Let's Talk Real Skills

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**Let's Talk Real Skills:
Segment 1**

**Report detailing the current
situation and mapping of
training provision in the
Leeds City Region.**

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Contents

Executive Summary

This report considers skills provision within the Leeds City Region (LCR) from the perspective of the provision offered (Segment 1); it will be supported and balanced by a Segment 2 report which will look at skills needs as identified by the region's employers, specifically within the fashion and textiles environment. As such, it presents findings and identifies gaps on an interim basis in the expectation that some of these may change or that new items will become apparent in due course.

Consideration is given to three areas of provision across the LCR: fashion and textiles, leadership and management and the application of digital technologies in a business context. It utilises data collated from various sources to make an assessment of what skills provision is offered, what business support is available to complement this offering and provides some exploration of what other regions are offering in the area of Industrial Digital Technologies (IDTs). Course provision is broadly mapped across the region with a simple and provisional mapping of IDT expertise provided by the LCR's universities also offered.

The report identifies 20 areas with possible gaps – and consequent opportunities – for consideration across the three areas of provision. Secondly, it suggests some ideas that could move provision forward in order to better meet the needs of its business audience.

Terms of reference and scope of report

Let's Talk Real Skills asks for, *"Segment 1 Current Provision – Develop a robust understanding of skills provision in the Leeds City Region connected to areas of identified occupational skills shortages. The availability, capacity, level, method of delivery and location of the training will also be mapped.*

- *Identify which providers (FE / HE and private providers) are delivering skills in LCR and assess what provision is available and to what level by occupation.*
- *Identify resource needs of employers and the sector.*
- *Assess what non-core skills provision and supporting mechanisms are in place for target audiences by 3rd sector organisations and local initiatives that provide parts of the skills and training pathways into the sector.*
- *Identify areas of under-provision or gaps in provision available (type and level) in the identified skills and training pathways to meet occupational needs for both new entrants and upskilling the existing workforce.*
- *Assess current capacity and capability of the provider network in LCR in light of the findings of the Area Based Reviews and Delivery Agreements.*

Segment 1 Deliverable: Report detailing current situation and mapping of training provision."

This draft report (S1) is the first in a series that will assist businesses and skills providers collectively to identify training requirements in order to meet prevailing skills gaps. S1 looks at skills provision predominantly from the providers' side; S2 will look at the skills needs of SMEs and can be expected to modify some of the content from this report as well as contribute towards other segments.

This report will examine skills provision in the LCR from three perspectives in particular.

1. Technical (textiles and clothing sector specific)
2. Leadership & Management (generic and available to other sectors)
3. Digital (generic and available to other sectors)

Both the Leadership and Management and Digital elements are cross-cutting themes; inevitably, this will become ever more prevalent in the future where the digital sector continues to combine with the technical training provision available for the T&C sector. An example can be found from the series of reports covering the Textile, Clothing, Leather and Footwear (TCLF) industries which has identified nine emerging occupations, very much driven by digitalisation, that are seen as critical to their continued well-being[1]. These will be discussed under the T&C sector specific

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[1] TCLF newsletter (February 2018 and following)

heading but referred to under the digital section as most are directly relevant there in a wider context.

Currently, caveats apply as follows. Although references are made to areas such as the introduction of the T Level, in general terms sixth form colleges have been left out as sources of evidence for provision. The non-wovens side of the T&C manufacturing sector has not been addressed as a specific area and this is an acknowledged gap perhaps best covered through interaction with businesses in that sector in the coming months. Concentration on the Leadership and Management elements of generic provision is quite deliberate and reflects their importance to the T&C sector over other areas. In addition, examples (courses, programmes etc.) from outside the LCR have been included where thought to be relevant or where their offerings appear to be similar to or larger than those generated within. Finally, a large number of courses, in particular those of a short, commercial nature, do not fall into any easy categorisation when viewed against the eight levels within the national framework (Level 1 to PhD). Accordingly, they have not been treated in this way in this report.

Aspects of national and regional policy on skills and digital directions

National policy

A number of reports over the last five years have sought to identify what skills will be required in the future, particularly with regard to digitalisation. Evidence from many of these will be drawn on in order to gain an appreciation as to whether current provision in the LCR matches this evidence and, if not, offer some ideas on what needs to happen in order to do so. The review of post-18 education observed that all is not well with the existing structure and funding models and cited a decrease in part-time learning at university level (post-18 review) and decline in L4 and L5 qualifications and in L3 and below by 2017-18 amongst its examples. Among the recommendations was the introduction of a lifelong learning loan allowance, which could be used at any stage of an adult's career for full and part-time students.

The Apprenticeship Levy acts as a levy on UK employers to fund new apprenticeships; it affects employers in all sectors. The levy will only be paid on annual pay bills in excess of £3 million, and so less than 2% of UK employers will pay it. In some instances non-levy payers have been affected by budget changes elsewhere in the system. A pertinent example affects the T&C sector currently with some employers unable to access apprenticeship funds for technical textile and other qualifications due to contracting issues affecting some training providers. As things stand that represents an unwelcome gap in the market!

The Department for Education has recently begun the rollout of a National Retraining Scheme, which it hopes will help adults whose jobs are at risk. The £100m

programme, currently being trialled in Liverpool, is meant to prepare workers who could be replaced by automation. Research from the programme suggests that cost, employment working patterns and poor previous experience of education all act as barriers to retraining.

Recently the government pledged £400m for FE funding in 2020-2021 which would support the introduction of the new T Level qualifications. T Levels will be incoming for September 2020; one of the first three to be available at this time will be digital production, design and development. The list of providers with approval to deliver this qualification from September 2020 (for 2020-2021) includes the following from Yorkshire & the Humber (those in red are outside the LCR).

- Barnsley College
- Bishop Burton College
- Grimsby Institute of Further & Higher Education
- Notre Dame Catholic Sixth Form College (Leeds)
- Scarborough Sixth Form College
- Shipley College of Further Education
- York College

Thus far, Notre Dame and York College have indicated that they will not be delivering this qualification at that time[2]. On the basis of the information available currently it does not appear that sufficient digital pathways will be available via the 16-19 education route in the short-term. That constitutes a gap on current evidence.

For the political opposition, Labour's says its Nation Education Service - a 2017 manifesto pledge - would be "free at the point of use" and "open to all regardless of age, background or circumstance". A learner-centred system could help reverse the decline in adult learning, according to the party's Lifelong Learning Commission but the concept will remain just that until Labour is elected to government.

