

MAKE IT SMART: HOW WE CAN DELIVER IMPROVED RESILIENCE AND PRODUCTIVITY BY DIGITALISING OUR MANUFACTURING BASE

Policy paper: May 2020



#MakeItSmart

EXECUTIVE SUMMARY

Our economy is undergoing a profound digital transformation, powered by a new source of energy: data. This Fourth Industrial Revolution has the potential to transform our lives and our economy, making it more productive, resilient and sustainable.

As we rally together as a nation to address the economic, social and public health impacts of the COVID-19 pandemic, we are seeing at first hand the critical contribution of our manufacturing sector to this effort. Whether it is making the medical devices and protective equipment our hospitals need, or keeping us all fed, the UK's makers have played their part.

And this speedy and flexible response has largely been made possible by digital manufacturing technologies. When new medical devices were needed, they were designed remotely and collaboratively. They were tested virtually, using digital twinning techniques. And when disrupted supply chains meant a shortage of critical components coming from overseas, we turned to additive manufacturing processes to 'print' replacements in the UK.

This sort of resilience will play a role in the future manufacturing recovery post-COVID-19. There are many lessons we can, and should learn from this.

Which is just one reason why it's critical that our manufacturing sector isn't left behind in this digital revolution. As with many longer-established sectors, this transformation produces specific challenges for manufacturers – and profound change is required. These challenges are further amplified by the fact that most manufacturers are SMEs: often located in the parts of the country with less strong regional economies, and where the Government is concentrating its efforts to 'level up'.

This is why – quite rightly – the Government and the wider public sector is funding a range of innovation-led programmes to help promote industrial digitalisation. Some of these flow from the 2017 Made Smarter review, including a regional adoption pilot for SMEs in North West England.

As we approach a comprehensive spending review, and the establishment of new funding streams such as the Shared Prosperity Fund, Make UK has undertaken a review of the existing support arrangements and made recommendations for the future.

To do this, we gathered evidence through five interactive workshops in different English regions, engaging with over 100 stakeholders. These included universities, Catapult centres, growth hubs, local authorities, colleges and local enterprise partnerships, as well as manufacturers themselves.

Following this engagement, four strong themes emerged, around which we are basing our recommendations:

Content: what support do manufacturers need to help with digitalisation? Are the four key components identified in the Made Smarter review still correct?

Funding: do current funding arrangements work? How could these be improved to better support public bodies and manufacturers?

Delivery: how well are current delivery arrangements working? What improvements could be made to delivery?

Governance: how should stakeholders best be brought together to oversee and manage a programme of industrial digitalisation?

We make 15 recommendations, addressed at industry, Government, local regional development bodies, Innovate UK, universities and other stakeholders. These conclude that:

- **The Made Smarter Review's approach to SME adoption is broadly speaking the right one and should be used as the basis for roll-out in other areas;**
- **To address funding gaps and overlaps, a 'single pot' approach should be used – as already applies in the North West;**
- **Effective delivery requires a single lead partner to take responsibility for co-ordinating efforts within a region; and**
- **To ensure wide buy-in from all stakeholders there should be effective regional consultation and oversight.**

CONTENT

When the Made Smarter industry-led review published its report on exploring how UK manufacturing can maximise benefits from increasing adoption of digital technology in 2017 it came up with three main goals: Leadership, Adoption and Innovation.

We wanted to focus on the **adoption element** and, within that, its pilot programme currently running in North West England. This contains four elements of support, integrated into a single programme:

- **Strengthened regional SME advisory services**
- **Financial support for investment**
- **Mentoring support and improved university links**
- **Support for change management**

If you are a small or medium-sized manufacturer in the North West you can register with the Made Smarter programme and go through all of the stages of these recommendations.

All of these four components working together as a blended approach does not exist in other regions. In our conversations and workshops with manufacturers, stakeholders, and providers, the majority agreed that these recommendations are still useful, and these four strands remain the right ones for effectively supporting SMEs. Participants agreed that wider adoption efforts across the country would best be based on an extension of this approach.

Recommendation 1: The four-strand approach set out by the Made Smarter Commission is working and has widespread support. It should form the basis for a wider roll-out of industrial digitalisation efforts across the country.

Strengthening regional SME advisory services

Participants agreed that encouraging digital adoption by SMEs is hard work. It is unlikely to happen by just waiting for the SMEs themselves to take action as SMEs often do not have the spare capacity or the additional skills required to undertake digital transformation - even if they have identified this as a strategic necessity. And – as Make UK's own research shows – SMEs can be confused by the range of options, technologies and services being marketed to them. This means that a concerted effort by 'digital ambassadors' - with the relevant technical, process and change management expertise - is needed in order to create relationships with SMEs and provide them with impartial advice.

