



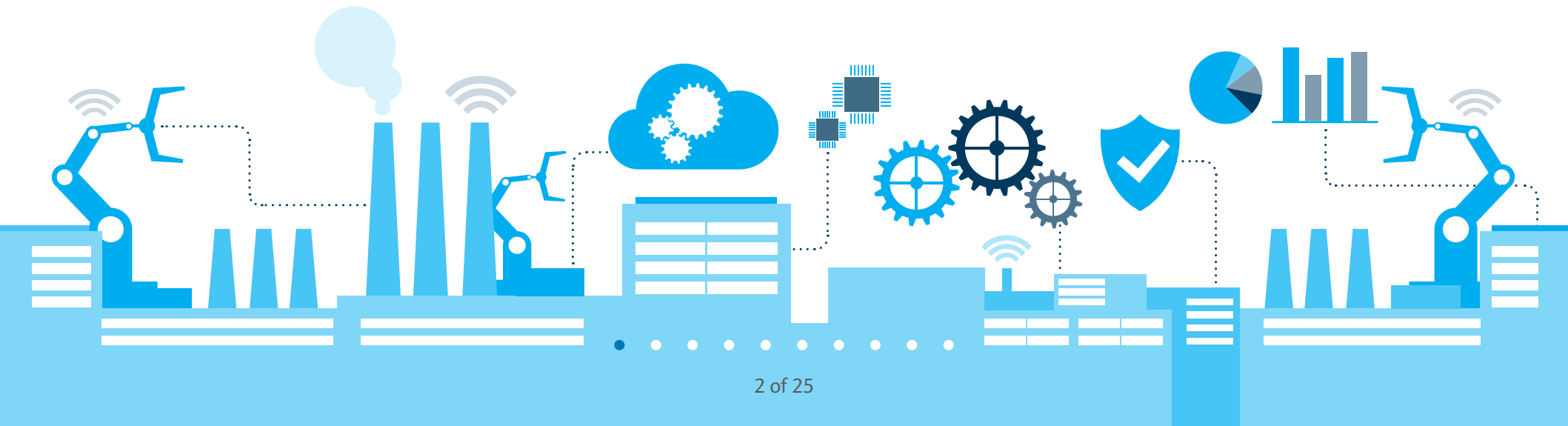
Intelligent manufacturing: an industrial revolution for the digital age

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About the research

The Barclays Corporate Banking Manufacturing Report, *Intelligent manufacturing*, is based on a survey conducted by Opinium and Economic Modelling conducted by Development Economics. The survey of 508 decision makers in the manufacturing industry was conducted in September 2017.



Executive summary

A new industrial revolution is under way. It is set to drive the transformation of manufacturing across the world.

This change builds on the automation that characterised the Third Industrial Revolution, but goes far beyond. It meshes industrial processes with breakthroughs in advanced technologies such as data management, machine learning and the Internet of Things.

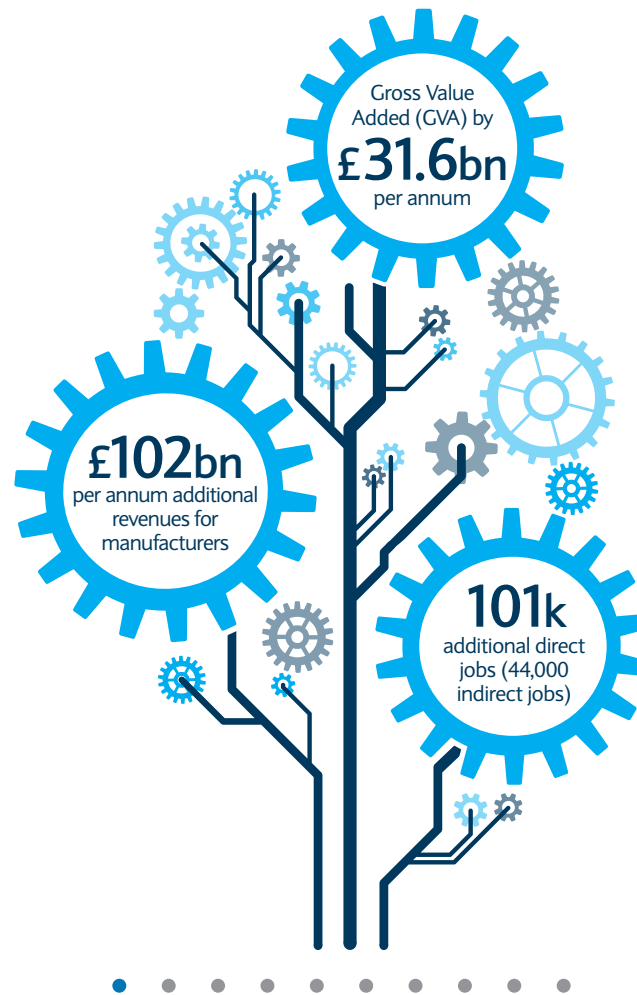
Capitalising on this movement could enable UK manufacturing to accelerate its sluggish recovery, according to our new analysis. It has the potential to improve global competitiveness and address the notorious productivity gap. However, UK manufacturers' investment in existing technology lags behind that of our rivals.

Among those who have already invested, over half report that the technologies have improved productivity.

Our research explores manufacturers' appetite and ability to invest in advanced technologies. We consider the barriers faced by UK industry in being part of the next revolution – and we assess the potential benefit to the economy if these obstacles can be overcome.

Our modelling suggests these gains are significant. They include additional growth of 15% within a decade, and more than 100,000 extra manufacturing jobs. We also look at two UK manufacturers' practical experiences and analyse the impact they see this revolution having on their businesses.

By 2026 enhanced investment in 4th Industrial Revolution (4IR) technology could grow



The challenge is on

The manufacturing sector continues to be vital to the UK economy. Output has recovered slowly over the past few years, though it remains below pre-recession levels. After a sharp decline between 2007 and 2010, employment in the sector has stabilised at around 2.7 million.

In 2016 the number of manufacturing businesses increased to over 133,000 – surpassing the number in 2008 for the first time.¹ Small businesses predominate. Meanwhile, firms have stepped up capital investment: this figure doubled between 2010 and 2015. However, the UK has slipped in the world ranking of manufacturing nations. From a consistent place of fifth or sixth in the total output league table in the decades up to 2004, it now ranks eighth.²

Our industry is also characterised by persistently poor productivity. In terms of output per worker, the UK was 16.6% below the average for the rest of the G7 nations in 2015.³

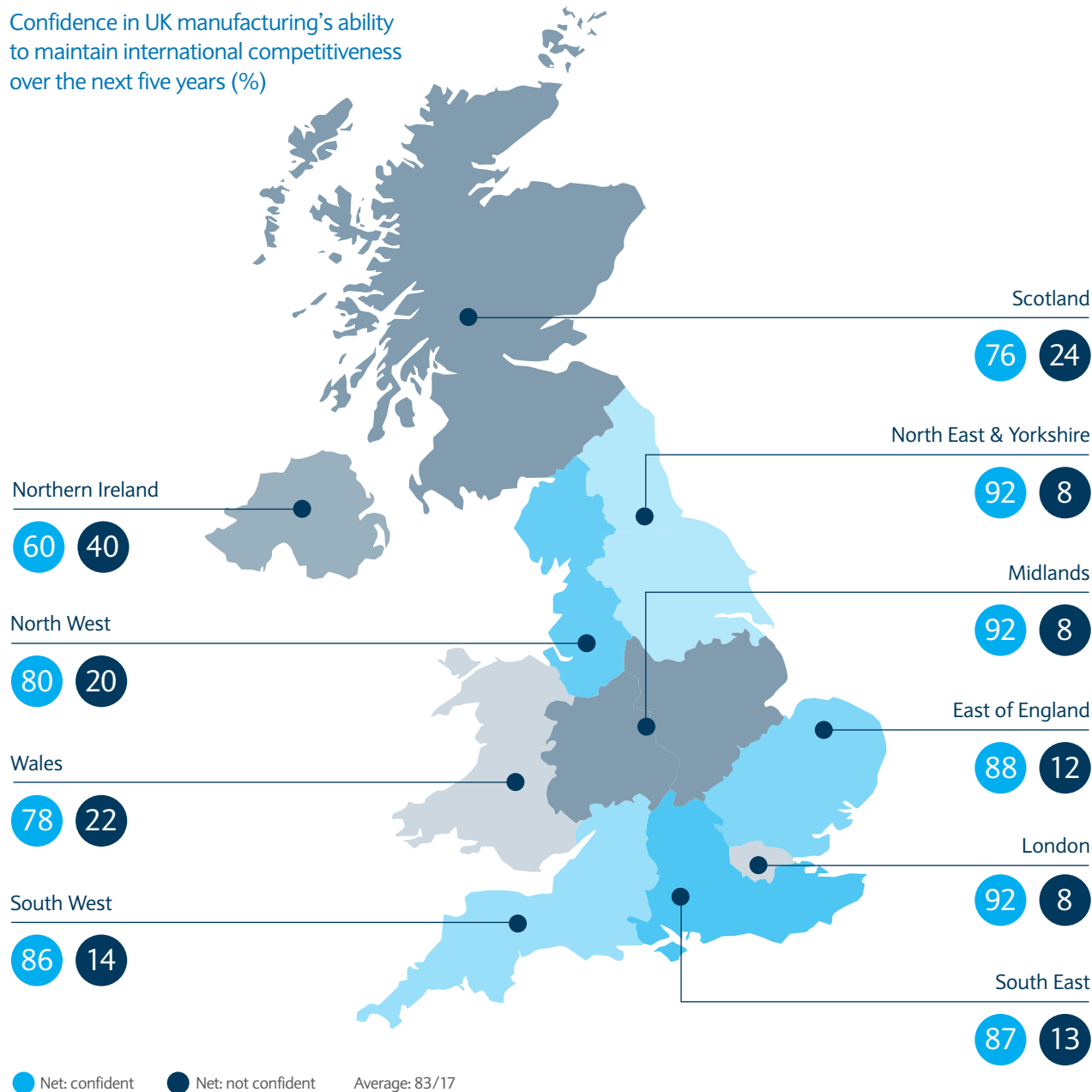
This productivity gap was highlighted again earlier this year in the government's Industrial Strategy Green Paper, which also underlined regional disparities. The government set out 10 priorities to drive manufacturing growth, the first of which was investment in science, research and innovation.

