



Will the published industrial strategy help rebuild manufacturing

9th National Manufacturing
Debate report, 2018



www.national-manufacturing-debate.org.uk



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What is the National Manufacturing Debate?

An annual debate launched in 2010 hosted by Cranfield University to provide an independent national forum for supporters of UK-based manufacturing. Stakeholders who attend the debate include manufacturing companies, engineers and scientists, academics, national and local government, finance providers, trade bodies, membership organisations and educational providers.

For the ninth successful year running, this event brought together professionals and academics from a range of sectors to debate current challenges in the industry. The event encourages networking and collaboration across the sector to enable continued and long-term growth. The topic for 2018 asked “Will the published industrial strategy help rebuild manufacturing?”

Previous National Manufacturing Debates have focused on:

2010: Manufacturing for energy

2011: Investment, incentives and innovation

2012: Enhancing the supply chain for growth

2013: Does the UK need a manufacturing strategy?

2014: How can the UK improve its manufacturing productivity?

2015: How do we develop the capability for effective reshoring to the UK?

2016: Accelerating manufacturing growth

2017: Leadership and investment for manufacturing skills

National Apprenticeship (NAC) Competition 2018 – Winners

- **1st place** – S.T.E.V.E (Specialised Terrestrial Experimental Vehicle Explorer) from OAS Training Centre
- **2nd place** – Team Olympus from UCP Zeller
- **3rd place** – M.A.R.C (Mars Adventure Rover Convoy) from OAS Training Centre
- OAS Culham from Oxford Space Instruments
- Team UKAEA from Culham Centre for Fusion Engineering
- The Martins from OAS Training Centre





Industry and academia came together to share evidence on whether the Industrial Strategy would help rebuild manufacturing.

Lord Alec Broers opened the debate for the fifth consecutive year. He said, "The Industrial Strategy is a good thing. Don't expect too much – but be enthusiastic about it." It was essential to have a strategy, especially with Brexit looming. He warned not to expect the US to come to the UK's rescue, because it won't.

Professor Sir Peter Gregson FREng said two components of the Industrial Strategy should help manufacturing specifically: the Sector Deals and the extra £4.7bn in science research and development funding that the government committed to between 2017 and 2021. Also the Industrial Strategy Challenge Fund will get a further £725 million over four years. A good example was the Intelligent Mobility Engineering Centre developed at Cranfield University with the Transport Systems Catapult.

A white paper, researched by Professor Rajkumar Roy and a team of Cranfield University master's students, provided the evidence for the debate.

It was based on analysis of media reports and citations of manufacturing in the media using NVivo word frequency software. The team's white paper revealed the big productivity problem in the UK; UK labour productivity has fallen 9% in 10 years. In the same time it has increased in Germany by 21% and in France it is up by 2%. The morning and afternoon debates focused on this gap.



"UK labour productivity has fallen 9% in 10 years. In the same time in Germany it has increased by 21% and in France it is up by 2%."

Using the media citation methodology, the study found the biggest factors affecting growth were

1. R&D and innovation,
2. the skills shortage,
3. value of the pound.

From the Manufacturing Welfare Index it found that weekly earnings in manufacturing fell in 2018, partly due to the relative rise in wages in other sectors.

All the results can be found on the white paper accompanying this report.

www.national-manufacturing-debate.org.uk/2018/



Keynote speakers



Dr Clive Hickman,
CEO of the Manufacturing Technology Centre (MTC)

Clive looked at each of the five pillars of the strategy: Ideas, People, Infrastructure, Business Environment, and Places.

He said people should not be afraid of technology stealing their jobs. New jobs are being created as businesses adjust to changes. He cited Vauxhall in the UK, which over time has reduced its total UK headcount from 4,000 some years ago to far fewer today, due to factory worker cuts at Ellesmere Port and Luton. But the company improved productivity and sales, so workforce in the group in non-production jobs has increased. For each he showed where the MTC was already adding value and where the Strategy (IS) could inject more. His message is that there was already much for the IS to build on.

For Places, he referenced the West Midlands. At the Ansty Park site near Coventry, several years ago it had the MTC's main building and little else. Today the site has five or more separate buildings within the MTC's real estate, FANUC's new factory and showroom, Chinese automotive firm Geely's factory for making the iconic London taxis, Meggitt is building a new £130 million factory next door as well as other companies on site. This pattern of colocation beside Catapult centres has been repeated at the AMRC with Boeing in Rotherham.



