networks, security, change management, cloud, IT and OT application enablement and industrial architectures puts us in the right position to help you bring IT/OT convergence efforts to fruition.

Find out more about Verizon's manufacturing and automotive solutions [here](#).