



# Industrial Digitalisation Review

## Interim Report

This is an interim report of this review. It does not represent the final recommendations to be issued to Government this autumn

Version 3.0

Date 6/7/2017

For further information and updates on the review see:

[www.industrialdigitalisation.org.uk](http://www.industrialdigitalisation.org.uk)



## Table of Contents

Executive Summary .....	2
1. Introduction to the Industrial Digitalisation Review .....	5
2. The opportunity for the UK from industrial digitalisation .....	7
3. The barriers limiting the opportunity for the UK.....	9
4. Emerging recommendations to address these barriers.....	11
5. Next steps .....	14
Appendix: Governance and Review Structure .....	16

## Executive Summary

A group of businesses from across the UK have come together to lead a review for Government of 'Industrial Digitalisation' and how to unlock the opportunities it presents. This is sometimes described as the 4<sup>th</sup> Industrial Revolution or Industry 4.0, but in simple terms, the exam question we're seeking to answer is: how can UK manufacturing rapidly increase the development and adoption of industrial digital technology to become more productive and competitive, sustaining and creating well-paid jobs across the country? The potential prize is big: recapturing the UK's industrial spirit as a nation of 'creators and makers'.

This interim report comes halfway through the review and summarises our work to date: where we see the opportunity for the UK from this important agenda; what's holding us back; and an early view on emerging recommendations. Over 200 companies are already involved in the work and sharing this interim report is the next step in testing our initial findings with an even wider audience.

### *What is the opportunity for the UK from Industrial Digitalisation?*

The faster adoption of industrial digital technologies (IDT) can become a key driver of improved productivity, global competitiveness and increased exports. A recent study identified that by fully applying these technologies over the next decade, UK industrial production would be up to 30% faster and 25% more efficient<sup>2</sup>. For example:

- Automation of manufacturing processes, coupled with real-time process monitoring and re-engineering, mean radical improvements in cost efficiency and accuracy allowing work to move back to the UK from low wage economies;
- Technologies such as additive manufacturing fundamentally change the supply chain, where advantages afforded by high volumes and low labour costs are replaced by proximity to market and the opportunities for products to be unique to each customer.

All of these technologies and services will deliver multiplier effects for even more new businesses and jobs throughout the economy, and it is estimated this would lead to manufacturing sector growth of 1.5-3%, delivering annual growth of 0.5% of GDP<sup>2</sup>. These include:

- The potential for whole new industries and services to be created by harnessing the data and insights flowing from these technologies, including real-time management of assets such as trains, jet engines or wind turbines;
- The opportunity for the UK to be a leader in the development of the digital technologies themselves, in areas of strength such as artificial intelligence, blockchain and virtual reality;
- Furthermore this new economy will need to be supported by new and improved services and infrastructure in areas like cyber security, fibre networks; 5G and remote monitoring.

The UK is well placed to make a swift transition to new and ground-breaking production across its existing primes and supply chains and by developing digital value chains of the future. And we see an opportunity for the UK to differentiate itself in this digital industrial revolution. The relatively flexible and competitive UK labour market has allowed many companies to achieve world class productivity at lower levels of automation. This will provide an even stronger competitive advantage with Industry 4.0 technologies like 'Cobots', where humans works in harmony with advanced technologies to create highly agile businesses attuned to the changing needs of their customers.

Other countries are stealing a march on the UK with coherent Government strategies in place in most developed countries, for example in China (Made in China 2025), Germany (Digital Strategy 2025) and the USA (Manufacturing USA). So, we need to act at pace if we are to harness the potential of this agenda.

### *What are the barriers preventing the UK from fully achieving this vision?*

The review has identified three themes which are limiting the UK from achieving its potential.

#### 1. Lack of leadership of Industrial Digitalisation in the UK

- Although the UK has a combination of leading edge R&D, and some world-class sectors in the application of digitalisation, there is no clear narrative setting out what we already do well and the

significant opportunity for UK industry – and the country – from the faster development and adoption of industrial digital technologies;

- We have centres of technical expertise in, for example, the Catapult network but capability is fragmented with no single hub coordinating each technology providing a focus;
- This means our strengths are not recognised internationally, reducing potential inward investment, and we are failing to inspire current and future workers with a vision for how they can secure high quality jobs in a thriving part of the economy.

