# Made Smarter Review 2017

## Becoming a global leader in Industrial Digitalisation by 2030

**MADE SMARTER.UK**

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**Goals**
**One million workers up-skilled, £455bn added to the economy and a 25% productivity boost**

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# Goals and recommendations

## Made Smarter aims to improve productivity through faster adoption of digital in the UK manufacturing sector

**PURPOSE**

To steer the UK into a digital future by proposing a set of recommendations for the British Government and industry that will boost manufacturing through the application of leading digital technologies

**RECOMENDATIONS**:

1. Create a much **more visible and effective digital ecosystem** to accelerate the innovation and diffusion of Industrial Digital Technologies (IDTs)
2. **Up skill a million industrial workers** to enable digital technologies to be successfully exploited
3. Inspire the UK's next industrial revolution with **stronger leadership and branding** of the country's ambition to be a global pioneer in IDTs
4. **Address the key barriers** preventing adoption of IDTs

**WHY NOW**

1. Manufacturing is vital to the UK. The sector employs 2.6m people, contributes 70% of business R&D making the UK the 8th biggest maker in the world
2. We are the only country in the western world without a plan for the fourth industrial revolution
3. As of 2016 manufacturing is worth £168bn and contributed 50% of UK exports. Implementing Made Smarter could add £455bn to the economy over ten years.

**STRATEGIC GOALS**



MADE SMARTER.

# Scope of the review

## Technology scope and industry scope

The review considers a broad spectrum of IDTs and a wide view of industrial sectors covering low, medium and high-tech manufacturing and construction. For ease of analysis the IDTs considered have been grouped into the following families:

- Artificial intelligence, machine learning and data analytics,
- Additive manufacturing,
- Robotics and automation,
- Virtual reality and augmented reality,
- The Industrial Internet of Things (IIoT)
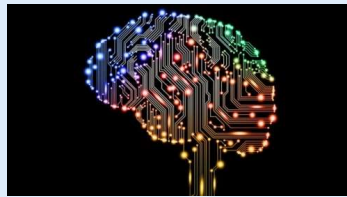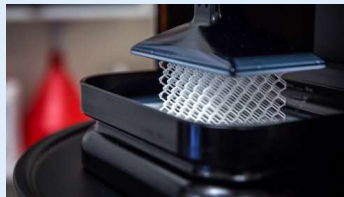
## INDUSTRY SCOPE

Project scope based on the UK standard Industrial classification of economic activities (UKSIC):

| Sector | Industries |
|---|---|
| Low & Med Tech Mfg. | ▶ Food,Beverages and Tobacco<br>▶ Metals, Plastics and non-mineral products<br>▶ Shipbuilding<br>▶ Other manufacturing |
| Med & High Tech Mfg. | ▶ Chemicals<br>▶ ICT & Precision Instruments<br>▶ Automotive<br>▶ Aerospace<br>▶ Machinery, Electrical and Transport Equipment<br>▶ Pharmaceuticals |
| Other Production | ▶ Agriculture and Forestry<br>▶ Mining and Quarrying<br>▶ Utilities<br>▶ Construction |
| Knowledge Services | ▶ Digital services |

# Industry support
## Who backs Made Smarter?

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# Industry support

## Over 200 organisations got behind the review.

**UK Industrial Strategy**

The Government published a Green Paper in January 2017 setting out its vision for a new Industrial Strategy for the UK. The aim is to improve living standards and economic growth by increasing productivity. The paper invited proposals from industry groups for approaches to address low UK productivity, with a view to some of these becoming Government-supported 'sector deals'.

UK Industrial
Strategy Green
Paper
January 2017
(130pp; Link)

Made Smarter was developed in consultation with representatives from over 200 organisations involved in UK manufacturing, including SMEs, large enterprises, start-ups, academics and industry bodies.

Who will benefit?
What sectors will be boosted?
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# Huge UK growth potential

## The potential size of the prize is huge

- Industrial Digital Technologies (IDTs) offer the promise of recapturing the UK's industrial spirit as a nation of 'creators and makers'

- **£455 billion** positive impact for UK manufacturing of faster innovation and adoption of IDTs over **10 years**

- Net gain of **175,000 jobs** across the economy

- More than **25%** industrial productivity gain by **2025**

- Reduce carbon emissions by **4.5%**

| | VALUE TO INDUSTRY (£ BN) | VALUE TO INDIVIDUALS | VALUE TO SOCIETY |
|---|---|---|---|
| **CONSTRUCTION** | £88.9 | Cost savings from construction passed on to individuals<br>Improved living standards | 365,000 tCO$_2$e reduction in 2027[1]<br>105 lives saved over the next decade due to increased health & safety during construction |
| **FOOD AND DRINK** | £55.8 | £2.3bn saved from household spend due to waste reduction<br>25% increase in customer satisfaction | 32 million tCO$_2$e reduction throughout the food supply chain in 2027[1]<br>27,370 injuries avoided in food & drink production over the next decade |
| **PHARMACEUTICALS** | £22.4 | £1bn of cost savings passed on to consumers<br>30 minutes per year are likely to be saved per clinical trial patient | 86,000 tCO$_2$e reduction in 2027[1] due to efficient manufacturing processes<br>1,555 accidents avoided in production and 14,804 lives saved from improved dosage accuracy over the next decade |
| **AEROSPACE** | £17.5 | £3bn of cost savings passed on to consumers<br>69% increase in customer satisfaction<br>13% increase in job satisfaction | 63,000 tCO$_2$e reduction in 2027[1]<br>15,310 injuries avoided during aerospace manufacturing over the next decade |