¹ www.ons.gov.uk/businessindustryandtrade/business/businessservices/bulletins/uknonfinancialbusinesseconomy/previousReleases

² www.eef.org.uk/about-eef/media-news-and-insights/media-releases/2017/sep/british-manufacturing-continues-climb-up-global-rankings

³ www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/bulletins/labourproductivity/jantomar2017/relateddata

Confidence in UK manufacturing's ability to maintain international competitiveness over the next five years (%)



A confident outlook

Given the rather static picture outlined earlier, the widely upbeat mood of UK manufacturers revealed by our survey is striking. Asked about the international prospects of the sector over the next five years, 83% express confidence.

Over half of those who are confident point to buoyant domestic demand for their products. Almost as many cite strong international demand. And for 43% of this group, the prospect of raising their productivity through new technologies is a factor in their confidence.

Confidence is highest in London, the Midlands and the North East & Yorkshire, and notably lower outside England. Of those who lack confidence, 80% are worried by the negative impact of Brexit. Skills shortages and cost pressures are also factors.

More than a third of respondents were unaware of the government's industrial strategy. A further 38% feel that the strategy would either have no impact on their business, or does not go far enough.

Alternative futures

The use of automation in global manufacturing has soared since 2010. Improvements in robot technology have transformed practices in many sectors, delivering efficiency and productivity gains.

UK take-up has been lower than in most other advanced nations, however. Lack of skills to implement these innovations and simple lack of funds to invest are among the deterrents. And our survey suggests 23% of manufacturers are still unconvinced by the likely return on investment in these technologies. Yet among those who have already invested, 51% report that the technologies have improved productivity. Cost reductions and the freeing of staff to work on higher-value activities are among the other gains experienced.



March of the robots

Automation of machines and processes has swept through global manufacturing since 2010. Demand for industrial robots has risen as the technology has improved.

The automotive sector was among the first to make widespread use of robots, but other manufacturers have since adopted them to improve efficiency and productivity. In 2015 global industrial robot sales rose by 15%, with the electronics, metal, chemical and plastics sectors driving the biggest growth.

UK industry has embraced this trend less enthusiastically than most of its peers. Shipments of robots to the UK in 2015 amounted to around half those to Spain and France, and only 8% of those to Germany. And UK manufacturing was using just 71 robots per 10,000 employees, compared with 301 in Germany and 531 in Korea.

Barclays' 2015 *Future-proofing UK manufacturing* report suggested UK usage might be picking up, but the trend wasn't sustained.⁵ In that report, many firms cited lack of funds and lack of external sources of support as barriers to investment. Some commentators have cited the high proportion of SMEs in the UK sector as a structural reason for low technological investment.

Are we 4IR-ready?

Companies with existing 3IR technology will be better placed to reap the benefits of 4IR. Unfortunately, the slowness of many UK businesses to invest in 3IR means that they are already behind the curve. A surprising 40% of small businesses (rising to 70% of micro-businesses) in our survey indicated that they felt that the technology comprising both 3IR and 4IR is not relevant. Of those planning investment, levels are low, at an average of just 5–7% above investment made over the past two years.

A step-change in investment intention is clearly required for UK manufacturers to have a chance to compete with their global peers.

According to a 2016 assessment by PwC: "The investment required to catch up is likely to be too costly, and faster-moving companies will have a significant advantage... Perhaps most importantly, companies who try to jump in too late will find that their internal cultures have lagged behind."⁶

Other experts have recently highlighted the UK's relative lack of readiness.

- Boston Consulting Group (BCG) found 79% of companies it surveyed had made some progress towards 4IR, lagging behind China (98%), Germany (90%) and France (89%)⁷
- KPMG underlined the need for greater commitment to R&D to ensure UK manufacturing's adoption of 4IR. It pointed to the UK's relatively low R&D investment at present – 1.7%, compared to the 2.4% average invested by OECD countries⁸
- And the EEF found that only 11% of UK manufacturers believed their sector was geared up to take advantage of 4IR.⁹

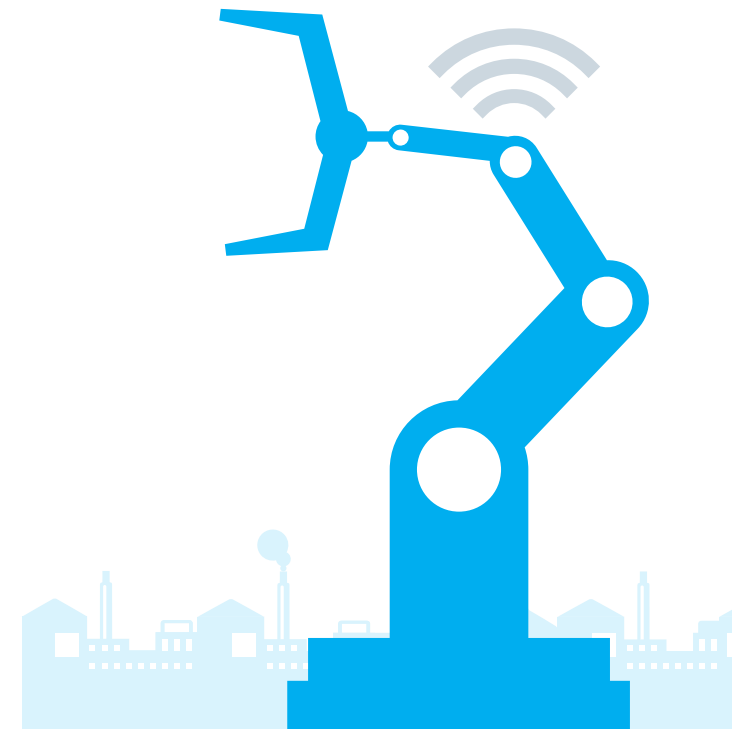
⁵www.barclayscorporate.com/insight-and-research/industry-expertise/investment-in-automation.html

⁶www.pwc.com/gx/en/industries/industries-4.0/landing-page/industry-4.0-building-your-digital-enterprise-april-2016.pdf

⁷media-publications.bcg.com/Is-UK-Industry-Ready-for-the-Fourth-Industrial-Revolution.pdf

⁸assets.kpmg.com/content/dam/kpmg/uk/pdf/2017/04/rethink-manufacturing-a-uk-industrial-strategy-for-industry-4-final-report-2.pdf

⁹www.eef.org.uk/resources-and-knowledge/research-and-intelligence/industry-reports/the-4th-industrial-revolution-a-primer-for-manufacturers



A digital advantage

At the same time, the UK holds some important advantages. For instance, its internet economy accounts for a higher proportion of its overall economy than any other G20 member, and is growing fast. BCG points out that this advantage will be enhanced if the UK maintains its lead in introducing 5G mobile networks, and continues to invest in the infrastructure and training required for 4IR adoption.

Our case study on EnviroVent (p.20) shows how one company is already adopting this technology to improve customer experience and future product development.

The threat from our competitors

While broadly bullish about future UK competitiveness, our respondents are acutely aware of the strong position of our rivals.

Asked how the productivity of the UK sector measures up against other international manufacturing hubs, they position the UK behind China, Japan, South Korea, Germany and Taiwan. They also sense that the UK invests less in 4IR technologies than its international counterparts.