## 2. Poor adoption, particularly amongst SMEs

- The UK is behind on overall productivity (output per worker), which is in part due to lower levels of adoption of digital and automation technology<sup>6</sup>. This is particularly acute amongst SMEs;
- One of the potential causes of this is an ineffective and confused landscape of business support, with no clear route to access help and ambiguity about what good looks like;
- SMEs in particular perceive significant barriers to adoption, such as risks around cyber security, lack of common standards allowing different technologies to connect, and access to funding to support investment;
- Businesses also face a skills shortage, particularly digital engineering capability, hindered by a fragmented skills system and lack of systematic engagement with industry.

## 3. Under-leveraged innovation assets to support start-ups/scale-ups

- The UK is a leader in research and innovation and has started to establish favourable support infrastructure to develop and commercialise technology. However these innovation assets are under-leveraged and not focused enough on supporting IDT start-ups, meaning we are falling behind in creating of new innovative companies and industries.

*How can industry and Government work together to address these barriers?*

We have started to identify some possible solutions to these barriers which we now want to test further. These can be considered against the barriers set out above

### 1. Leadership – a UK approach

- the adoption of **much stronger marketing and messaging** of UK's ambition supported and amplified by national government, local government and industry.
- the establishment of a **Digital Technology Institute** and **Digital Technology Networks** across our existing institutions, identify clearer priorities, provide much better coordination, consolidation and higher profile eco-systems of innovation excellence; co-ordinating Universities, Catapults and others and hence establishing a strong public-private partnership in supporting and promoting their eco-systems.

### 2. Rapid Adoption – raising our game

- focused support for SME's through a stronger and much clearer national framework of **effective business support** that is deployed in the regions through LEPs and other business support hubs to drive the adoption of IDT, especially by SMEs;
- Interventions such as the creation of **clear standards for emerging digital industries** and the ownership of data, more targeted fiscal incentives for the investment in IDT, and active support to address cyber concerns;
- We need to develop the skills in the workforce which will enable digital technologies to be deployed and successfully exploited. We are a long way from having a solution to delivering this skill-base with the current structures. The work so far has identified the opportunity for interventions such as an **Institute of Digital Engineering**, which could showcase and spread best practice in learning and development, focused on the workforce of the future as well as upskilling the existing workforce.

### 3. Innovation – securing value in the UK

- We are also looking at specific recommendations to drive forward the key technologies of Industrial Digitalisation, like Additive Manufacturing and Artificial Intelligence within autonomous operations/vehicles, and hence build these as segments in their own right and create new industries;
- Additionally, in an effort to reduce the fragmentation, we are exploring the opportunity to standardise and simplify the delivery of the dynamic skills required in the future, through a digital and modular platform, initially supporting small and medium business with “kite marked and user rated content”. This content could be extremely effective as a constituent of as well as a pointer to the skills needed in, the broader education system

In summary, Industrial Digitalisation is a massive opportunity for the British economy. Get it wrong and we will de-industrialise more, and rely on imports even more than we currently do. Get it right and we find the key to rebalancing and strengthening our economy and create many exciting, new and well-paid jobs – leading to a renaissance for the UK’s as a nation of “creators and makers”.

