ICT GROUP

WHITEPAPER

# Increasing **agility** and **flexibility** through the adoption of new **technologies**

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# 1. Introduction

Before the crisis, Industry 4.0 was already a very interesting, future-orientated topic for many manufacturers. But as COVID-19 spread around the world, the ability to have real-time information on everything at your fingertips – from suppliers to the factory floor – enabled teams to work at the same speed, if not faster, and thus Industry 4.0 turned into a reality[1].

A McKinsey study found that companies that had already scaled up digital technologies were in a better position to respond to the crisis. For companies that were still in the process of scaling up, the crisis is a reality check and a wake-up call for companies that have not yet started working on their smart manufacturing transition[2]. The pandemic appears to be the driver of the digital transformation of companies. In the coming year, companies will reflect on restoring their operations and building the strength required to be able cope with future crises. In this respect, Industry 4.0 transformations will be the most realistic choice for most companies[3].

The pandemic has changed the rules of the digital game. The crisis is forcing companies to rethink the direction of their operational strategies, changing both the business issues they want to address and the Industry 4.0 technologies they will use to do so. It does therefore not come as a surprise that agility and flexibility in operations are emerging as top strategic priorities, in addition to increasing productivity and minimising costs, which was always the primary objective for most companies before the crisis.

[1] *KMPG: https://assets.kpmg/content/dam/kpmg/xx/pdf/2020/11/global-manufacturing-outlook-2020-covid-19-special-edition.pdf*

[2] *McKinsey: https://www.mckinsey.com/business-functions/operations/our-insights/covid-19-an-inflection-point-for-industry-40*

[3] *McKinsey: https://www.mckinsey.com/business-functions/operations/our-insights/industry-40-reimagining-manufacturing-operations-after-covid-19*

# 2. Key elements for being agile and flexible

Labour plays a very important role in creating value, but the pandemic has made it clear how quickly production can come to a complete halt. Manufacturers lost most of their on-site staff, causing them to face forced work stoppages. However, not all production workers on the front line can do their job in the relative safety of their home. That's the reason why manufacturers have had to find innovative ways to work with their on-site staff and end customers during the pandemic[4].

To make the transition to the "next normal", in which the need for more safety and less human contact dominate the digitisation of factories, managers in a factory see the following points of attention:

- Capacity management
- Digital connectivity

## 2.1. Capacity management

One of the major issues exposed by the pandemic was the availability of staff. How can factories use the available employees as optimally as possible without reducing productivity? And how can planning be adjusted in real time?

### Remote working

As factory managers are reconfiguring their operations in order to ensure the safety of their employees and to respond to changes in the wider value chain, companies need to maintain their production performance. A year after the first measures, remote working has become the (new) normal for many organisations. This way of working allows performance in the factory to be managed effectively and thus productivity can be stimulated remotely.

We will be seeing a rapid introduction of remote diagnostic, management, and collaboration tools. This will result in the emergence of an off-site team of specialists. They will be remotely and continuously connected online from their personal devices by means of secure remote access software in order to guide and support the reduced "physical strength" of on-site staff. Augmented Reality allows remote staff to get a virtual shop floor so they can help the frontline teams to solve problems or even participate in walks to support line supervisors and operators[5].

For example, using sensors will allow managers to check from a distance how often critical parts of the equipment are cleaned, adjusted or checked. This will allow managers and team leaders to issue early warnings of potential problems before they weaken operational performance.

[4] *McKinsey: https://www.mckinsey.com/business-functions/operations/our-insights/managing-a-manufacturing-plant-through-the-coronavirus-crisis*

[5] *McKinsey: https://www.mckinsey.com/business-functions/operations/our-insights/managing-a-manufacturing-plant-through-the-coronavirus-crisis?cid=other-eml-alt-mip-mck&hlkid=5996e7d150bf46a0896ba9dc9a2edc29&hctky=1529367&hdpid=f4ca96ff-0508-4775-90a7-cca5d580dbbe*

With real-time data, AI-based insights, and a range of communication and collaboration tools, the virtual shift will help digitalise and scale up much-needed expertise across the organisation. In addition, it will enable on-site staff to be more target-oriented, efficient, and ultimately become significantly more productive[6].

### Smart deployment of staff

Advanced analytical algorithms can optimise the utilisation of available employees, thus maximising productivity and service levels by taking into account variables such as individual skills, available equipment, production targets and shipping dates – all with minimal supervisor guidance.
The system optimises staffing on the factory floor to improve utilisation and productivity by using the individual skills and abilities of the workers in order to assign them to specific production process stations. This will maximise the profitability of factories and increase the quality of their output.

### Increasing the knowledge of staff

The transition to the new normal in manufacturing companies requires both leaders and frontline teams to develop new skills. A more advanced option of the afore-mentioned algorithm will help in complementing the required skills of employees by filling gaps with AI. Instead of getting employees to follow long training sessions, some companies have introduced advanced, IoT-based assistive technologies to guide operators through complex production processes. By tracking the output, quality and production speed of the operators, managers can identify shortages of specific skills and move operators to machines where they can follow on-the-job training via multimedia screens[7].

## 2.2. Digital connectivity

As we have seen above, companies are going to focus on technologies to build the necessary strength to cope with future crises. Digital connectivity will be one of the dominant trends in the manufacturing industry and, according to Deloitte, the Digital Twin offers the necessary levels of resilience and flexibility[8].