Rating productivity

Respondents who believe the UK manufacturing industry is more productive than other international manufacturing hubs

Mexico	48%	Taiwan	30%
India	42%	Germany	28%
USA	34%	South Korea	28%
Canada	32%	Japan	25%
China	31%		

Yet, in terms of adoption of Industry 4.0 technologies, respondents placed the UK as third most advanced.

There are some wide disparities within this, however. For example, London businesses are far more likely to perceive the UK as being the most advanced adopter of 4IR technologies. 60% of respondents in the capital believe this, compared to 12% in the South West and Wales, and just 4% in Northern Ireland.

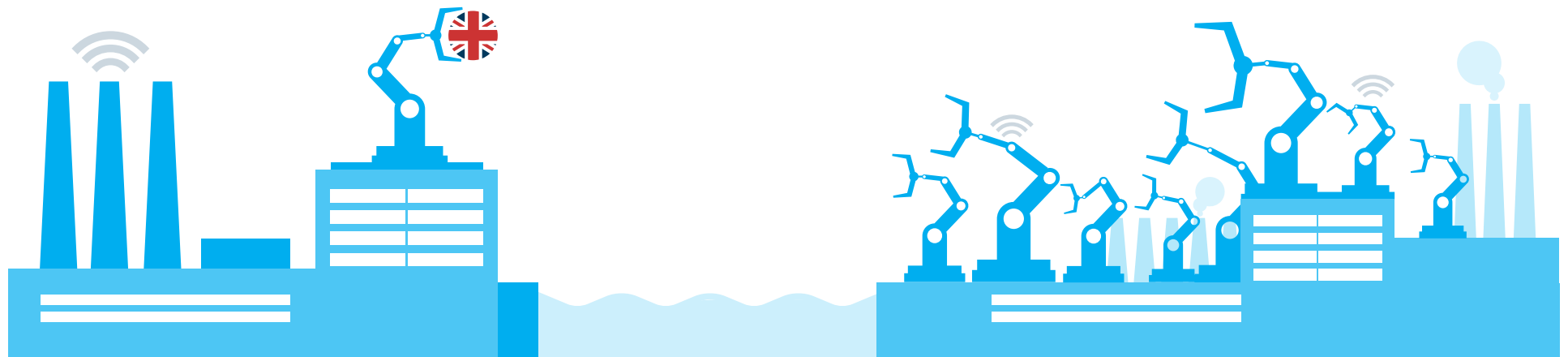
Industry 4.0 leader board

The five markets rated most advanced for 4IR technology adoption

Japan	36%
Germany	27%
UK	26%
China	24%
USA	21%

Similarly, while 74% of London respondents believe the UK invests more than its international counterparts, those in Northern Ireland and Wales are more likely to perceive the opposite – 64% and 58% respectively say the UK invests less.

A more realistic awareness of the challenges facing UK manufacturers who have not embraced 3IR as they strive to compete with global businesses leading the 4IR agenda is required. The time to act is now.



Two alternative futures

What would be the outcome if UK industry were to step up its investment in 4IR technologies now? Conversely, what if it falls behind in the global race to gain a competitive edge from 4IR?

Likely answers are provided by the development of alternative scenarios about the future of UK manufacturing.

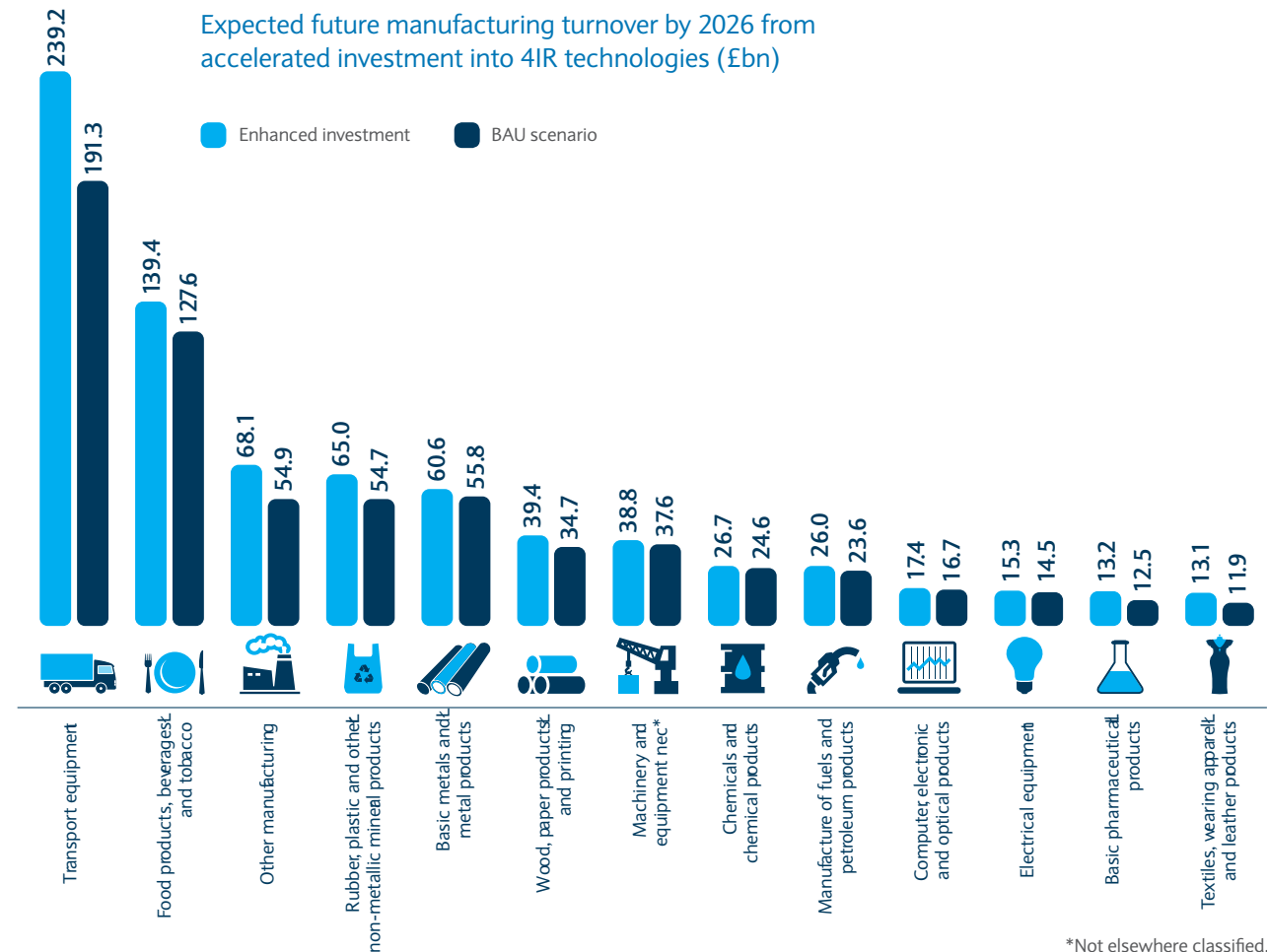
Scenario 1: Business as usual

The starting-point for our modelling is a baseline scenario, founded on official statistics as well as medium-term forecasts for the UK economy published since the Brexit referendum. This assumes that UK manufacturers continue to invest in 4IR on their current and recently forecasted trajectories. In 2016 manufacturers are estimated to have invested just over £3.3bn in digitisation. This is expected to rise to £4.4bn by 2021, and to £5.8bn by 2026.

Under this ‘business as usual’ projection, the industry is expected to generate turnover of nearly £661bn and economic output (GVA) valued at just over £207bn per year by 2026.

Output is expected to grow across most sectors, with vehicles and other transport equipment experiencing the strongest growth. Four sectors – fuels, chemicals, pharmaceuticals and computer/electronic equipment – are likely to see a decline in output.

These industries are also expected to shed jobs, as will two further sectors: textile and clothing, and the wood, paper and printing industries.



Scenario 2: Reduced investment

For this more pessimistic scenario, we assume that manufacturers' investment in digitisation grows at a slower rate than in the 'business as usual' case, with businesses devoting a lower proportion of their capital investment to it.

This scenario is supported by our findings on the persistent deterrents to investment, and by other analyses of the UK approach to this issue, including the ones mentioned on pages 6 and 7.

Here we project annual capital spend on digitisation of £3.92bn by 2021, and £4.71bn during 2026 – a reduction over 'business as usual' of £0.44bn and £1.09bn respectively.¹⁰ Over the decade, the assumption is that manufacturers spend 11.8% less on digitisation than currently expected.

The modelling suggests this would lead to a total turnover of 10% below the 'business as usual' scenario. Some sectors would be more heavily affected. Revenues for rubber, plastics and non-metal products would drop by 13.2%; vehicles and other transport equipment by 14.9%; and other manufacturing by 15.2%.

