

Connected Manufacturing Programme First Phase Report: January - July 2017



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Executive Summary and Recommendations

Digitalisation is coming and the manufacturing industry needs to be made aware because at present the UK is getting left behind. The first phase of the Connected Manufacturing programme has started a dialogue with Barnsley manufacturers about their challenges and opportunities in embracing digitalisation, or the Fourth Industrial Revolution. The programme also offers the chance for digital tech companies to make new contacts and understand the growing need for their skills. To build on this initial phase, the following recommendations have emerged from meetings with local businesses and running the first Connected Manufacturing event:

1. Develop **strong relationships** with local manufacturers and understand the requirements of the individual businesses. Any time they spend out of the office needs to be worthwhile, i.e. informative and impactful.
2. Create a **trusted group of digital providers** and business advisors who can support local manufacturers on their digital journey.
3. Engage **Digital Account Managers** who can help identify potential areas for digital interventions, act as connectors between the manufacturing and digital worlds and help manage new collaborations.
4. Identify (and ideally fund) **short proof of concept projects** to explore how the digital interventions can work in practice, and at the same time generate useful case studies that can be promoted to other manufacturers and stakeholders.
5. **Maintain and build on regional and national links** in digital manufacturing, which can bring additional support and funding. The Advanced Manufacturing Research Centre (AMRC), for example, would like to create an online portal with information on digital transformation, including a searchable database of demonstrators.
6. **Facilitate access to finance** to support the adoption of digital technologies.
7. Involve Enterprising Barnsley Human Resources specialists to advise specifically on **driving change and succession planning**.
8. Support manufacturers and digital tech businesses to become **more aware of the global landscape**, including competition as well as export opportunities.
9. Provide a variety of **training options** via 1:1 consultancy, mentoring and workshops in conjunction with regional partners, such as the Sheffield Innovation Programme and the AMRC.
10. **Promote cross-talk** between manufacturers, as there are a lot of learning opportunities between them.

Introduction

Connected Manufacturing brings the manufacturing and digital communities together to encourage adoption of digital technologies to improve manufacturing productivity and competitiveness. It supports the introduction of the Fourth Industrial Revolution or Industry 4.0 to local manufacturers and digital tech companies.

The programme was initiated by Ceri Batchelder (Connect&Create) and Tracey Johnson (Digital Media Centre/Enterprising Barnsley). The first phase has been delivered with the support of Digital Catapult and Digital Catapult Centre Yorkshire, Sheffield Digital, the Sheffield Innovation Programme (involving both Sheffield universities) and the University of Huddersfield and has been part of a Yorkshire-wide digital manufacturing initiative led by Digital Catapult Centre Yorkshire.

Whilst the main focus is on Barnsley, the programme also has a wider regional reach.

Ceri Batchelder was recently involved in organising a related event (also supported by Digital Catapult Centre Yorkshire) called [Digital Manufacturing: Industrial IoT and Analytics](#) at the 3M Buckley Innovation Centre in Huddersfield on 12 July, which had similar aims in bringing digital enablers together with manufacturers to promote the Industry 4.0 agenda.

Rationale

As part of Barnsley Council's strategic planning, there is a strong focus on jobs, business and innovation to support the growth of Barnsley's economy [Reference: BMBC Jobs and Business Plan 2014-17]. This includes developing existing businesses and creating a more competitive private sector employment base. In addition, the Employment and Skills Strategy for 2016-2020 has a focus on 'More and Better Jobs', particularly higher skilled jobs and those that grow Barnsley businesses in the long term. Within this context, Enterprising Barnsley's Connected Business event programme aims to introduce businesses to the benefits of making greater use of digital technology and supporting digital skills development. Connected Healthcare (2016) and Connected Manufacturing are linked programmes, building on an annual Connected Business conference, which promote the uptake of digital technology and skills in their respective sectors to enable business transformation.

