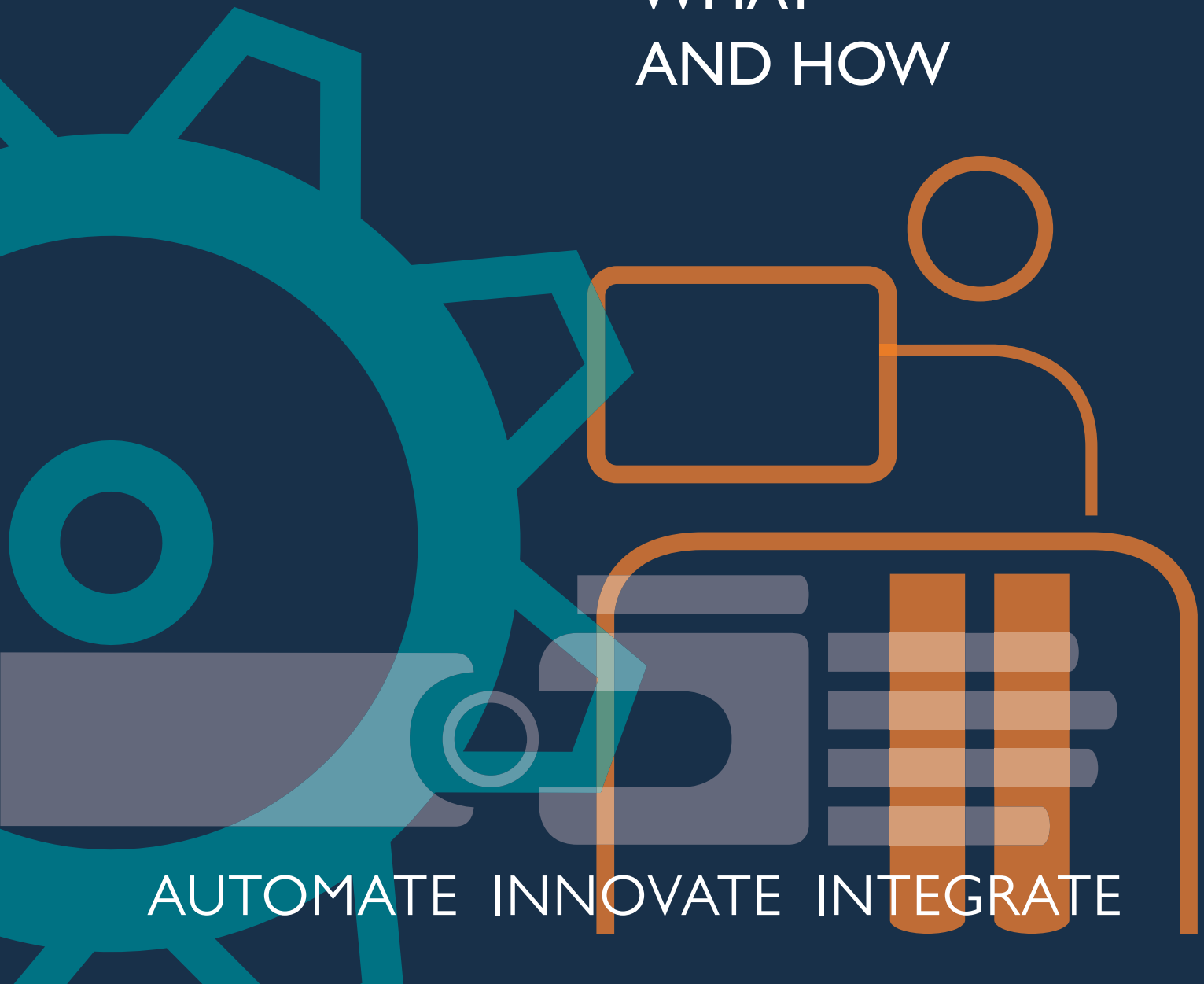
ALPHR
TECHNOLOGY

ROADMAP TO AUTOMATION

THE WHY, WHAT AND HOW



AUTOMATE INNOVATE INTEGRATE

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ROADMAP TO AUTOMATION

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ROADMAP TO AUTOMATION

OVERVIEW

AUTOMATE INNOVATE INTEGRATE

Key business goals

Productivity
Efficiency
Resilience
Competitiveness

These are the key business goals that automation technology - Industry 4.0, big data, smart factories and Industry 5.0 - can help achieve.