The overall effect on Gross Value Added would be similar. It would be reduced by £20.9bn, or 10.1%, against the reference case. Again, the sectors mentioned above would be most heavily affected, alongside the field of basic metals and metal products, which would see a 16.9% hit to GVA under this scenario.

By 2026 employment would decline by 6.3% over 'business as usual'. That equates to 164,000 direct jobs. We estimate that a further 72,000 jobs would be lost indirectly.

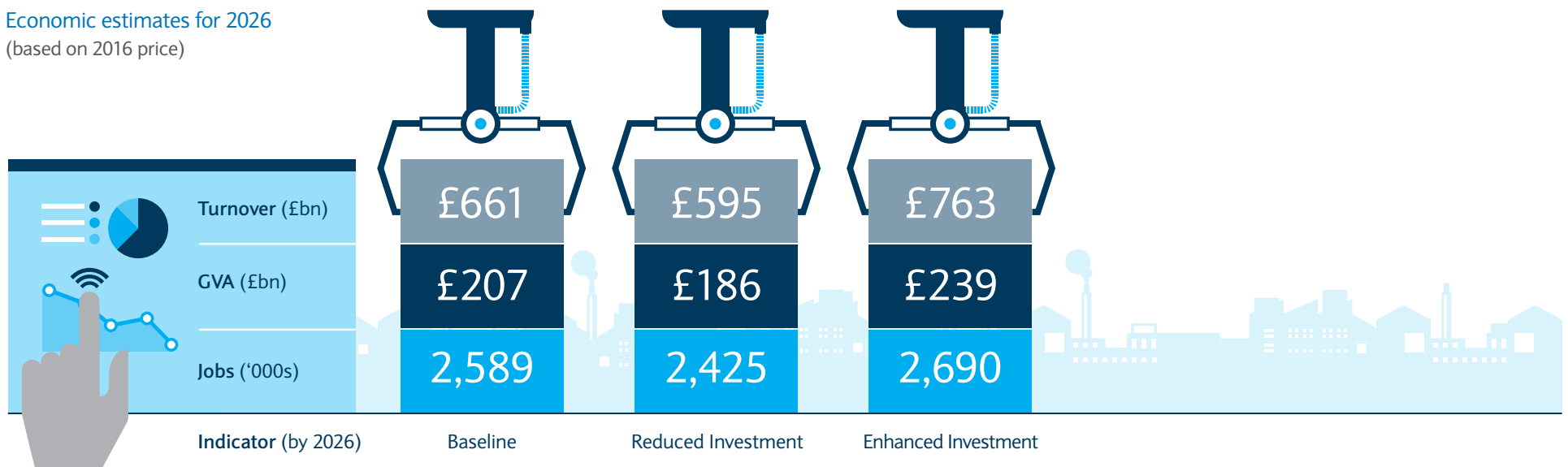
Sectors standing to lose the most jobs include textiles, clothing and leather products, pharmaceuticals, wood, paper and printing, and fuel manufacture.

The modelling suggests that reduced investment would lead to a total turnover of 10% less than the BAU scenario.

The regional effects would be uneven, too. The areas expected to suffer the largest reduction in direct jobs by 2026 would be the North West (22,000 jobs), West Midlands (21,000) and Yorkshire and the Humber (20,000).

¹⁰Figures in all scenarios reflect 2016 prices.

Economic estimates for 2026 (based on 2016 price)



Scenario 3: Enhanced investment

For this, more optimistic, scenario, we assume faster and more widespread adoption of 4IR processes and technologies among a greater proportion of UK manufacturers. This would be expected to generate increased production, lower costs and better productivity.

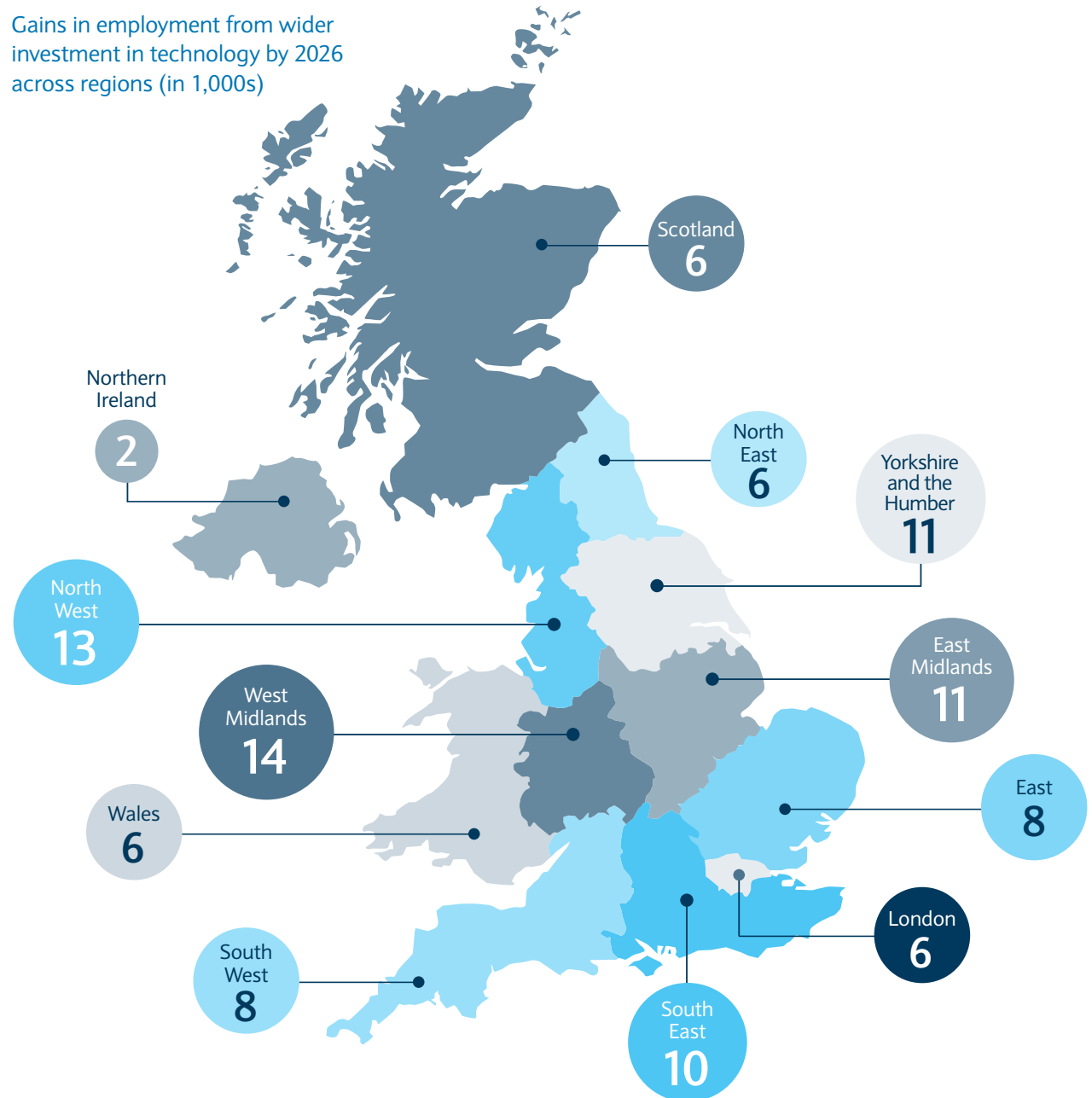
This scenario builds on the good awareness and appetite for investment displayed by many respondents to our survey. It assumes that the UK would exploit its advantages in areas such as the digital economy and 5G network development. It also assumes the government will act on its new industrial strategy by addressing skills gaps and supporting R&D investment.

The scenario assumes digitisation investment of £5.06bn per annum by 2021, and £7.75bn during 2026, an increase over current expectations of £0.69bn and £1.94bn respectively. Over 10 years, this amounts to an increase of £8.88bn, or 19.5%. We project this would lead to an overall boost to annual revenues of £101bn, or 15.3% above 'business as usual'. Some sectors would see greater benefit: revenues for transport equipment would grow by 25%, other manufacturing by 24.1%, and rubber, plastic and other non-metallic products by 19%.

The total increase in annual GVA would also grow by 15.3%, touching £31.6bn. There would be above-average increases in several sectors – a rise of over 30% in basic metals and metal products, for instance.

The increase in employment over current projections would be significant. Some 101,000 additional direct jobs would be created by 2026, 3.9% more than currently expected. A further 44,000 indirect jobs would be generated across the economy. The regions standing to gain most additional jobs are the West Midlands (14,000), North West (13,000), East Midlands and Yorkshire and the Humber (11,000 each), and the South East (10,000).

Gains in employment from wider investment in technology by 2026 across regions (in 1,000s)



A boon for productivity

Just over half of the businesses we surveyed which have invested in 4IR technology have seen productivity improvements. These benefits are spread across all sizes of business: they are reported by 45% of firms employing fewer than 10 people, and by 53% of companies with over 2,500 employees.