Meetings with manufacturers

Ceri Batchelder and John Heckingbottom (Business Development Manager, Enterprising Barnsley, now retired) met with 9 manufacturers and 1 software company (Target Information Systems, working closely with manufacturer Coca-Cola European Partners) in Barnsley from February to April 2017, listed in Table 1. Importantly it was John's reputation and relationship with these business, in terms of how he had helped them in the past and the trust he had built up, which allowed us to book the appointments. Reports from the meetings are available on request where the information can be shared.

The meetings informed the theme of the first event, which was how digital technology can have an **impact on operational efficiency and productivity** in manufacturing. We also

wanted to ensure that attendees could make the **connections** needed to help take the first steps to digital adoption in their businesses.

In addition, we connected more widely to organisations in contact with manufacturers, including the Advanced Manufacturing Research Centre (AMRC), Knowledge Transfer Network, Made in Yorkshire and Sheffield City Region Growth Hub. In particular, we organised a meeting at AMRC with digital manufacturing stakeholders across Yorkshire to share aims and ambitions.

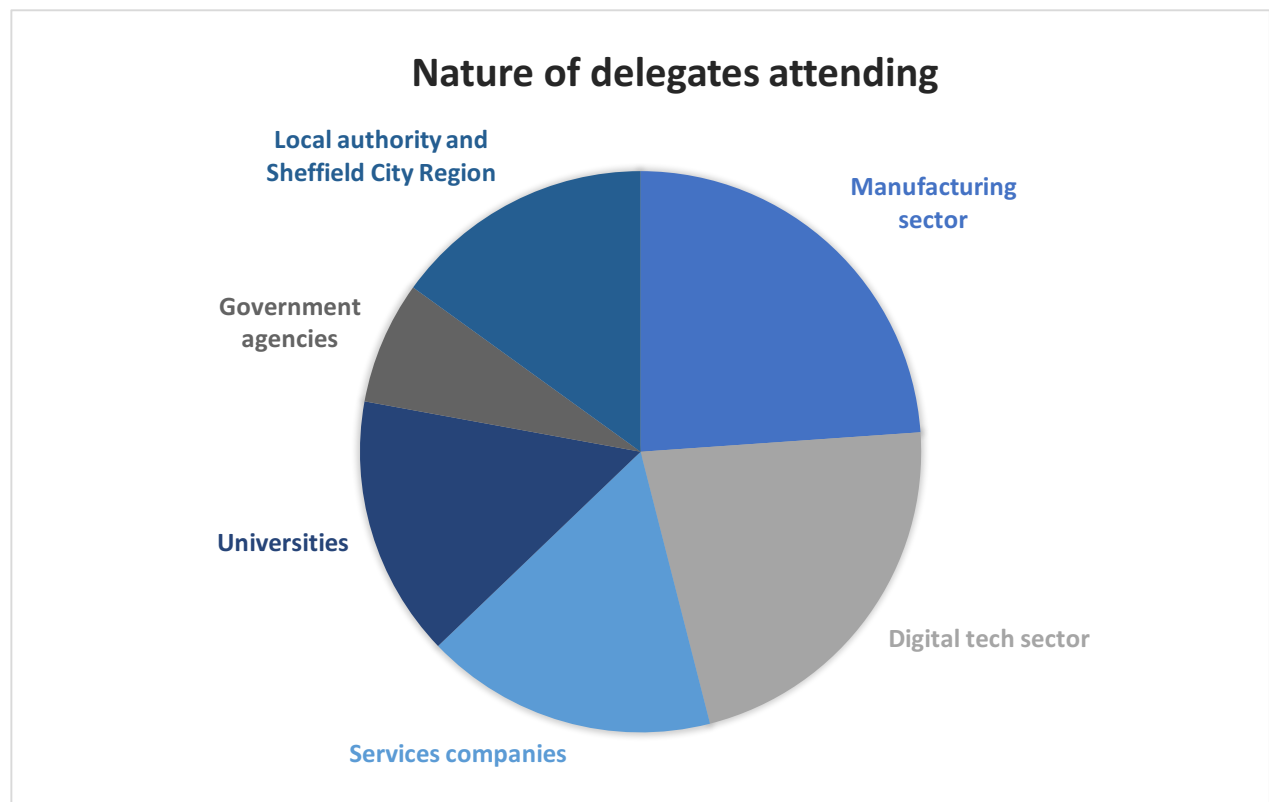
Table 1

Company	Focus	Customer base
Bartec Auto ID / Bartec Systems	Manufacturers of tyre pressure monitoring systems Waste management software systems	Automotive – original equipment manufacturers, e.g. Mercedes, BMW, Aston Martin, Bosch. Waste – UK Councils
Dibsa Structures	Lightweight steel roofing manufacturers	Commercial property. Linked to DSM Roofing, that produces all the external steel installations for McDonald's restaurants.
Eroda Tools	Precision engineering specialists using wire and spark erosion and electrical discharge machining. Essentially an engineering 'jobbing' shop.	Aerospace, marine, automotive, petrochemicals, textiles, nuclear, energy, surgery, rail, defence, oil and gas.
Innovative Support Systems (ISS) and Natural Cement	ISS coordinates the design and manufacture of ground support systems for large structures, e.g. for bridges. Natural Cement manufactures and distributes environmentally friendly products developed from a natural cement based binder.	Rail, civil engineering, water, utilities and construction industries.
MG Industries	Supply, design and manufacture equipment related to bulk handling (e.g. conveyor belts bringing rocks out of a quarry).	Steel industry, quarries, power generators and recycling plants.
Metalliform	Manufacturer of school and office furniture Supply and installation of stadium seating	Education and Office sector Sports stadiums, multi-event arenas.
Naylor Industries	Manufacturer of building & construction products, e.g. specialised clay pipes, plastic drainage systems, clay pots.	Construction and building industries. Garden centres.
Qualter Hall	Design, manufacturing and engineering of bespoke turnkey projects, e.g. bridges, water control gates (Thames and Hull barriers).	Mining, power generation, water, rail, ports, construction industries.
Target Information Systems	Software packages to manage business information, data and processes	Broad customer base
Wintwire	Speciality wire manufacturer. Makes bespoke wire from different alloys.	Engineering, textile and medical industries.