Planning the route

The route to choosing the appropriate technology and achieving these key goals, requires a roadmap and an implementation partner, but it begins by asking the right questions.

The big questions

What are the benefits of automation?
What needs to be considered?

Benefits and considerations

The BIG benefits and opportunities afforded by automation technology are to:

Be productive

The COVID-19 pandemic hit a global economy that was already struggling with slow productivity growth. Productivity growth is the key driver for sustainable income growth and poverty reduction

Beat disruptions

Pandemics; Brexit and the end of free movement of labour between the UK and the EU; and trade agreements that may make it more difficult to trade across international borders - all have the potential to affect the global supply of labour, where shortages are already forecast by 2030

Disruptions equate to a potential for higher wages, leading to increased production costs and reduced competitive advantage

Be agile

One of the lessons of COVID is that automation enables resilience in manufacturing, helping companies to adapt quickly to disruptions, maintain business operations and safeguard people

Be competitive

In recent years, adoption of automation in global markets has been driven by highly automated emerging countries, and by regions that are already highly developed economically

The UK is an example of a highly developed economy with a low level of automation – a robot density of 91 units per 10,000 employees. In comparison, Singapore leads the field with a robot density of 918

(Source: International Federation of Robotics, March 2021)

Automation equates with improvements in productivity, quality, consistency, reliability of output and increased competitiveness

Be successful

If manufacturing is to compete successfully, no matter where in the world it is located, it needs to control its cost base, increase profits, and reduce risk. Automation can make a significant contribution to this

Barriers to automation

Fear

Dispelling the fear

We are dedicated to sharing our expert knowledge of automation, product design and manufacture, to create innovative, integrated solutions for our clients.

We have 30 years of global experience in providing an industry-leading range of test solutions, innovative complex assembly, portable test equipment, standard products and capturing complex data, to deliver flexible and bespoke solutions. Our support is global and our expertise runs from end-to-end.

We can help dispel the fear of the unknown by sharing our knowledge and helping you to quantify the benefits of automation, and how automation can enhance the skills of production line staff.

The operational costs

Automation provides fixed costs, where inflation has no impact, and there are controlled and forecastable labour and training requirements.

Our aim is to encourage businesses to invest in productivity-enhancing plant and machinery assets that will help them grow, and to make those investments now.

Good reasons for change

New technology is much more efficient

It offers better quality control

There are significant benefits in using AI and machine learning

All automation machines are designed with safety in mind and must conform to all relevant safety standards and regulations

To be greener through waste reduction and increased energy efficiency

Adding value to the workforce

All the evidence points to the fact that automation does not lead to job reductions overall

An automation machine can be equivalent of two or three staff. It enables the re-allocation of staff from dull and repetitive work to higher value-added tasks

Industry 4.0 and Industry 5.0 benefits

Moving to Industry 4.0, means enjoying the advantages of using modern smart technology. Moving to Industry 5.0, means the workforce is supported, not superseded by robots, and there is an optimal balance between productivity and efficiency. In each case, this means you can:

Be productive Produce more, more quickly, more efficiently, more cost-effectively

Be proactive Proactive maintenance means less downtime and minimizes unplanned stoppages