Businesses in the wood and paper products sector are most likely to have seen productivity gains, with the chemicals and food and drink industries also reporting widespread benefits.

Reduced costs are the second most common gain. 45% of 4IR investors have achieved cost efficiencies, with the pharmaceutical and furniture industries most likely to have made savings. Again, all sizes of business are gaining, though there are more beneficiaries among larger companies.

Almost a third say 4IR technologies are freeing up staff to do more valuable tasks.

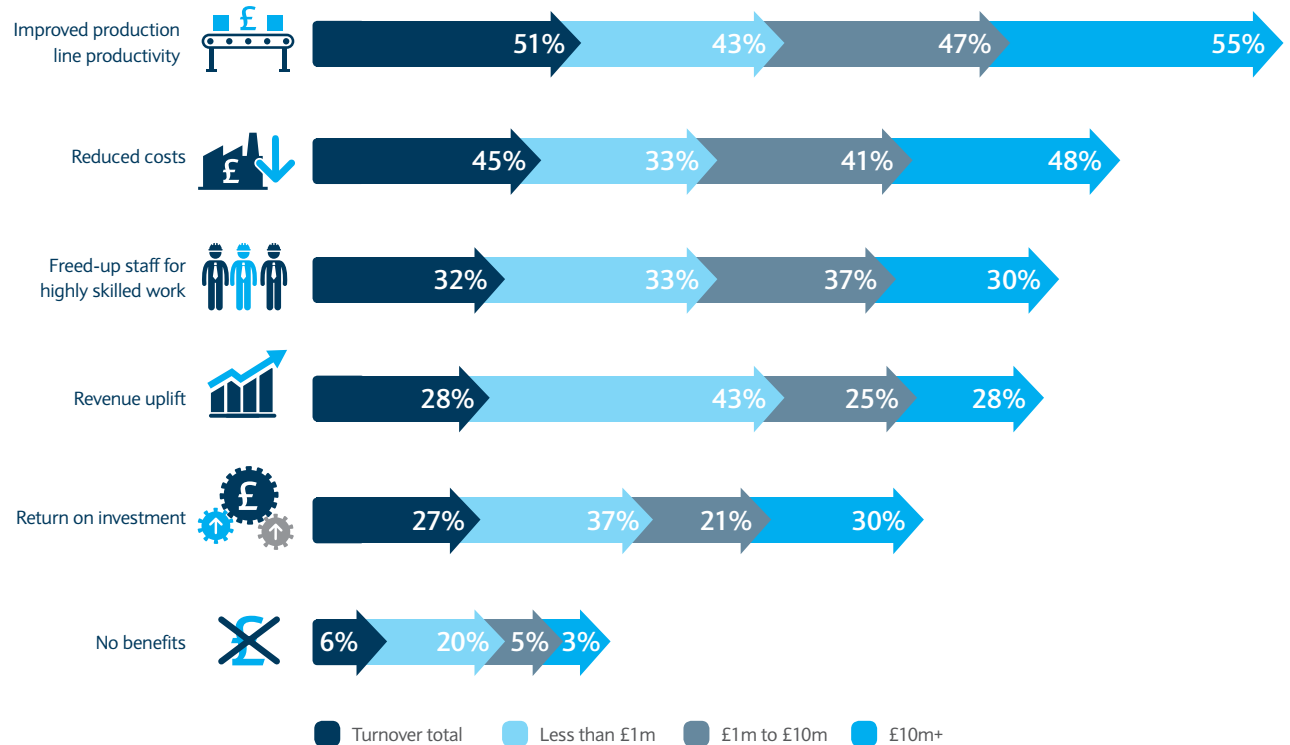
Yield, time and quality improvements

Increased yield is another key motive for introducing 4IR technologies and processes. Of our investors, 69% reported improvements in yield and productivity of the business. Over half of those said they had enjoyed gains of 10% or more.

A significant number of businesses have seen 4IR improve the consistency and quality of their end products. 18% noted improvements of 20% or more, 17% saw improvements of around 10% and a further 28% have seen single-digit percentage gains.

In addition, more than half of 4IR investors have gained by improved manufacture cycle times. For 30% of investors, times have been slashed by 10% or more.

Benefits noted by manufacturers that have invested in Industry 4.0 (by turnover)



4IR and the bottom line

The bottom line for business is, of course, whether 4IR ultimately boosts revenue and delivers a return on investment. 28% of our investing respondents report increased revenue, and 27% say they are already seeing ROI.

As with the other gains, these are spread between different sizes of firm. Companies with turnover of under £1m, however, are most likely to report increased revenues through 4IR – 43% have experienced this, compared with an average of 28%.

There is a wider variation between sectors. The proportions reporting a revenue boost range from just 4% of wood and paper product businesses, to half the respondents in textiles and clothing.

The quick and considerable ROI convinced us that implementing appropriate technology was a no-brainer for the company.

William Watkins, Managing Director, Radnor Hills

Investment plans and obstacles

UK manufacturers must plan to accelerate 4IR investment if our optimistic scenario for the future of the sector is to be realised. What do their current intentions say about the prospects – and what are the constraints they face?

Many businesses plan to step up their 4IR commitments. Those with investment plans intend to boost their commitment by 5 to 7% compared to the past two years, although for those playing catch-up with 3IR technologies this may not be enough.

Automation, already the most widely used of the 3IR technologies, is in line for the biggest boost. Almost half of respondents aim to increase their spend on programmable systems or robots, with a third planning to spend at least 10% more.

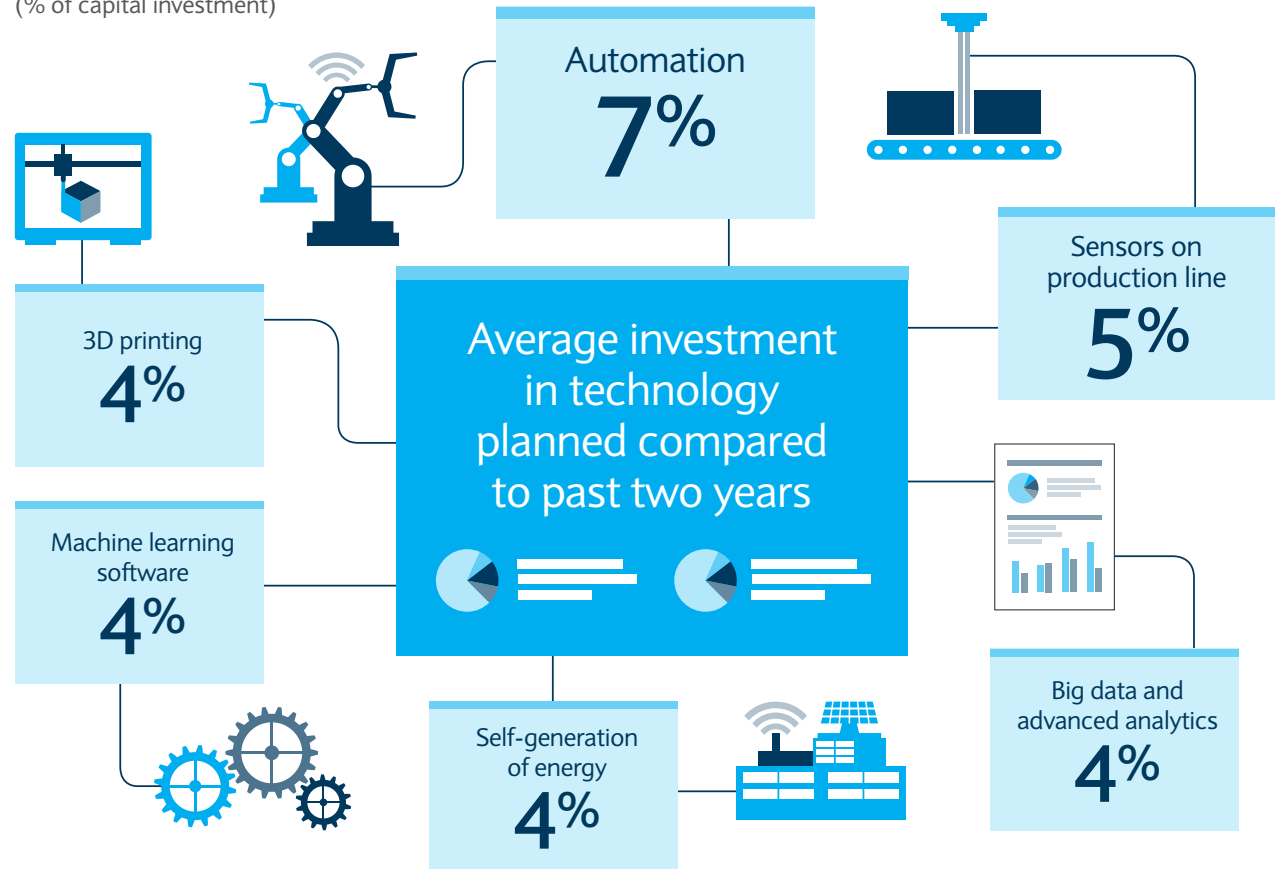
At least a fifth of our businesses intend to spend at least 10% more on each of the other technologies covered by our survey: sensors, big data, machine learning, 3D printing and self-generation of energy.