The Catapult centres are a network of world-leading centres designed to transform the UK's capability for innovation in specific areas and help drive future economic growth. The Catapult model[3] has been rolled out across the country over the course of the last few years with those for the high value manufacturing and digital sectors being of particular relevance to Yorkshire and the LCR. A range of expertise and support mechanisms are available or are being developed. This type of model can be complemented by other initiatives such as the Virtual Engineering Centre, based in Daresbury, near Warrington, and supported by the University of Liverpool[4].

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[2] As of 18th June 2019: https://www.gov.uk/government/publications/providers-selected-to-deliver-t-levels/providers-selected-to-deliver-the-transition-programme-from-the-2020-to-2021-academic-year
[3] https://catapult.org.uk/
[4] http://www.virtualengineeringcentre.com/

Regional policy

The LCR Employment and Skills Plan 2016-2020 identifies clearly the need for more training and a further up-skilling to higher levels of education in order to meet the needs of its people and businesses. It identifies two key pipelines, digital and advanced manufacturing, as a means of helping achieve these goals. The ever-growing importance of the digital agenda is highlighted further through the LCR Draft Digital Framework Outcomes and in practical terms by the 2019 Digital Enterprise programme, for example. The NESTA report from 2018 (see below) suggests that not all digital skills used in work are predicted to grow, however, so the future alignment of skills provision on offer to those actually required will be of great importance.

The West Yorkshire Area Review final report from November 2016 estimated that the majority of future employment opportunities in the LCR manufacturing sector will be at Level 4 and above[5]. It flagged up that businesses across all sectors were facing a digital skills shortage, particularly in coding, programming and data analysis[6]. A fourth area, software development, was included in the LCR Employment and Skills Plan[7]. Furthermore, the LCR's labour market analysis for 2018 identified Barnsley, Bradford and Wakefield as the three areas suffering from education and skills deprivation[8].

A further thought should be given to the array of digital expertise within the LCR through its digital businesses. That is outside the scope of this report but the number of businesses providing hardware, software, animation or security services and solutions ought to be of significant size and importance (see next paragraph); many of these businesses can be expected to provide aspects of digital training for their clients.

Digital directions

Leeds is the 7th most thriving innovation community (by city) according to a UK breakdown of seven key digital sectors produced by DataCity[9]. Its UK Digital Technology Census 2019 revealed that Leeds is the most digitally thriving city in Yorkshire but less than half the size of Manchester (ranked second) and twenty times less than London (ranked first). The data lists Leeds with 528 Gaming, 372 Cyber, 271 Advanced Digital, 104 Fintech, 39 AI, 20 IOT and 8 Medtech organisations. The data from the DataCity census suggests that a good range of

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[5] West Yorkshire Area Review, p10
[6] Ibid, p10
[7] LCR Employment and Skills Plan, p5
[8] https://westyorkshire.moderngov.co.uk/documents/s7329/item%205c%20app%201%20-%20appendix%20Labour%20Market%20Intelligence.pdf
[9] https://www.thedatacity.com/products/gmtechprofile/organisations-explorer/june2019/?sectors=AI,Fintech,Medtech,Advanced%20Digital,IoT,Cyber,Gaming

varied digital expertise exist within the region, albeit weighted heavily towards the gaming sector.

Business Insider's Yorkshire Digital Pulse survey (June 2019 issue) provides some interesting data on businesses' online presence. Resource constraints (30%) and lack of digital expertise (29%) were cited by Yorkshire businesses as major reasons blocking the growth of their online businesses. More positively, implementing new technologies (24%) was seen as a digital priority over the next twelve months with better reporting and insight (54%), chat bots (26%) and A/VR (13%) being planned investment areas.

The same survey revealed how many aspects of digital marketing were viewed clearly as important. Social media (79%), email (64%) and paid searches (29%) were seen as current drivers to business websites (word of mouth at 77% remained top of the list by percentage) with brand awareness (68%), an improved online experience (48%) and increasing site traffic (53%) cited as digital priorities over the next twelve months. The use of video (77%) and podcasts (28%) were two areas of investment planned over the same timescale. Not enough website traffic (29%) as a blocker to online growth could be indicative of various issues, including lack of knowledge, expertise or funding internally or accessing the right tools and expertise externally.

These varied responses, allied to responses of only 18% rating their own websites excellent with only 17% stating that these met the needs of customers, highlight some potentially interesting opportunities.

A number of universities and employers have got together under the Tech Partnership banner to offer degrees in IT Management for Business (BSc / MSci) and Software Engineering for Business (BSc). Whilst employer participation is from amongst large companies and government departments in the main there is no university participating from Yorkshire. This might be worth exploration. For example, the Software Engineering course is described as follows:

Core topics include:
- Software engineering principles
- Programming techniques
- Problem solving
- Innovative software design
- Cyber security and cross-platform web development

You will also learn about emerging technologies and innovations, for example: virtual reality, mobile collaboration, 4G communication, 3D displays, artificial intelligence and renewable energy.

NESTA produced a report highlighting a number of digital skills predicted to increase / reduce in importance in the coming years[10]. Although based upon evidence from online job advertisements and therefore limited in scope it suggests that digital skills used in animation, engineering, education and computing are more prevalent in occupations that are predicted to grow.

NESTA's work on skills and occupations is complemented by the work of 4Manufacturing in identifying twenty-two digital themes that are seen as of particular relevance to the manufacturing sector[11]. These themes have been adopted by the Textile Centre of Excellence as a means of approaching discussions with its manufacturing base in order to identify those digital processes of benefit to an individual company, and to identify any key skills that are missing, require further training or reskilling, for example.

For the LCR as a whole there are numerous awareness raising session being arranged relating to the digital transformation and the opportunities that it might bring. Events have been arranged by Leeds University under the Future Fashion Factory project (Leeds); the Digital Exchange (Bradford); Lloyds Bank (Halifax) and in Elland just for the month of September 2019. That can be supplemented by digital or innovation initiatives such as the Yorkshire Cyber Security Cluster (https://ycsc.org.uk/), which exists in part to support the government's commitment to cyber security by building cyber security knowledge, skills and capabilities in the region, or the PAPI project, which has just launched its new series of innovation workshops in the region (access to innovation support and expertise).

Training provision in the LCR (with associated support for businesses)

Types of provider

As might be expected, the majority of provision available for businesses comprises the HE, FE and private sectors with some provision offered by the Third Sector, including courses that are relevant to the T&C sector, particularly for adult learners. It is inevitable that some learning will be delivered by providers external to the region, either online or through regional delivery.

HE provision

Twelve universities have been founded within Yorkshire and the Humber (see below). In addition, there is a campus of the University of Lincoln at Hull, although the main campus is located in its namesake city of Lincoln in the East Midlands regions. Additionally, Coventry University, West Midlands, has opened a campus in

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[10] Which digital skills do you really need?: 2018
[11] 4Manufacturing Report August 2018 FINAL

Scarborough, North Yorkshire. Overall, nine of the region's universities fall inside the LCR.