Anna Keeling,
Senior Vice President Commercial, GKN Aerospace

Anna said the Aerospace Growth Partnership was investing £3.9 billion in research and technology until 2025. GKN Aerospace is a major tier one supplier in this industry, one of the biggest and most capable tier ones she said. She stressed that competition in global aerospace and defence is intense and that it would take more than an ambitious Industrial Strategy to persuade global companies like GKN Aerospace to invest in the UK. Overall on several metrics the UK lags behind our competition.

She emphasised that competitiveness is the biggest challenge of UK manufacturing, for global companies. The pressure is because most big businesses place great importance on growth. Labour costs in the UK are on average \$31,000 p/a while the peer average is only \$18,000.

Straight competition was partly offset by work share agreements, where big OEMs need to give different countries / places work in order to win contracts.

"But customers are asking us for innovative solutions and for commodity pricing," Anna said.

But there is some good news. With quality, cost and flexibility the main priority and proximity less important, the UK was a good location for GKN. Additive manufacturing (AM) is a strong story in the UK, with the GKN AM centre creating 22 UK-based R&D jobs this year. Also 20% of GKN's suppliers reside in the UK.

She said the Strategy needed a regular forum, like the NMD, to monitor and report on the progress.

But she emphasised the Industrial Strategy needed to be “robust enough” to be suitable and meaningful for global companies while supporting and being relevant to SMEs.

In summary, Anna Keeling said for the Industrial Strategy to work, it must address the subjects that matter to big business:

1. Competitiveness,
2. Supply chain and,
3. Markets are dynamic.

All these are bigger issues than any Industrial Strategy.

“It would take more than an ambitious Industrial Strategy to persuade global companies like GKN Aerospace to invest in the UK”

Anna Keeling,
GKN Aerospace



Lord Alec Broers
(Chair) The National Manufacturing Debate

Lord Broers replied that the quoted R&D spend by UK Government of “rising to 2.4% of GDP” while good to hear, was only the same level as Sweden 18 years ago. It is vital to “stand up for R&D”, he said.

Despite the reality check, he reminded the audience there was still a lot of factory investment in the UK, including Clarks, the shoe manufacturer, reshoring its Asia factory to Somerset in May.

The remaining morning presenters focused on their companies and activities, and tried to connect what they do to the Industrial Strategy aims. They were:

Mandy Ridyard,
Finance Director at Produmax

Atul Kariya
Head of Manufacturing and Engineering,
Partner, MHA

Andrea Rodney
Director at Hone-All Precision Ltd

Andrew Schofield
Head of Manufacturing and Materials Engineering,
BAE Systems

Steve May,
Managing Director of Small Fry Design



Left to right Anna Keeling (AK), of GKN Aerospace, Andrew Schofield (AS), of BAE, Atul Kariya (AtK) of MHA, Mandy Ridyard of Produmax (MR), James Selka of the Manufacturing Technology Association (JS),

The morning debate

The effect of technology on jobs: changing the number of workers and type of work.

AK said **GKN Aerospace** had created new jobs in commercial roles for women. It had grown its group that deals with the Government (government relations) and academia. She said technology has had a very positive effect at GKN – there can be a positive effect on productivity without reducing employment.

AS referred to the £16 million **BAE Systems** (BAE) has invested in a new technical training centre in Lancashire. The technology here is all aligned to BAE's manufacturing strategy of reskilling. "The current distribution and description of fitter or electrician will change as we go forward." He said when BAE gets more efficient it can create more jobs so it's a virtuous circle, but it needs a tremendous amount of reskilling and flexibility in the workforce. He said it is possible there may be fewer jobs in manufacturing but more elsewhere in the company. He added that unions have been consulted on these changes.

MR said **Produmax** has increased productivity by a staggering 36% in the last three years and increased its headcount by nearly 60 per cent, showing the two can happen in tandem. The company now concentrates on life-long learning where employees expect to have to reskill and is recruiting people with the right values and agility rather than seeking specific skills, because it can't be sure what skills future jobs will demand.

"Where is the Great British Make Off on TV? How do we really improve the perception of careers in manufacturing and engineering?" asked Sameer Savani at ADS, the aerospace and defence business group.

The MTA's James Selka (JS) said that the broadcast media at the 2018 MACH exhibition covered a report that the MTA produced with HVM Catapult, Lloyds Bank and EEF. Researched by Oxford Economics, it aimed to "level the playing field" on the Government measure of manufacturing and its impact on the economy. He said "Readdressing this measure [...] to what we know it actually is" – following the transition in the 1970s from the vertical integration of large companies, and including today the supply chain orientation of modern manufacturing. On this measure, the impact of manufacturing on the UK economy is not 10%, as commonly quoted, but arguably 23% of the UK economy.