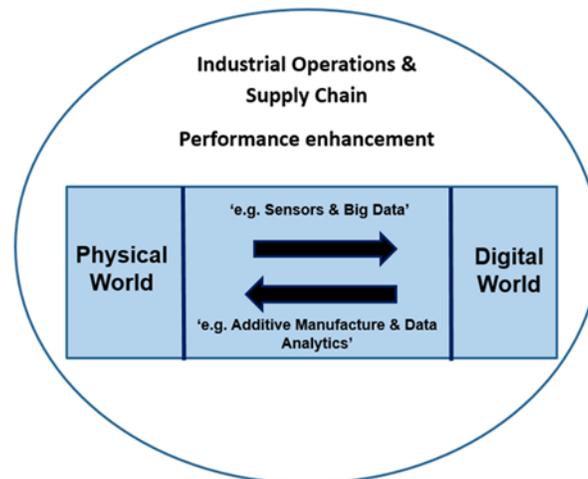
# 1. Introduction to the Industrial Digitalisation Review

A group of businesses from across the UK have come together to lead a review for Government of 'Industrial Digitalisation' and how to unlock the opportunities it presents. The review was announced in the Government's Industrial Strategy Green Paper published in January 2016 and this report provides an interim update on the work to date.

## i) What we mean by Industrial Digitalisation

At its most simple, Industrial Digitalisation is the application of digital tools and technologies in all their forms to the value chains of businesses who make things (e.g. automotive and construction) or are operationally asset intensive (e.g. power grids, wind farms etc.). It is the merging between the physical and digital worlds to significantly enhance performance and productivity.

There are a variety of supporting industrial digitalisation technologies (IDT) – e.g. artificial intelligence, 'Internet of Things', robotics, and analytics – but fundamentally it's the integration of these cyber and physical technologies into production and logistics that allows new businesses to form, increase speed to market, integrate and strengthen supply chains, and allow productivity gains to be realised. The application of these known and emerging technologies will continue to disrupt companies as they adapt to customer centric business models, offering personalised products through mass customisation and enhanced services.

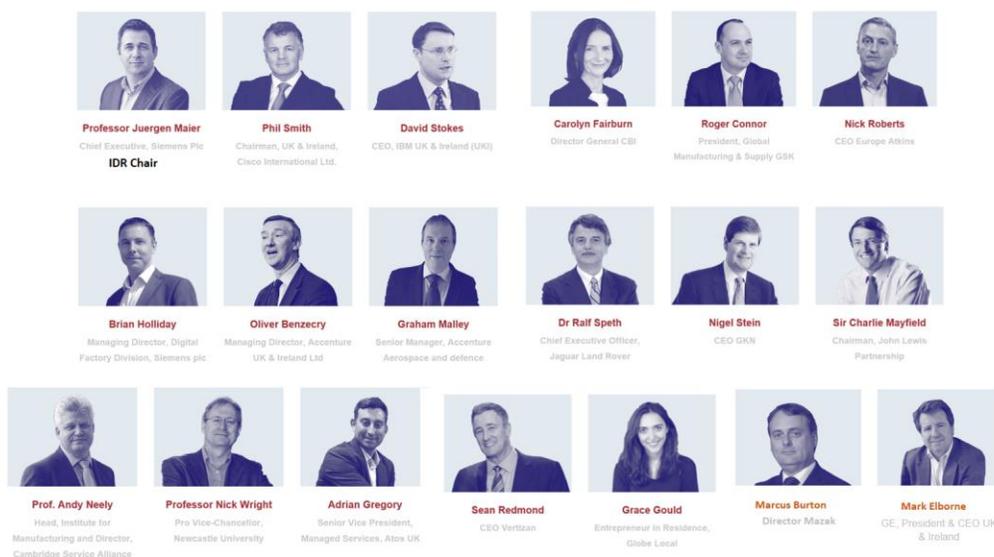


The scope of this review is very broad so we have sought to focus on areas not covered elsewhere. For example, this review does not set out to discuss the adoption of digital technologies in health and life sciences which is included within the scope of work being undertaken by Sir John Bell. The review acknowledges various current, specific studies in flight and seeks to contextualise and build on key learning rather than to replace them. This includes the Artificial Intelligence review being undertaken by Dame Wendy Hall and Jérôme Pesenti, and the work of Digital 4 Industry.

## ii) Our approach to the industrial digitalisation review

We have formed the IDR Leadership Team to take forward this work, drawing on expertise from across the wealth of UK Industry.

