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The Digitalisation Productivity Bonus in Drinks Manufacturing

What value does Digitalisation offer the Drinks Manufacturing industry?

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Contents

Management Summary

- Digital transformation – or Industry 4.0 - is a widely recognised imperative in manufacturing. Manufacturing CFOs, however, require measurable outcomes on which to base their investment in digital transformation
- Research from Siemens Financial Services has shown that measurable improvements in manufacturing productivity are the most reliable starting point for the digital transformation business case
- In this paper, productivity gains from Digitalisation and automation – known as the Digitalisation Productivity Bonus – has been estimated for the Drinks Manufacturing industry in the UK
- Creating an automated, digitized manufacturing environment requires major investment. Specialist financing tools – Finance 4.0 - are being developed by expert financiers to enable affordable and sustainable transition to the smart, digitalized factory
- Industry 4.0 Financing is now employing that new mind-set to offer techniques which range across:
  - Pay to access/use equipment and technology finance so that precious capital is not tied up in depreciating equipment
  - Technology upgrade and update to take advantage of the latest innovations
  - Software finance to embrace all aspects of an Industry 4.0 solution
  - Pay for outcomes to align rate of benefit with rate of payment
  - Transition finance to minimise disruption in the move to automation and digitization
  - Working capital solutions to manage cash-flow in a digital world

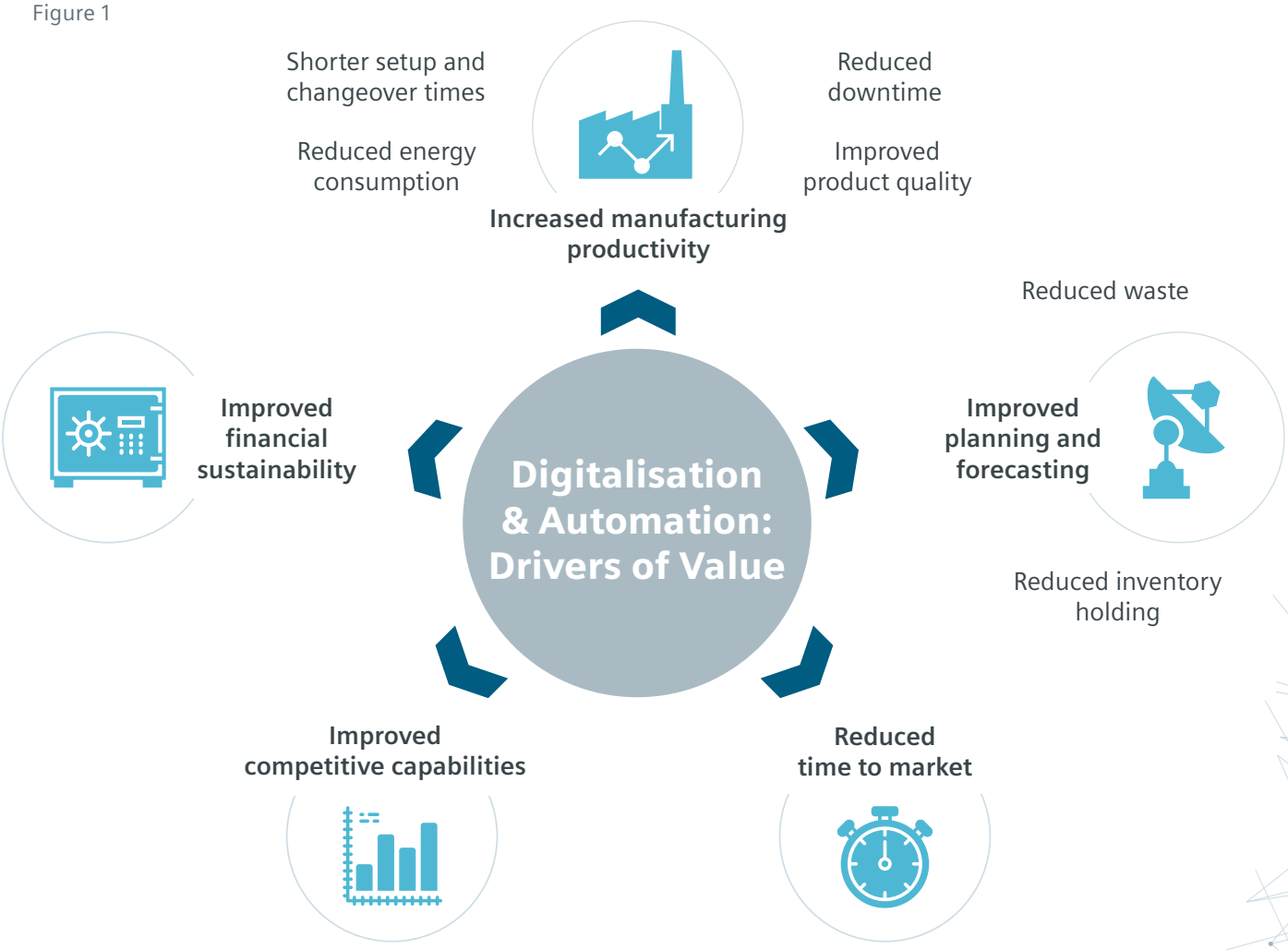
Automation and Digitalisation: The new imperative