JS said that when BEIS – which he accepted had done a good job in creating the Industrial Strategy – asks the Treasury for the support that manufacturing

deserves, the Treasury responded to BEIS by saying “it’s only 10% of the economy”. He said they should now recognise the massive multiplier effect that manufacturing, almost uniquely, has in the UK.

Atul Kariya at MHA said it did research on SMEs, using the European Union definition of SME, i.e. companies with less than €100 million turnover. It amazed him how many SMEs in this sector are doing clever, amazing things but they are not often very good at projecting that image. People do not know about them so the image of manufacturing remains old, suppressed and stereotypical.

MK says Produmax has an annual apprentice open day that has helped change the perception of manufacturing among local people. AS said the working environment at BAE Systems today was very different (more modern) than stereotypical North of England manufacturing environment and it runs events like the Make It campaign. These activities have had a demonstrable effect on the number of job applications at BAE.

Q: Is the Industrial Strategy addressing the gender gap?

Anna Keeling said there is nothing in the Industrial Strategy specifically to address gender.

AK said GKN was asked by the Government to release its gender pay gap information as part of the Government’s report in April. The more revealing statistic was not the pay gap but the gender gap. Most facilities only employ about 4% of women – a stark statistic. GKN is trying to correct this by ensuring role descriptions are gender neutral and seeking women candidates. It is making sure its [director] panels are diverse, while giving more consideration to a greater diversity of applicants. Produmax, a small company, employs 20% women.

AK said GKN Aerospace is not employing positive discrimination, to select a female candidate over a male candidate on the basis of gender. She said GKN sought applicants from a much wider spread of industries than aerospace.

She referenced the Alexander Review that targeted 33% of female candidates at senior levels in organisations that, with other work, were driving more interest in women’s career progress. The review names organisations that are doing this very well but unfortunately there were not examples from the manufacturing sector.

Productivity and employment

The panel discussed the link between productivity and employment, where often as one increases the other falls. GKN has increased manufacturing productivity greatly and has also managed to create many new jobs in several new roles. However with the sale of GKN to investment firm Melrose, workforce consolidation seems likely.

Andrew Schofield continued to cover pay, R&D, supply chain collaboration, the skills shortage, productivity. JS pointed out that the research is very different to development and the UK needs more of the “D” from university research.

Pay

One audience member said it was important to address pay. AS said that 92 per cent of jobs at BAE pay above the national median average. He said the company pays apprentices well because it wants the best.

AK said pay has an aspirational factor, it can attract the best candidates. Also that in such a competitive environment for skilled job vacancies, young people can reap benefits from companies offering great perks.



keynote speakers continued



"Produmax's Employee Engagement Scores are regularly 5/5"

Mandy Ridyard,
Finance Director at Produmax

Mandy Ridyard,
Finance Director at Produmax

Produmax is a precision engineering company primarily serving the aerospace and defence industry. It manufactures a range of components and is the only UK supplier of gearbox housings for Boeing, and makes actuators for Bombardier regional jets.

The company needed to change: she reminded the conference of former GE CEO Jack Welch's comment: "If the rate of change on the outside exceeds the rate of change on the inside, then the end is near."

Civil aerospace has grown 40 per cent over the last five years.

She said if average UK productivity is bad, it was worse still among SMEs. Produmax had the chance to tender for a \$50 million Boeing Dreamliner contract, but it needed to design and build a new purpose built factory – an opportunity and a big risk.

She said there is support for companies but as a manufacturing SME it is difficult to navigate the options. They discovered Sharing in Growth or SiG, an aerospace supplier programme, part Government funded, run by Rolls-Royce to bring more SMEs (target 65) up to world-class standards of quality and delivery that aero primes demand. They were too small to join the programme which demands a £10 million entry level.

Working hard they persuaded SiG to let them join. The programme gave them access to Deloitte, the National Physical Laboratory and help they could never have afforded as an SME. The process is both an audit and benchmarking exercise. The process led to a physical and attitudinal change at Produmax.

Produmax transformed its image, operations and its workforce dedication through the process.

"We, the company, now shout about manufacturing all the time," says Mandy. We have learned to have a Vision, Mission and Values.

Some of the changes the company made include:

- A large cut-out "Superhero" in the centre of the factory which has become their symbol, to inspire their own superheroes of manufacturing.
- The company has no job titles. It works on a meritocracy.
- A live TV screen showing the company's in-house weekly magazine showing employee and performance news (consider that Produmax is a small company). Its communications, Mandy says, are around "personal performance" showing results-driven performance.
- It hosts small, community building activities, e.g. the Produmax "Bake-Off" and an annual free hog roast for staff and families.
- An annual open day for young people to visit and see what manufacturing is about.
- Produmax's EES, Employment Engagement Scores, are high: in nine questions it scored 5/5, and 4/5 in the remaining.