## Business Leadership Team



We recognise that success will only be achieved by creating a coalition for change across the business community. So far, we already have over 200 companies<sup>7</sup> involved in the work and we want to use this interim report as the next step in broadening our engagement further.

If we are to create lasting change, this work also needs to be in partnership with Government and we are engaging regularly with key Whitehall Departments via the Government Partner Team (Annex).

### iii) Structuring the work

We have structured the review by setting up groups to lead specific case studies. These provide a sectoral, place or technology perspective on the opportunities and challenges of IDT. These case studies are designed to inform a series of cross-cutting themes, which will in turn help us define our key recommendations. More detail on the workstreams is in the Annex.

Our aim is to ensure recommendations are ambitious and transformational as well as practical so they can quickly be turned into action.

This interim report summarises our work to date and seeks to answers three questions:

- **What is the opportunity for the UK from industrial digitalisation?**
- **What are the barriers preventing the UK from achieving this vision?**
- **How can industry and government work together to address these barriers?**

## 2. The opportunity for the UK from industrial digitalisation

### i) The size of the prize

Manufacturing contributes over £6.7tn to the global economy and makes a significant contribution to UK PLC. UK manufacturing is 9.8% of the UK economy (£162bn GVA in 2015) and the UK is still in the top 10 largest manufacturing nations (9th 2016/17) and 4th largest in the EU. It employs 2.6m people but more like 5.1 million across the manufacturing value chain. UK exports of goods produced by the manufacturing sector totalled £257 billion in 2015, and were 50% of all UK exports. It accounts for 70% of business R&D and 14% of business investment<sup>1</sup>.

It has been recognised that by leading Industrial Digitalisation, the UK has the potential to realise industrial efficiency gains of up to 25%, manufacturing sector growth of 1.5-3%, delivering annual growth of approximately 0.5% of GDP<sup>2</sup>. For example a recent survey KPMG conducted on behalf of the SMMT identified the cumulative single sector benefit of automotive digitalisation at £74 billion by 2035.

The Global market opportunity is significant:

- Internet of Things (expected to reach \$7.3tn by 2017)
- Wearable technologies (expected to reach \$70bn by 2024)
- Big Data and Data Analytics (expected to reach \$32.4bn by 2017)
- 5G and associated wireless technologies (expecting a 40-fold increase by 2018)
- Robotics (expecting to reach \$29bn by 2018)
- Autonomous vehicles (expecting to reach \$28bn by 2020)
- Advanced manufacturing, building automation (expected to reach \$49.5bn by 2018)<sup>3</sup>

IDR addresses more than manufacturing. If we consider the impact on asset intensive industries such as utilities, e.g. oil production, and the blurring of manufacturing output which is increasingly being sold as services the opportunities for the UK economy are considerably magnified.

Our hypothesis is that the potential benefits of full scale industrial digitalisation are substantial, positively impacting exports (goods and services), economic growth more broadly, productivity and net employment, especially in the creation of new high value, well paid jobs. Tech City UK estimates that the digital sectors are creating jobs 2.8 times faster than the rest of the economy. The 'tech sector' now represents 6% of the UK economy with an estimated GVA per person in the region of £91,800, well above the UK average. The average advertised salary in digital roles is just under £50,000, 36% higher than the national average.

### ii) The opportunity for the UK

We recognise that the UK has a range of strengths which give us confidence that we can realise the opportunities of Industrial Digitalisation.

The UK has a combination of leading edge R&D and high performing sectors in the application of digitisation. An example is aerospace, which is already supporting the development and adoption of the specific technologies which will define the new Industrial Digitalisation revolution: additive manufacturing, collaborative robots, artificial intelligence (AI), data analytics, virtual and augmented reality (AR).

The UK is especially strong in digital and technology and has a thriving start up ecosystem in IDTs such as AI, blockchain and additive manufacturing. For example the UK has the strongest Artificial Intelligence/Machine Learning market in Europe with over 200 SMEs compared to just 81 in Germany, and 50 both in the Nordics and France.

