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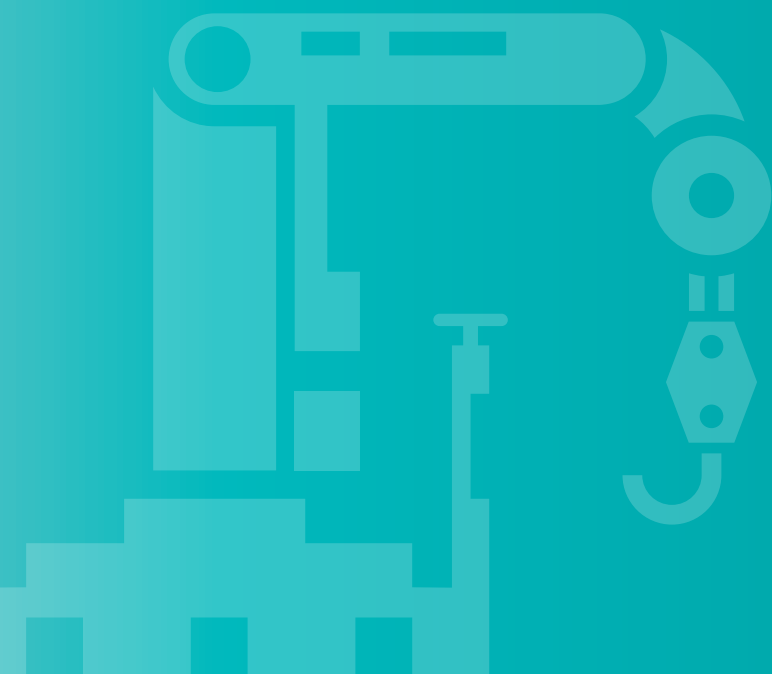
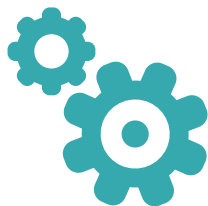


The Digitalisation Productivity Bonus: Manufacturing in the North East

What value does digitalisation
offer manufacturers in the
North East of England?

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Management Summary

- Manufacturers now recognise that they must implement Industry 4.0 technology in order to remain competitive. However, manufacturers need to be able to demonstrate measurable outcomes to support the business case for digital transformation
- Measurable improvements in manufacturing productivity are an obvious and reliable starting point for demonstrating the value of digitalised equipment and technology
- Research from Siemens Financial Services has conservatively estimated the productivity gains from digitalisation and automation – known as the *Digitalisation Productivity Bonus* – for the manufacturing sector in the North East of England
- Funding investment in digitalised technology and equipment is a major challenge for manufacturers. However, expert financiers are developing specialist financing tools – known as Finance 4.0 - to help manufacturers digitally transform their operations in an affordable and sustainable manner
- The finance tools within Finance 4.0 continue to evolve, but some widely used techniques include:
 - Pay to Access/Use Equipment & Technology Finance
 - Technology Upgrade and Update
 - Software finance
 - Pay for outcomes
 - Finance to Assist Transition from Pilot to Mainstream
 - Working capital solutions