**Estimated value for industries not directly studied:** Highest growth rate (Aerospace, 21%) applied to the 62% of UK manufacturing GVA not studied, giving **£270bn** extra value at stake. **Value at stake for UK manufacturing:** our studied industries total (£185bn) + remaining industries total (£270bn) = **£455bn**

# What is at stake?
## Creating 175,000 jobs

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# Digitalisation and job growth

| DIGITALISATION LEADS TO JOBS BEING CREATED | |
| --- | --- |
| **NEW JOBS** | New digitally skilled jobs that did not previously exist are created based on the introduction of new technology and techniques. Technology has driven this job creation model for centuries. |
| **GROWTH** | Being more productive and competitive, winning additional business leads to need for more of the existing jobs to meet the increased demand. |
| **RESHORING** | Digitalisation makes it economically viable to have localised, flexible manufacturing, closer to the market with shorter lead times. Jobs are reshored to the UK from previously low labour-rate countries. |
| **SUPPLY CHAIN** | There is a multiplier effect in the supply chain – for every job created in industry, several jobs will be created in product suppliers and service providers throughout the supply chain. |
| **SERVITISE** | Digitalisation allows a servitization model, where products are sold as a service with a performance guarantee. In addition to manufacturing jobs, further service based jobs are also created. |

# Creating a digital ecosystem
## Accelerating innovation

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# Creating a digital ecosystem

**RECOMMENDATION 1.1**

**Invest in a new National Adoption Programme (NAP).** This would accelerate the development and diffusion of IDT through focused support to small and medium-sized enterprises in the UK regions. The programme will be owned at a regional level by Local Enterprise Partnerships (LEPs) and delivered by accredited regional partners. Investment will be targeted at strengthening both the capability and capacity of regional advisory services in digital technologies. It will provide kick-start funding for companies to leverage assets and expertise within the ecosystem. It will also increase the mentoring offered by industry and strengthen the interaction with upcoming talent within universities through focused projects and placements.

**RECOMMENDATION 1.2**

**Scale the support provided by UK innovation centres through a new national innovation programme.** This would bring together a network of existing distributed Digital Innovation Hubs (DIHs), strategically selected to best serve the challenges of each local business community. It will demonstrate, with industry participation, how the industrial and manufacturing sector can be positively transformed by IDTs.

**RECOMMENDATION 1.3**

**Implement large-scale Digital Transformational Demonstrator programmes within the DIHs, co-funded by industry.** These would address both sector-specific and key cross-cutting industry challenges and be focused on delivering tangible results in both productivity and sustainability. The demonstrators would be regionally organised and, together with the National Adoption Programme (Recommendation 1.1), would provide a key accelerator for the diffusion of IDTs especially within SMEs.

**RECOMMENDATION 1.4**

**Drive forward the UK's global IDT research and development leadership.** Create a network of Digital Research Centres (DRCs) to bring together the country's expertise in, initially, five areas:

1. Artificial intelligence, machine learning and data analytics;
2. Additive manufacturing;
3. Robotics and Automation;
4. Virtual reality and augmented reality;
5. The Industrial Internet of Things (IIoT) and connectivity (5G, LPWAN etc.)

Each DRC would be tasked with advancing state-of-the-art research and innovation for industrial digitalisation in its technology field. The network of DRCs would build on the excellence and infrastructure in the existing UK science and innovation base and work with the tech developer community to drive UK leadership in the technologies that underpin industrial digitalisation.

## Strategic Outcomes

**North West pilot**

- Increase GVA by 15% over a 3-year period – delivering an estimated £70 million benefit.
- 20 emerging technology start-ups working directly with industry on new projects.

**National rollout**

- GVA increase £770 million.
- 220 emerging technology start-ups.

- 20,000 businesses supported by DIH
- Increase in GVA by £1.2bn
- 40 new Digital Innovator spin outs
- Increase in R&D investment >£400m,

# Up skilling one million workers
## Digital skills for 2030

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# Up skilling one million workers

**RECOMMENDATION 2.1**

Create a single national Skills Strategy and Implementation Group (SSIG) under the governance of the Made Smarter UK Commission (MSUK). This group would act as a focal point for the engagement of industry and provide a forum for identifying future skills requirements, synchronising and focusing existing initiatives, and ensuring quality and consistency through a kite-marking mechanism.

**RECOMMENDATION 2.2**

Establish a modern digital delivery platform providing scalable, relevant, timely and easily 'digestible' content for upskilling and reskilling. This would enable all companies, but particularly SMEs, to play their part in the Fourth Industrial Revolution, with incentives and networks in place to drive adoption.