The UK is investing significantly in key areas of infrastructure e.g. renewables (owing to strong incentivisation within this sector), which provides an opportunity to stimulate the creation of new local supply chains with a high rate of adoption of IDT.

In other areas we face challenges and we know that, on average, the UK is behind on overall productivity (output per hour - recently estimated at most to be 80% levels in Germany<sup>5</sup>), and in the adoption of the previous industrial revolution of automation, or 'Industry 3.0'. For example the 2016 IFR world robotics report<sup>6</sup> identified that the UK has 33 robots per 10,000 employees (excluding automotive), compared with France at 75 (nearest comparator) whilst Germany lead Europe at 170.

This is clearly a challenge for us to address, however because of the structural underpinning of the UK labour market (namely flexibility and wages), some companies have achieved world-class productivity at lower levels of automation. Indeed these lower levels of "fixed" automation have allowed leaders of the UK's best factories to both be productive (in terms yield – output/unit cost – versus labour productivity) and highly flexible.

We believe that as the UK invested less in Industry 3.0 they have less of a legacy burden and by providing the correct support to these companies they could more readily transition to the future Industry model than our International competitors. We also think this can provide an even stronger competitive advantage with Industry 4.0 technologies like Cobots, where the human works in harmony with advanced technologies.

### iii) Our ambitions

We believe that through a focus on increasing the adoption of industrial digitalisation technologies we should be ambitious, and our goals should be:

- 'To create a high profile and national movement with a high level of participation by UK industry with the intention of being a fast and early adopter of industrial digitalisation to help accelerate the transformation of UK Industry'
- 'To become one of the world's most attractive places to create and grow new businesses in the space of Industrial digitalisation'
- 'Industrial digitalisation to become the key technological enabler to raising productivity'
- 'To improve the competitiveness of UK Industry, in support of increased exports and UK regionalised growth and a measurable reduction in our trade deficit'
- 'To create more jobs than are displaced through the faster adoption of IDT in industry with new, higher skilled jobs paying more than the ones they replace'
- 'To establish a low risk, dynamic business-and institutional environment that attracts and nurtures talent to ensure ongoing UK innovation leadership at the forefront of this industrial digital revolution and through that create new businesses and industries'

### 3. The barriers limiting the opportunity for the UK

The review has identified three groups of barriers which we believe need to be addressed if the UK is to fully achieving the potential of Industrial Digitalisation.

#### i) Lack of leadership of Industrial Digitalisation in the UK

- There is no clear narrative of the significant opportunity for UK industry through the faster development and adoption of IDT, hence not engaging enough of UK business, especially SMEs, to invest in order to become the world leaders of the future like ARM;
- Whilst the UK has established a lead in some of the key emerging industrial digitalisation technologies there is no clear national strategy to maintain our dominant position;
- There remains unclear marketing and messaging of UK's strengths in the development and adoption of IDT (in the UK and internationally), hence not attracting enough inward investment.

#### ii) Poor adoption, particularly among SMEs

- The UK has a long tail of companies that have not adopted IDT at scale. This is particularly acute amongst SMEs. A recent BCG study identified the UK's competitive problem exists in part in the tail of companies that are significantly less prepared for the challenges of Industry 4.0. Among UK respondents, 21% report having no Industry 4.0 goals, more than double the size of the "tail" in France or Germany, while a further 9% report minimal progress<sup>2</sup>;
- One of the potential causes of this is the current landscape of business support and related delivery mechanisms which is confused and ineffective. This is particularly acute for SMEs searching for best practice guidance for adopting new technologies, with feedback telling us that SMEs are not aware of support opportunities and unsure of what good looks like;
- Access to people with the right skills is a recurrent theme of conversations about what is holding back adoption. It is clear as we start to look at the scale of the change of skills required for the future that the system is not currently coherent enough or coordinated enough to fulfil the requirement of a highly automated future. The skills system suffers from extreme fragmentation and duplication and the level of systematic engagement of industry with the skills and education fall significantly behind comparator countries and will fall well short of the dynamism required for a future digitally enabled world;
- Our tax investment incentive system is not targeted enough and other countries are now offering specific incentives to invest in IDT, for example in Poland and Italy;
- Digital standards are emerging and developing but the rate of development is too slow and there is a real risk of fragmentation;
- Cyber Security is seen as a large risk preventing the uptake of digital services.