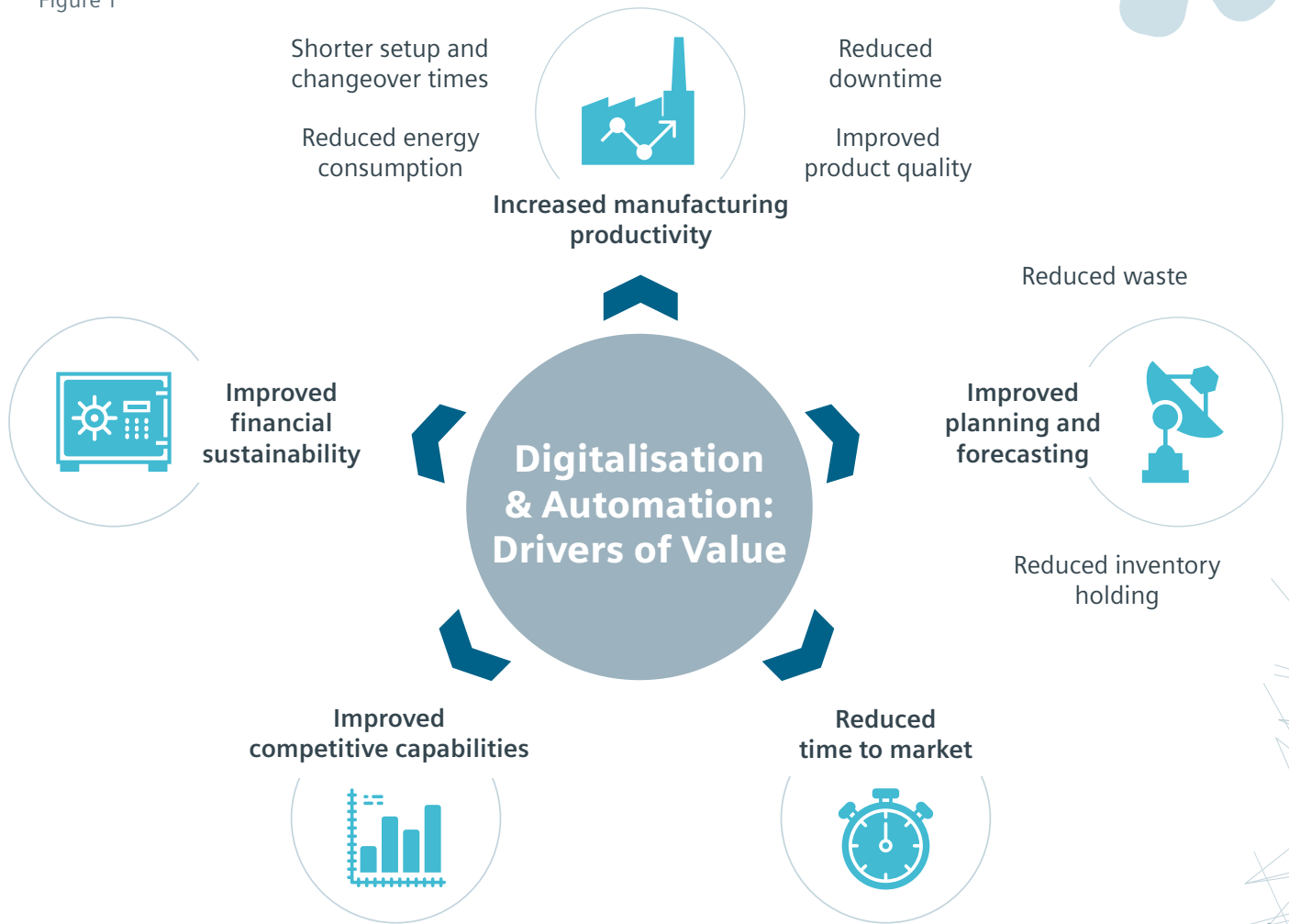
Automation and digitalisation: When not if

Debate within the manufacturing community has moved on from whether investment in Industry 4.0 technology is worthwhile. That fact is now assumed. Instead, the questions facing manufacturers are when and how to digitally transform their operations. Industry 4.0 within the manufacturing environment is built upon digitalisation of processes. The pace of adoption and implementation of digitalised technology varies from country to country, region to region, sector to sector, business to business. In some instances, the main focus is on making manual processes automated, by controlling them through digital systems. For processes that are already automated, the focus is on further digitalisation through the Internet of Things (Iot). Here, sensors installed within the physical environment provide real-time data which can be used to enhance processes. This is achieved in a number of ways, such as increasing production capacity, achieving faster job setup and completion, maximising equipment 'uptime', enabling predictive maintenance and enhancing supply-chain logistics with just-in-time distribution. Some manufacturers are also improving their competitiveness with mass-customisation; by tailoring products on a large scale while achieving the same economies of mass production.¹

Manufacturers recognise that in order to endure and grow in increasingly international and competitive markets, investment in Industry 4.0 technology and solutions is inevitable. Nevertheless, this substantial investment needs a business case to support it so that it can be justified to stakeholders and shareholders. This will include clear evidence of the outcomes of digitalisation – including expected revenue and growth benefits.