There is no longer debate about whether the Fourth Industrial Revolution – Industry 4.0 – is under way; the conversation has moved on to address where, how much and how quickly it is being implemented. Digitalisation of the manufacturing environment and its processes forms the foundation of Industry 4.0, adoption of which varies from country to country and economy to economy. In some parts of the world and in certain industries, the emphasis is placed on automating previously manual processes. Automated systems are, by definition, programmed and controlled through digital systems; and where automation is already widespread, further Digitalisation is taking the form of the Internet of Things. This development involves the widespread installation of sensors in the physical environment and the ability to rapidly enhance production economics through real-time performance data analysis. Some Digitalisation pioneers are using digital controls and digital data analyses to improve a wide range of processes, including production capacity, job setup and turnaround, uptime maximisation, predictive maintenance, supply-chain logistics and just-in-time distribution. There are even instances of manufacturers – including those in the Food & Beverage sector - improving their competitive capabilities edge through mass customisation, a technique where tailored products are offered with much the same economies formerly associated with mass production[1].

For manufacturers that want to remain competitive in increasingly aggressive markets, the move to greater automation and Industry 4.0 is not an option – it is a necessity. But seizing the competitive advantages of automation and Digitalisation that lie at the heart of Industry 4.0 requires a substantial investment in new-generation automated and digital platforms. Responsible business leaders will therefore need a solid business case that justifies this kind of significant investment to stakeholders and shareholders, one that paints a credible picture of the revenue, margin and growth benefits an investment in automation and Digitalisation technology will bring.

Early movers in the manufacturing community (see figure 1) are already enjoying many Industry 4.0 benefits, yet the precise commercial gain from each of these benefits can sometimes be challenging to calculate. To help establish a more precise starting point for manufacturers embarking on the automation and Digitalisation journey, Siemens Financial Services commissioned research to understand which of these benefits could be most reliably estimated and used by most manufacturers to formulate a business case for investing in Industry 4.0 technology.

Figure 1

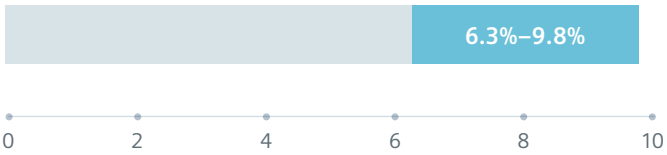

Shorter setup and changeover times
Reduced energy consumption
Reduced downtime
Improved product quality
Increased manufacturing productivity
Reduced waste
Improved planning and forecasting
Reduced inventory holding
Improved financial sustainability
Digitalisation & Automation: Drivers of Value
Improved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

The starting point for a business case: The Digitalisation Productivity Bonus

The vast majority of manufacturers and expert consultants interviewed for the research[2] confirmed that the ability to **increase manufacturing productivity** is a universal starting point for determining measurable value from Digitalisation. The ability to manufacture the same product volume at less cost, or manufacture more products for little or no increase in costs, resonates with manufacturers considering digital technology investment as a competitive enabler. This was felt to be the case for both manufacturers taking their first steps into automation and those looking to install the latest sensor-based technology to fully digitalize their production environment.