Many remarked on the productivity puzzle, saying that Japan had a highly automated manufacturing industry but low productivity – suggesting that automation alone is not the panacea for productivity.

She summarised by saying that Produmax had shown examples of investing in several pillars of the Strategy, especially People and Environment. Her message was that for companies to succeed they need their own strategy, must be ambitious and get all the employees on side.



"To really stimulate the industrial sector, the government could give SMEs a complete tax break for a year."

Atul Kariya,
Head of Manufacturing and Engineering,
Partner, MHA

Atul Kariya

**Head of Manufacturing and Engineering,
Partner, MHA**

Atul Kariya, head of manufacturing and engineering (M&E) at the accountancy group MHA, talked about the group's annual manufacturing survey findings.

MHA, a collective of accountancy and audit firms, has 90 offices, more than 2,500 manufacturing clients and turns over £130 million.

The MHA annual survey revealed that 67% of SMEs do not claim R&D tax credits – despite this the M&E sector has the most claims by volume. R&D credits were very efficient he claimed: for SMEs, for every £100 invested in the business, £43 is refunded through the tax system.

But it's a confident sector. 73% of clients expected growth in revenue and profits in the next 12 months.

AK said R&D tax relief in France, for example, is more generous with rebates of 228-33 per cent. Keeping corporation tax low is a positive move to attract investment and increase employment.

He suggested that if the UK government really want to stimulate the industrial sector it could give SMEs a complete tax break for a year or greatly increased tax allowances for a period to encourage investment.

On the Apprenticeship Levy, Atul said MHA's clients believed the funds they got back [by claiming the levy refund] do not adequately reflect the costs of training.



Winning team, National apprenticeship competition – S.T.E.V.E (Specialised Terrestrial Experimental Vehicle Explorer)

Where, when and how?



Andrea Rodney

Director at Hone-All Precision Ltd

Andrea Rodney, MD of Hone-All Precision, represents an exemplar small British engineering business, local to Cranfield, being based in Leighton Buzzard.

Andrea said national strategies come and go: reminding the NMD that 18 years ago Jeff Wilson formed an industrial strategy for the East Anglia Regional Development Agency (RDA). Then the Government changed and it disappeared over night. She said the five big pillars were laudable but there was no detail in the white paper. It does not provide specific actions for real SMEs like ours.

Covering the “people” pillar of the Industrial Strategy, Andrea was fed up of recruitment agencies that could not deliver apprentices. Hone-All posted their own ads on local Facebook sites for “anyone with a passion for engineering, regardless of age, gender, profession etc”. They had planned to take on one apprentice but hired three due to the strong response. “They have only been in our business a few weeks and already they are adding value.”

On the Infrastructure pillar Andrea said there was a lack of joined-up thinking about how the investment will be allocated. The Government has committed to giving the Local Enterprise Partnerships (LEPs) the responsibility to develop local strategies. She said, the truth is that some LEPs have added value to their regions and others have not.

Hone-All asked EEF to create a LEP contact sheet for their Regional Advisory Board meetings, because several LEPs crossed over the EEF East of England region. It took more than a month, and several contacts were missing. When Andrea contacted the LEPs to ask what they could offer manufacturers by business subject, several didn't know.

“It is worrying that the Strategy says the LEPs are meant to be delivering our regional strategic direction,” she said. “With the loss of the Manufacturing Advisory Service and RDAs, like the LEPs, some worked very well, some did not. So why change or disband the whole system?” For the IS to work for many companies, it is vital to have a link organisation to them that really worked, or it would fail. She said it was difficult to fulfil the Strategy's objectives without giving the LEPs more capability.

On infrastructure there seemed to be disproportionate focus on grand projects like HS2, HS3 and new runways. Many SMEs outside these supply chains are looking for something more relevant.

Hone-All have given their tax credits claims to a company that specialises in making R&D tax claims. The government needs to promote how to claim with real examples of what can be successfully claimed for what is spent and the timeframe for the R&D rebate should be shortened. Andrea said that the mandate for infrastructure should be given to the Local Enterprise Partnerships to deliver local needs.

For the Business Environment pillar, Andrea said that the Strategy fails to address the high cost of doing business in the UK. This, compared with other economies, is one of the biggest issues [manufacturers] face she said. EEF says just eight per cent of UK companies think the Government has specific policies to support Manufacturing and engineering growth in the UK. But 65 per cent of those surveyed believed that Germany has these policies. Government should reinstate 100 per cent capital allowance to create a positive environment to invest.

Shaping the future of aircraft manufacture



“Technology for us means affordability and lead time reduction.”