**RECOMMENDATION 2.3**

Establish an incentivised programme, co-funded by industry and government, to improve digital skills capabilities. Under the guidance of the SSIG (Recommendation 2.1) and using the digital delivery platform (Recommendation 2.2), the programme would take the form of personal training and reskilling allowances which would be targeted at:

- Individuals whose jobs are being displaced by automation;
- Workers whose skillsets need to evolve to next-generation capabilities (e.g. the use of additive manufacturing technology or artificial intelligence);
- Providing leading skills in all organisations (e.g. the digital engineer of the future).

## Strategic Outcomes

- 1 million workers re-skilled or upskilled over the next 5 years.

- At least 200,000 users completing level 3/ 4 certification per year

- Delivery of a platform which provides modular, up-to-date, relevant and accessible content for online and blended up-skilling and re-skilling

- 100,000 employees enrolled in training incentivisation scheme in year 1.

# Leadership and brand
## Made Smarter UK

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# Leadership and brand identity

**Made⊕Smarter**



## RECOMMENDATION 3.1:

Establish a major national brand campaign, delivered by both government and industry, to significantly increase awareness of how new digital technologies can transform industry. Delivered within a wider support framework, the campaign would promote the adoption of digital technologies (especially among SMEs), address negative preconceptions that IDT is expensive and risky, and inspire current and future workers with a vision of how they can secure high-quality jobs in a thriving part of the economy.

### Strategic Outcomes

- Increased awareness of digitalisation in year one (as measured by YouGov poll) by 20%
- 36,000 additional manufacturing SMEs accessing support from Growth Hubs
- Strong and enduring Industry & Government partnership established providing leadership for Made Smarter

## RECOMMENDATION 3.2

Establish a Made Smarter UK Commission (MSUK). This would be a national body, comprising industry, government, academia and leading research and innovation organisations, responsible for developing the UK as a leader in IDT. With a chair from industry and a Ministerial co-chair this public–private partnership would provide a market-focused view on IDT priorities, and ensure the faster innovation, adoption and diffusion of IDT to drive maximum value for the UK economy. The MSUK Commission would establish and govern a more visible and better-organised ecosystem that will deliver business transformation through innovation (see Recommendation 1).

## RECOMMENDATION 3.3

Set up interim Strategy and Support Implementation Groups (SSIGs) to be responsible for the delivery of the MSR recommendations. These SSIGs would comprise industry, government and academia, and would be accountable to the MSUK Commission.

# Overcoming the barriers
## Stimulating adoption

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# Stimulating adoption

**RECOMMENDATION 4.1**

**Implement a Standards Development Programme (Including cyber-awareness and best practice) for emerging digital Industries to promote the greater Interoperability of IDTs.** The creation of standards is known to be an effective way of promoting adoption, by providing confidence and assurance to businesses that use them. This programme would develop both generic and sector-specific standards for IDTs, and would be led by BSI in partnership with industry, the research community, government bodies and regulators. The resulting standards would then be promoted internationally through BSI's membership of CEN, CENELEC, ISO, and IEC.

**RECOMMENDATION 4.3**

**Develop data trusts to overcome one of the biggest Inhibitors In exploiting IDT In manufacturing: a reluctance to share data.** We strongly endorse the recommendations of the UK government's AI review which proposes a government and industry programme to develop data trusts – proven and trusted frameworks and agreements – and ensure data exchanges are secure and mutually beneficial.

**RECOMMENDATION 4.2**

**Implement targeted financial incentives to promote the development and adoption of IDTs.** This would include:

- Enhanced capital allowances in the first year of IDT investments,

- Broadening the R&D Tax Credit system to include IDT,

- An increase in the write-down allowance for specific technologies, and

- Working with the British Business Bank to develop policies or programmes to encourage the adoption of IDT and facilitate the financing of suitably qualified projects as appropriate.

## Strategic Outcomes

- Creation and internationalisation of key IDT standards (including 5 priorities identified) by 2020

- Adoption of New Standards >10,000 firms

- Increased level of investment* in IDT >20%

- Aim is to develop data trusts in 5 key high value sectors in the first year, which could include Aerospace, Automotive and Pharmaceuticals.
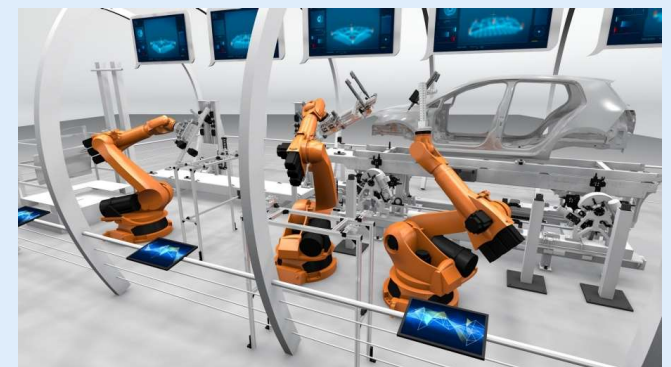
# QUESTIONS

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