However, the commercial gain from digitalisation is often difficult to evaluate. Siemens Financial Services commissioned research to understand which of the benefits of digitalisation (see fig.1) could be most reliably calculated and used as evidence by manufacturers seeking to make a business case for investing in Industry 4.0 technology.

Figure 1



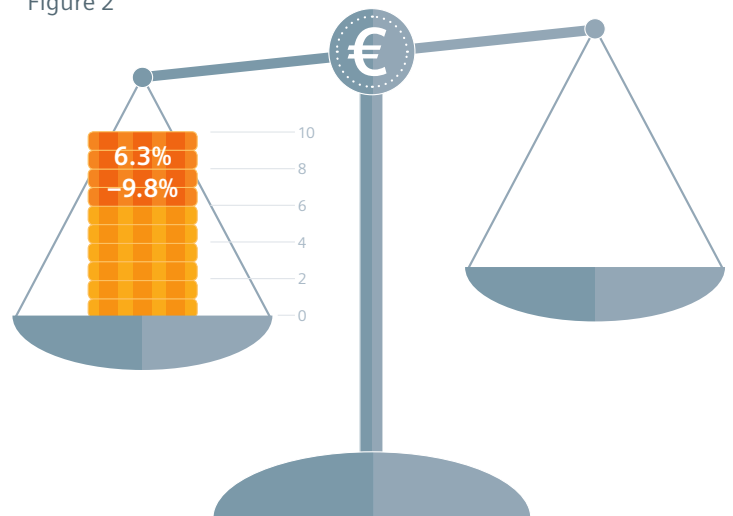
The Digitalisation Productivity Bonus

The vast majority of manufacturers and expert consultants interviewed for the research² confirmed that the ability to **increase manufacturing productivity** as the most valuable starting point for measuring the potential value from digitalisation. Manufacturers can clearly see that manufacturing the same product at less cost, or increasing production with little or no cost increase improves their competitiveness. The research indicates that this is true for both manufacturers just starting their digital transformation journey and those that are further down the road and are now looking to install the latest sensor-based technology and further digitalise their processes.

The research found that manufacturers can make production productivity gains equivalent to between 6.3% and 9.8% of their annual revenues by automating and digitalising their production systems. Named the **Digitalisation Productivity Bonus**, respondents identified this gain as the most reliable starting point for building a business case to demonstrate the benefits of investing in Industry 4.0 technology and equipment.

Digitalisation Productivity Bonus: reduced production costs with digitalised technology

Figure 2





“The research found that manufacturers can make production productivity gains equivalent to between 6.3% and 9.8% of their annual revenues by automating and digitalising their production systems.”



Region Focus – The North East of England

Manufacturing jobs in the North East account for 10% of the region's total workforce, the second highest for any region.³ Although uncertainties around the UK's relationship with the EU remain, global companies from sectors including automotive, technology, pharmaceuticals and food production have all invested in the region.⁴

The region boasts the International Advanced Manufacturing Park (IAMP)⁵ which promises to bring together manufacturers, offering "superb access to global markets, a skilled workforce and a place where like-minded people can transform technologies, drive economies and accelerate business growth."⁶

Key manufacturing sub-sectors in the North East are:

Automotive

Several companies from across the automotive supply chain have joined to form the North East Automotive Alliance (NEAA), an industry-led cluster group, established to support the economic sustainable growth and competitiveness of the automotive sector in the region. The automotive cluster now employs over 30,000 people, higher than any other UK region and impacts a further 141,000 jobs across the UK.⁷

The North East is home to leading OEMs which are responsible for producing over 502,000 passenger cars and commercial vehicles, 6,400 non-highway vehicles and over 325,000 engines.⁸