Andrew Schofield,
BAE Systems

Andrew Schofield

Head of Manufacturing and Materials Engineering,
BAE Systems

Andrew Schofield, Head of Manufacturing and Materials Engineering in BAE Systems’ Military Air business, showed the audience some of the manufacturing technologies being adopted at BAE Systems to produce more aircraft, more quickly and with more flexibility than ever.

He showcased Typhoon, the Eurofighter aircraft assembled at Samlesbury, and Taranis, an unmanned aerial vehicle and the result of 1.5 million miles of research in the UK and Australia. He said the apprentices who received the NAC awards this morning were entering aircraft manufacture at a really exciting time.



BAE Systems is investing £4 billion in R&D over four years. Of BAE’s 83,000 employees, it has about 30,000 each in the US and the UK, where over half the UK employees are engineers. A new CEO, Charles Woodburn, was appointed in summer 2017, “whose

mantra is technology,” said Andrew, has appointed a Group Manufacturing Director to oversee and integrate all the business sectors, where previously there was less connection between the businesses’ manufacturing operations.

The challenge – supply chain issues

The Hawk, with over 1,000 aircraft built, production line is a 1970s design and BAE is trying to digitise this to increase productivity. The Typhoon line, with over 620 aircraft built, and F-35 production, which is approaching the rate of 140 is comparable to big civil aerospace firms Airbus and Boeing. F-35 plans to build 3,000 units in the world’s biggest defence programme, worth £1.5 trillion, and 10 per cent belongs to BAE.

Technology for these programmes means affordability and lead-time reduction, said Andrew.

He said in the future the volume of military aircraft will be much lower with a lot more variability and specification. The next generation will be asked to do a lot more than the current generation, in terms of range, adaptability for customer needs and cyber attack. Batch volumes are lower, orders are more variable – where orders for Hawk are typically now 10 or 16 aircraft. To manufacture this alongside more utilised, volume products gives BAE a big challenge for suppliers. Suppliers that make forgings don’t want to make five or 10 for BAE when they have orders for thousands from Airbus.



Costs, lead-times and time to market are all falling – BAE just has less time to spend thinking about, qualifying and producing a solution. As well as new manufacturing technology, this also means more collaborative working.

He agreed there is not enough detail in the People pillar of the Strategy and BAE is working to keep its pipeline of people suitable for the new manufacturing needs.

BAE reviews its manufacturing strategy about once every 10 years, and well before the Industrial Strategy green paper was issued, the company identified nine key areas to address.

BAE in the North West has a logistics centre for supplying parts, and will soon break ground on the new AMRC North West. BAE's factories have moved to a right-first-time culture and has developed strategic partnerships with companies including Renishaw and Siemens.

There is a big difference between how the three military aircraft are assembled. For example, the Hawk and F-35 JSF were manufactured using three separate manufacturing systems, with little commonality. This was scrapped and BAE moved to a single, SAP based manufacturing system.

BAE assesses its Technology Readiness Levels (TRLs) – and has partner universities and works with EPSRC on early stage research in materials and areas like metrology. In the mid-tier TRL range, BAE is a member of the AMRC, MTC and National Composites Centre, as well as working closely with the Aerospace Technology Institute with GKN and Bombardier. He mentioned for projects outside the UK it was important to keep the European funding source running.

Manufacturing technology trends at BAE Systems

Design: The company is moving away from “design-for-manufacture” in the established way, and looking more into new designs where the next generations of aircraft will be made differently.

These include:

Model-based definition, reconfigurable factories, robotic automation, mixed methods of manufacture. BAE is using digital twins to simulate assemblies before they are made – part of the Industrial Strategy, BAE is involved with a Rolls-Royce initiative on a £200m digital manufacturing accelerator which was submitted to the Government.

It is using augmented reality, emerging digital media, where BAE has a mixed reality CAVE suite to design and develop layouts, to retrain the in-service engineers, better exploiting the level of data in the business.



Robots

BAE with Airbus and the ATI have a project to integrate humans and robots on an aluminium frame assembly. This includes working on the deployment of robots into a production area.

Automation of conventional processes: BAE has now implemented a five-year programme with the AMRC into its production line, for first in class, 21-axis dual robot system that removes the need for manual counter-sinking on composite wing components. It has delivered huge cost and lead-time savings.

Reconfigurable assembly: shows the assembly of the future, with less need for lots of assembly tooling. With the University of Nottingham, it proved it could manufacture a one-half size aircraft fuselage without the user path tooling with two independent robots. This assembly method is fed back to the design stage, to help re-design the aircraft to be assembled in this way, optimising design before it is manufactured.

BAE has invested a lot of activity into **artificial intelligence and machine learning**.