Outside the North West of England there is no integrated model for doing this in relation to industrial digitalisation. Growth hubs in other parts of the country said that they didn't have the ability to provide sufficiently expert advice to support this work. Elsewhere a patchwork of local authorities, LEPs, universities and others are trying their best, but with limited resources. They often struggle to locate SMEs who need their help and to interact meaningfully with them.

Recommendation 2: Regional SME advisory services must be strengthened to include technical, process and change management expertise linked to industrial digitalisation.

SMEs will not engage unless they have confidence that they are receiving expert and impartial advice.

Financial support for investment

Digital transformation often requires investment in technology, which brings with it up front costs. The North West Made Smarter pilot has a small fund which can be used to make grants to help SMEs offset some of this cost. In some parts of the country dedicated loan finance is also available, for example through various programmes run by Scottish Enterprise.

Participants agreed that a range of small-scale financial incentives remains important to helping SMEs digitalise, although grants/loans need to be seen as part of the wider picture alongside, for example, fiscal incentives such as tax credits or investment allowances. Often finance is less of a barrier than, for example, technical awareness or concerns about change management. There are particular issues around the longevity of some of the funding mechanisms currently used: these are discussed in the funding section below.

Recommendation 3: A range of financial incentives – grants and potentially small-scale loans- should be made available as part of the support package offered to manufacturing SMEs.

Mentoring support and university links

Most of the stakeholders pointed to the importance of connecting with other SMEs and local universities. Case studies and the ability to learn from others are highly effective in persuading SMEs to embark on digital transformation themselves. While many had developed effective links with local universities, the appetite for action amongst universities themselves differs - depending on strategy, history and funding.

Parts of the country with a long history of manufacturing tend, as a result, to be better served by engaged university engineering departments and business schools offering relevant research and support opportunities. Elsewhere, SMEs will struggle to find a local university partner to work with. This reinforces the need for visible, active mentoring from SMEs.

One option could be for universities and catapult centres to link up with local SMEs to offer one-year post-graduate 'digital ambassadorships', seconding more experienced students into the business to identify productivity and process improvements. Alumni of this scheme could then form a network to discuss ideas and exchange good practice. This could build on the work already being done in some parts of the country through Knowledge Transfer Partnerships.

Recommendation 4: Made Smarter, Government and Make UK should work together to gather and promote case studies and mentoring opportunities, building on those already gathered as part of the North West adoption pilot.

CASE STUDY: BRANDON MEDICAL

This company based in Leeds manufactures medical equipment for operating theatres which is exported globally. They wanted to introduce Industrial Internet of Things technology into their products to create a 'connected operating theatre'. Through a Knowledge Transfer Partnership with the University of Huddersfield they have realised their Digital Operation Room concept which improves quality, audit and efficiency for hospitals, staff and patients.

The KTP opened up opportunities for the business that were previously unreachable. It involved attaching a postgraduate student to the company for 18 months, as well as making available the expertise of relevant academics and the world-leading technology that the University has on site, such as 3D printers.

Recommendation 5: Innovate UK should assess levels of engagement by universities with local manufacturing economies, identifying any regional gaps and action to be taken to fill them.

Support for change management

Most participants identified a lack of confidence amongst SMEs to implement the wider change needed to accompany digitalisation (for example to working practices) as a key barrier. Make UK's own research backs up this finding. While Made Smarter is able to provide this support in the North West, it is not widely available elsewhere. Participants said that they would struggle to secure the funding to establish such a programme. Other similar initiatives – such as Be The Business – were regarded as too generic: focussed on business as a whole and general productivity improvement.

Recommendation 6: Irrespective of decisions on the wider roll-out of the Made Smarter programme, BEIS and Innovate UK should consider how specific support for change management linked to digitalisation by manufacturing SMEs can best be funded and delivered.

Digitalisation and decarbonisation

The link between industrial digitalisation and the transition to a net-zero carbon economy was raised by a number of participants. Technology and data capture and analysis (for example through smart metering) is one of the methods that manufacturers can use to reduce their carbon footprint and energy costs. But too often these agendas are pursued separately – by businesses and government. A greater understanding of the synergies would help with effective implementation of both the industrial decarbonisation and digitalisation agendas.

Institutional questions

One participant commented that the UK's current and diversified institutional landscape produces additional challenges to a national rollout.

Other countries use existing institutions to deliver digital support nationally: for example the US (through the Manufacturing Extension Partnership, MEP), Japan (through prefectural advisory centres), and Germany (through Steinbeis and Fraunhofer regional bases). The UK does not have equivalent structures.

However participants felt that it was better to build on what we do have – such as the network of regional economic development bodies – and the experience of the North West pilot, rather than create completely new national structures.