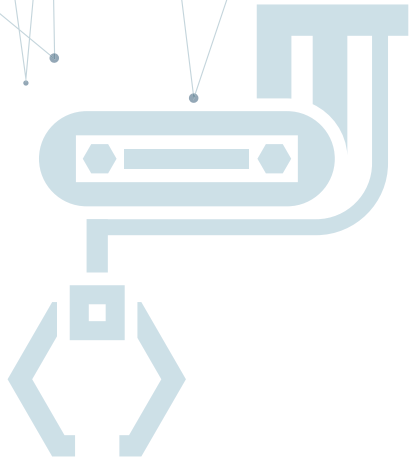
There are over 240 automotive companies in the North East automotive sector, together they generate over £11 billion in sales, export over £6.5 billion annually, with a trade surplus of £2.6bn. Today the sector directly employs over 30,000 people and impacts a further 141,000 jobs across the UK.⁹

Within the region, there is growing investment into research and development and new and emerging automotive technologies such as advanced propulsion and connected and autonomous vehicles.¹⁰

Pharmaceutical

The North East boasts over 5,600 employees working in 145 companies in the medicines manufacturing industry. Including the supply chain, there are around 7,750 employees in 200 companies. 95% of North East pharmaceutical production is exported.¹¹

A number of significant pharmaceuticals manufacturers are present in the area, including one which is a recognised centre of excellence for tablet manufacturing and packaging. One global company in the region produces over 500,000 units a day at its 60-acre manufacturing site, employing 1,100 people.¹²



Companies are taking advantage of the North East's strength in the digital health sector to lead technological advances in next generation molecular diagnostics tests, using software to research genomics and biochemistry.¹³

Chemical processing

The North East of England Process Industry Cluster (NEPIC) represents chemical-using industries including petrochemicals, polymers & materials, fine & speciality chemicals, pharmaceuticals, biotechnology and renewables. The group aims to make the region one of the most competitive and successful chemical-processing locations in Europe.

One of these manufacturing plants hosts Europe's second largest ethylene 'cracker', and another, the world's largest Low-Density Polyethylene plant.¹⁴

Digitalisation Productivity Bonus

Siemens Financial Services has applied its **Digitalisation Productivity Bonus** model to the manufacturing sector in the North East to demonstrate the potential gain from Industry 4.0 for manufacturers in the region. The average 'Bonus' percentage range was applied to the total annual revenue of the manufacturing sector in the North East (revenue data derived from official third party sources). The resulting financial sums in the table below estimate how much North East manufacturers could gain from digital transformation and the resulting improvements in manufacturing productivity. These efficiencies, although not estimated here, can also be realised throughout the supply chain.

Estimated Digitalisation Productivity Bonus – reduced production costs resulting from conversion to digitalized technology in North East England

Region	Baseline Bonus (production cost reduction)
NORTH EAST	£1,650m

The **Digitalisation Productivity Bonus** is only one aspect of value that digitalisation is delivering to manufacturers in the North East. Nevertheless, it provides manufacturers with a reliable starting point from which to build a digital transformation business case. Financial gains which result from digital transformation could be returned to shareholders, invested in R&D, or used to improve a company's competitive position in its key marketplaces.



Financing Industry 4.0

Despite the clear benefits of the technology, manufacturers still face the significant challenge of making a major initial investment in Industry 4.0 automation and/or digitalisation technology. To help manufacturers overcome this hurdle, specialist financiers have developed “Finance 4.0”, a set of financing tools which enable the transition to new-generation digital technology. These tools are designed to make Industry 4.0 investment affordable and sustainable, while helping to ease pressure on manufacturers’ cash-flow and working-capital.

Financing digitalisation:

Pay to access/use equipment & technology finance

This tool enables manufacturers to acquire a piece of technology, machinery or a system from OEMs without the need to use up their own capital – whether accrued profits or bank loans. Financial solutions will usually be based on a range of options: finance lease, operating lease, rental or hire purchase arrangement. This type of financing can also cover associated costs of ownership, such as maintenance, into a “bundled” monthly payment.

Technology upgrade & update

For manufacturers already well on the path to becoming a fully digital enterprise, integrated equipment and technology finance options allow them to upgrade during the financing period and offer protection against technological obsolescence. Upgrades might involve replacing with a newer model or retro-fitting enhancements onto the main technology platform.