Be in control	Improved traceability and quality control
Be collaborative	Smart manufacturing processes provide greater access to data across the entire production and supply chain network. This data can be used to monitor performance, and aid planning, product development and innovation
Be agile	The ability to flex production easily and quickly respond to client requirements
Be flexible	One-off production, high-mix manufacture
Be your best	Improve quality with automatic inspection and control throughout the manufacturing process
Be innovative	End-to-end measurement and understanding of the whole production process from procurement to shipping
Be available	Automation enables 24/7 production
Be less exposed to risk	Providing certainty of output means helping to manage the risks in your business

Summary

We can work with you to create your own Roadmap to Automation

We can help you identify your automation goals

We can give you the tools to help get buy-in from your team

We can help you realise your automation goals

We can be your trusted implementation partner

We will be there with continued support and advice

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ROADMAP TO AUTOMATION

WHY AUTOMATE?

What are the production benefits?

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Why automate?
What are the production benefits?

Why automate?

Reliability

Remote monitoring and diagnostics automation offers the benefits of smart maintenance

Automation technology is trusted in some of the most pressurized production environments in the world

Availability

Predictive maintenance minimizes all unplanned downtime

Automation can be flexed to offer 24/7 output or easily switched off altogether

Maintainability

Remote monitoring and diagnostics automation offers the benefits of smart maintenance

Machine learning enables self-diagnosis on a machine level

Safety

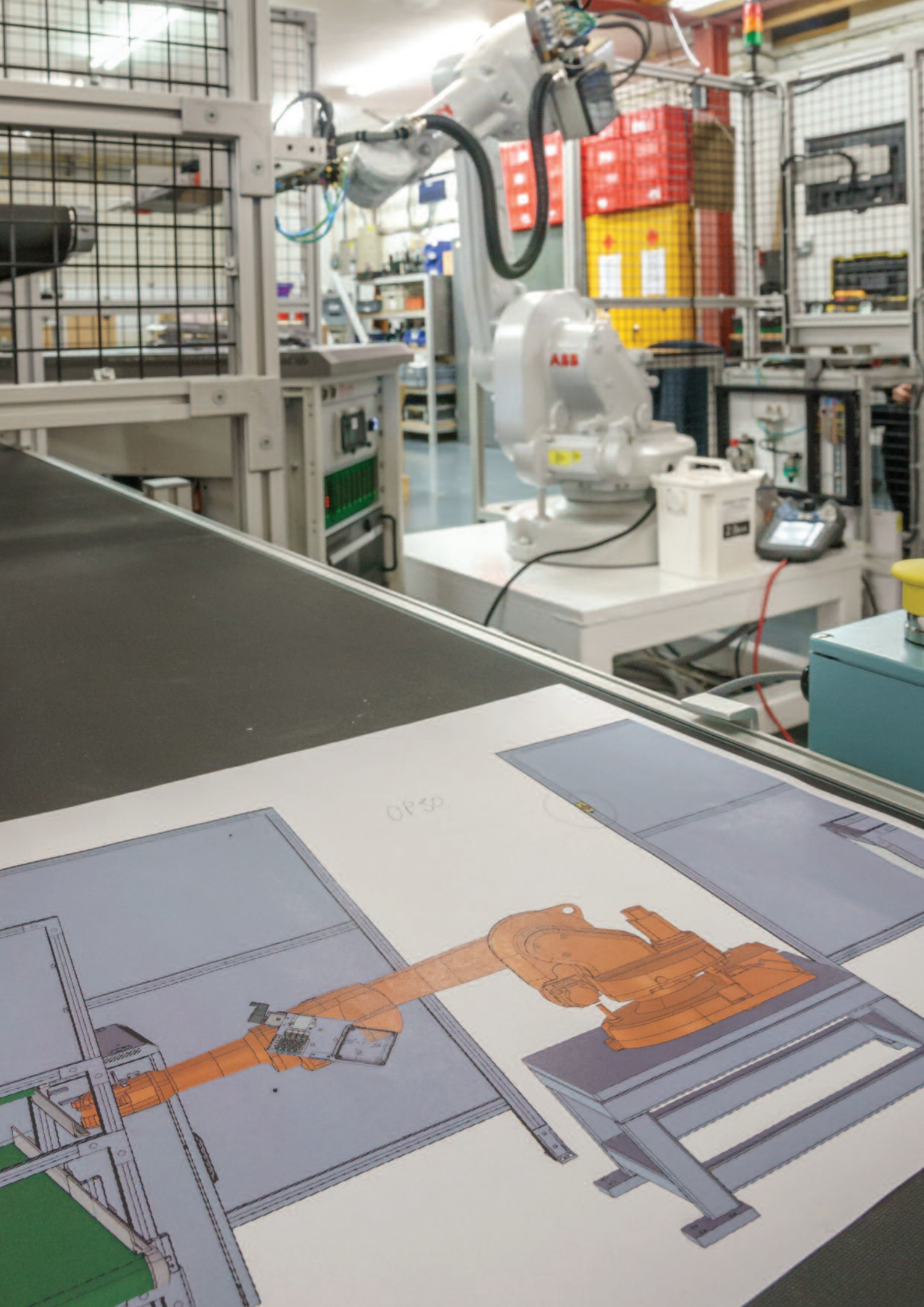
Automation machines are designed to work in a safe manner and can improve workplace health and safety, by reducing physical stresses and strains, and repetitive work