University of Bradford	Bradford
University of Huddersfield	Huddersfield, Barnsley and Oldham
The University of Law	Leeds (privately funded)
University of Leeds	Leeds
Leeds Beckett University	Leeds
Leeds Trinity University	Leeds
Leeds Arts University	Leeds
University of York	York
York St John University	York

FE provision

The Association of Colleges lists thirty-four members[12] under Yorkshire and the Humber of which fourteen fall within the LCR.

Askham Bryan College
Barnsley College
Bradford College
Calderdale College
Craven College
Harrogate College
Kirklees College
Leeds City College
Leeds College of Building
Northern College for Residential Adult Education
Selby College
Shipley College
Wakefield College
York College

In the LCR only Barnsley College is listed on UKFT's list of training providers for fashion and textile related apprenticeships.

Private sector provision

Provision here includes those organisations providing government financed education and training and those offering training on a purely commercial basis. In the LCR only the Textile Centre of Excellence is listed on UKFT's list of training providers for fashion and textile related apprenticeships.

Third Sector and related

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[12] https://www.aoc.co.uk/about-colleges/map?field_region_tid=380

There is a diverse range of provision in this area ranging from courses run through the WEA to self-help groups, e.g. Ravensthorpe Community Centre where the TCoE helped deliver design and sewing sessions in 2016.

The type of delivery on offer and available is diverse. Examples include the following.

- Company based
- Community based, often in short sessions
- Classroom based (group learning and 1:1), typically either as day release or block release for apprenticeship delivery
- Distance learning
- Online learning (webinars, podcasts, sometimes with the inclusion of simple pattern downloads in the case of the T&C sector)
- Virtual Learning Environments (really support enriched teaching and learning, incorporate interactive quizzes and videos, provide real-time feedback and have easy and clear communication and collaboration between the tutor and learner)[13]
- Blended learning
- Flexible learning, particularly at L4 and above (flexibility and variety in the way people can access education, for example by learning on a modular basis rather than having to choose between study and work)
- AR/VR usage (examples include training sequences developed by the AMRC, Sheffield, in an electrics environment or training in the use of sewing machinery developed by Oxford Brookes University)
- Learning via social media, e.g. YouTube tutorials

Capturing details on current provision

The TCoE has created three simple databases as part of this work: one to capture local training provision covering generic skills applicable to the T&C sector; a second to capture training provision of the digital skills similarly applicable and a third to capture private sector expertise in areas relevant to the digital agenda and the T&C sector in particular. The generic skills database covers the more basic array of IT training provision as well as other business related skills. The first two databases seek to capture baseline information on courses and learning available to businesses and learners across the LCR; they are not meant to cover courses in exhaustive detail. Data for the third database is being collected in the absence of any current equivalent although it may feed in to the database being developed for national use by the Made Smarter NW pilot (see below).

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[13] Taken from a webinar offered by AELP on 25th September 2019 utilising expertise from Qube Learning

Currently, the generic skills provider database holds over 1500 records (including a significant number covering ICT and digital / creative courses) and the digital course holds a further 405 items. Neither is complete: data collection is ongoing and options for a searchable version online should be considered. Recourse to other, existing databases is necessary in any event if only to read about specific courses in more detail. A representative list of hyperlinks is included below on page 13.

The digital database holds numbers by digital theme as follows.

Additive Manufacturing	7
Augmented & Virtual Reality	24
Big Data & Artificial Intelligence	253
Circular Economy	2
Continuous Improvement	1
Cyber Security	80
Design for Manufacture	1
Digital Manufacturing	1
Digital Manufacturing Readiness	1
Digitally Assisted Assembly	1
Industrial Internet of Things	2
Predictive Maintenance	8
Robotics & Automation	2
Supply-chain Management	12
Web to Order	10

The categories identified between the databases exhibit what appear to be alarming gaps in the digital and creative content. This is more likely to be a result of combining different approaches to a range of data headings and can be resolved in due course, most obviously by bringing courses associated with the 22 digital themes within a wider framework.

It is also worth pointing out that defining a course by level is by no means straightforward or even possible when outside the apprenticeship and vocational training framework. It can be quite time consuming to try! Many courses listed on the databases are undefined as a result, particularly but not exclusively where offered by private sector providers.

	Skills Area	Apprenticeship	Course	Area	Provider	Level
261	Digital and Creative	N	Microsoft Excel Beginners	Keighley	Airedale Enterprise Services Ltd	Unknown
669	Digital and Creative	Y	Digital Marketing Advanced	Calderdale	Calderdale College	Level 3
671	Digital and Creative	Y	Digital Marketing Higher	Calderdale	Calderdale College	Level 4
713	Digital and Creative	N	Search Engine Optimisation (SEO)	Calderdale	Calderdale College	Unknown
714	Digital and Creative	N	Social Media Training	Calderdale	Calderdale College	Unknown
746	Digital and Creative	N	Video Editing Intermediate	Calderdale	Calderdale College	Unknown
765	Digital and Creative	Y	Creative Digital Media	Bradford	City Training Services	Level 3
816	Digital and Creative	Y	Social Media and Digital Marketing	Huddersfield	Kirklees College	Level 3
919	Digital and Creative	Y	Digital and Technology Solutions	Leeds	Leeds Beckett University	BSc (Hons)
923	Digital and Creative	Y	Digital and Technology Solutions (Software)	Leeds	Leeds Trinity University	BSc (Hons)

A screenshot of the Skills Provider database

The digital skills database has been constructed using the 4Manufacturing 22 themes as a course guide. The Knowledge Transfer Network (KTN) has sought to help SME manufacturers understand and take advantage of the digital agenda by means of its 4Manufacturing tool, which identifies twenty-two key digital themes and seeks to assist businesses to judge their current status and future objectives for those themes deemed critical to success. The TCoE's initial work with the tool has suggested that a further theme, Digital Marketing, should be considered. These twenty-two themes are by no means exhaustive – many are cross-cutting – but at least offer a structure by which businesses can gain some practical understanding and knowledge.

A screenshot of the Digital Skills database

It is appropriate to point out that many course databases exist online already, including some overseen by job recruitment companies. Examples below include the following.