#### iii) Under-leveraged innovation assets to support start-ups/scale ups

- As described above, the UK has a strong leadership position in some key areas of IDT, e.g. artificial intelligence and machine learning, and this strength in delivery of high quality research is globally recognised as is the UK's high level of innovation. These factors, combined with the national innovation infrastructure developed through the Catapult centres, universities and other

institutions, provide the basis of a strong technology platform both to develop, commercialise and scale up future IDT and create new businesses and industries.

- The UK has a vibrant technology start-up economy supported by growing financial institutions and government, resulting in the rapid emergence of Fin-tech, and Ed-tech. However, the huge economic opportunity of IDT is not generally understood and is under promoted.
- The UK is a leader in research and innovation and has started to establish favourable support infrastructure to develop and commercialise technology. However, this is under leveraged and is not focused enough on supporting IDT start-ups, and hence we are falling behind on the creation of new innovative companies and industries.

## 4. Emerging recommendations to address these barriers

We have started to identify a range of solutions which will help us deliver a step change in UK industrial success through digital technologies. These are focused in three areas mirroring the barriers identified in the earlier section.



### i) Focused Leadership – a UK approach

- Much stronger marketing and messaging of UK's ambition to a both a UK and a global audience'. This would include a clear description of the 'moon shot'<sup>1</sup> that engages industry from a business value and emotional viewpoint and to engage with a stronger level of intent and investment. This review will make a recommendation for this 'moon shot'.
- We are considering the case for a stronger ecosystem to lead this agenda building from existing institutions and assets. We envisage this including:
  - o a Digital Technology Institute (DTI) to provide stronger prioritisation and promotion of the key technology areas of focus where the UK aims to be 'world beating' in the space of IDT development and deployment;
  - o a Digital Technology Network (DTN) for each key technology, e.g. Additive Manufacturing, which would coordinate all the existing support assets e.g. Catapults and University Innovation Centres, with a clear 'hub' identified to provide a single point of focus.
- This wouldn't necessarily mean any additional institutions. We will identify the existing institutions who are well placed to lead on each technology. Where there are capability gaps we will propose investment to build new capability.

### ii) Rapid adoption – raising our game

- a) Greater SME engagement through more visible and better organised support ecosystems
- The Digital Technology infrastructure described above would provide a much clearer structure for business support aligned with LEPs at local level. This would support SMEs to adopt

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<sup>1</sup> Moon Shot refers to the US Apollo programme in 1960's which led to the advancement of a number of technologies

technologies using, for example, technology demonstrators to bring to life what good looks like, and help apply digital best practice.

- We would seek to align with the Industrial Strategy Challenge Fund to set up one or two of these new high profile 'eco systems' and adoption demonstrators focussed on implementation of specific technologies.
- For the following support mechanisms we intend to work in collaboration with the Productivity Leadership Group (PLG<sup>4</sup>), to build awareness and propagate – so our actions and branding are consistent and highly visible in areas including but not limited to data measurement, support tools, mentoring. This will include:
  - SME outreach and engagement events;
  - Toolkit to better understand 'How digital is your business?' and help identify 'the ID business opportunity';
  - Focused SME support program; e.g. digital mentoring, start-up digital toolkits;
  - Specific digital supply chain engagement program;
  - Focused digital start-up company programs in identified IDT areas;
  - Financing: banks to join in to provide "productivity loans".