Benefits for precision, and waste reduction

Automation offers continuous and repeatable levels of precision and quality

This leads to reductions in waste and reworking

This offers benefits to cost base and profitability, whilst also making a business greener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Benefits for the workforce

Automation enables the business to replace:

Repetitive tasks
Monotonous tasks
Low value activities

This offers benefits around greater job satisfaction, better value from staff, and a safer working environment.

The production benefits

Increased availability and reduced unplanned downtime

Redeployment of skilled resources to higher value tasks

Improved mean time between failures (MTBF). For current technologies used in control systems, these are in the range of 50-150 years

Lower cost of manufacture to gain a competitive edge

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ROADMAP TO AUTOMATION

WHAT AND HOW TO AUTOMATE

The engineering benefits

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The big questions

What and how automate?
What are the engineering benefits?

What and how to automate

Step 1

Creating your own automation roadmap starts by value stream mapping your current manufacturing processes, taking particular care on the interfaces between each distinct process.

There are many ways to automate your manufacturing processes using robot pickers, vision inspection, testing, and auto screwdriving, for example.

Clearly mapping your processes will enable you to develop a plan to automate in stages, identifying the quick wins and maximising your path to success.

Step 2

By understanding the production processes you have selected to automate, you can evaluate the best approach.

If you intend to use a robotised cell, then you need to consider robotic dexterity, as robots have a limited range of movements compared to a human. Think how the production parts might flow through the process to simplify the tasks for the robot cell.

Unlike humans, robots can be fitted with different tools to fit a specific task – grippers, vacuum cups, vision inspection systems, and screwdrivers, for example. Systems Integrators like us, can offer advice and support to help you identify and choose the best robot fitment.

Understanding and optimizing a process, enables the maximum efficiency to be gained from the tooling of the robot.

If the robot is picking up the production part, is it easy for a robot to hold? If not, can it be changed to make it easier? Which fitment is best to handle the part? It could be a two or three finger gripper, a vacuum, or a magnet, for example.

We encourage you to think beyond the current processes, and consider other values that could be added to the process. It could be vision inspection, utilising AI to capture defects early in the production cycle.

Step 3

Following the evaluation in Step 2, do you need to?

Re-engineer the process?

Can the process be redesigned to maximise the benefits of automation?

Does automation offer the ability to carry out more than one process within the cell or station?

Think about the flow of parts. On a robotised cell the most efficient assembly is the one with the minimum number of directions used.

Redesign the product?

Can the product or output of the process be re-engineered to better fit with automation – including this process and further elements in the manufacturing process?

Is the product 'vision friendly'?