The research revealed that by automating and digitalizing their production systems, manufacturers were set to make production productivity gains equivalent to between 6.3% and 9.8% of their annual revenues.

Global *Digitalisation Productivity Bonus*: reduced production costs resulting from conversion to digitalized technology Figure 2



Bonus (production cost reduction expressed as % of total revenues)

Termed the ***Digitalisation Productivity Bonus***, this gain was identified by respondents as the most reliable starting point to make a business case for investing in Industry 4.0 technology upgrades.

Financing Industry 4.0

Manufacturers around the world, however, still face the challenge of having to make a major initial investment to acquire Industry 4.0 automation and/or Digitalisation technology in the first place. To overcome this obstacle, specialist financiers have developed a set of financing tools called "Finance 4.0" These tools enable the transition to new-generation digital technology in a way that is affordable, sustainable and designed to alleviate the manufacturer's cash-flow and working-capital pressures.

These specialist Finance 4.0 tools can be summarized as follows:

Pay to access/use equipment & technology finance

This enables the acquisition of a system or piece of equipment. Technology, service and maintenance are all included in a single agreement. Periods can be adjusted to match payments to the financial benefits gained. Master agreements can be established that help speed up future technology acquisitions.

Technology upgrade & update

Manufacturers want to access technology innovations as they appear (and digital innovation cycles are shortening[3]). Finance can also offer options to upgrade during the financing period, whether to replace with a newer model or retrofit enhancements to the main technology platform.

Software finance

By definition, most Industry 4.0 technology solutions involve both hardware and software. Because specialist financiers understand how the software is implemented and likely benefits in practice, they can understand the associated risks and include the software as an element in the total financing package.

Pay for outcomes

These arrangements base payments on the expected business benefits, or "outcomes", that automation or Digitalisation technology makes possible.[4] Actual financial savings, such as reduced electricity consumption, are used to subsidise or even completely fund monthly payments, making the technology cost neutral for the manufacturer.

Transition finance

Manufacturers do not want to start paying for their Industry 4.0 technology platform until it is installed, tested and operational. Finance 4.0 recognises the challenges of transition and offers financing arrangements that defer payment for a new system until it is reliably up and running, eliminating any period of cost duplication for the manufacturer.

Working capital solutions

Finance can be optimised in more areas than technology acquisition. Improved competitiveness can lead to sudden growth, which exerts pressures on supplies, inventory and overall cash flow. Financing services such as 'extended payment terms' – usually based on some form of invoice finance – are available to help manage the broader financial challenges that success through Digitalisation brings.

Sector focus: Drinks Manufacturing Industry

The Drinks Manufacturing Industry is well known for its product innovation and brand promotion skills. However, the advent of Industry 4.0 is now opening the doors to a series of new ways of working that offer the potential for substantial competitive advantage – the imperative commercial payback needed from digital transformation.

For example, one multinational drinks company used digitalisation – specifically data analysis - to reduce the risk associated with bringing a new soft drink to market. By reviewing the data from its machines that allow customers to mix their own drinks, the company was able to predict its customers' tastes. As a result, it launched a new cherry flavoured drink which it knew consumers were already making themselves. The same company is now looking at developing a virtual assistant to interact with its customers at vending machines.[5]

Digital transformation is also enhancing packaging processes, as well as beverage production. For example, several soft drinks brands have allowed customers to personalise their own labels by entering their desired label text online.[6] Another brand used digital printing technology and an artist's designs to create millions of labels carrying unique graphic patterns for its bottled water.[7] In another marketing initiative, customers were able to design their own labels via a crowdsourcing platform and then able to order the product, with their own label configuration, in small quantities.[8] These examples of "mass customization" show how digitalized Industry 4.0 print and dispatch technology are helping brands to build their image and customer relationships.

