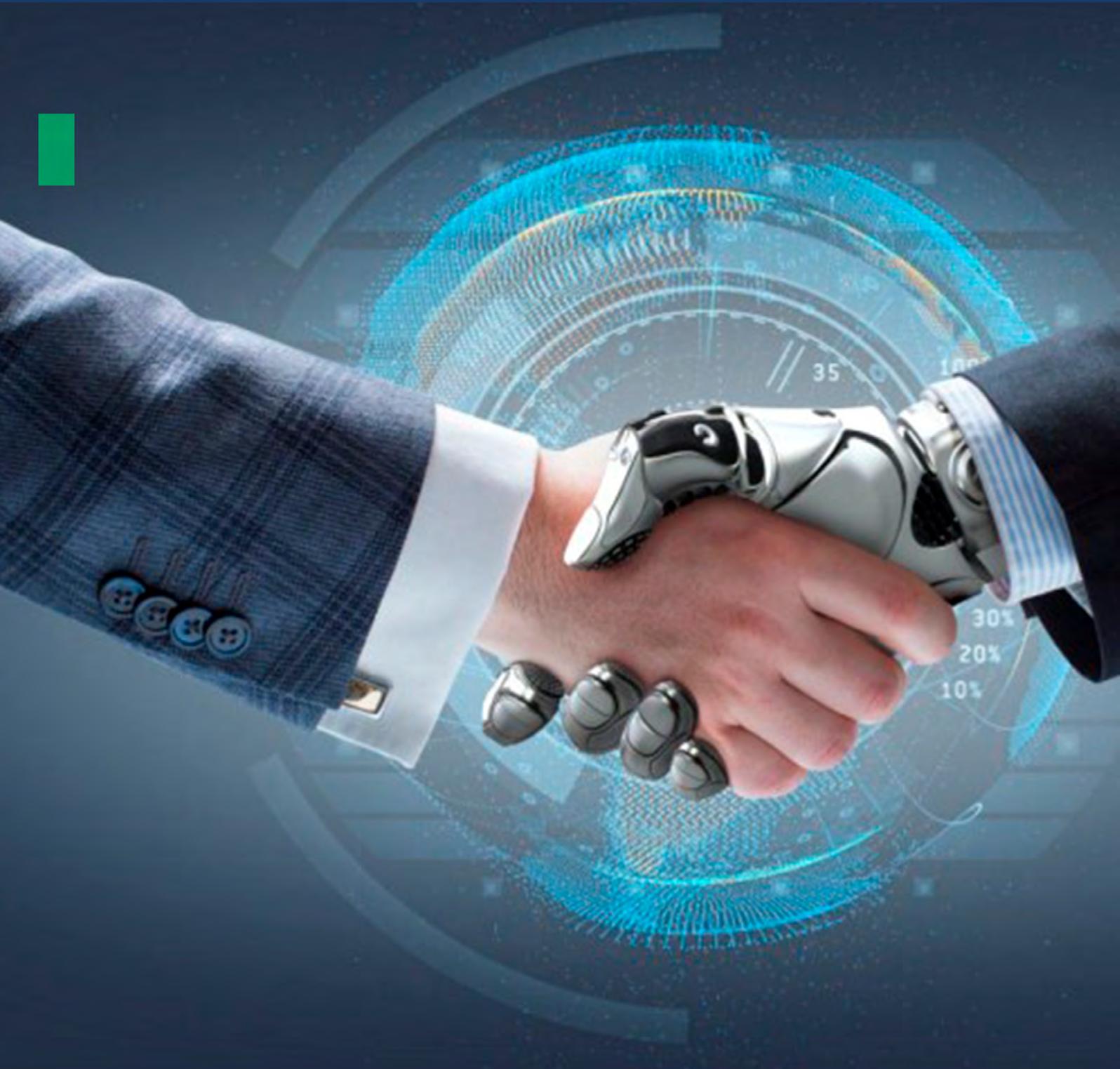


HOW TO MANUFACTURE A SMARTER FACTORY

CHAPTER 4: ROBOTS AND AUTOMATION





CHAPTER 4:

Robots and Automation

It used to be the case that few manufacturers outside of the automotive sector would have a requirement for, or the funds required, to invest in robotics and automation. But as the sector has accelerated its own output levels through the use of robotisation, other sectors have taken note and begun to embrace this new trend.

The result is that robotics and automation products are more available and affordable today than they have ever been, and they are beginning to be implemented in shop floors across the UK. At face value, the argument for robotics and automation is a strong one; they do not require annual salaries, they don't have 'off' days, and they can start work immediately. In many cases, manufacturing plants already have robots on the shop floor connected to their ERP systems, enabling them to begin

production the moment a sales order is finalised, in order to deliver instant service to the customer.