First event

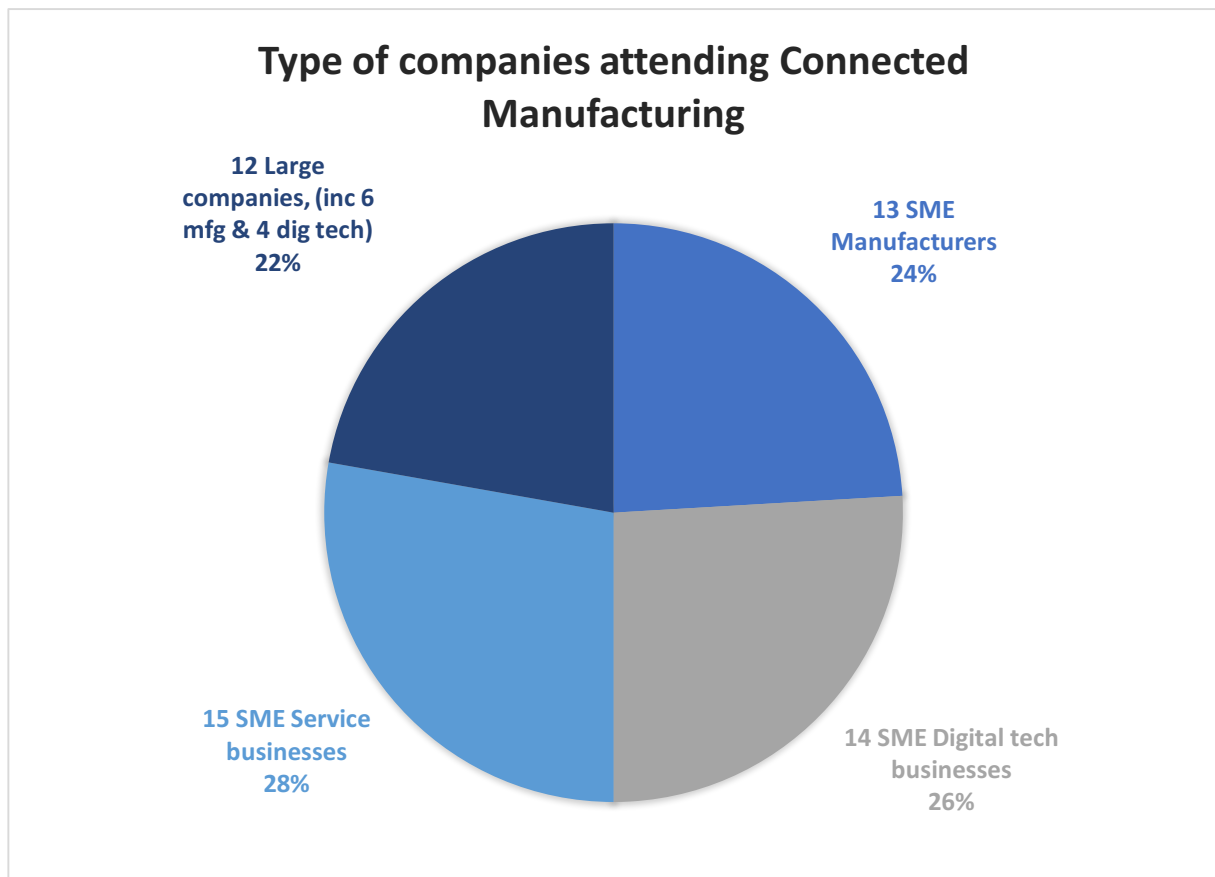
The first '**Connected Manufacturing: Transformation through technology**' event was held on 17 May 2017 at the Digital Media Centre in Barnsley. 113 people attended, from a broad spectrum of organisations and sectors, see Figure 1. These included manufacturers, digital companies, service businesses, large corporates, investors, universities and those in enabling/support roles. The University of Huddersfield (including the Northern Productivity Hub), Sheffield Hallam University and the University Sheffield (including the AMRC) all played an active role and the following government support agencies were also highly involved: Digital Catapult and Digital Catapult Centre Yorkshire, the Knowledge Transfer Network (KTN) and Tech North.

Figure 1



Over 50 companies were represented and fairly evenly split between SME manufacturers, SME digital tech businesses, SME service businesses and large companies (including manufacturers and digital tech companies), see Figure 2. Significant manufacturers/manufacturing supply chain companies attending included Siemens, Coca-Cola European Partners, Morrisons PLC, AECOM, ATS-Global, Liberty House (formerly Tata Steel), Apex Tool Group and Bartec AutoID (a tier one supplier to the automotive industry).

Figure 2



Speakers and exhibitors were selected to provide a wide flavour of digital manufacturing, including:

- An introduction to the topic of the Fourth Industrial Revolution or Industry 4.0.
- Examples of data collection and monitoring, data analytics, information management and reporting, connected devices and the Internet of Things and smart software solutions.
- Speakers ranged from small digital companies and SME manufacturers to large corporates such as Siemens and Coca-Cola. Talks included three joint presentations from collaborating digital tech companies and manufacturers which were very well received.
- Business funding and support programmes for digital innovation.

For more information, please click on the links below:

[Event video](#)

[Event programme and presentations](#)

[Event booking link](#)

Short interviews were held with some of the manufacturers at the event to capture their thoughts on the content and more information about their challenges and opportunities in adopting digital technologies.



Collaborators Lee Grant, Stainless Plating (manufacturer) and Tom Dawes, Valuechain (software company) at the Connected Manufacturing event

The state of play in Barnsley

Positives

- Software development is a core competence of one of the manufacturing companies and its products are wifi and blue-tooth enabled.
- There is some use of digital design packages (e.g. AutoCAD) and digitally controlled machinery (e.g. Computer Numerical Control (CNC) machines).
- There is generally an understanding of the need for change and some companies have introduced:
 - software packages to reduce paperwork
 - production planning software to help control job scheduling
 - use of web cams to monitor machinery remotely
 - electronic resource planning software
 - barcoding to control stock levels
 - sub-metering of energy supplies
 - use of robots on the production line
 - digital testing of new/improved products before tooling or investment
 - an online training academy