Scaling back on investment

However, some businesses plan to scale back their investments. Depending on the technology, this applies to between 5 and 10% of respondents.

And significant numbers of businesses have made no previous investments and do not plan to do so in future. The proportions here range from 23% (automation) to 33% (3D printing).

Average investment in technology planned compared to past two years (% of capital investment)



Potential for the future

Looking ahead, we asked businesses to what extent there was additional potential for increasing their use of 3IR and 4IR technologies over the next five years.

A total of 78% identify at least some potential for further commitment to automation. Over two-thirds see more potential in sensors, big data, energy self-generation and machine learning. And just over half can foresee more use of 3D printing over this period.

21% of businesses lack confidence that they have the in-house skills or knowledge required to use 4IR technologies.

Again, significant numbers of manufacturers see no medium-term role in their businesses for these technologies, ranging from 22% (automation) to 39% (3D printing).

Persistent doubts

Given the benefits already being reported by those who have invested in 4IR technology – only 6% of those who have invested report seeing no benefits – it is perhaps surprising that doubts about its value persist so widely.

Concern over return on investment is the most common reason cited by our businesses when asked what has prevented them from investing more in 4IR technologies. This is cited by 23% of respondents.

21% of businesses lack the confidence that they have the in-house skills or knowledge required to use 4IR technologies.

Funding issues

Financial constraints are prominent too. 19% of respondents say their business lacks funds to make long-term investments, and a similar proportion believe their capital spending priorities lie elsewhere. Lack of grants and loans from government, or funds from banks, are among other reasons cited.

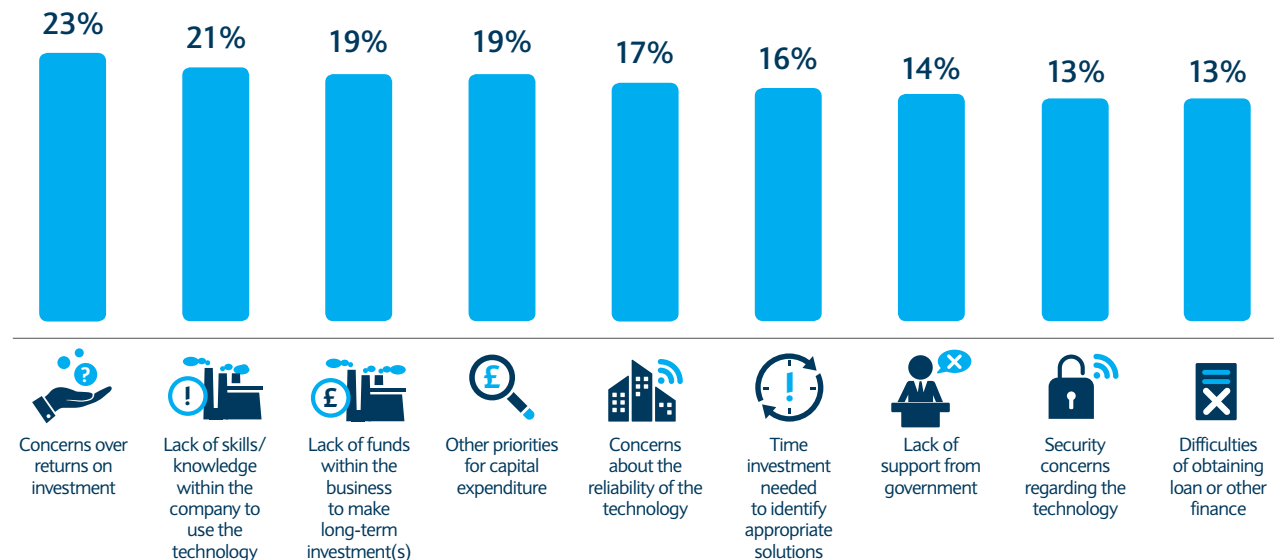
Some have concerns about the reliability of 4IR technology (17%) or its security (13%). Others simply say they need time to identify the right solutions, while uncertainty over Brexit is mentioned by 14% as a reason for putting off investment decisions.

Concerns about the employee impact of 4IR implementation are also raised. 11% worry that staff concern over losing their jobs would lower morale, while the prospect of making redundancies puts off 8% of respondents from investing.

In addition, a significant proportion of manufacturers believe 4IR technology is simply not relevant to their businesses.

This is particularly true of smaller firms, despite the fact that a higher proportion of businesses with turnover under £1m reported benefits in terms of return on investment and revenue uplift when compared to their mid-sized and large counterparts. In fact, two-fifths of small businesses say they consider each type of technology irrelevant to their businesses. Among micro-enterprises, the proportion rises to around 70%.

Constraints on investment in 4IR technology



An eye on the horizon

Offering greater support – in financing, education and implementation – could help to accelerate 4IR investment, according to manufacturers.

Given the constraints on manufacturers, what can be done to spark action and encourage faster and deeper investment in 4IR? When asked what would help them to start investing, or to invest more, our respondents point to a range of factors.

Grants and loans

An increase in the availability of government grants and loans is the most commonly cited initiative. 36% of respondents said this would be helpful.

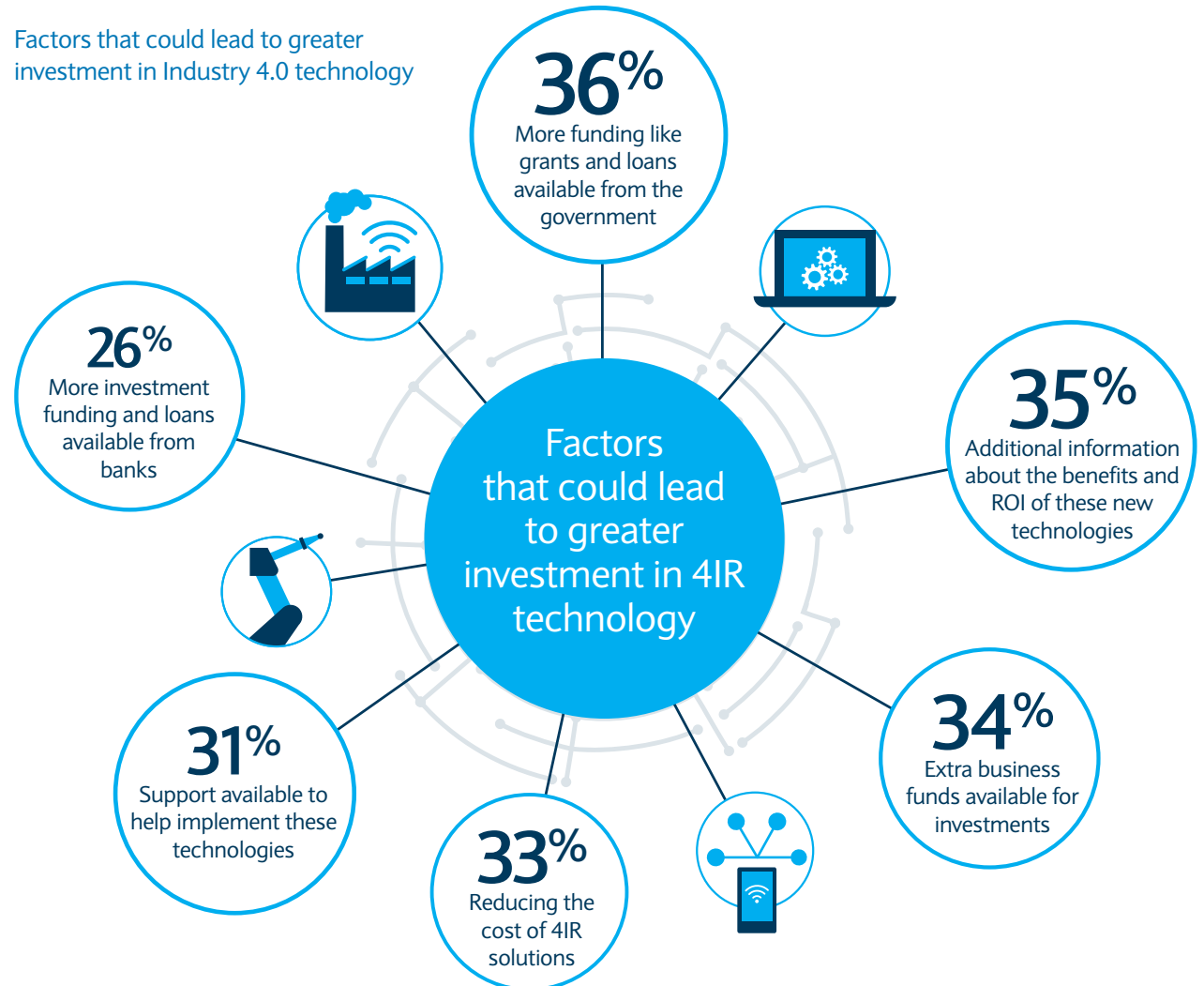
Government financial support would be especially welcomed by the smallest operations. 45% of businesses with fewer than 10 employees would judge this helpful, compared to a quarter of the biggest enterprises.

