



JULIAN WARE, ABB UK & IRELAND SALES MANAGER

ABB Robotics

Factories of the Future



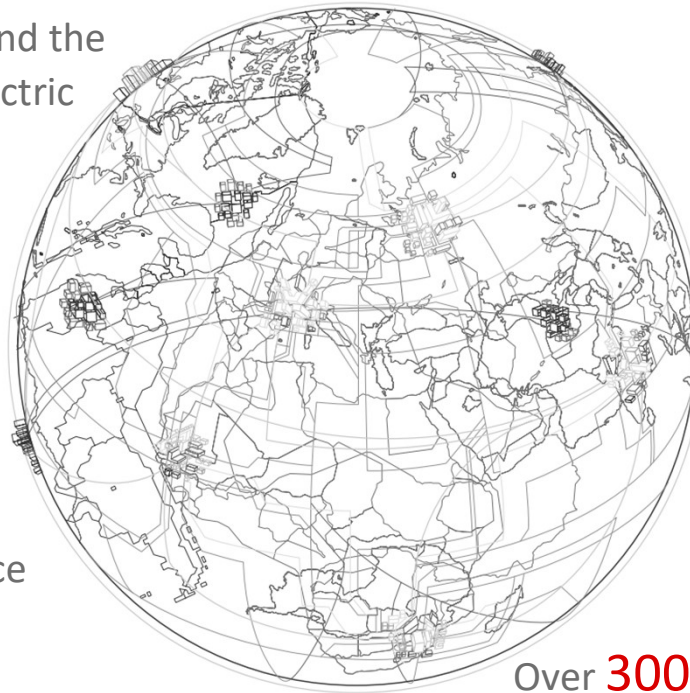
ABB Robotics - Globally

Key facts

Introduced painting robots in **1969** and the world's first commercially available electric robot in **1974**



Technology leadership sales and service operations in **53** countries and more than **100** locations



Manufacturing in **Europe, Asia** and **America**

~ **6000** employees

Over **300,000** robots delivered worldwide



Robotics and Artificial Intelligence

First to understand the barriers preventing productivity



Still room for improvement

Productivity – a major challenge

Productivity in the UK

UK economic growth is being hampered by low productivity

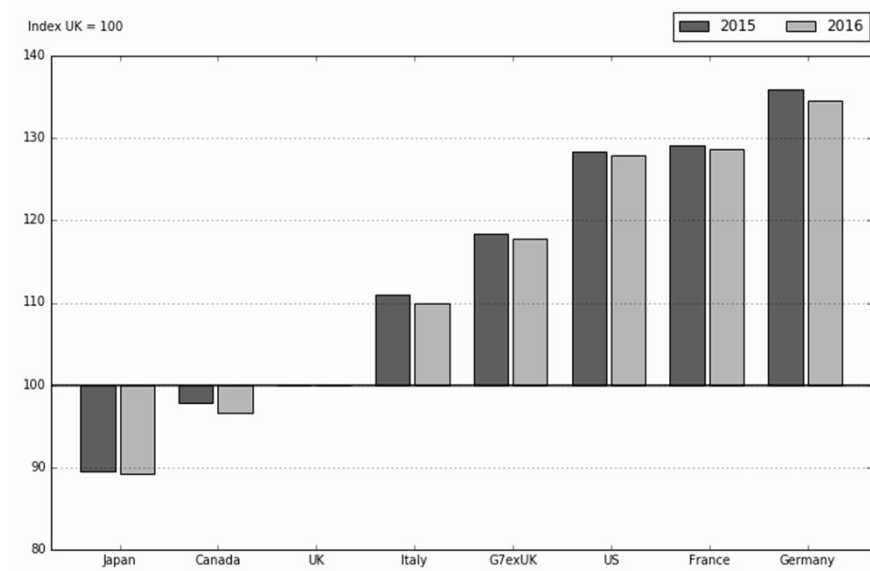
GDP per hour worked is lower today than it was in 2007, despite employment being higher