- https://www.findapprenticeship.service.gov.uk/apprenticeshipsearch
- https://www.westyorkshirecolleges.co.uk/course-listings
- https://www.ucas.com/undergraduate/what-and-where-study/choosing-course/choosing-undergraduate-course
- http://www.studyin-uk.com/course-search/
- https://www.thecompleteuniversityguide.co.uk/courses
- https://www.Reed.co.uk/courses is one such and it offers filters such as subject, method of study, qualification type and price
- https://www.Findamasters.com offers a range of filters to find appropriate qualifications

In addition, there are various industry, sector or application specific websites offering courses across a variety of delivery mechanisms, e.g. https://www.ukft.org/skills-and-training/apprenticeships/ for the T&C sector or https://www.sans.org/find-training? for cyber security training and related options. Keyword search mechanisms might play a role in determining the ease of finding an appropriate course.

Business support

There is no shortage of funded programmes across the LCR relating to skills provision that T&C businesses and individuals can tap into. The West Yorkshire Consortium of Colleges offers several programmes to SMEs via Skills Connect and through its Skills Service:

- Higher Performing Workplaces
- Progression from Low Pay
- Reach Higher
- [Re]boot
- Let's Talk Real Skills

In addition, there are several strands of business support available covering IDTs. A chart listing of the key strands of support is shown in Appendix 1.

Some examples of digital awareness raising and learning from outside the LCR

The examples below are thought to be worthy of inclusion for several reasons. Firstly, some other areas can be considered to be further ahead in exploring how the digital agenda can work for the business community. Secondly, there are some interesting ideas around how best to reach businesses and business leaders with appropriate offerings of information, funding, strategic direction and practical action plans – some of these ideas are reflected in plans to bridge gaps in the LCR. Thirdly, some of this work has identified a number of occupations that are required now, or are likely to be critical in the future. A common theme throughout is the emphasis placed upon providing directors and senior management teams with the tools to get on with the job of utilising IDTs to best advantage for their businesses and acquiring the necessary knowledge and skills (for themselves and their workforces) in order to achieve this. Typically, this appears to involve a partnership of expertise spread between universities, private sector digital companies and the business community itself.
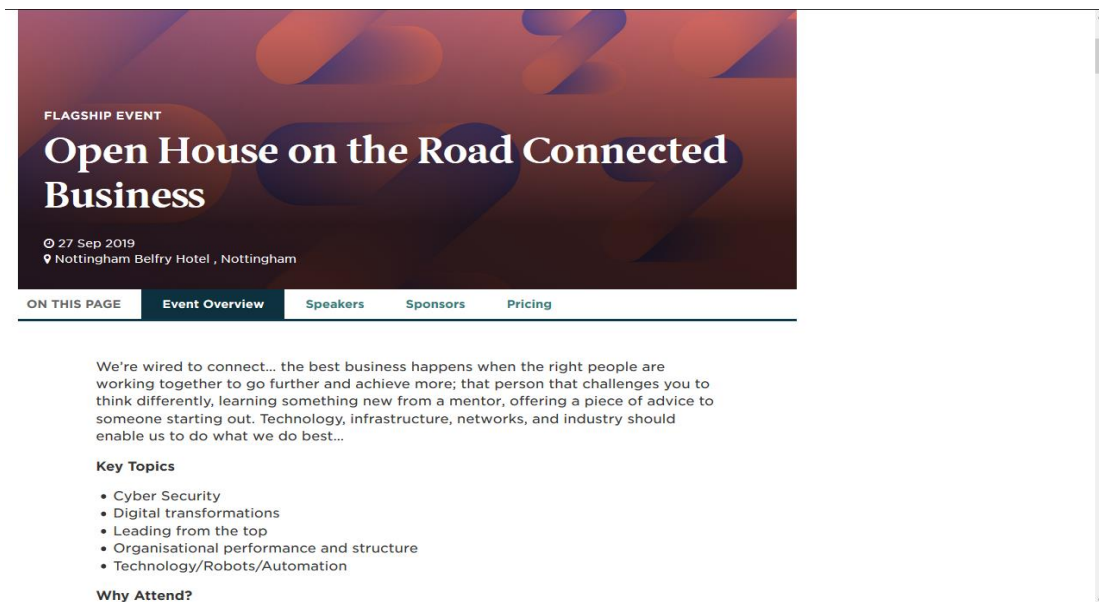
The Institute of Directors has an interest in providing its members with access to information and expertise. In October its Suffolk branch is offering a half-day session covering some of the alternative aspects of digital implementation in companies and the Essex branch will be holding a session on how AI, Machine Intelligence and Robotics can be used by business. More generally, there is an ongoing roadshow concerning digital connections[14] covering:
- Cyber Security
- Digital transformations
- Leading from the top
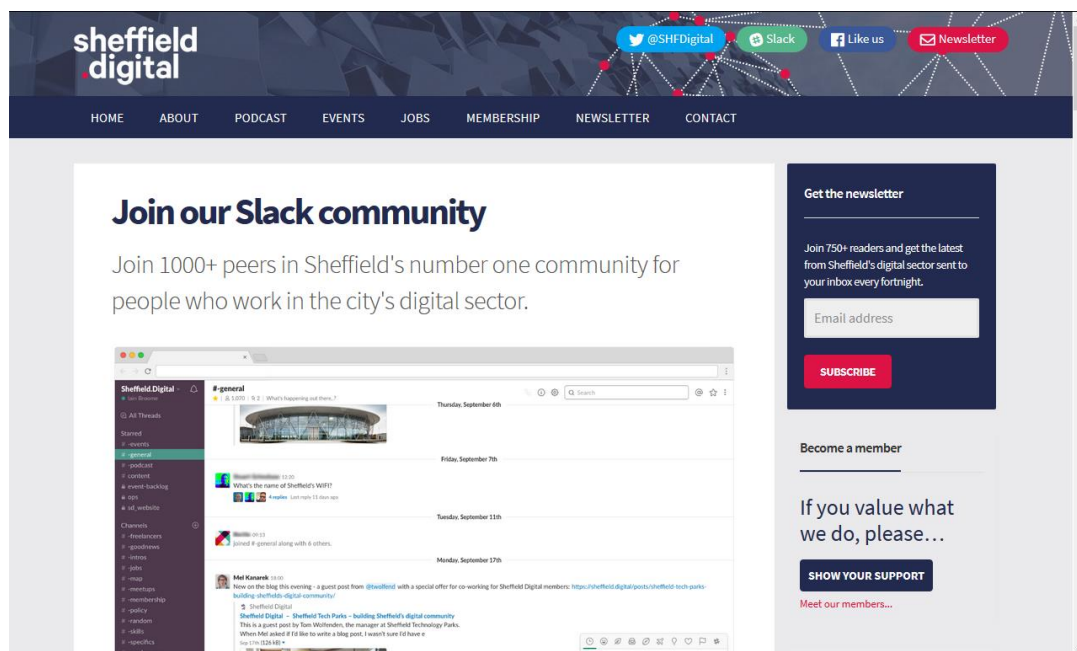- Organisational performance and structure

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[14] https://www.iod.com/events-community/events/event-details/eventdateid/15214

- Technology/Robots/Automation

Screenshot of the digital offering on the IOD site

Sheffield Digital Slack community (https://sheffield.digital/slack/) is an example of community assistance and knowledge sharing and collaboration. It states itself to be "a free space for people who work in or have an interest in Sheffield's digital sector. It's the place to go meet like-minded folk, share information, find out what's going on."   The Sheffield Digital Slack community guide provides information on how to use the community resources and obtain worthwhile results.

