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The *Digitalisation Productivity Bonus*: Manufacturing in the Yorkshire & Humber

What value does digitalisation offer manufacturers in Yorkshire & Humber?

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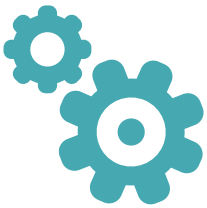
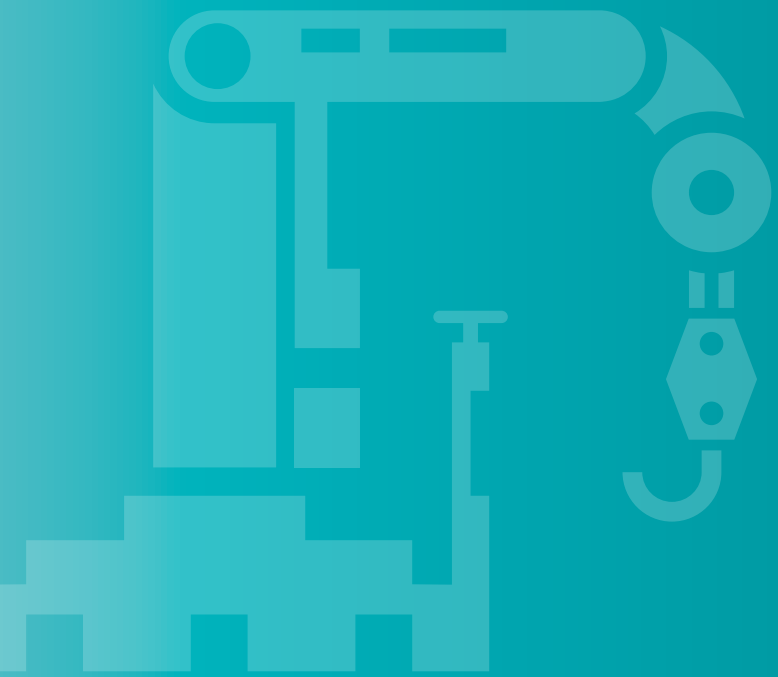




Management Summary

- It is widely accepted that the economic impact of the global Covid-19 pandemic is expected to be significant and prolonged, fundamentally affecting patterns of supply and demand as well as working and labour practices
- Meanwhile, manufacturers still recognise that they must implement Industry 4.0 technology in order to remain competitive and react to shifting market demands with optimum agility and flexibility. 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 Yorkshire & Humber
- Funding investment in digitalised technology and equipment is a major challenge for manufacturers – particularly during this period of economic volatility. However, expert financiers are developing smart financing tools to help manufacturers digitally transform their operations in an affordable and sustainable manner
- Smart finance tools continue to evolve, but some widely used techniques include:
  - Machinery & Technology Financing
  - Retrofit Finance
  - Software finance
  - Outcomes Finance
  - Digital Enterprise Finance
  - 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, during what is expected to be a prolonged and significant economic crisis.