The company is moving to a **mixed manufacture model**, combining subtractive with **additive manufacturing** (AM) where Samlesbury has invested heavily in both polymer and metal AM technology. It has just introduced a non-metallic duct for Typhoon's new radar, formerly made from 17 parts, it is now made from two with the use of AM.

With its partner Cranfield University, BAE is well on the way to proving a method for AM fabrication of large, structural parts.

Battery technology: Printed electronics and the need for highly flexible printed films, which asks the question how can the airframe do the job of a structural battery rather than a heavy battery fixed inside?

On multifunctional materials Andrew said "BAE will soon reach the point where it will know whether graphene is the right material for embedded sensors in composite components and light-weighting or low-cost tooling."

He also talked about in-service product support.

Factory in a box, a mobile mini factory, could be used with and by the MoD to upgrade an aircraft in-base rather than flying to a fully-equipped service area.

In summary, to reflect the Industrial Strategy's pillars, BAE Systems is transforming its manufacturing technology, supply chain, factory, IT and mode of manufacturing. All this needs new skill sets. Andrew spoke more about new job descriptions and the way engineers are trained, such as the need for digital engineers, those versant in digital twin, additive manufacture and robot and automation engineers.



The role of industrial design



Steve May, **Managing Director of Small Fry Design**

Small Fry is an award-winning product and branding design agency.

One of its achievements was inputting flashing lights in training shoes to Asics. This concept added \$82 of value for a \$1.5 investment and the company sold six million units in a year. Steve talked about the evolution of product design. He suggested "in the 1970s we made pretty objects. Since then we have created experiences. Now we [the UK] need to create growth."

Steve made several points about the Industrial Strategy and how companies can use design and branding to grow.

He highlighted three priority areas that the Industrial Strategy could address:

1. The grant landscape, including the role of Innovate UK, how to signpost funding and how best to use it.
2. He suggests that the Department for International Trade tends to do "more of the same", which potentially is not working.
3. Education about manufacturing and engineering, focusing on STEAM not STEM (see below).

Steve cited research that claimed only three per cent of university research in Britain impacted the economy. Specifically, according to Universities UK, the Higher Education sector actually makes up about 3% of the economy.

Innovation, an abused word, Steve said, is at the cross section of development and marketing. It is the strategic implementation of good ideas to add value.

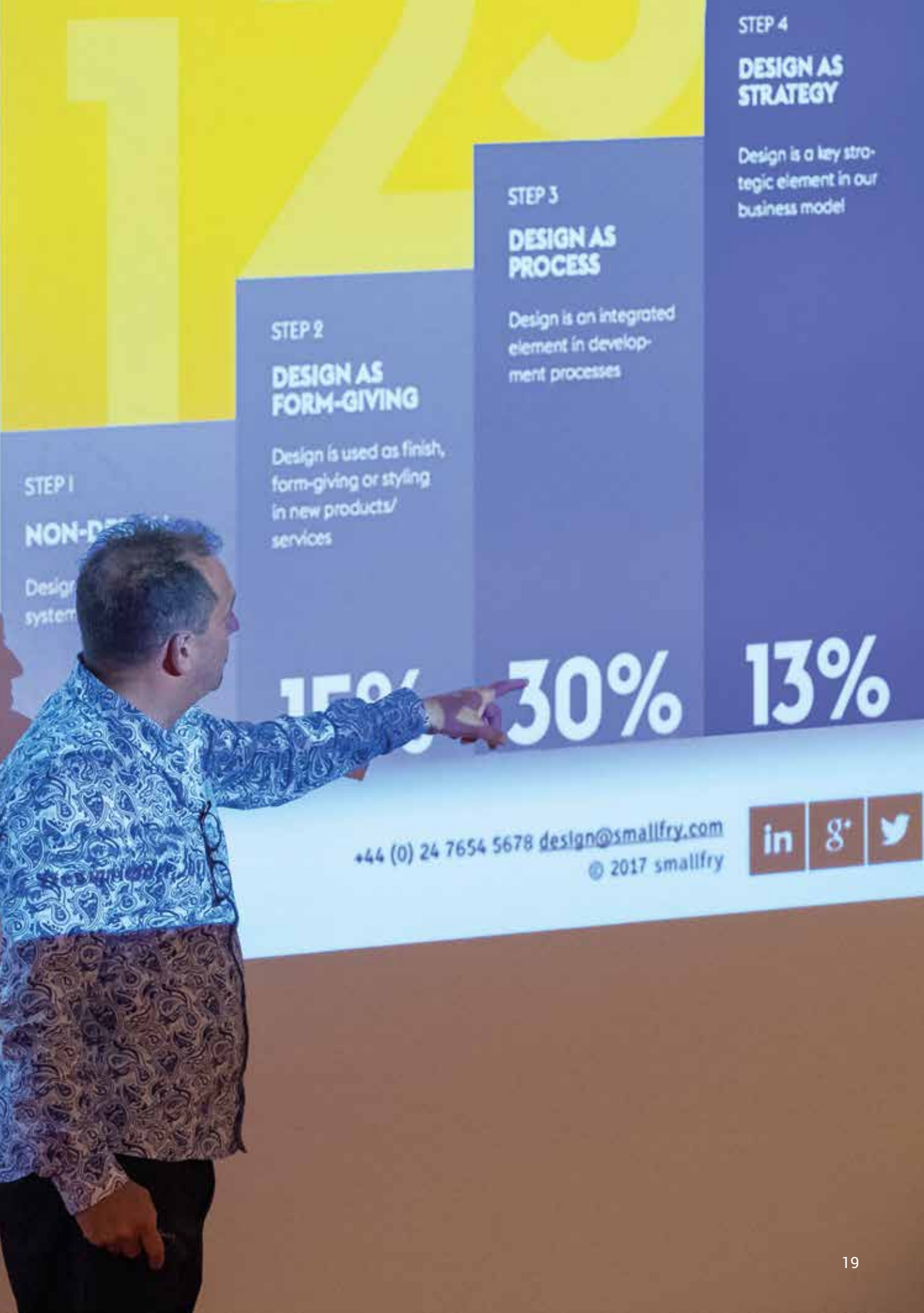
Steve said "design and innovation is not people-intensive. Ninety five per cent of SMEs employ five people or less. Apple's new design headquarters, a huge circular building, cost over \$2 billion but Jonathan Ives, Head of Design, has a core team of just 12 people."