b) A more systematic focus on digital engineering skills

- Industry should work with government and higher education institutions to create a virtual Institute of Digital Engineering which would showcase and spread best practice in learning and development, focused on both the workforce of the future, and the upskilling of the existing workforce.
- There should be an industry defined national skills standard for digital engineering which should inform teaching and learning in schools, colleges and universities as well as those providing training to existing engineers to transition them into digitally enabled functions. Organisations should be encouraged to embed the standard in their learning and development programs, which could be recognised by an easily understood kitemarking system.
- This would be reinforced with a significant program of industry engagement on skills not necessarily across all departments but certainly significantly including BEIS, DCMS and DfE.

c) Supporting policies

- Creation of clear standards for emerging digital industries and the ownership of data.
- More targeted tax incentives to encourage investment in IDT.

iii) Innovation – securing value in the UK

- The DTNs will help achieve a depth of excellence required to build the most effective ecosystem and develop new innovative technologies in their field of focus. These will create the space that encourages the linking up between start-ups, academia and broader industry, hence providing an environment to rapidly incubate and mature product offerings.
- Active promoting and education of financial institutions about the high returns available in investing in early stage IDT.

- Industry commitment to support and collaborate with early stage IDT offerings that enables the fast scale up of new businesses.

## 5. Next steps

The next phase of our work is focussed on refining the recommendations and turning them into specific actionable proposals.

The broad industry support for this review is providing us with confidence that a number of clear and practical recommendations will emerge founded on a broad consensus.

In specific areas, we expect industry to pledge support through Tier 1 supply chain initiatives to help drive broader, aligned adoption of IDT with the agreed support mechanisms. We expect broader adoption of IDT and associated automation technologies, with some newly targeted support mechanisms as incentives to enable transformational results beyond those enabled by single company, single initiative investments.

In return, our expectation is that Government will provide stronger leadership– both domestically and internationally – for the UK’s leadership ambitions regarding Industrial Digitalisation. We are also looking for Government to prioritise support for adoption of IDTs and a commitment to reform the necessary support mechanisms for the long-term. This will require support across Whitehall and particularly from BEIS, DfE, DCMS, HMT and DIT.

With commitments from both industry and Government, we believe this work is well placed to develop into an effective ‘Sector Deal’ as trailed in the Industrial Strategy Green Paper. We also recognise that some of our recommendations may have broader applicability beyond any specific sector and look forward to a conversation with Government about how they can be taken forward.

The institutional structure to ensure successful implementation of the review’s recommendations will need to be designed in partnership with Government. We expect this to become clearer during the next phase of the work as final recommendations become clearer. This would be underpinned by clear KPIs to ensure that impacts can be tracked, for example:

- % increase in exports;
- % increase in Industrial Productivity (exact measure to be defined and agreed with PLG<sup>4</sup>);
- % increase in GDP;
- Inward investment levels in technology companies in the space of the defined IDT;
- Digital implementation maturity by sector – exact measure to be defined and agreed with PLG<sup>4</sup>;
- Number of start-up companies in the space of the defined IDT.

We hope that this review stimulates further thinking and acts a catalyst for input from all UK stakeholders likely to be impacted by IDTs. You can do this through our website [www.industrialdigitalisation.org.uk](http://www.industrialdigitalisation.org.uk)

We are continuing to gather evidence to help our thinking and to finalise our recommendations and we will issue the final report in autumn 2017.