Simply investing in robotics and automation, though, is not enough for your manufacturing enterprise to thrive during Industry 4.0. They need to be integrated into the wider business strategy and into a smart, Big Data environment. They should be there to solve a problem in the business, often a manual, admin-heavy task; robots should not end up being supplemented by more manual work.

In this regard, the UK can begin to create smarter factories where people collaborate with robots, tedious business processes are automated and people are being empowered by machines to make better decisions.

JARGON BUSTER

High Value Manufacturing Catapult Centre

In the final chapter we'll be covering the megatrends that could help keep your business competitive for the foreseeable future and will retain relevance with your customers. Our top tips include tying megatrend research and analysis into your strategic review and keeping an eye on the competition's approach to megatrends. A meaty but easy to digest set of bullet points will cover a variety of megatrends in practice while our leading practice inspiration will again come from Industry 4.0 powerhouse, Rolls-Royce.

Robotisation

Robotisation explains the mass adoption and integration of robots and intelligent devices into industry. It also defines the way that these machines interact and communicate with each other.

TOP TIPS

1 Think about where robotics and automation fit into your wider business strategy. Once implemented, robots are difficult to remove so you need to make sure your people are behind the decision to implement a robot. Some may fear for their jobs, but others will embrace the new opportunities that this will bring.

2 Virtualise robots and automation first. The logistics of where a robot fits into an existing process can be tricky. It's always useful to partner with an organisation such as The Manufacturing Technology Centre to virtualise the implementation of robots in your factory and de-risk some of the costs and investment involved, before introducing them to the real life shop floor.

3 Think about how robots will integrate into your existing technology framework and how their role supports other automation workflows. Can they receive customer orders and bills of materials directly from your ERP solution to commence production? Are they communicating the completion of production back to the ERP system to notify the warehouse and the customer? Can quality information be fed into Microsoft Cortana Analytics so you can continually improve this automation?

4 Think about your ROI. We'd all like a fancy robot on the shop floor but we don't all have a need for this. Think carefully about the value a robot or automation will bring both to your employees and your customers. Don't just think about cost reduction, instead focus on how this cost reduction is going to add greater value.

Why embrace it?

Believe it or not, robots and automation can create jobs as well as value. It may seem counter intuitive that a machine which has been purchased to take over a manual task can create a new job, but a recent International Federation of Robotics study estimated that over two million jobs would be created in the next eight years due to robots. Robots improve productivity, which boosts competitiveness, improves revenues, generates economies of scale, and therefore improves overall margins. This creates demand for more design and engineering jobs to innovate and create new products and services, in turn, opening up more sales opportunities.

Job creation does not end there. Robots and cobots change the skill requirements on the shop floor, opening up the industry to a new workforce generation and making the sector more appealing to young people. This helps to bridge the industry wide skills gap, and often this diversity can spawn creativity. Robots also have the capacity to work in dangerous or hazardous environments where people would be facing health and safety risks.

Robots and automation reduce costs and time. It also helps to keep manufacturing in the UK. Robots do not require a salary, enabling UK manufacturers to compete with cheaper overseas labour. And often, the process that a robot or automation takes over frees up the employee previously performing the job to concentrate on other areas of value within the business. Gartner predicts that by 2018 the total cost of ownership for the factory floor will be 30% lower than it is today as these technologies mature. And, of course, not every job can be robotised or automated. They may collect and respond to data, but rarely do they have the business experience or knowledge required to effectively analyse this data and use it to make important decisions.

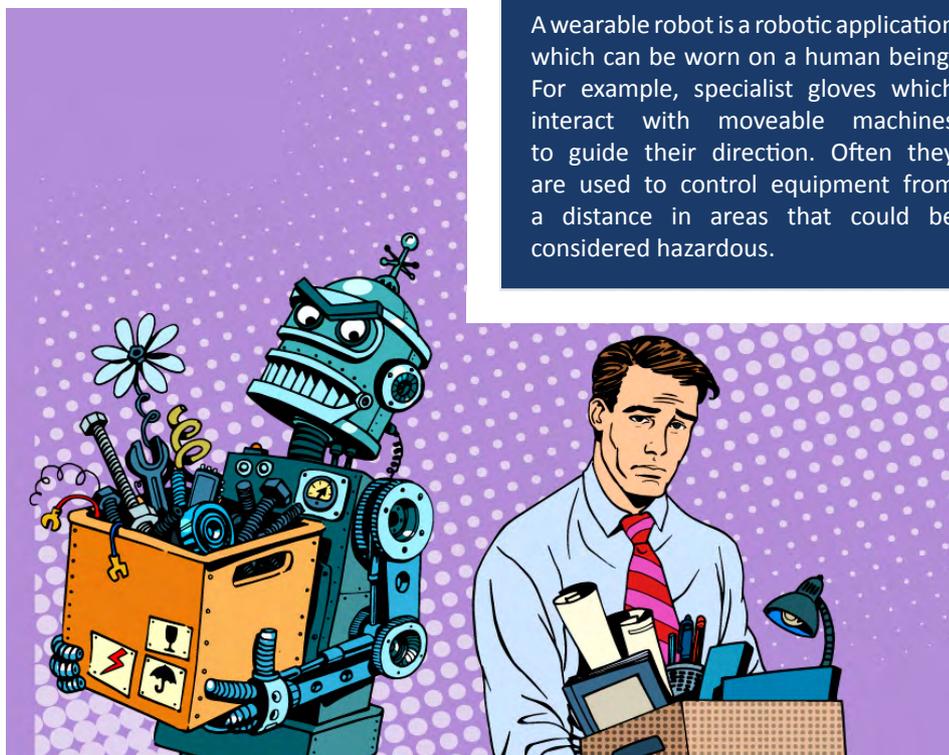
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Cobots