He cited Jaguar Land Rover's current success today from a near bankrupted business – its turnaround came when it started to design "desirability" into its cars. A wristwatch is an outward projection of a person, and cars are the same.

In the technology vs jobs debate, Steve said "you cannot automate creativity." It was essential for the education sector to focus on STEAM, more than STEM, i.e. science, technology, engineering, ART and maths, adding that without creativity these subjects fall over.

Recalling school, he loved maths, physics and art but his teacher told him it was a bad combination so he took history and art. It was the wrong choice. It is important for these subject areas to be encouraged.





STEP 1

NON-DESIGN

Design is used as a system

STEP 2

DESIGN AS FORM-GIVING

Design is used as finish, form-giving or styling in new products/services

STEP 3

DESIGN AS PROCESS

Design is an integrated element in development processes

STEP 4

DESIGN AS STRATEGY

Design is a key strategic element in our business model

15%

30%

13%

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Left to right, Andrea Rodney, Chris White, Andrew Schofield, Mandy Ridyard, Steve May and Atul Kariya

The afternoon debate

The PM debate asked how the Industrial Strategy can be held to account.

Chris White, the former MP for Leamington who assesses the Industrial Strategy at Kings College London, said "the Industrial Strategy Council had been slow to formulate. The right body would look at the deliverables and outcomes, real impacts, and be answerable to an independent auditor". He said "industrial revolutions are not planned", but the Strategy has been pushed through very much in response to an economic environment that needs it. Chris said "Post-Brexit we need to make sure we have the strongest domestic policy possible to exploit these new technologies."

The panel were critical of the dearth of detail in the IS. Steve May said if he was a consultant paid to produce a conclusive plan for a client and provided the Strategy paper, he would be fired. There is not enough implementation detail.

Andrew Schofield said "industry had learned not to waste experience. When Typhoon was discontinued,



engineers in BAE's Military Air business were moved to the Submarine business and compulsory redundancies were minimised. In a previous redundancy round the company lost 1,000 years of experience", he said.

An audience member said that following both the Wolff report and Richards report on skills, the Apprenticeship Levy was a good example of why skills training policy cannot be left to the government.

Figures in April show that apprentice applications have fallen by 24% since the Levy was launched.

"Post-Brexit we need to make sure we have the strongest domestic policy possible to exploit these new technologies."

Chris White,
Former MP



Brexit was covered briefly. Avoiding the gloom, the panel looked for positives. A panellist said public procurement should benefit UK industry.

AR said when we leave the EU and government contracts are not tendered to 28 countries, we can do all the procurement domestically. For example, an estimated £1 billion per year is spent on maintaining the NHS with building maintenance and plant. Steve May said Brexit is a big opportunity for business.

One delegate said with referenda decided on such fine margins, clear decisions to clearly benefit the UK were very hard. Higher winning margins were needed to give the public confidence.