- There is an awareness that data gathered from machinery could be used to make evidence-based decisions about buying new equipment and energy usage to bring greater efficiencies and reduce costs.
- There is an appreciation that you need to bring people with you when introducing digital technologies. Some businesses have brought in Human Resources strategies to support change which includes digitalisation. For example, transitioning the culture from one that is autocratic to more democratic and asking for business improvement suggestions from the shop floor.
- Some businesses are at an early stage in their digital journeys, such as enabling their factories for digital data capture, and two are working with Siemens.
- Strong and professional web presence for several manufacturing companies, some of which have been produced by Barnsley digital businesses.

Challenges

Business owners

- Busy and stretched
- Hard to find the time to think about new technology
- Driving change is very challenging
- Succession planning is a big issue in family-owned and other businesses
- Tender writing for new contracts
- Need to improve their digital marketing presence and activities

Equipment

- Old, inefficient, traditional machinery (e.g. needs to be left on all day and night in case it can't be re-started, leading to unnecessary energy usage and costs)
- Use of old software, including back up on floppy discs
- Lack of digitalisation across the board, including shop floor, admin, and business information systems, which are often not joined up

Staff

- Traditional outlook, reluctant to change
- Don't have the skills to use digital technologies
- Hard to find people with the digital skills that are needed (from marketing to operations)
- Need to transfer experience and knowledge in people's heads to new colleagues/next generation.

New technology

- Attempts to integrate digital technology with existing operations and staff activities have sometimes been unsuccessful
- Some confidence/trust issues with suppliers of digital solutions
- Data collection and use of real-time insights aren't being used by most.
- Once you have data, you need to know what to do with it.