Productivity per worker has grown by just 0.7% a year since 2008*

In 2016, output per hour in the UK was 22.6% below the US, 25.6% below Germany and 26.2% below France**

Two possible solutions:

- Either we all work longer hours; OR
- We work smarter, not harder, to produce more with the same level of input

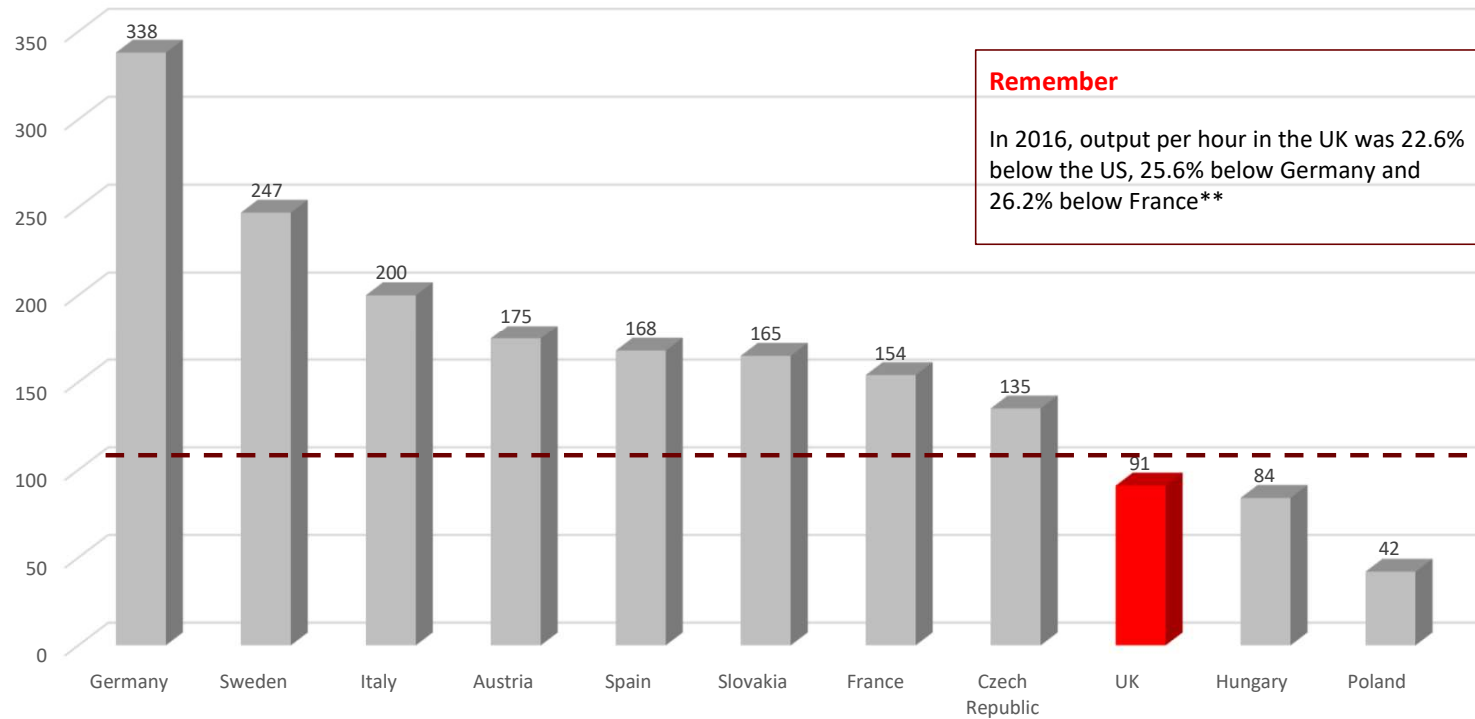


Gross domestic product per hour worked, G7 countries, 2015 and 2016
(Source: Office for National Statistics)**