"Why do business improvement consultants today see the very same problems they saw 25 years ago?"

Andy Shaw,
Ostoya Associates

The audience asked questions including:

- Why do improvement consultants today see the very same problems they saw 25 years ago?
E.g. companies wanting to adopt automotive lean methods but have not started.
- The Apprenticeship Levy and why it is not working as a method to increase the skilled workforce.
- The lack of specific detail in the Strategy, no blueprint for delivery.
- Age profile: The approaching retirement cliff edge for many manufacturers.
- The potential for additive manufacturing and if standards need to be developed.
- The lack of funding in Further Education colleges to support the needs of employers.



NMD 2018: Calls to action for government

The panel were asked to provide recommendations to government to accelerate and improve delivery of the Strategy. These were added to ideas submitted by the NMD audience. These are some of the recommendations:

Government

Keep leaders at the top of government who really understand business needs.

Appoint a **minister for manufacturing**.

Encouraging people to seek better outcomes on projects.

More joined-up thinking in government. There are silos in departments that should by now be connected.

[From MTA's research with Oxford Economics]
When taken with indirect jobs and the multiplier effect, manufacturing is worth 23% of the UK economy.

Tax

Innovative tax credits to encourage investment – one delegate suggested tax breaks for a year for start-ups, higher capital allowances for manufacturers and lower corporation tax for SMEs in vulnerable growth periods.

The removal of capital investment spend from the business rates assessment would really help small capital intensive companies.

Taxation for SMEs should be simplified and stable. Government should remember the tax is their [these businesses] money.

Use local business support groups better. For example, fund the LEPs and give them more resources and a mandate to grow businesses, like the RDAs.

The Industrial Strategy

The Strategy needs to account for global competition. If it doesn't make the company in the UK competitive, it is of little relevance to global companies operating here (GKN).

More supply chain integration. Industries work so much better when their supply chains are joined up.

Recognise that markets are dynamic, they move fast.

These issues are far more important for [manufacturing] companies than the Industrial Strategy. The IS has to account for these needs.

"If BEIS and the Treasury can accept the higher valuation of manufacturing that captures the multiplier effect [Oxford Economics / MTA study], then deeper, longer support for manufacturing activities can be justified."

James Selka,
The MTA



Three priority areas for SMEs:

- 1 Grant landscape. Make this clearer. Involve Innovate UK and the new UKRC combined research council. What is best mechanism to explain the grant landscape to SMEs?
- 2 Export opportunities. If an expensive programme is not working, stop it. Evidence that we tend to do more of what is not working.
- 3 Education – connect with industry.

There should be elements in the Strategy that help SMEs explicitly.

R&D: stand up for the importance of R&D. The IS commits to reach 2.4 per cent of GDP investment in R&D by 2027 and to reach 3 per cent of GDP in the longer term – Sweden had 2.4% of GDP 18 years ago (Lord Broers). Should “among the top quartile” of countries be enough?

Focus on people: Tendency to think of innovation and R&D as technology. Need innovation in people, in training. Promote new training and new jobs to new cohorts of people.

Focus on STEAM – Science, Technology, Engineering, ARTS and Maths (STEAM) – more than STEM.

During 4IR / Industry 4.0, more jobs will be automated but you cannot automate creativity. This should be a stronger part of the IS and manufacturing.

Bring marketing into the equation. For some, innovation for companies is at the cross-section of product development and marketing.

Gender gap: More work on a huge demographic that is untapped; women. There is work on encouraging women into Manufacturing careers but it is fragmented and disunited.

Technology: educate people about Industry 4.0. Explain it will have a gross positive effect on jobs.

Local power: There must be a distinct change in the role and accountability of LEPs.

Perception: Manufacturing still, in 2018, needs an image makeover. Can the Strategy drive this through, pulling all the organisations together? Where is “The Great British Make Off” on television? Can “better perception” be delivered by the Industrial Strategy?

The IS refers to the 2018 Year of Engineering but that is scant commitment.

Key recommendation:

The most common action demanded was to make the Strategy measurable and accountable. The IS has yet to appoint an Industrial Strategy Council having said it would. The mechanism by which it is audited and reported must be transparent and well communicated to all in industry.

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Events

Manufacturing 2075
5 December 2018
www.manufacturing-2075.org
Theme: Digital Engineering

National Apprenticeship Competition
21 May 2019
www.national-apprenticeship-competition.org.uk
Theme: Production of a multi-purpose vehicle/lab/
workshop/habitat for exploration on Mars

National Manufacturing Debate
22 May 2019

www.national-manufacturing-debate.org.uk
Theme: UK Manufacturing under threat!
What are the opportunities?