Screenshot of the Sheffield Digital Slack website

The Digital Manufacturing on a Shoestring project (https://www.digitalshoestring.net/) is offering a workshop seeks to increase the digital capabilities of SME manufacturers via low cost solutions will be run by the Institute for Manufacturing, Cambridge, on 24th September 2019. This particular workshop aims to show attendees:

- How to identify low cost digital options for small companies
- Opportunities for involvement in the Shoestring project
- How off-the-shelf technologies can be used in low cost solutions

Screenshot of the IfM project

Part of the offer has been and will be to work with SMEs from various sectors to identify key priorities where digital solutions might be effective (using company assessments via a developing methodology). In-depth, individual company analyses are planned as part of future actions. Simple or short-term, low cost individual solutions can be constructed, often using open source software and off-the-shelf technologies, e.g. Alexa voice recognition technology and a liberal helping of Raspberry Pi computing power, in such a way as to build an interconnecting and interoperable series of building blocks for wider use on a plug and play basis.

The Digital Catapult NE (https://www.digicatapult.org.uk/regional-engagement/netv/) runs two types of programme to increase digitalisation amongst businesses there. The first (ERDF funded) acts as a taster session to introduce local SMEs to some of the key themes of digitalisation with the aim of exploring how some or all of these could work in practical ways. It is run as a residential workshop over 1.5 days.

The second offers a more intensive and in-depth look at a handful of key themes, e.g. IOT, immersive technologies, AI, over two days. The sessions are interactive in nature and comprise small groups (no competitors) of no more than fifteen people. They are aimed at director level but businesses can opt to bring up to five members of staff covering a mixture of roles. The best results obtained are said to have included a senior management team / finance / operational mix. The sessions are led by experts and facilitated to ensure that each business attending develops an action plan to put into practice when back in their business environment. Up to six days of mentoring and consultancy is offered post-workshop in order to help bring these plans to fruition.

Screenshot of the Digital Catapult NE program

The Made Smarter NW pilot programme (https://www.madesmarter.uk/made-smarter-north-west-pilot) can support North-west Small and Medium-sized Enterprises (SMEs) who make, manufacture or engineer across Cheshire & Warrington, Cumbria, Greater Manchester, Lancashire, and Liverpool City Region. The project is managed by The Growth Company.
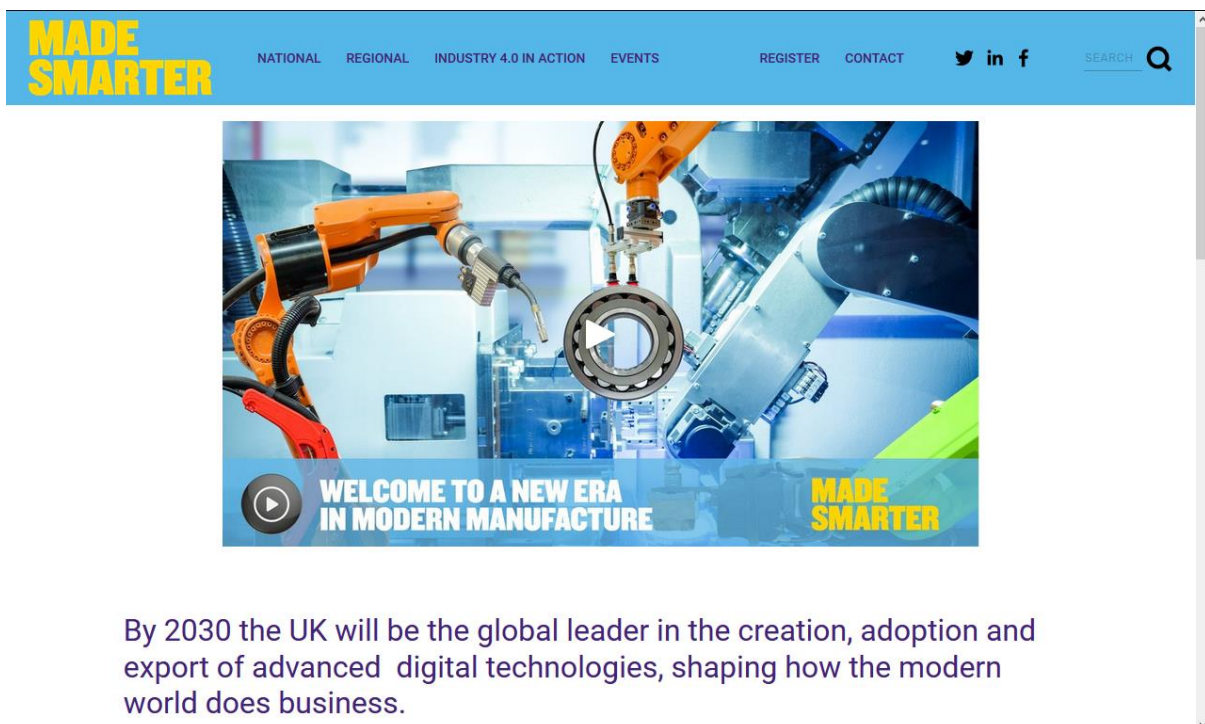
The Made Smarter pilot offers:

- Fully-funded specialist advice to assess your current operations and develop your digitalisation strategy
- Up to 50% grant funding to implement new technology, software and hardware into your manufacturing
- Access to a UK-wide Industry 4.0 technology supplier directory

- Access to a subsidised Leadership Development programme, designed specifically to support the programme
- Access to student placements to help you understand how to implement the technology.

Its technology supplier directory – still under development – is a national initiative seeking providers in the following areas:

- Additive Manufacturing (3D printing)
- Augmented & Virtual Reality / Simulation
- Big Data & Analytics
- Cognitive Computing & Artificial Intelligence
- Data & Systems Integration
- Industrial Cyber Security
- Industrial Internet of Things (sensors)
- Mobile Devices & Wearable Technology
- Robotics and Process Control Automation

Screenshot of the Made Smarter NW program

An individual example of interest is Harrow School's intention to set up a virtual sixth form for education delivery to pupils outside the UK[15].