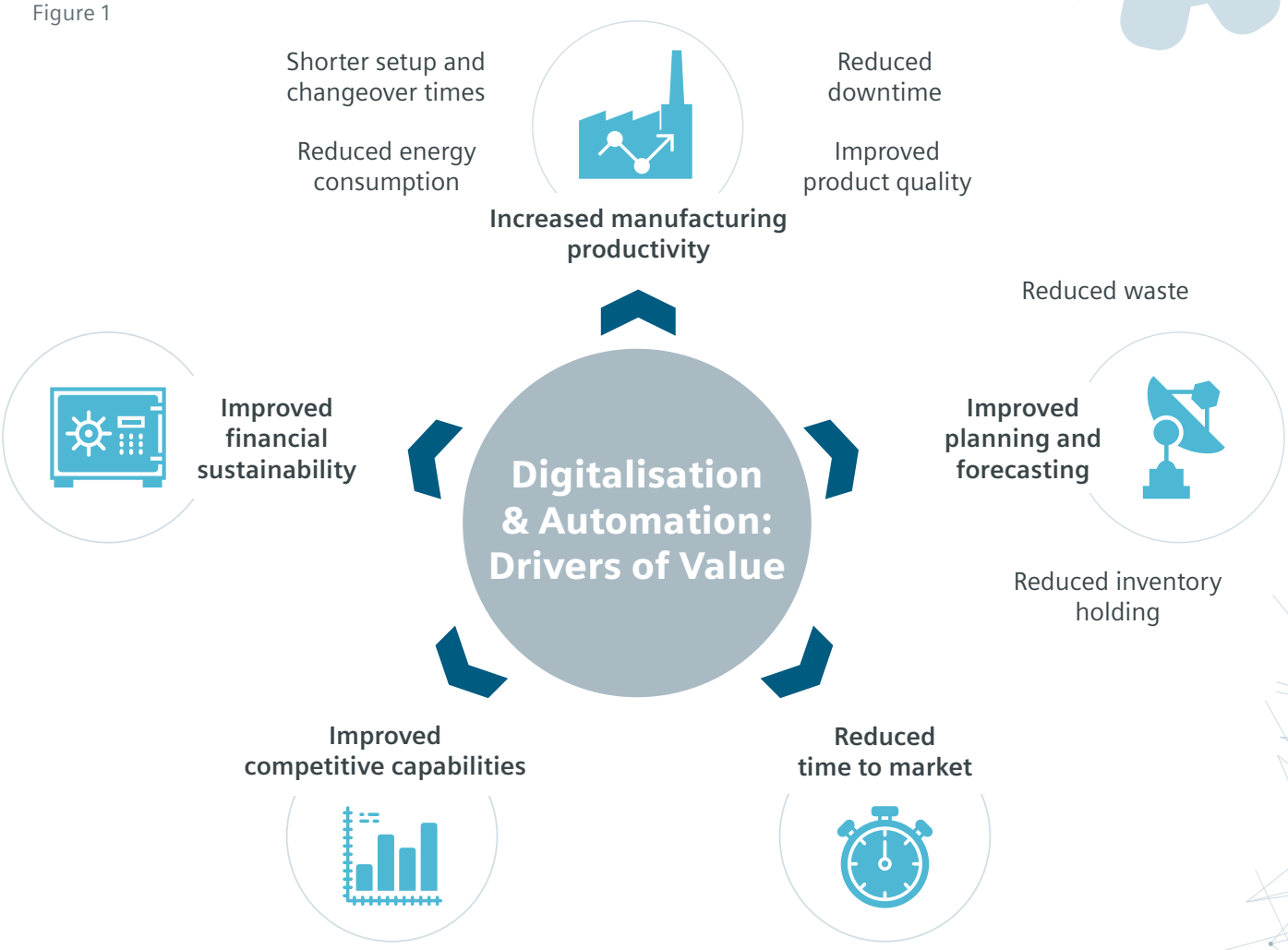
Now, more than ever, businesses need to be able to adapt to rapidly changing patterns of supply and demand. Industry 4.0 technology can facilitate levels of operating flexibility that can cope with uncertain and volatile markets – a flexibility that is becoming an increasingly important competitive advantage, both now and in the future.

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, competitive and volatile markets, investment in Industry 4.0 technology and solutions is essential. 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


Shorter setup and changeover times
Reduced energy consumption
Reduced downtime
Improved product quality
Increased manufacturing productivity
Reduced waste
Improved planning and forecasting
Reduced inventory holding
Improved financial sustainability
Digitalisation & Automation: Drivers of Value
Improved competitive capabilities
Reduced time to market

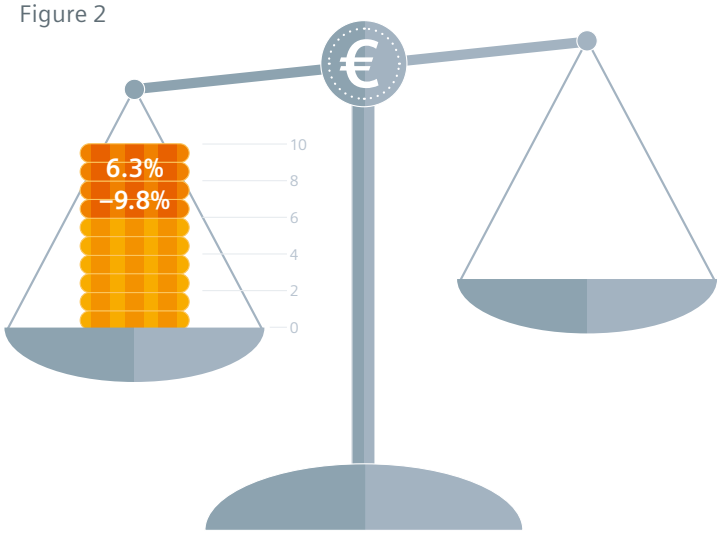
The Digitalisation Productivity Bonus

The vast majority of manufacturers and expert consultants interviewed for the research[2] signalled 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 – Yorkshire & Humber