Behind the curve

The UK invests far less in robotic automation than its global competitors

Robot Density - Number of Robots per 10,000 employees



99 robots per 10,000 workers =
global average robot density in the
manufacturing industry

Government Support

It can only work with parliamentary support for the SMEs

Select Committee report – Sept 2019

“The problem for the UK labour market and our economy is not that we have too many robots in the workplace, but that we have too few”

“If we fall further behind in productivity and the adoption of new technologies, then future investment decisions will not follow “

*“The lack of focus on automation, beyond AI, in the Government’s Industrial Strategy is a missed opportunity. Its absence strengthens the case for a UK Robot Strategy, which supports British innovation as well as encouraging automation adoption - **We recommend that a UK Robot Strategy includes actions that support UK automation businesses to grow and remain in the UK**”*

“We recommend that the Government urgently brings together employers, workers, academia and automation developers to design a UK Robot Strategy on how it plans to promote and manage the transition to amore automated world of work.”



House of Commons

Business, Energy and Industrial
Strategy Committee

Automation and the future of work

Twenty-third Report of
Session 2017–19

*Report, together with formal minutes relating
to the report*

*Ordered by the House of Commons
to be printed 9 September 2019*

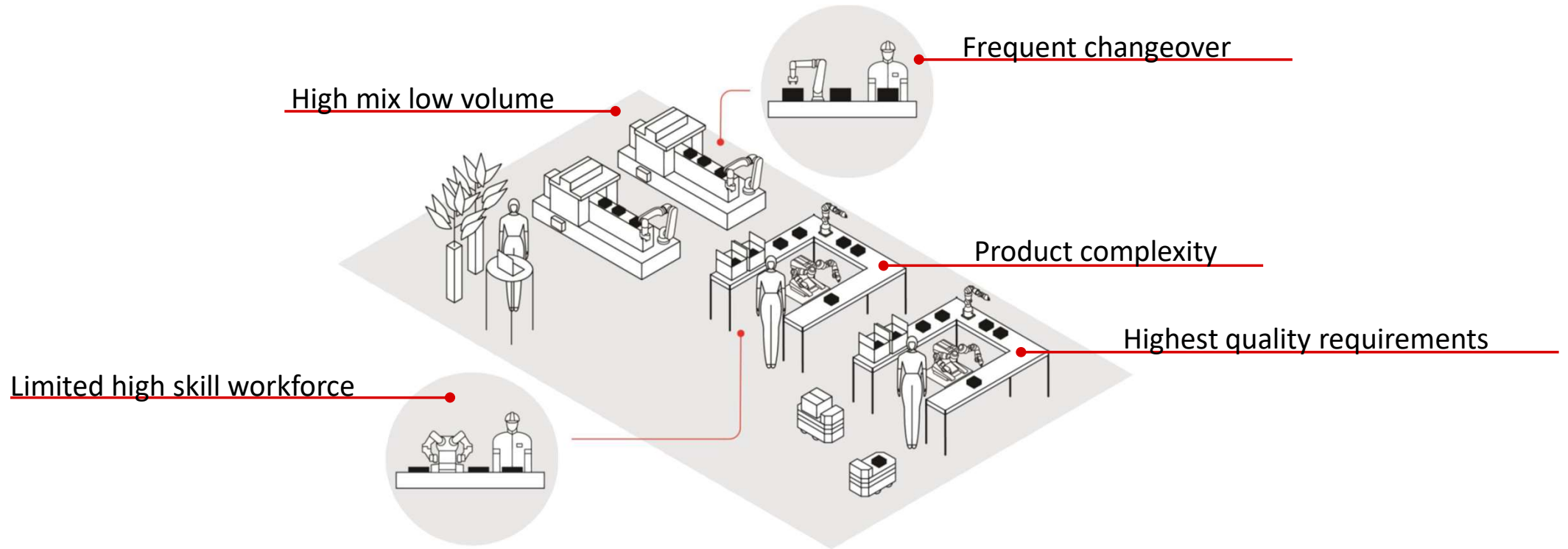


AI and Factories of the Future



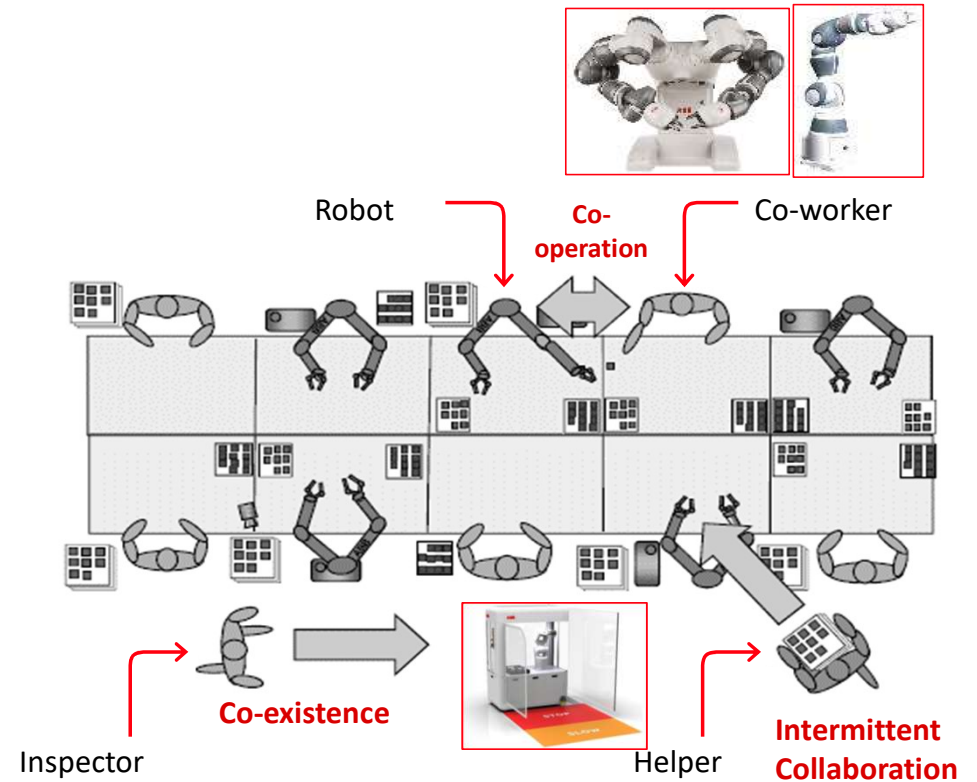
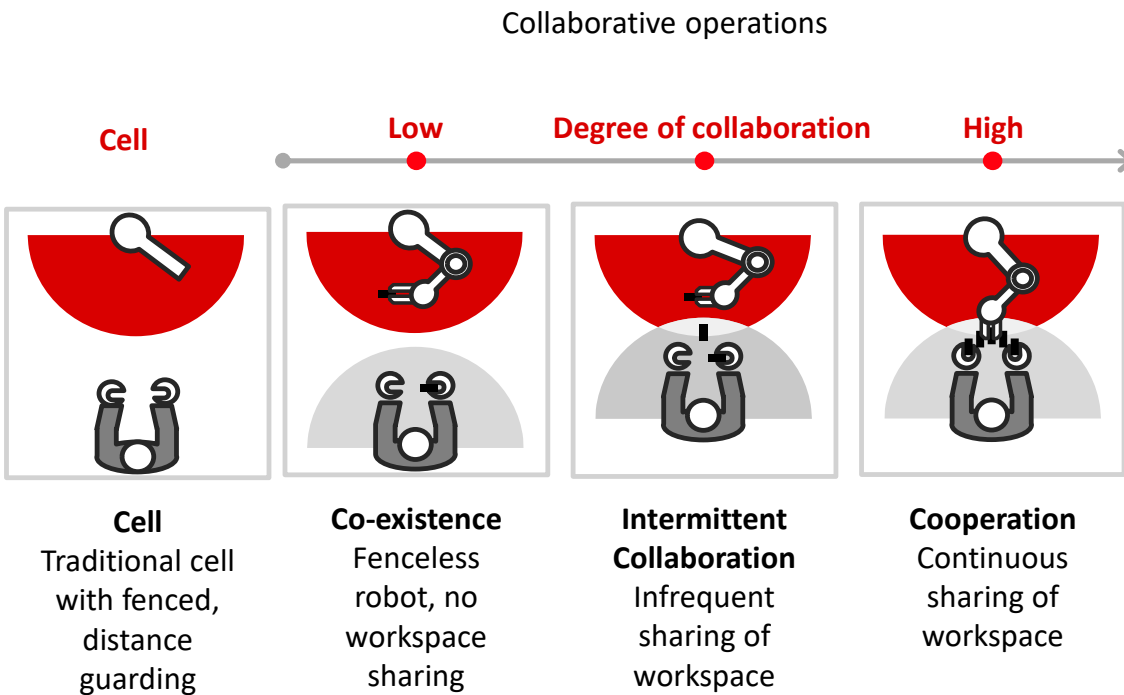
Factories are changing