For example, if a barcode needs to be scanned by a vision system, it should be considered in the design process, as many types of barcodes are difficult for automated vision systems to read. If the vision system is mounted on a robot, then consider access requirements as well as alignment – the fewer movements the better in terms of efficiency.

What is the purpose of the vision system? Is it to check if parts are *in situ,* to record barcodes or serial numbers, or to inspect for flaws and damage? For flaws and damage AI systems now offer an alternative to the binary pass/fail mode, which coupled with machine learning, enables a graduated approach to be taken.

Change the COTS parts used within the product?

Are your COTS, or commercial off-the-shelf, parts designed for automation? If not, are there suitable alternatives?

If you plan to pack products using robots, then consider the design of the packaging. Designed for automation ready packaging allows for quicker throughput and less potential issues.

The engineering benefits

By following the steps for what and how to automate; reviewing your current manufacturing processes and identifying where improvements can be made through automation; the engineering benefits will be:

Improved efficiency
Quality
Consistency
Traceability
Proactive maintenance

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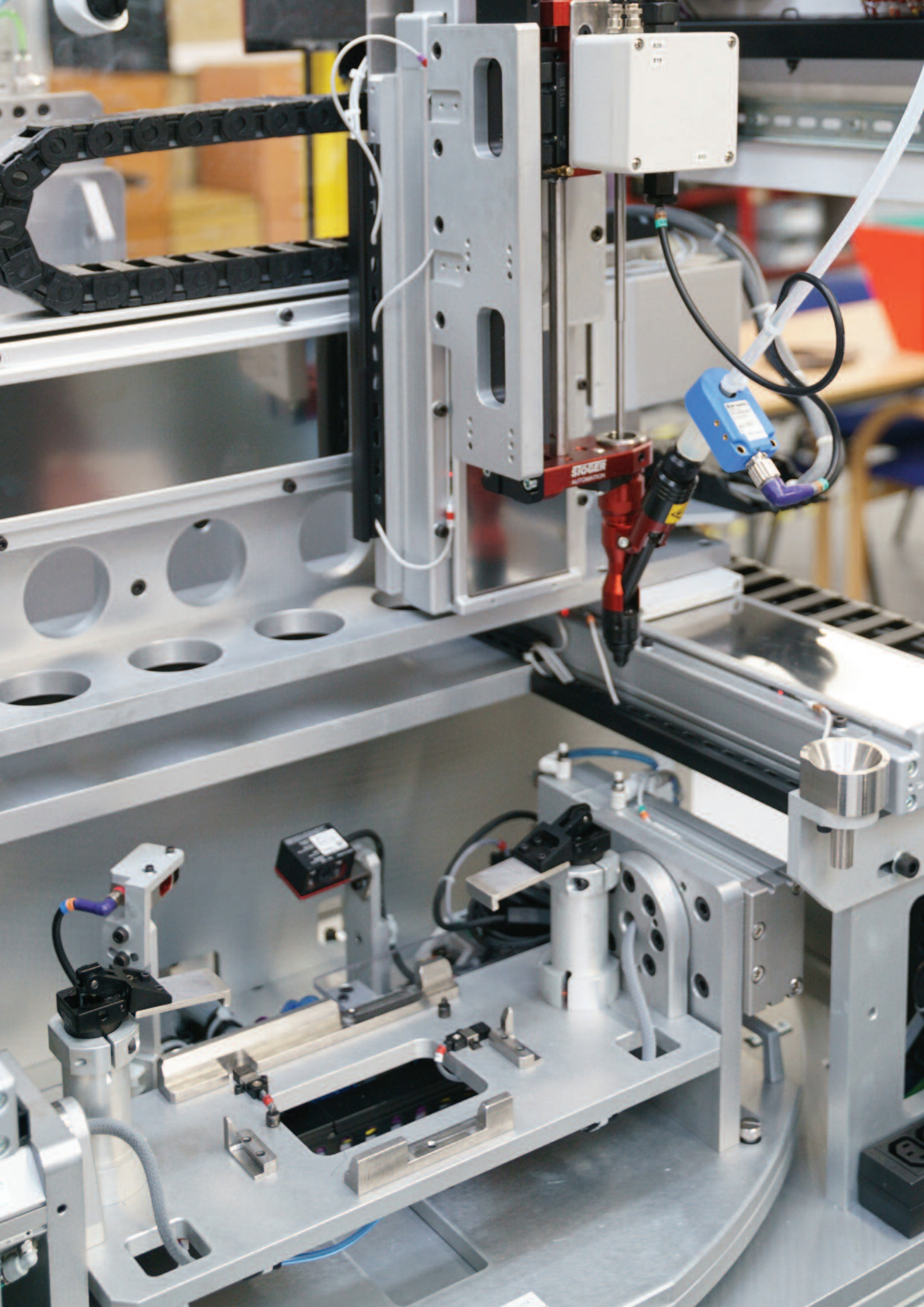