Training provision for the T&C sector

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[15] https://www.bbc.co.uk/news/education-49720716

A series of reports covering the Textile, Clothing, Leather and Footwear (TCLF) industries has identified a number of emerging occupations, driven mainly by digitalisation, that are seen as critical to the sector's continued well-being[16]. Defined as being either management or professional competencies, therefore likely to be Level 4 and above, these are:

- Supply-chain data manager (management)
- Product trend manager (management)
- Product life-cycle manager (the process of managing the entire lifecycle of a product from inception, through engineering design and manufacture, to service and disposal of manufactured products (management))
- Leather technologist (professional)
- Process analyst (professional)
- Finishing technician (professional)
- Digital marketing (professional)
- Research, development & information researcher (professional)
- 3D Footwear designer and pattern maker (associate professional).

The report makes clear that more than one of the management related occupations may well be held by the same person in SMEs.

Leather applications are not of notable interest to the Yorkshire region but the occupation concepts are relevant, especially with regard to 3D expertise, e.g. as a precursor to additive manufacturing on the one hand through to systems and applications used increasingly for customising fashion and clothing on the other. Expertise in most of these areas (or aspects of them) resides within local universities, e.g. Claire Watson and Nicola Redmore (trends and forecasting, Leeds and Huddersfield respectively), Alison McKay (product lifecycle management, Leeds), Andrew Taylor (3D technologies, Huddersfield) or Emma Grain (3D design and additive manufacturing, Huddersfield). That can be supplemented by an array of private sector expertise, not all from the LCR, offering software or consulting solutions with degrees of mentoring and / or training offered as part of a package, e.g. Bombyx PLM (product lifecycle, Hull), Data Venture Solutions (data analysis, Leeds).

UKFT is the sector skills body for the sector and provides information, advice and guidance to employers, employees and training providers. It offers seminars and masterclasses, either from its premises on onsite, which is of relevance here. These include the following items that are relevant to particular aspects of the industry and to one of the 9 occupations above.

- Production and sourcing

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[16] TCLF newsletter (February 2018 and following)

- Fabric and fabric sourcing
- Fit and sample development
- Product lifecycle management

From a LCR perspective the HE sector provides F&T courses via several institutions. The universities of Leeds and Huddersfield have significant departments covering fashion and textiles and offer a wide range of degree and postgraduate courses and expertise but there are others offering alternatives, e.g. Leeds Arts offers undergraduate courses (Fashion Design, Textile Design and Fashion Branding with Communication) and Leeds Beckett (Fashion). Secondly, the FE sector offers a range of foundation and degree courses, e.g. Fashion and Textile and Surface Design (Bradford College).

Furthermore, HE research and development expertise available to the LCR complements these training and knowledge transfer activities, especially on the digital agenda – via awareness raising workshops and funded programmes – as evidenced by the first round of projects agreed through the Future Fashion Factory[17]:

- Abraham Moon & Sons: A digital system for enhanced accuracy and efficiency of the wool dyeing process
- Advanced Dyeing Solutions / Roaches International: A process to digitally evaluate, relay and visualise the aesthetics of textile fabrics to users in a different location
- AW Hainsworth and Yorkshire Textiles: Digitising early designs from Leeds Industrial Museum to produce a 'new heritage' fabric for electronic jacquard manufacture
- Deluxe Beds: Design of a modular mattress product
- Gieves & Hawkes: Reducing the lead time on a UK made-to-measure suit from 6-8 weeks to 48 hours
- Joshua Ellis: Market assessment of high value recycled cashmere products manufactured in the UK
- Laxtons: Development of immersive technology for staff training in large-scale textile production
- Whiteford Felt & Fillings: Data analytics supported market research of new outerwear product lines
- WT Johnson & Sons: Developing a new digital analysis system for quantitative prediction of the effect of selected process conditions on fabric handle and finish

Below degree level the FE sector as a whole offers a number of courses relating to fashion, sewing, weaving and engineering applications relating to the sector in particular, predominantly at levels 2 and 3. There is wide geographic coverage

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[17] As noted on the Fashionunited website on 15th August 2019

across the LCR although many courses appear to offer fixed calendar entry points rather than roll-on roll-off enrolment. The college offering can be shown in brief as below.

Leeds College[18] (textiles)
Keighley College Textile Academy[19] (dressmaking, fashion and textiles and apprenticeships)
Yorkshire Art[20] (textile screen printing)
Bradford College[21] (more emphasis on fashion but some textiles related courses)
Craven College[22] (sewing workshops)
New College Pontefract[23] (textiles and fashion) although this is sixth form provision
Barnsley College (mainly fashion and sewing, also graphic design and printing)[24]
Keighley College operates a Textile Academy offering five courses, including Asian Dressmaking and Advance Pattern Cutter; all are Level 3 or under.

Bradford College offers a Level 4 BTEC in Fashion and Design with other short courses available with 22 hours learning each over a number of weeks, e.g. courses for beginners and improvers at Bradford College in both fashion and textiles. Leeds College offers a Level 3 Textiles Extended Diploma and an Art Enterprise (Fashion and Textiles) Foundation degree. Barnsley College offers a Level 3 Fashion & Clothing qualification with a 2020 start and full-time only option. Craven College has a Fashion and Textiles – Developing Design Skills course (11 hours) and several sewing with around 24 hours learning each over a number of weeks. Solvo, a Leeds based provider, offers a Level 4 apprenticeship in Buying / Merchandising that relates to the T&C sector.

As can be seen, many of the courses available are Level 3 and below and many are short, almost taster sessions in length. Secondly, the geographic spread is patchy. It could be considered that gaps exist here if future demand seeks to fulfil qualifications at higher levels on the one hand and seeks to bring new entrants into the T&C market on the other.

What is available here is supplemented by technical courses run by the Textile Centre of Excellence (Huddersfield) and the Society of Dyers and Colourists (Bradford). Technical apprenticeships are available via the Textile Centre of Excellence and offer a day release option allied to training and assessment at the employer's location; the Centre has a long history of delivery here to manufacturing