The agile shift to low volume, high mix and shorter cycles



Understand the environment

Different robots and safety strategy for different collaborative and non collaborative application needs



Why do we need to change?

Manufacturing is changing

Consumers are demanding goods faster, in more varieties and at the lowest possible prices, without compromising on quality

Trend towards personalisation is demanding processes that can handle 'batch size one' production

Growing pressure for manufacturers to reduce wastage and environmental impact

Growing number of companies worldwide are using robots in an expanding array of applications

Robotic automation is also a key component of many countries' industrial growth strategies – e.g. China, South Korea, Germany, USA



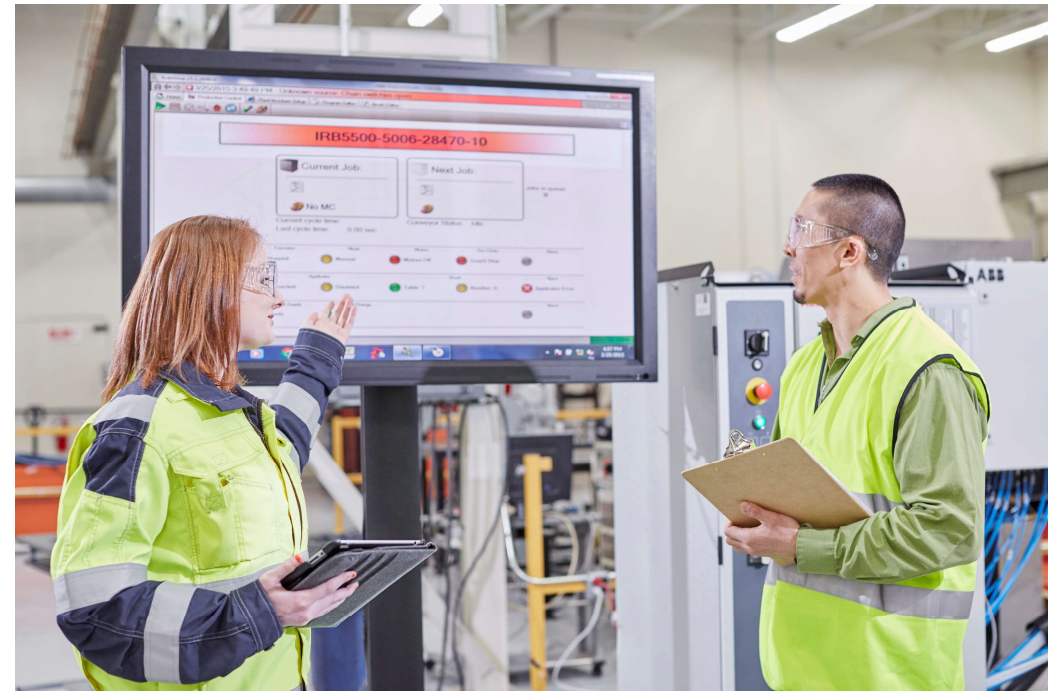
Creating the factories of the future

Everything connected

Automated, connected factories are the future of manufacturing

Much more than just robots and automation. Also includes:

- Connecting devices and machines to the internet to monitor their condition, improving production performance and saving cost
- Vertical integration of the supply chain and fully-automated manufacturing processes that connect the shop floor to the board room and create highly flexible and transparent production systems



Robots have a critical role in the 'Factory of the Future'

Flexible and agile



Shorter cycles, faster launches



Increased cost of downtime



Greater human / robot interaction



Efficient at every level



Flexible and agile



The Factory of the Future is characterised by flexibility and enabled by collaboration & digitalisation

Factory of the future – spotting the future

Helping our customers make the transformation to the digital Factory of the Future

Digitalization enables machine learning capability

- Allows manufacturers to receive the full benefits of connected robots in a digital ecosystem while managing cyber security concerns
- Provides actionable intelligence
- Predictive maintenance prevents unplanned downtime
- Monitors gearbox performance using machine learning algorithms to facilitate preventive or corrective maintenance
- Improves performance and reliability of robots or entire fleets



Machine learning algorithms

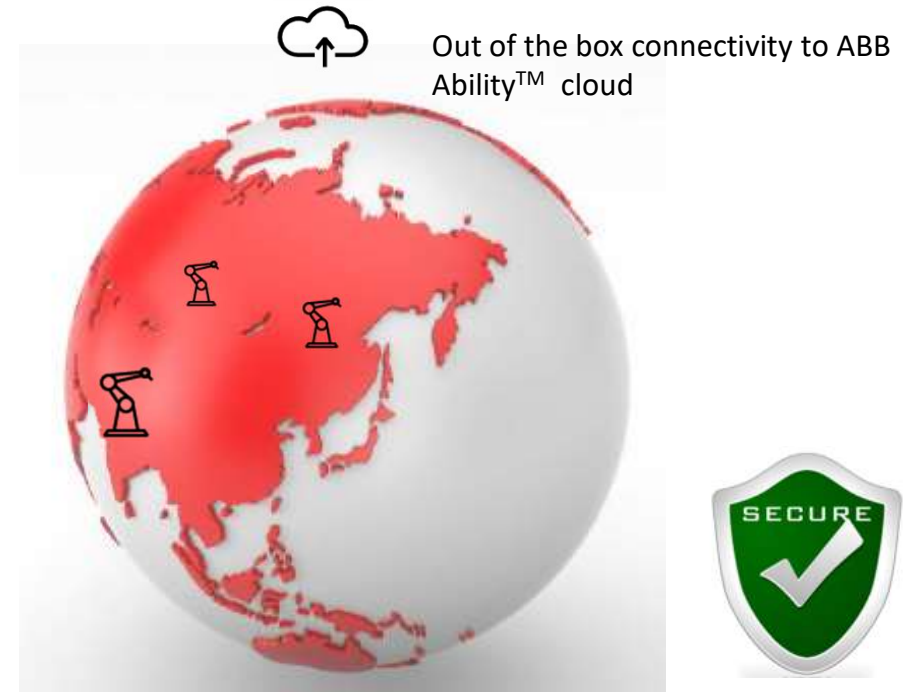


Visualizing data and analytics



ABB proactive technical support service

A monumental leap in digitalization and cyber security



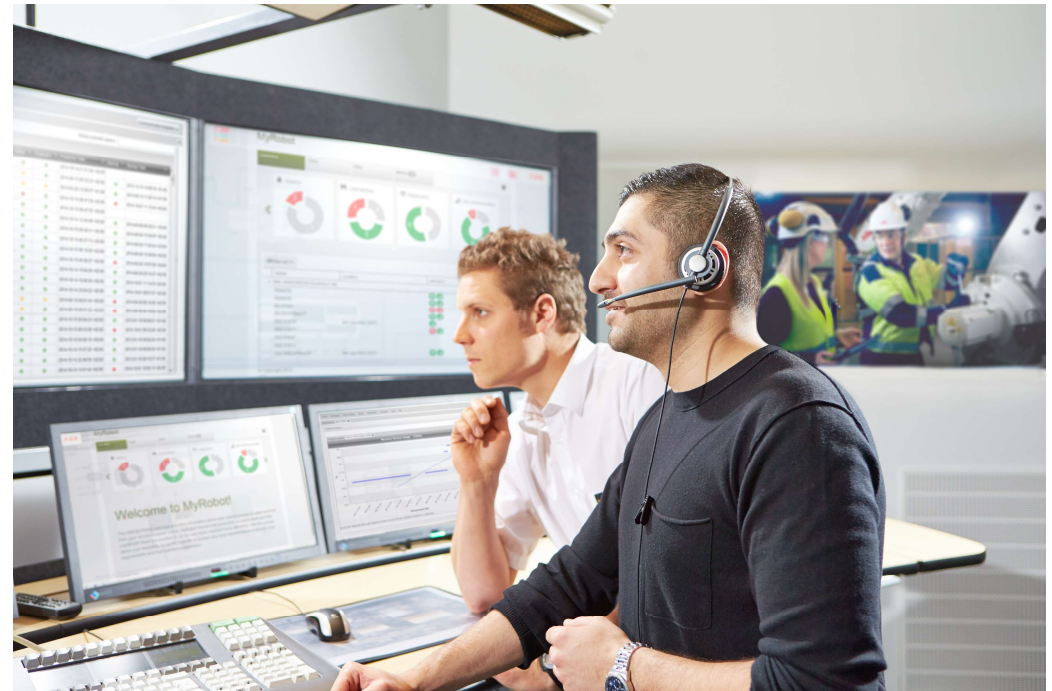
How is AI/ML going to change robotic automation?

More intelligence, greater capabilities

Combination of robots and other machines with more computing power and artificial intelligence (AI)/machine learning (ML) will bring many benefits:

- Greater efficiency - e.g. self-optimizing performance
- Increased reliability – e.g. predictive maintenance monitoring