Wider availability of 4IR-supporting funds from other sources would also be welcomed by a significant number of firms.

Just over a quarter call for increased availability of loans or other finance from banks, and a similar number would welcome grants or loans from sources other than government or financial institutions.

More generally, 34% agree that “increased availability of funds within the business” would enable them to make or enhance 4IR investment. And a third suggest that a reduction in the cost of 4IR solutions would be critical.

Factors that could lead to greater investment in Industry 4.0 technology



A hunger for information

There is also evidence that UK manufacturers are in need of support both to fully understand the potential benefits of 4IR technologies, and to implement them within their businesses. This ties in with the earlier suggestion that lack of skills is a significant barrier.

More education is the second most commonly cited factor to encourage investment. 35% of our respondents would welcome further information on the benefits and return on investment that 4IR can provide.

And 31% would be keen to have practical support to adopt 4IR, whether from government, manufacturers of the equipment or other sources.

Notably, the call for education and support is fairly uniform across business sizes, suggesting that big enterprises are as likely as micro-firms to benefit from this kind of help.

Even sectors that are among the leading adopters of 4IR would welcome further information and assistance. Over half of pharmaceuticals, firms and almost half of food and drinks businesses, for example, say more education is important.

More certainty over post-Brexit trade would encourage 28% of businesses to consider more 4IR investment. This would be especially welcomed by firms in Northern Ireland (48%) and by businesses in sectors such as chemicals and aerospace & defence (44% and 41% respectively).

The role of government

The government's Green Paper, *Building Our Industrial Strategy*, was published in January 2017. While it does not specifically mention 4IR, the paper acknowledges the challenge of the UK's productivity gap.

One of its solutions is investment in science, research and innovation; the government has pledged to invest an extra £4.7bn in R&D funding by 2020/21. Among the other priorities are skills development and infrastructure upgrade in UK manufacturing.

UK manufacturers are in need of support both to fully understand the potential benefits of 4IR technologies, and to implement them within their businesses.

Will the strategy boost the competitiveness of UK manufacturing? Most businesses believe it will have an effect on their business – only 19% believe it will not.

However, 19% also express concern that what they have heard so far about the government's plan "does not go far enough" to address the challenges facing the sector.

Only 17% are confident that the government's commitment will ensure a sufficient future pipeline of skilled workers. And just 15% believe it will address the UK's competitiveness issues; while a similar number say the government's commitment provides UK manufacturing with the financial investment it needs to secure a successful future.



Strategies for success

Preparing your business for 4IR is not an easy task, but there are a number of strategies you can adopt that will help.



Are you 4IR-ready?

Identify what stage your business is at in adopting 3IR technology such as automation. Because 4IR builds on the 3IR platform, lack of investment now could prove detrimental in future. As the latest industrial revolution transforms your sector, consider what your business must do to remain competitive.



Reach out for help

Explore the potential for financial and practical support through government initiatives such as Innovate UK, Digital Catapult and High Value Manufacturing Catapult. Talk to your bank about financing at an early stage.



Join forces

Discuss your plans with supply chain partners. Explore possibilities for collaboration and joint investment in technologies. Emphasise the mutual benefits.



Upskill your workforce

Those who have invested report significant gains in terms of productivity – as well as freeing-up staff to work on higher-value tasks. Ensuring that employees have the skills to implement next generation technologies will be critical to future success.



Case study: Radnor Hills

From its small beginnings in rural Wales, soft drink supplier Radnor Hills has harnessed the power of technology to become a major player with the capacity to produce a staggering 400 million bottles per year.

The soft drinks industry is a numbers game. Twenty years ago, Radnor Hills – which started life as a mineral water supplier – was using bottles that weighed 30 grams.

Two decades and heavy investment in the finest bottle-blowing technology later, the company now makes bottles using 13 grams of plastic resin. But this is still not the lightest in the sector; some manufacturers have reduced this down to just nine grams.

Investment in the right technology and automation processes is essential to remain competitive in an industry that depends on raw materials. Particularly when those materials are increasingly sourced from Europe and so often affected by a weakening pound.

A digital automated future

Automation has already been incorporated across a number of business processes, reducing human error and increasing efficiencies in manual processes. Investment in automating our tank cleaning process removed the human effort and time required and reduced any waste created by minimising errors.

The quick and considerable ROI convinced us that implementing appropriate technology was a no-brainer for the company. It is now on its way to becoming a paperless production plant – with its entire quality control system centralised on one server. Because we took advantage

of the automation advances during the 3rd industrial revolution we are now in a strong position to take advantage of 4IR and the opportunities it brings. We strongly believe that this will be the only way for us to remain competitive in the future.

Investment in the right technology and automation processes is essential to remain competitive.



Tackling rising costs

For us – and right across manufacturing – the rising minimum wage, growing national insurance contributions and initiatives such as the Apprenticeship Levy are raising operating costs.

As a result, maximising the use of technology to improve efficiencies and free up employees for more highly skilled roles is becoming increasingly important.

Forecasting success

Our paperless production line provides access to accurate, up-to-date data at the touch of a button, but we are already working towards a second phase which will enable the live collection of data. It is a reality that, only three years ago, was beyond our wildest dreams.

But it is the only way forward for us and for the manufacturing industry in general.



William Watkins

Managing Director, Radnor Hills



Case study: EnviroVent

The Fourth Industrial Revolution (4IR) is here. For UK manufacturers like EnviroVent, this represents a unique opportunity to revamp processes and products, as well as adding value to the end-customer, believes its CEO Andy Makin.

Smart devices are everywhere in UK homes. Not just smart phones, but smart lighting systems, fridges, printers, entertainment systems, hub-style personal assistants, and even cars.

As such, more and more machines and devices are continuously communicating with each other – in what is known as the Internet of Things (IoT). The integration of these technologies, and the data they offer up, into business and production processes represents a huge opportunity for manufacturers to leverage 4IR.

The next level

At EnviroVent, we continue to invest in new technology, with an emphasis on connectivity. We see IoT as one of the main forces driving innovation and growth in our business. What that means in practice, is that we are no longer ‘just’ a manufacturer of ventilation units – and the product is becoming much more than the sum of its component parts.

Our new ‘myenvirovent’ app gives the consumer total control of their ventilation system from anywhere in their home via their Apple or Android smartphone or tablet. Not only does the app give users greater flexibility to amend their ventilation rates, they also get notifications about maintenance – such as when a filter needs changing.

The app is extremely user-friendly and flexible, allowing the installer to set up the ventilation rates with visibility of the unit’s current status at the touch of a button. Through its use, consumers can also access user guides and technical documents, and can provide feedback and future product requests to the EnviroVent R&D centre.



This kind of functionality delivers added value to the customer – which is absolutely key to taking advantage of the changes that 4IR is bringing. Innovation has to be first and foremost about making life better for the consumer, and if there are business benefits to that, then so much the better.

Technology platforms

Successfully leveraging IoT isn’t necessarily straightforward, though. There are many aspects to consider, not least which technology platform to use. There is no point manufacturing a device to work on IoT only to find that it won’t communicate with other devices because the technology is incompatible.

It’s also important to consider how many of your end-users will have access to the technology required to use the device. There will be some consumers who don’t have the know-how to benefit from smart technology in your products, or who don’t want to be tracked. Our customer groups will not want too much customisation and complexity, or they will not recognise the value in it.

For instance, there is also a growing demand for such functionality among younger, and tech-savvy, homeowners. This is being driven in large part by the rise of smart home hub technology – which is becoming a lifestyle choice and even a status symbol.



The new normal

Regardless of which category a consumer falls into, it is important for any manufacturer looking to leverage IoT to undertake customer education. Only once the benefits of a smart solution are truly understood will widespread adoption happen. Right now, there is also a tendency for this kind of functionality to be seen as a gimmick rather than a relevant and useful tool.

Manufacturers have a role to play in addressing that misconception – starting with designing smart solutions that have tangible benefits for the consumer. That means asking tough questions about what your product does, how it can be improved, why IoT connectivity would be advantageous, and what your solution might look like in the future.

Only once the benefits of a smart solution are understood will widespread adoption happen.