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[18] https://www.leedscitycollege.ac.uk/courses-apprenticeships/courses/creative-arts/textiles-extended-diploma-level-3/
[19] https://keighleycollege.ac.uk/college-campus-information/student-facilities/textile-academy
[20] https://yorkshire.art/wp-event/textile-screen-printing-5-week-evening-course-2/
[21] https://www.bradfordcollege.ac.uk/coursesearch/any/fashiontextiles
[22] https://www.craven-college.ac.uk/courses/art-design/sewing-workshop-creative-textiles/
[23] https://ncpontefract.ac.uk/textiles-and-fashion-design/
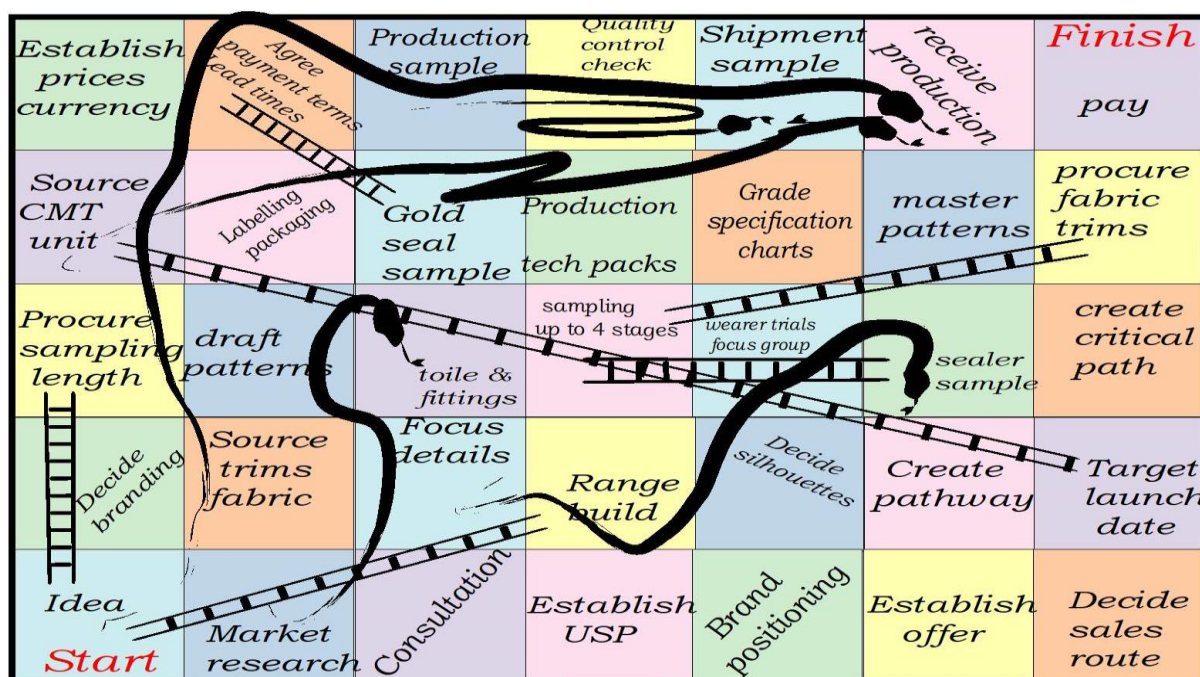[24] https://www.barnsley.ac.uk/our-departments/art-design-and-fashion/

companies in particular. Some existing, older apprenticeships will be withdrawn in 2020 and it is possible that this will leave some gaps in funded provision. The newer Trailblazer qualifications appear to provide greater scope for in-depth learning but their less generic content might suggest that a wider number of pathways will need to be developed. Currently, recently approved apprenticeships at Level 3 (Fashion and Textiles Pattern Cutter) and Level 4 (Fashion and Textiles Product Technologist) bring up no local providers on the Institute for Apprenticeships website. That holds also for the Level 5 Bespoke Tailor / Cutter apprenticeship.

Dyeing provides a different example. Some general training exists at Levels 2 and 3 with more specific, in-depth elements provided locally at higher levels. A Level 4 apprenticeship Trailblazer qualification has been approved but has no provider available to deliver it at present. The circumstances surrounding its delivery suggest that a solution will be some time away.

The Textile Centre helped to develop a pathway from concept to fulfilment for garment design and construction via the TCBL project. The thirty-five key stages of development identify many critical areas of learning (see below) and the Textile Centre's personnel have taken a number of designers and start-ups through all or aspects of the process. It appears unlikely that a course encompassing all aspects of design development is available in the LCR; the learning requirements here are likely to cover all levels from 2 to 8 and could be covered by a course offering some or all of the content or by a pick and mix modular approach.

Some providers appear to have taken advantage of the television series, The Great British Sewing Bee, to offer related courses, e.g. Yorkshire School of Sewing (Leeds

and Harrogate) or some offered via the thesewingdirectory.co.uk or craftcourses.com. The Yorkshire School of Sewing offers day courses from starting out through to sessions on couture and fitting. Barnsley College and Jane White Couture Tuition (North Lincs.) are two further examples from the FE and private sectors respectively. Barnsley College's part-time course offers 5 weeks of learning basic sewing machine skills and a range of techniques from seams, to zips, to buttons etc.. That is followed by a further 5 weeks where learners can put their new found skills to use making an item of their choosing. Jane White Couture aims at a particular market, women, for its offering around dressmaking and pattern cutting, on a roll-on, roll-off basis.

This kind of opportunity can be complemented by examples such as the collaborative sewing project (WORTH Partnership) currently underway between the Textile Centre of Excellence (UK) and Gullo Filati (Italy). The challenge we address here is to design sewing kits that are well adapted to different skill levels. Arguably, it can best be realised in a collaborative environment such as a sewing café and the services and products can be exchanged and sold within a network of TCBL Cafés, potentially including in the LCR. Some local offerings link training to free downloads of patterns with instructions provided, e.g. the York School of Sewing[25].

Jane White makes an observation (on her website) that there are few garment construction and pattern cutting courses available to adults, vocational or non-vocational. In fact, a L3 Fashion and Textiles pattern cutter apprenticeship was approved for delivery from October 2018 but the only delivery that is available currently appears be in London (Fashion Enter).

Some of these could be seen as helping to play a role in building capacity by introducing learners to the industry, or by reintroducing ex-workers to it. The WEA continues to offer a range of courses throughout Yorkshire and the Humber[26], including some targeting the British Asian market specifically. These courses concentrate mainly on sewing with some others on textiles available. Secondly, there is perhaps a clear role here for gaining wider access to the British Asian market; taking the WEA offering as an example shows course related to this segment on offer around the country, notably the Midlands and Yorkshire and the Humber. More generally, searches on its website against two obvious items, textiles and sewing, reveal fifty-six and eighty-three results respectively: 13/56 (Halifax, Bradford, Huddersfield, Shipley and Dewsbury) and 24/81 (Bradford, Huddersfield, Shipley and Dewsbury) to be held in the LCR with further courses being available across other parts of the region.

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[25] https://www.yorkschoolofsewing.co.uk/
[26] https://enrolonline.wea.org.uk/Online/CourseSearchResults.aspx?results=50&PageSizeForm=true

Training provision in Leadership and Management

A number of universities across the region offer training provision incorporating leadership and management elements through masters, postgraduate and MBA qualifications via their respective business schools. That is supplemented by content provided via the Institute for Leadership and Management (ILM), the Chartered Management Institute (CMI) and other organisations through a diverse provider network funded and commercial.