### Digital Twin

Production processes are being organised in a smarter way, for example due to the emergence of advanced software for virtual prototyping and simulations that run parallel to the physical construction (Digital Twin).
This will allow testing and the preparation of a new machine design (Virtual Commissioning) to be started at an earlier stage. This is important now that both the time-to-market and the product life cycles are becoming shorter and shorter.

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[6] *Industryweek: https://www.industryweek.com/technology-and-iiot/article/21129334/what-will-manufacturings-new-normal-be-after-covid19*
[7] *McKinsey: https://www.mckinsey.com/business-functions/operations/our-insights/labor-intensive-factories-analytics-intensive-productivity?cid=other-eml-dre-mip-mck&hlkid=a774e1a8976d4a078406df70a8406fd5&hctky=11860996&hdpid=4439d486-774e-4fbb-8aed-02861baec336*
[8] *Deloitte: https://www2.deloitte.com/content/dam/Deloitte/us/Documents/energy-resources/us-2021-manufacturing-industry-outlook.pdf*

Deloitte expects that Digital Twins will be widely deployed in the coming years, in various sectors and for multiple use cases. Digital Twins, combined with machine learning and advanced network connectivity such as 5G, will increasingly track, monitor, route and optimise the flow of goods for logistics, manufacturing and supply chains, both in factories and around the world. Real-time insight into locations and conditions (temperature, humidity, etc.) will become self-evident. And the "control towers" will be able to take corrective action by sending stock transfers, adjusting process steps to an assembly line or giving containers a different route, without any form of human intervention[9].

Digital Twins offer a wide range of benefits, including higher productivity, by reducing development time for new products and preventing costly defects. Digital Twins offer the flexibility and agility that manufacturers need in a post COVID-19 world[10].
Deloitte predicts that as the Digital Twins trend gains momentum in the coming years, more and more organisations will explore the possibilities of using digital twins[11].

### Model-based testing

In the digital age in which we find ourselves, technology must always change course quickly to keep pace with today's developments and in order never to become obsolete. The complexity of software-intensive systems is increasing. Model Driven Design technologies and code generation have the potential to control complexity and increase the efficiency of software development.

Model Based Testing (MBT) is a method to design software faster, cheaper and more efficiently. Using the system requirements as a point of departure, an abstract model is created of what the system or a part of the system should do. Tools then automatically generate the code for the test (MBT). The result: more innovative products that can be brought to market faster.

MBT has several advantages. Because the test scripts are generated automatically, a much more extensive test set can be created than if all tests are written manually. In addition, the chance of errors is greater if a code is written manually. A typo is easily made, but can have major consequences.

In addition, working with models makes the work transparent and understandable for everyone. The simulation gives an idea of the end product. As a result, everyone (client, domain expert, tester or designer) looks at the same model and errors can be discovered at an early stage. The model serves as a common language for all concerned in order to improve comprehensibility and reduce the complexity of the system.

[9] *Deloitte: https://www2.deloitte.com/xe/en/insights/focus/tech-trends/2020/digital-twin-applications-bridging-the-physical-and-digital.html*
[10] *KPMG: https://assets.kpmg/content/dam/kpmg/xx/pdf/2020/11/global-manufacturing-outlook-2020-covid-19-special-edition.pdf*
[11] *Deloitte: https://www2.deloitte.com/xe/en/insights/focus/tech-trends/2020/digital-twin-applications-bridging-the-physical-and-digital.html*

## 3. Obstacles in the adoption of new technologies

The adoption of new technologies does not come without obstacles. Organisations have to overcome a large number of organisational and technological hurdles in order to arrive at a viable solution that delivers the value they are looking for[12].

According to Industryweek, some companies are currently experiencing issues with the adoption of Digital Twins to improve staff performance and production efficiency. IoT platforms process data from machines and thus make real-time insights available that can continuously optimise digital models. However, companies must first move away from their legacy systems before they can fully capitalise on this progress. It may not be possible to effectively deploy Digital Twin technology throughout the value chain until they do so.

In addition, organisations should also consider the skills of their staff to fully exploit the benefits of Digital Twins. Even though design and simulation are becoming increasingly automated and efficient, companies still need their staff to make the right decisions to act quickly and efficiently. The lack of knowledge about the entire value chain and a potentially aging workforce with a background in legacy methods can continue to be a barrier for some companies.

[12] *Industryweek: https://www.industryweek.com/technology-and-iiot/article/21121741/are-you-using-digital-twins*

## 4. Conclusion

The coming year will be different for manufacturers, depending on where they have felt the biggest impact of the pandemic. For some, the emphasis will be on restoring lost revenue streams; for others it may be necessary to re-align the way of working with the new trends. But all manufacturers must work to make their operations more flexible. By continuing to invest in digital initiatives in their manufacturing environment, manufacturers can respond to the disruptions caused by the pandemic and build a resilience that allows them to flourish[13]. However, the first step consists of overcoming the obstacles that prevent the adoption of new technologies.

ICT Group has more than 40 years of experience in applying new technologies and can support you in overcoming the organisational and technological obstacles in order to accelerate the digitisation of your organisation.

We follow an integrated approach based on TOP, Technology Organisation Processes. Applying new technology alone is not enough. How does it fit into your organisation? Which processes need to be adjusted? What skills are needed to make good use of the technology? Those are some of the questions you need to consider when adopting new technology. Value creation also depends on how a technology is integrated into your organisation. We help you innovate and transform while keeping the store open. Our Centre of Excellence is your partner. And we would be most happy to deploy our experience and expertise to assist you in your search.

[13] *Deloitte: https://www2.deloitte.com/us/en/pages/energy-and-resources/articles/manufacturing-industry-outlook.html*

## 5. Acknowledgement of the source

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