This can seem like a daunting prospect, since there are no right answers to some of these questions – and no-one is able to accurately predict the future. What is certain, though, is that IoT is not going away. This means it is time for British manufacturers to think seriously about how to combine big data with IoT to provide enhanced, customised offerings to end-users, whilst garnering business benefits.



envirovent

Andy Makin
CEO, EnviroVent



Case study: Arlington Industries

As vehicle manufacturers turn to lighter, more advanced materials, strategic investment is helping supply chain integrators build pace and flexibility into their business models, says Group CEO Mark Franckel.

Ten years ago a tier one supplier like Arlington could safely invest in a robot with the confidence that it would continue to make the product in question for at least the next five years. But unprecedented change has driven a significant shift in the way we invest.

Brexit is naturally a concern for the UK manufacturing industry, but ultimately technological development presents the greater challenge – and opportunity.

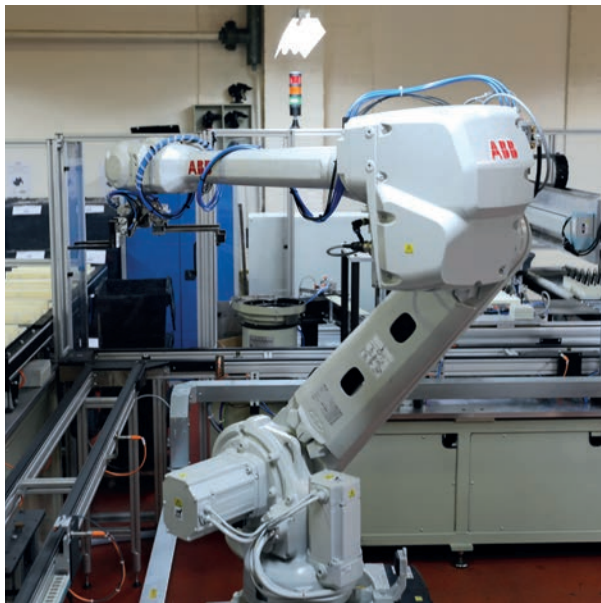
As this pace of change accelerates at a greater rate than ever before, OEMs want to focus on designing and selling the best cars for their customers – and for our planet. For the supply chain, this means building pace and flexibility into their business.

A flexible future

Growing demand for hybrid and electric vehicles has not only introduced further variability in terms of the engines required, but in the combination of traditional and new materials used. This has a knock-on effect for other supply chain processes as joining composites will require bonding, rather than the heavy duty welding robots we currently use.

When considering new investments, working to a one- to three-year plan is no longer sufficient. Expensive machine tools may just about deliver a payback over three years, but it is slipping towards payback of four or five years.

For this reason, decision-making which would have once centred on identifying the most cost-effective tooling for that job must consider how versatile a new machine is likely to be. Sometimes a tool will deliver in both areas, but the perfect machine for the job today may not be suitable in the future. That is why we are constantly looking ahead – trying to anticipate change and investing strategically – to ensure our technology can support forthcoming demand.



Of course, in automotive, the customer is heavily involved in the ‘tooling’, so we are not always able to make these decisions independently. But if we think that a product is likely to change in the future, then we might only invest in one of the specified machine tools and work it more intensively, rather than investing in four that could soon be obsolete. This also protects us, to an extent, from unexpected slowdown in a project.

We are constantly looking ahead – trying to anticipate change and investing strategically – to ensure our technology can support forthcoming demand.

This impact is not quite so pronounced in the Group’s Aerospace division. Implementing change in the aerospace industry can take longer, but we are seeing more composites and exotic materials being used to make aircraft lighter and more fuel-efficient. This presents new challenges and opportunities for design and manufacture of jigs and fixtures required, as well as the flying parts and cutting tools used during production. But planning, testing and investment are still generally more long-term.



All-in-one

The goal is, of course, getting to a stage where a single production line can cope with almost real-time variation in both volume and material.

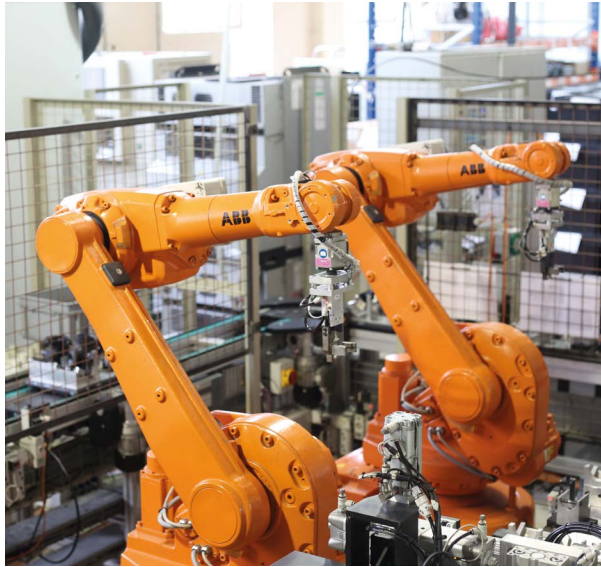
In order to meet commercial targets, however, I think we are going to see a separation of volume and flexible sales: one flexible line, with a higher number of cells and probably more people; and one volume line, with a robotic cell and perhaps just one person. Of course, even the high volume line will use flexible tooling as much as possible.

Automating labour-intensive processes frees our employees to focus on the more complex value-added parts. This has changed the way in which we recruit; increasingly, we are looking for individuals in these higher-value positions of sophisticated assembly or engineering, while also accelerating the development and training of our existing workforce.

Automation and advanced robotics have also enabled us to increase our volume capacity.

This works to give our customer greater value and provides greater efficiency throughout our business. A mere 1p per part may not sound like much, but in the high-volume world of vehicles, this would offer a key efficiency for the customer and the supply chain integrator. Trying to find these win-win situations is the challenge that we face.

Automation and advanced robotics have also enabled us to increase our volume capacity. More capacity has led to winning more orders, and investment has led to us winning more complex parts. Robots can now do more manual tasks, while more complex parts are still semi-automated. With new technology and more customers we are employing more people and we have actually increased our headcount by 33% over the last three years.



Real-time data

In the UK we are now seeing greater integration between suppliers and manufacturers, which presents a great opportunity for us all.

Real-time data and communication is going to become increasingly important. Already, the frequency of shipments means that per-shift press shop analysis cannot be done on a daily or weekly basis; it must be monitored in real time.

Investing more in our IT infrastructure will also enable us to talk to the sophisticated, real-time systems of these large manufacturers and process variable orders seamlessly.

We have to prepare for a time when OEMs want the structure of a car to be the same, regardless of whether it has an electrical, hybrid or petrol engine. And we need to be agile enough to be able to receive this order data and cope with the variability.

Two steps ahead

As a management team we need to be looking to the future and anticipating change.

We need to be asking ourselves: what's next? What's around the corner? The introduction of more key account managers should help us to get closer to each customer and create greater collaboration on future projects.

Globally, there is an increasing demand to become more agile, flexible and efficient.

I believe that, increasingly, the supply chain will be faced with even greater challenges. A bracket might be steel at the moment, but cars are getting lighter and we need to be prepared to find alternative materials that can cope with engine temperatures, for example.

Globally, there is an increasing demand to become more agile, flexible and efficient. The United Kingdom has always demonstrated our ability to change, to innovate and to meet global demand. And that is why it has and always will be recognised as a county of manufacturing excellence.

I see this as an exciting opportunity for us all. And one that we are ready to embrace.



Mark Franckel
Group CEO, Arlington Industries



Key takeaways

- By enhancing investment in 4IR technologies, manufacturers could benefit from an overall boost to annual revenues of £102bn. This could lift the sector to growth of more than 15% above current expectations within a decade, and create 101,000 extra direct jobs and 44,000 indirect jobs
- This enhanced investment could also lead to a £31.6bn increase in GVA
- Manufacturers are confident about the UK's future competitiveness, and 43% believe new technologies will boost productivity
- UK manufacturers that have already invested in 4IR technologies are already seeing the benefits. These include: improved productivity (51%), reduced costs (45%) and better use of staff time (32%)
- However, nearly a quarter of businesses are still concerned about return on investment in 4IR; lack of skills or funds to implement it are also deterrents
- Further investment could be encouraged by increasing the availability of grants and loans for 4IR through government and other sources, and by enhancing education, training and support for 4IR implementation.

To find out more about how Barclays can support your business, please call 0800 015 4242* or visit [barclayscorporate.com](https://www.barclayscorporate.com)

*Calls to 0800 numbers are free from UK landlines and personal mobiles, otherwise call charges may apply. To maintain a quality service we may monitor or record phone calls.

About the author

For further information and to find out how our sector specialist teams can support your business, please contact Mike Rigby, Head of Manufacturing, Transport and Logistics.



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Mike is passionate about the manufacturing, transport and logistics sectors and believes they are essential to the UK maintaining a balanced and resilient economy. His vision is to make Barclays the bank for companies in the manufacturing, transport and logistics sectors.

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