Manufacturing jobs in Yorkshire & Humber account for 11.1% of the region's total workforce[3]. There are more than 12,000 manufacturing businesses in the region, which provide 267,000 jobs.[4]

The sector is an important part of Yorkshire & Humber's economy, accounting for 15.6% of the region's output (including manufacturing, services, and construction), well above the UK average.[5] In recent years, the sector has experienced strong growth: in 2018, Yorkshire boasted the highest proportion of exports going to Sub-Saharan Africa from the UK and was above the national average in terms of exports going to Latin America and the Caribbean.[6] Exports in the region rose to a value of £18.1bn in the year to the end of March 2019, a rise of 7.6% and more than double the 3.5% national increase.[7]

Key manufacturing sub-sectors in Yorkshire & Humber are:

Food and Drinks

Food and drink manufacturing occupies by far the largest share of all manufacturing production in the region (23.4%).[8] The latest reports from HMRC indicate that the region's food and drink exports hit a record value of £1.2bn in the year up to March 2019; exports to China, in particular, grew by 26%.[9] In Q1 2020, Yorkshire & the Humber was 1 of only 2 regions to report positive highly positive output and order figures, a success attributed to its robust food and beverage sector.[10]

The most valuable regional export was meat, which totaled £172 million in value, growing by 6% over the past 12 months. The largest growth is attributed to dairy and eggs which saw an increase in exports of 16% and trade worth £88m.[11]

Generally, the increasing strength of exports in Yorkshire & Humber can be attributed to an array of products and goods manufactured locally, however, food and animals in particular make a notable contribution. Valued at nearly £1 billion in 2017, the exports of food and animals grew by 11.6% between Q1 2017 and Q1 2018.[12]

The sector has benefitted from the "Food is GREAT" campaign, a co-initiative between the Department for Environment, Food and Rural Affairs (Defra) and the Department for International Trade (DIT) that aims to showcase UK food and drink abroad by assisting companies with export.[13]

The region is home to numerous international food and drink companies and brands,[14] as well as countless manufacturing SMEs.[15]

Chemical

Alongside its other industries, Yorkshire and Humber has a prominent chemicals sector and accounts for 12% of UK chemicals employment.

The Humber in particular is one of UK's four largest chemicals-producing regions.[16] There are around 100 chemical and refining companies in the Humber area which employ approximately 6,000 people and generate a combined annual turnover of £6 billion.[17]

Digitalisation Productivity Bonus

Siemens Financial Services has applied its ***Digitalisation Productivity Bonus*** model to the manufacturing sector in Yorkshire & Humber 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 Yorkshire & Humber (revenue data derived from official third party sources). The resulting financial sums in the table below estimate how much Yorkshire & Humber 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 Yorkshire & Humber

Region	Baseline Bonus (production cost reduction)
YORKSHIRE & HUMBER	£3.3bn

This figure equates to around 6% of total revenue for manufacturers in the region.

The ***Digitalisation Productivity Bonus*** is only one aspect of value that digitalisation is delivering to manufacturers in Yorkshire & Humber. Nevertheless, it provides manufacturers with a reliable starting point from which to build a digital transformation business case – even through the current economic difficulties.

Smart finance

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 smart finance, 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:

Machinery & Technology Financing

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.

Retrofit Finance

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.

Outcomes Finance

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.

Digital Enterprise Finance

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 2019, 2019: https://www.makeuk.org/-/media/eef/files/reports/industry-reports/make-uk-bdo-regional-manufacturing-outlook-2019.pdf

[4] Invest North East England https://investnortheastengland.co.uk

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[10] Make UK, Regional Manufacturing Outlook: 2020 Quarter 1 (2020), https://www.bdo.co.uk/getmedia/9280848c-d224-4d3f-84b5-33d7e8e6d45d/Make_UK-BDO_Manufacturing_Outlook_Q1_2020.aspx

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[12] Ministry of Housing, Communities & Local Government, Department for International Trade, The Rt Hon Jake Berry MP, and Graham Stuart MP, 'Yorkshire leading the way for manufacturing exports outside of London' *Gov.uk* (1 August 2018) https://www.gov.uk/government/news/yorkshire-leading-the-way-for-manufacturing-exports-outside-of-london

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[14] Such as Northern Foods, Northern Monk Brewery Co, Fox's biscuits and Cravendale milk

[15] Food and Drink Federation, *FDF Response to Department for Business, Energy and Industrial Strategy (BEIS) Business Productivity Review* (December 2017)

[16] Brian Groom, 'How the chemicals industry is driving prosperity in the North' *Raconteur* (4 June 2018) https://www.raconteur.net/manufacturing/chemicals-prosperity-north

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