CASE STUDY: NUMATIC

Numatic, based in Somerset, produces the famous Henry vacuum cleaners. In 2017, they began a two-year Knowledge Transfer Partnership with the Bristol Robotics Lab and the University of the West of England.

At the time they were building the devices entirely by hand. The research and development carried out through the KTP has allowed them to introduce a semi-automated production line, using two collaborative robots, or 'cobots'. This has increased productivity by 50%, helping to expand exports and pave the way for future product innovation.

Key to the success of project was access to the expertise at Bristol Robotics Lab. BRL provided support in design, testing and implementation of the project and UWE provided an electrical engineering graduate to work at Numatic for the duration of the project.

FUNDING

While there is a wider range of different programmes out there which can provide support for industrial digitalisation, they are uncoordinated and confusing to SMEs. There are gaps in some places, and overlaps in others.

Multiple responses from our participants confirmed the general confusion in the funding support ecosystem. We asked them to consider the various funding streams available and to talk about their suitability for supporting this kind of work.

Innovate UK funds are often not well-suited to the needs of SMEs

Multiple participants explained that they find Innovate UK funds (which are supposed to be targeted at industrial innovation) not suitable for this kind of activity. Firstly, the scope of these funds is clearly limited to research and innovation – adoption programmes are not generally supported. Secondly, the competition-based bidding structure tends not to work with SMEs. The effort requires to bid, the bidding process itself and the lack of feedback on unsuccessful applications were all quoted as barriers to SME engagement. Where SMEs have successfully bid for funds, they have often used the services of a bid-writer or consultant: demonstrating again that they tend not to possess the core skills needed to engage with these types of financing mechanisms.

Recommendation 7: BEIS and Innovate UK should work to overcome the gap in funding for adoption. Either Innovate UK funds should be made more flexible to include this kind of activity, or they should operate in conjunction with other funding mechanisms that will pay for this kind of work.

Recommendation 8: Innovate UK should consider alternative delivery mechanisms – such as operating through intermediaries – to make their funds more accessible to SMEs. This should particularly apply to funds such as the Manufacturing Made Smarter strand of the Industrial Strategy Challenge Fund.

The European Regional Development Fund is widely used to fund adoption activity at the moment

Many partners outside North West England are currently using ERDF funds to support industrial digitalisation activities. They told us that they found this the most suitable financing mechanism – as it is regionally allocated (making it less competitive than Innovate UK funds) and sufficiently flexible in scope. However they pointed to ERDF's focus on job creation as a challenge – as digitalisation activity might be more about doing existing things more effectively rather than directly increasing the number of jobs in a given area.

All participants using ERDF said that they did not know how, or whether, they would be able to fund this activity once the current European programmes end.

Recommendation 9: The Shared Prosperity Fund, which the Government intends to replace European regional economic development funding, must include scope in its regional component for SME adoption programmes. If it does not, then there is a significant risk of a funding gap opening up, with no obvious alternative funding streams being available to fund this type of activity.

CASE STUDY: DIGITAL CITY

The Digital City programme supports SMEs in the Tees Valley to adopt digital technology and techniques to improve productivity and efficiency. Run by Teesside University in association with a group of local authorities, and funded by the European Regional Development Fund, it provides information, advice and grants to SMEs who want to embed digital ways of working.

CASE STUDY: SPARK FUND

The Spark Fund, run by the University of Hull, supports SMEs in North and East Yorkshire who want to innovate. It provides advice, mentoring and small-scale grants for innovative projects and research and development, including for digitalisation and decarbonisation. It is financed by the European Regional Development Fund.

DELIVERY

The workshop participants provided numerous comments and suggestions on the delivery of the digitalisation programmes, thematically ranging from the lack of clarity on who to turn to for relevant funding and support, to the confusing language used in the schemes and the lack of clearly defined benefits for individual businesses.

Keeping delivery simple

Participants repeatedly pointed to the need to 'keep it simple' when engaging with SMEs. All praised the integrated nature of the North West pilot, bringing the four strands of support together in a single programme, able to flex as required to meet the needs of individual businesses. In other regions they identified a range of often competing and overlapping delivery agencies, with gaps in some areas and over provision in others. All this added to confusion with SMEs and mitigated against widespread adoption.

Participants were clear that, to be effective, there needed to be a lead delivery partner for each region, bringing together the various agencies under a recognised brand. While this could be a Growth Hub (as in the North West) other delivery options were also possible. This lead partner's ability to deliver would be enhanced with a 'single pot' funding approach, providing dedicated funds to support its activities.

Recommendation 10: BEIS should identify a single lead delivery partner in each region to co-ordinate industrial digitalisation activities under a common brand.

Recommendation 11: The lead delivery partner should be financed via a 'single pot' model, with dedicated funds to support industrial digitalisation activity.