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ROADMAP TO AUTOMATION

THE BUSINESS CASE FOR AUTOMATION

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The big question

What is the business case for automation?

Capital investment

Automation is typically a high-cost capital investment.

This means it may be unattractive to many businesses when there are so many other demands for capital.

So why would a business tie up capital in automation?

The business benefits

Cost control	Production using automation has a fixed, measurable cost
Forecastability and predictability	An automation machine has a cycle time, which means you know it will produce *x* units per hour, every day of every week, of every month
Efficiency	Automation reduces waste by controlling quality
Flexibility	Production can be flexed to produce what you need when you need it
Return on investment	Becomes easy to calculate based on the cycle time or throughput of the machine, factoring in reduced wastage and higher quality
Lease options	We offer a range of options to move procurement from capital to operational expenditure. We are also able to offer support to identify funding schemes, overseas and in the UK, where government help may be available to fund capital investment

Our aim is to encourage businesses to invest in productivity-enhancing plant and machinery assets that will help them grow, and to make those investments now


ALPHR
TECHNOLOGY
BUDGET
CALCULATOR
YOUR CALCULATOR
If you are thinking about automation, but unsure of the costs involved, we are here to help.
By answering a few simple questions, the ALPHR Bu
Calculator will quickly give an estimate of costs fo

ALPHR Budget Calculator

To obtain a quick estimate of costs for your automation project, visit our website www.alphrtechnology.com and use the ALPHR Budget Calculator.

This estimate will help provide a basis from which you can calculate your potential cost savings, return on investment, calculate the true cost of a process and support the business case for automation.

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SUMMARY OF BENEFITS FOR THE WHOLE BUSINESS

AUTOMATE INNOVATE INTEGRATE

Key business benefits

These are the key business benefits that automation technology - Industry 4.0, big data, smart factories, and Industry 5.0 - can help achieve:

Increased productivity	Produce more, more quickly, more efficiently, more cost effectively
Increased efficiency	Moving skilled resources to higher value tasks
Increased resilience	Reduced reliance on human beings and producing more in less space
Increased competitiveness	Lower manufacturing costs and increased competitive edge
Increased quality	Improved quality control through precision and repeatability

Key production benefits

The core philosophy of automation means that machines are built with these qualities in mind:

Reliability
Availability
Maintainability
Safety

Key engineering benefits

Creating a Roadmap to Automation means reviewing your current manufacturing processes, interrogating them, and identifying where improvements can be made through automation. This means:

Improved efficiency
Quality
Consistency
Traceability
Proactive maintenance

Smart benefits

Using automation and moving to Industry 4.0, means enjoying the advantages of using modern smart technology.
Moving to Industry 5.0, means the workforce is supported, not superseded by robots, and there is an optimal balance between productivity and efficiency. In each case, this contributes to greater:

Cost control and cost reduction
Forecastability and predictability
Efficiency
Flexibility
Increased return on investment

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