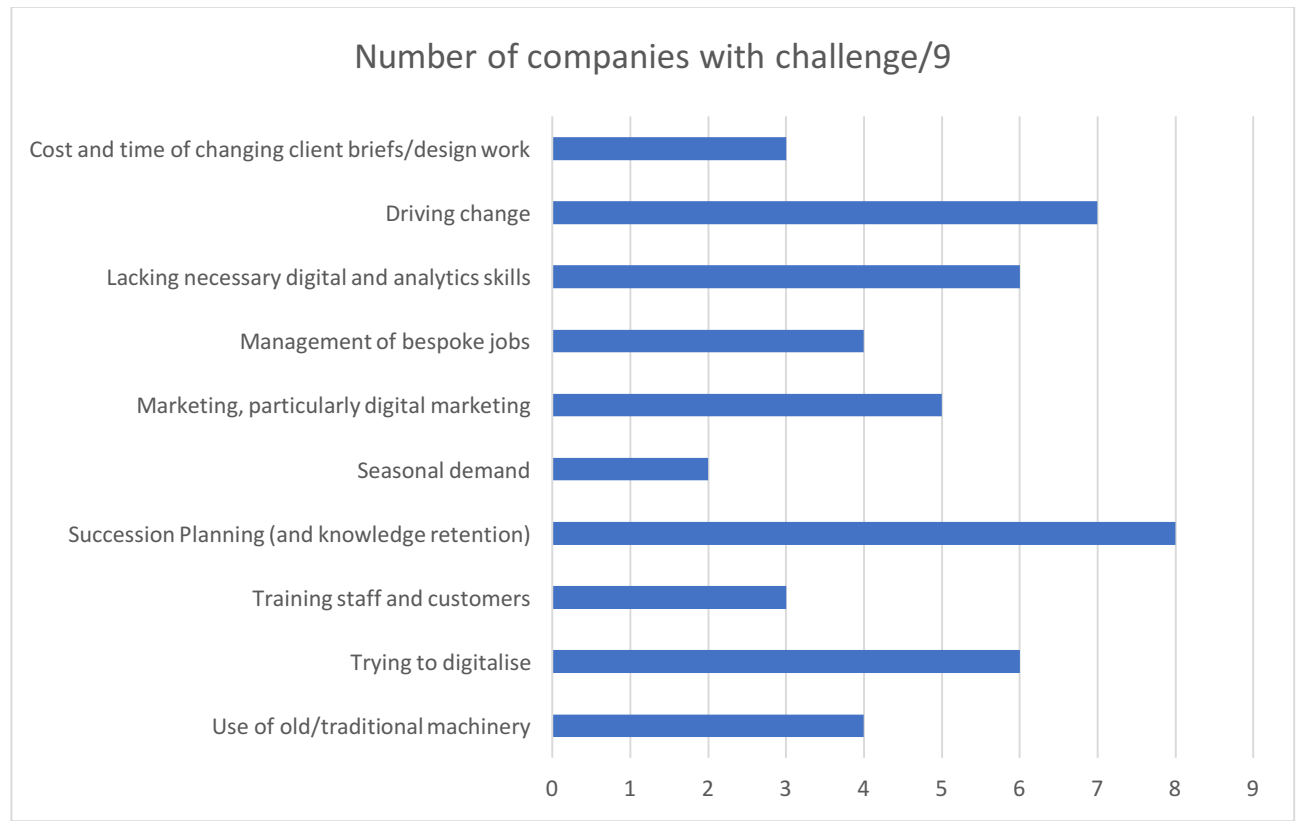
Operations

- Job scheduling (particularly for companies who make bespoke products)
- Seasonal demand
- Operational efficiency and productivity are the most critical areas

Clients

- Managing clients' expectations on timings of jobs (particularly for jobbing-shop type companies)
- Hard to recoup the cost of changing client briefs and upfront design work
- Keeping up to date with upgrades to software packages demanded by clients.

Figure 3: Main challenges facing the manufacturing companies we met in Barnsley



Emerging themes from the meetings and event

What are the high-level themes?

- There is a **big opportunity for improvements** in manufacturing through **digital interventions**.
- **Adapt or die** – digitalisation is coming and firms that do not embrace it run the risk of getting left behind, becoming increasingly uncompetitive and ultimately going under.
- Digitalisation is coming and the manufacturing industry in the UK needs to be aware, **as the UK as a whole is getting left behind**. The manufacturing sector in other countries such as France and Germany has been quicker to adopt digital technologies and in Germany at least there is massive investment.
- Manufacturers like to see how other companies have dealt with **the practical implications of digital transformation**, plus how they **demonstrate a measurable impact**.
- Digital adoption involves **change management** and ensuring the **staff and their views are highly integrated** in the process so they engage.
- Start small and run **pilot projects** before making investments.

What is the best method of delivering business support to help adopt new digital technology?

- Help raise awareness of Industry 4.0.
- Access to mentoring and a “readiness review”, i.e. here’s a roadmap, and here’s the starting point.