Communication and language

A significant number of participants, especially business stakeholders, said that the language used to describe the digital funding ecosystem needs to be consistent, clear and expressed in plain English. Often this is not the case, leading to confusion and lack of engagement. Some participants suggested that an 'Industry 4.0 Wiki' or similar publicly available list of agreed terms and definitions would help to address this issue.

Recommendation 12: BEIS, Made Smarter and Innovate UK to consider establishing an Industry 4.0 Wiki to help establish standardised terms and definitions.

CASE STUDY: MSM AEROSPACE

MSM is an aerospace fabrication company based in Greater Manchester. Having outgrown their current factory they needed to move to new premises, taking the opportunity of the move to redesign and overhaul their production processes.

With an integrated package of support from the Made Smarter North West Pilot they received advice and financial support to develop and invest in a digital twin virtual reality simulation of their new factory. This enabled them to quickly and easily simulate different options for the layout and operation of the premises and to identify the most efficient and effective solutions – before a single physical alteration was made.

Mentoring

Another theme across that was highly present and vocalised by the workshop participants was the importance of mentors and reverse mentoring. In particular, they said they would welcome an easily accessible mentor database that would allow manufacturers find relevant support.

Recommendation 13: Consideration should be given to establishing a mentor database to match suitable mentors and mentees.

Case studies

All of the stakeholders that took part in our workshops emphasised the importance of case studies in inspiring SMEs to take action. The Made Smarter pilot has a growing list of case studies presented on its website.

At the moment providers in regions organise workshops and Universities increasingly are opening their doors for small businesses to showcase the opportunities in digitalising, however, the majority agreed that it's very challenging to find them.

During the discussions, some participants raised an issue of having good quality case studies that would showcase benefits of digitalisation for manufacturers in an accessible and relatable way. Most of the participants felt that this would best be done via a digital platform that would showcase industry led stories.

Recommendation 14: Building on the existing work in North West England, consideration should be given to creating a national online database of case studies.

GOVERNANCE**Bringing it all together**

Participants overwhelmingly felt that a regional approach, with a lead partner co-ordinating activity and funding, was the best way to proceed. However there are many stakeholders active in this space, and it is important that everyone feels engaged and consulted as each programme is developed and implemented.

Recommendation 15: Regional boards should be established, involving all relevant stakeholders, to oversee and co-ordinate delivery efforts and to agree the work programme of the lead delivery partner. These could build on the model already established in North West England.

Conclusion

There is widespread enthusiasm for, and commitment to, increasing the pace and scope of our national efforts to promote industrial digitalisation. But to deliver, we need to build on the Made Smarter North West pilot, and replicate its success in other regions.

In particular we should:

- **Accept that the main delivery focus should be regional**
- **Appoint a lead delivery partner in each region, adequately funded for the task**
- **Simplify the interface with SMEs**
- **Ensure adequate governance so all stakeholders feel consulted and involved**

As the organisation representing 20,000 manufacturers across the country, many of whom are SMEs, Make UK is committed to playing its part in ensuring we create a sector which is digital, global and green: able to play its part in delivering prosperity and high-quality jobs right across the UK. We look forward to working with other stakeholders to consider and implement the recommendations in this policy paper over the coming months.

Acknowledgments

This policy report was made possible by the information and advice provided by members of Make UK, universities, Catapult Centres, Made Smarter, BEIS, Innovate UK, Local Authorities, Growth Funds and other funding providers.

We would like to thank everyone who contributed, in particular Mike Maddock, Make UK's 4th Industrial Revolution Champion, Sandy Findlay from ABGI UK and Marcus Burton from Yamazaki Mazak.

We would specially like to thank Dr David Leal-Ayala and Dr Carlos Lopez-Gomez from the Institute for Manufacturing, University of Cambridge for their commitment, passion, knowledge and support throughout the project.



About Make UK

Make UK works for the success of more than 2.7 million men and women employed in UK manufacturing. Representing member companies – from small businesses to multinationals – across every industrial sector, we are the most influential voice of manufacturing, enabling our members to connect share and create opportunities together.

We stimulate success for manufacturing and technology related businesses, enabling them to meet their objectives and goals. We empower individuals and inspire the next generation.

We create the most supportive environment for UK manufacturing growth and success and we represent the issues that are most important to our members, working hard to ensure UK manufacturing remains in the government and media spotlight.

Our extensive knowledge of manufacturing that means we're able to influence policy-making at local, national and international levels. We push for the policy changes that our members want to see. We are the voice of manufacturing.

To find out more about this report, contact:

Tim Figures

Director, Technology, Sustainability & Innovation

tfigures@makeuk.org

Nina Gryf

Policy Manager

NGryf@makeuk.org

Make UK general enquiries

0808 168 5874

www.makeuk.org