- Easier to use systems – e.g. a robot with AI could automatically download a program to do a new task, without manual intervention
- More flexibility – ability to adapt and handle different tasks
- Improve processes – e.g. real-time data analysis for improving quality

Inputs from **advanced vision systems** and sensors that feed into decision-making are also a key part of this process



How will industry benefit?

Delivering the factories of the future today

The ability of robots to automate tasks like parts identification and inspection is already benefitting many industry segments like **automotive**, **electronics** (3C) and **logistics**

Automotive tiers can inspect the quality of every single part and validate this for their OEMs

Advanced vision solutions paired with machine learning algorithms will help inspection and testing applications, e.g. the **electronics industry**, where very small components must be assembled with high precision and quality

Artificial intelligence will be helpful to **SMEs that lack in-house expertise** – e.g. robots that can download their own programming and automate control functions for less experienced operators



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ABB Dual Arm Collaborative Robot YuMi, using AI and ML for recycling waste



Want to know how to start your Robotics journey?

Come and join us on 21st November in Milton Keynes for Switch to Robots

Topics covered will include

- How using robots can you fill the skills gap shortage
- How developments in technology have reduced the cost and complexity of robot adoption
- How to identify which areas of your factory could benefit the most from robot technology
- How to create a flexible automation strategy and justify the potential on an investment in robot automation

There will also be a hands-on demonstration of our robots and offline programming technology



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