Software finance

The journey to digital transformation requires deploying combined hardware and software solutions that can deliver digital data streams of performance data. This is recognised by specialist financiers that can offer manufacturers integrated arrangements for financing requirements.

Pay for outcomes

Financing agreements in which payments are predicated on the expected business benefits, or “outcomes”, that the technology makes possible are being offered with increasing frequency. Savings or gains from access to the technology are used to fund monthly payments, making the technology cost-neutral for the manufacturer. In some cases, this means that solutions can be adopted at low or zero-net cost, because the benefits pay for the technology upgrade over the life of the financing plan.

Finance to assist transition from pilot to mainstream

Recognising the challenges of transition, financing arrangements are available that defer payment for a new system or scaled setup until it is reliably up and running. This removes the financial challenge of having to pay for the new system while the old one is still running.

Working capital solutions

Digitalisation may increase production capacity and productivity, while improving price competitiveness, to the extent that a manufacturer’s order book experiences a sudden, significant upswing. Yet the momentum that is built through digitalisation brings its own challenges – such as suddenly having to buy raw materials or components in greater quantities. Added-value financing services offered in partnership with a specialist financier – usually based on some form of invoice finance – are available to help manage the cash-flow challenges brought on by success through digitalisation.

Key references

- ¹ See, for instance: IBM, A framework for Industry 4.0, 10 Feb 2017; PwC, Industry 4.0 – Building the Digital Enterprise, 2016; McKinsey, Industry 4.0 (2015); Strategy&, Industry 4.0 (2014); McKinsey, “Manufacturing’s next act” (2015); Control Engineering Asia, “The dawn of the new industrial era with the Smart Factory” (January 2017); ABB, “The new age of industrial production” (2016); Assembly Magazine, Industry 4.0 (2016); Accenture, “The Growth Game-Changer: How the Industrial Internet of Things can drive progress and prosperity” (2015); Roland Berger, Industry 4.0 (2016); VDMA and McKinsey, “The future of German mechanical engineering” (2014); Oliver Wyman, “Digital Industry” (2015); Manufacturing Technology Center, Industry 4.0 (2016).
- ² Methodology: Over 60 international manufacturers, international management consultants and specialist academics were interviewed in January and February 2017. Respondents gave their expert estimate of financial gain from increased manufacturing productivity resulting from implementation of the new generation of digitalised and/or automated manufacturing technology and equipment classified under the title of Industry 4.0 or The Fourth Industrial Revolution. Respondents expressed their estimates of this financial gain as a percentage of total revenues, using their knowledge of gains calculated as a proportion of total operating costs (total operating costs for manufacturing companies varies between 75% of revenues in Europe to 85%+ in China, according to official statistics). This model was then applied to total revenue data of the manufacturing sector in different countries and manufacturing subsegments around the world to estimate the financial gain from increased manufacturing productivity resulting from implementation of digitalisation and automation in each of these geographies and segments.
- ³ Make UK, ‘Regional Manufacturing Outlook 2018’, <https://www.makeuk.org/insights/reports/2019/02/13/regional-manufacturing-outlook-2018>
- ⁴ Invest North East England <https://investnortheastengland.co.uk>
- ⁵ Sunderland Echo, ‘Work starts on huge £41million International Advanced Manufacturing Park aimed at creating thousands of jobs in Sunderland’, 20 August 2018 <https://www.sunderlandecho.com/news/work-starts-on-huge-41million-international-advanced-manufacturing-park-aimed-at-creating-thousands-of-jobs-in-sunderland-1-9310334>
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- ¹⁰ North East Local Enterprise Partnership, ‘More and better jobs – the North East strategic economic plan’, January 2017 <https://www.lepnetwork.net/media/1123/north-east-sep.pdf>
- ¹¹ Ibid
- ¹² Invest North East England <https://investnortheastengland.co.uk>
- ¹³ NRG plc, ‘North East manufacturing – a strong and growing sector’, <https://www.nrgplc.com/news-insights/insights/north-east-manufacturing-strong-growing-sector/>
- ¹⁴ The Wilton Centre, <http://www.wiltoncentre.com/tenants/sabic/>

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