This idea of bespoke packaging is being taken even further by a beer company which has used augmented reality to create a label that talks to the consumer. When the smart label is scanned using an app, facial recognition technology actively incorporates the consumer in dynamic scenarios according to the emotions displayed. The technology recognises whether the customer is happy or sad and the label-based dialogue with the consumer is adjusted accordingly.[9]

But the application of Industry 4.0 in the beverage industry is not just about clever marketing. It's also being used to improve quality control. For example, artificial intelligence (AI) and machine learning are being used to gain new insights into how microorganisms interact within a particular environment to identify food hazards in milk. By looking at genetic sequencing and bioinformatics analytics it is hoped that traits can be identified to determine if the milk appears abnormal.[10]

Similarly, one craft brewery uses sensor technology and machine learning to predict when different beers move from fermentation to the free rise phase. The company analysed the sampling data it had manually recorded and, with the help of digitalised technology, used it to 'teach' technology to predict when a beer would be ready for the next stage of production. This has helped to save time in moving each beer to the next step in the fermentation process and, as a result, reduced the process by 24 to 48 hours per batch overall, giving the brewery a chance to increase its annual production without buying additional equipment.[11]

Another brewer is effectively using digitalised technology to successfully detect machinery faults before they become

a problem and impact product quality or production efficiency. Wireless sensors detect ultrasonic sounds—beyond the grasp of the human ear—which are then analysed to predict when machines require maintenance. The system has prevented unscheduled production-line halts and product loss.[12]

As these examples show, even such a highly automated industry as drinks manufacturing is looking to Industry 4.0 Digitalisation to improve production efficiency still further, as well as well as leveraging incremental competitive gains from digital connectivity between people, machines, systems and locations – within the factory, down the supply chain and connecting with distributors and customers. In order to give an idea, however, of the fundamental financial benefit to be gained from Industry 4.0 in Drinks Manufacturing, this paper has applied its Digitalisation Productivity Bonus model to the Sector in the UK, highlighting a couple of subsectors. The average 'Bonus' percentage range was applied to the total annual revenue of the Drinks Manufacturers across the country (revenue data derived from official third party sources). The resulting financial sums in the table below estimate how much Drinks Manufacturers could gain from improvements in manufacturing productivity as a direct result of digital transformation. These efficiencies, although not estimated here, can also be realised throughout the supply chain.

The ***Digitalisation Productivity Bonus***, however, is only one aspect of value that Digitalisation is delivering in the Baked Goods industry. However, it provides industry players with a reliable starting point from which to build a digital transformation business case. These gains from conversion to an Industry 4.0 environment might then be returned to shareholders, invested in R&D, or used to fund a sharper competitive position in a company's key marketplaces.

Estimated *Digitalisation Productivity Bonus* – reduced production costs resulting from conversion to digitalized technology for Drinks Manufacturers