- There needs to be a connector or integrator to connect people within the industry and demystify digitalisation.
- A trial run of a digital process, like a simulation of what that process could bring to the business, before adopting it.
- 1:1 consulting with the right people rather than workshops.
- The funding needs to be visible.

What are the barriers to adoption?

- Cost and time (and the cost of that time).
- Staff engagement and old school thinking.
- Understanding what the business needs to achieve.
- Having ambitions but having no idea how to get there.
- The range of digital options and which one to choose/rely on.
- When the new tech is intrusive and disrupts existing processes.

What else do businesses want?

- Support with digitalisation across the whole business, not just operations, e.g. digital marketing support, business information systems
- Training programmes at a grassroots level that are futureproofed and can be delivered via smartphone to engage with staff in the easiest way possible.
- Online training of staff/distributors/customers through easy to access web portals.
- Engagement with younger people to work across different aspects of business.

Conclusions

The first phase of Connected Manufacturing has been received very positively by manufacturing and digital companies and business support organisations in Barnsley and beyond. Feedback included that it has been appropriately pitched and that new business relationships have been formed as a result. Phase 2 of the programme includes plans for further collaborative work with our delivery partners and plans to access ESIF (European Structural and Investment Funds) to deliver the next stages of support. The intent is to establish an ongoing programme that supports Barnsley and regional businesses in taking the next steps on their Industry 4.0 journeys.