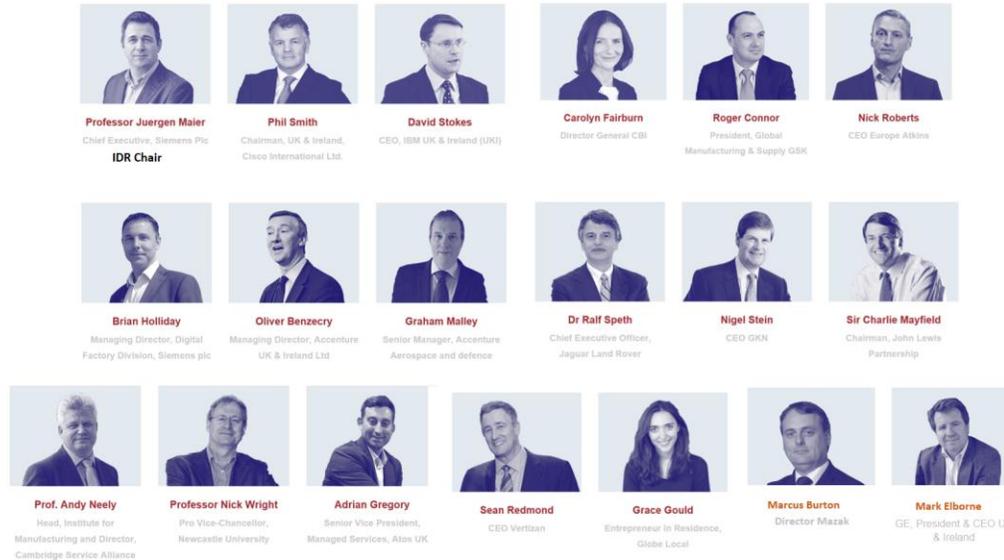
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- 1) EEF; Manufacturing Ambitions: An industrial strategy for a stronger economy. 2016
- 2) BCG; Is UK Industry ready for the Fourth Industrial Revolution. Jan 2017
- 3) House of Commons Science and Technology Committee. Digital skills crisis second report of session 2016-17.
- 4) PLG: Is the Productivity Leadership Group, which is a business led group supported by HMG with the responsibility to support business to drive productivity across all sectors across the UK.
- 5) The Guardian view on productivity: Britain must solve the puzzle. 9th April 2017
- 6) IFT; World Robotics Report. 2016
- 7) Partners engaged so far include: Accenture, Airbus, ARM, ATOS, BAE Systems, Siemens, Cisco, CBI, IBM, Rolls Royce, Cambridge University, Newcastle University, GKN, Vertizan, Local Globe, Atkins, GE, Mazak, GSK, JLR, University of Lincoln, Collison and Associates, ABB Robotics, FSA, Two Sisters plc, Tesco plc, Bakkovar plc, IMS Ltd, MTC, The University of Nottingham, KYN, Nissan, SMMT, Renishaw, RA Eng/ SEMTA, Gambica, Green-Alliance, Liverpool LEP, Manchester LEP/Growth Partnership, Techcity, EEF, TWI, Tech UK, MTA, IET, Atos, AMUK, UCLH, AMRC, Summit Engineering, Added Scientific, ElecTech Council, RAS Council, Lloyds Bank, Tech Partnership, Work Foundation.

# Appendix: Governance and Review Structure

## IDR Leadership Team

## Business Leadership Team



## ID Review Partner Support Organisations and Team

- HVM Catapult, Dick Elsy
- Digital Catapult, Jeremy Silver
- Gambica, Graeme Philp
- MTA, James Selka
- TWI, Robert Scudamore
- EEF, Lee Hopley
- RA Eng, Hayaatun Sillem
- IET, Nigel Fine
- ATI, Pal Clarke
- SMMT, Konstanze Scharring
- Tech UK, Antony Walker
- TechCity, Maria Palmeri
- Tech Partnership, Karen Price
- Semta, Ann Watson
- ElecTech Council, Tony King-Smith
- Robotics and Autonomous Systems Council, David Lane
- Work Foundation, Lesley Giles

## ID Review Government Partner Team

- BEIS, Gavin Lambert, Director for Advanced Manufacturing (Chair)
- BEIS, Clare Porter, Head of Manufacturing
- Government Office for Science, Mark Walport, Chief Scientific Advisor
- DCMS, Matthew Gould, Director General, Digital and Media
- DfE, Phillipa Lloyd Director General Higher and Further Education
- HMT, Josef Pitt-Rashid, Head of Industrial Strategy Branch
- Innovate UK, Ruth McKernan, Chief Executive Innovate UK
- DEFRA, Tim Render, Head of Great British Food
- DIT, Dylan Thomas, Director Technologies
- BEIS, Fionán O’Muircheartaigh – Industrial Strategy Unit

## Workstream structure