Baseline Bonus (production cost reduction)	**£954.7m**

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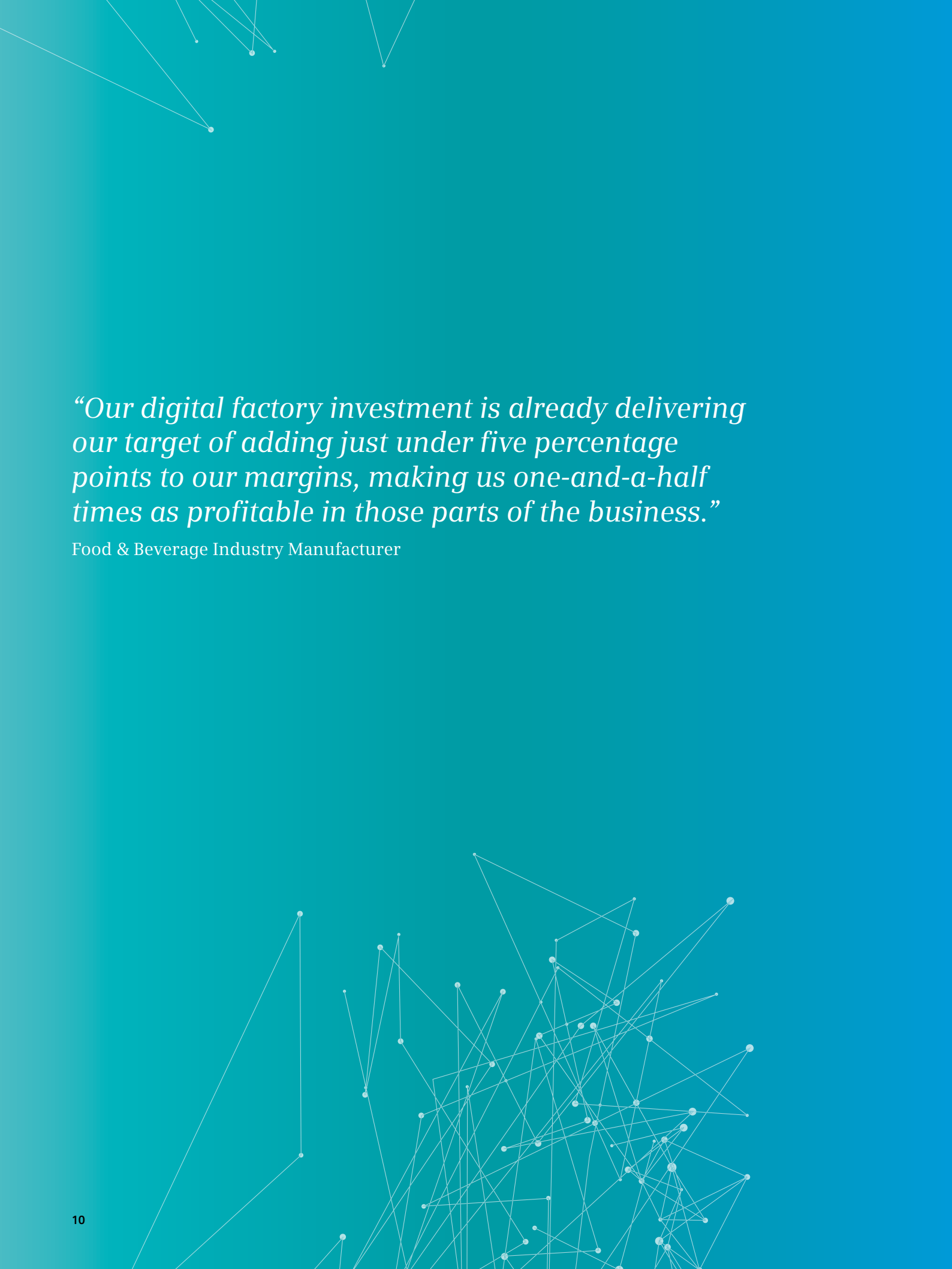
“Our digital factory investment is already delivering our target of adding just under five percentage points to our margins, making us one-and-a-half times as profitable in those parts of the business.”

Food & Beverage Industry Manufacturer



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[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 digitalized 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] Research from Siemens Financial Services published in "Investing in Success" (2016) indicated that 67% of manufacturing respondents observed that technology replacement/upgrade cycles are shortening.

[4] This whole subject is discussed in the Siemens Financial Services research paper "Opportunities and Outcomes" (February 2017).

[5] Gigster Blog, 'AI in focus: food and beverage', 27th February 2018, and, Quartz, 'AI told Coca-Cola to make Cherry Sprite. So it did', 27 September 2017.

[6] Drinktec blog, 'Personalized beverages: a must for the entire industry in the future?', 11 December 2018.

[7] Packaging World, 'Danone's 3.2 million unique labels', 14 September 2018.

[8] Source: original research, UK.

[9] Drinktec blog, 'Personalized beverages: a must for the entire industry in the future?', 11 December 2018.

[10] Prescouter, 'How Food and Beverage Companies Are Implementing AI for Supply Chain Management', July 2017.

[11] Osisoft, 'Deschutes: Better Data for Better Beer', 2017 and Fortune, 'Big data meets the beer industry', 29 January 2019.

[12] A blog for operations management educators, 'OM in the News: Using Machine Learning to Keep the Beer Flowing', 28 January 2019.

Published by
Siemens AG 2019

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Updated (unless stated otherwise): November 2019

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