A cobot is a collaborative robot, which has the capacity to physically interact with humans in a shared workplace. This is an advancement of previous robots, which often operate autonomously, or with little guidance.

Wearable Robots

A wearable robot is a robotic application which can be worn on a human being. For example, specialist gloves which interact with moveable machines to guide their direction. Often they are used to control equipment from a distance in areas that could be considered hazardous.



In Practice

BKW Instruments is a leading supplier, manufacturer, and distributor of instrumentation solutions across a number of industries including water, pharmaceutical, food and beverage, oil and gas, energy, HVAC and more. When looking at the ways the business could automate a number of its manual manufacturing processes, while increasing output the company explored the ways leveraging machine to machine data could help.

As a supplier, BKW already utilised machines in order to automate a number of its stock reordering processes. However, it was the company's out of the box thinking

which saw the company utilise the same technology within its own manufacturing processes. The company uses 3D barcodes and QR codes to create unique job cards, which creates bespoke routes through the shop floor. These routes are determined by information held on each job card and can see each individual job pass through each work centre, from machining, calibration, configuration and inspection. QR codes are scanned at each stage of the manufacturing process, which relays information directly back to the company's centralised ERP system.

This real-time information not only ensures that the company can create a comprehensive works schedule for each job, propelling

its productivity levels as a business, but it has also meant that BKW are now able to provide its customers with a greater level of customer service throughout the entire manufacturing process, from point of sale right through to distribution and after-sales support.

Yet the benefits of automation haven't stopped there for BKW, the company has also reported a 100% increase in the number of quotes it is now able to produce in a single day, while the introduction of automated stock re-triggers has also reduced the time the company previously spent on re-ordering by 50%. This has meant that staff are able to concentrate on other areas of the business, including future development.

Leading Practice

Airbus has introduced a range of technology to the shop floor over the last few years, including 3D printers, cobots, robots and virtual reality systems, as part of its 2020 programme.

As well as stand-alone robots, Airbus is also experimenting with wearable robotics that, for example, take the heavy lifting out of "human" jobs. Cobots are working alongside humans in an integrated collaborative Human – Robot process model.

The company is also investing in developing robots that can copy what they see, but also reconfigure their tasks with a degree of autonomy to adapt to a change in circumstances, e.g. avoiding a collision or changing the degree at which a bolt is fitted into a drill hole. 3D printers are computing the best materials to use in production, and also helping to develop new ways to produce products, enabling Airbus to significantly reduce the weight of parts within an aircraft, improving fuel economy, and reducing both the carbon footprint

as well as airline running costs.

Useful references

[Airbus](#)
Robotisation case study

[The British Automation and Robot Association](#)

The voice of robots and automation in government and academic departments

[The Manufacturing Technology Centre](#)
One of the UK government's seven High Value Manufacturing Catapult Centres.

SNEAK PEEK

CHAPTER 5: Megatrends - OUT 2nd Dec

In the final chapter we'll be covering the megatrends that could help keep your business competitive for the foreseeable future and will retain relevance with your customers. Our top tips include tying megatrend research and analysis into your strategic review and keeping an eye on the competition's approach to megatrends. A meaty but easy to digest set of bullet points will cover a variety of megatrends in practice while our leading practice inspiration will again come from Industry 4.0 powerhouse, Rolls-Royce.



k3syspro



get in touch

K3 Syspro
Baltimore House
50 Kansas Avenue
Manchester
M50 2GL

Phone: +44 (0) 161 876 4498
Email: info@k3syspro.com
Web: www.k3syspro.com



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