It is worth picking out some examples. Huddersfield University offers Business with Supply-chain Management Professional apprenticeship, as befits its expertise in supply-chain solutions and consultancy (delivery of a project offering business support in this area is included in Appendix 1). Leeds University offers a short programme for future leaders of SMEs and another, longer one for non-executive directors that includes a three month placement with a high growth SME. Both of these courses offer content that could be of value to businesses in the LCR, particularly given their SME focus. Bradford Business School offers a BSc in Management and Business Analytics over four years with content including the following.

- Fundamentals of Analytics and Artificial Intelligence
- Big Data Analytics for Business
- Business Law and Ethics
- Business Forecasting and Analysis
- Applied Business Analytics and Simulation

One might surmise that the intended and expected audience will be school leavers with no / little business experience; that type of content sounds of potential value to those in business already.

Separately, the Institute of Directors provides a wide range of courses available to business leaders in the LCR. Leeds Beckett University delivers many of the courses for company directors provided by the Institute of Directors although the latter delivers a wider number itself. Interestingly, the Non-Executive Director Network (NED) offers a variety of training options for non-executive directors but its website demonstrates an alarming lack of courses in Yorkshire; a situation compounded by NEDonBoard which offers courses only in London. It is left up to Leeds Business School to highlight potential benefits to this region via the Exceptional NED short course over four months[27].

Delivery at higher levels is offered by the college and commercial networks too. CMI courses at Level 7 are offered by Wakefield College; coaching and mentoring training is offered by Dutton Fisher at Ilkley or Azure in Wakefield.

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[27] https://business.leeds.ac.uk/short-course/1/leeds-university-business-school/1587/exceptional-ned-training-programme

A variety of courses are offered at Level 5 by a mixture of colleges, private sector providers and two universities (York and Leeds Beckett). The majority are awards, certificates and diplomas in Leadership and Management with a smaller number covering coaching and mentoring, operations management and practical leadership.

Fewer courses appear to be offered at Level 4 with the majority being once again from the ILM stable. Project and operations management are additions here. A variety of courses are offered at Level 3 by a mixture of colleges, private sector providers and one university (Leeds Beckett). In addition, it is possible that learners are being offered pathways that do not incorporate all levels, e.g. Leeds Beckett appears to offer qualifications at levels 3, 5 and 7.

Greater variety is offered amongst short course provision: managing change, managing performance and objective setting, for example, as well as skills such as project management. These are delivered as bitesize modules rather than as parts of a larger course. Delivery is varied, that variety applies to location too: Calderdale, Kirklees and Wakefield, for example and not wholly Leeds centric. Private sector involvement here is notable, both in tandem with the FE funding routes and purely commercial. Brooke Corporate Developments and ITS Group (Barnsley), Learning Innovations and Aire Vocational Training (Leeds), City Training Services and Appris Management (Bradford), Dutton Fisher (Ilkley) or the Textile Centre of Excellence (Huddersfield).

Training provision in Industrial Digital Technologies

The British Computer Society (BCS) runs the Chartered Institute for IT and promotes courses and training around a number of the key areas relevant to the T&C industry, e.g. Artificial Intelligence, Business Analysis and Information Security. A number of its courses are offered across the LCR. A global competitor to some but a provider potentially to all is represented by Google. Currently, its Global Digital Garage offers free online marketing training as a core are but its offer is much wider in scope as it touches on agile project management, programming, building websites and planning effective meetings, for example, amongst over 100 courses online[28].

The West Yorkshire Skills Consortium uses some private sector providers in parallel to delivering course material direct – all the colleges have offerings here. The majority of ICT courses are at lower levels but there is a good sprinkling of Cisco and Microsoft network courses and a few relating to digital themes such as machine learning and ethical hacking, both identified as valuable skills required now and in the future. The Virtual College offers an apprenticeship in Cyber Security (Level 4) via its cloud based learning platform amongst its collection of courses.

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[28] https://learndigital.withgoogle.com/digitalgarage/courses

In addition, there are many private sector providers delivering training commercially across the region. QA Ltd. and the Babington Group (Leeds), ITS Group (Barnsley), Estio Training (Halifax and Leeds) and Ginger Nut Training (Halifax) offer some locally based providers.

A number of private sector training organisations with offices outside Yorkshire offer digital courses in the Yorkshire region; these are mainly short course bootcamps offering both accredited and non-accredited training. Firebrand Training (London) uses Burn Hall, York; Nobleprog (London) uses Leeds; TrainX (London) uses Sheffield; Fast Lane (Reading) uses Leeds; Pentagon Training (Slough) uses Sheffield, Doncaster, Wakefield, Leeds and Harrogate; Pearce Mayfield (Oxford) uses Leeds and Knowledge Academy (Bracknell) uses Leeds. In the case of Firebrand most courses run at its premises outside London but it will offer courses in Yorkshire with a minimum 15-18 participants[29].

There is a varied selection of ICT and digital courses available through the Third Sector but, as might be expected, almost all at a relatively basic level, probably up to Level 3. Areas covered typically concentrate on getting started up to intermediate level and MS based material. Social media skills for job searching, Instagram for marketing or selling online are slightly more diverse in nature. One interesting variation is shown by some offers of training around Raspberry Pi, an important aspect of developing programming capabilities perhaps otherwise more often seen within the confines of universities and some schools.

The majority of video knowledge training on YouTube, for example, appears to be of marginal use and aimed primarily at home markets, e.g. sewing. Nonetheless, this platform demonstrates a potential offering that should not be ignored and there are examples of more technical subjects being handled in this way. Online fora represent a similar means of acquiring information and learning: both examples are subject to the usual rigours of quality assessment and trustworthiness.

The HE sector within the LCR provides a wide variety of expertise when compared to the 22 key digital themes identified by 4Manufacturing. An important issue requiring consideration ought to be how the local universities can better transfer their undoubted expertise into further and new knowledge and training opportunities for the LCR and for SMEs in particular. Expertise exists in plenty between Leeds, Bradford and Huddersfield in the West Riding and York in the North Riding. The Centre for Immersive Technologies, the Consumer Data Research Centre (CDRC) and the Institute of Data Analytics (LIDA) at the University of Leeds offer three examples of such expertise in the region with Sheffield University's Institute for Coding and Advance Manufacturing Research Centre (AMRC) being included because of involvement in the coding agenda and the national catapult programme (advanced manufacturing) respectively.

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[29] Verbal communication with Firebrand (7/8/2019)

The chart below depicts key areas of local expertise against the 22 digital themes identified by 4Manufacturing.

Colour blocking in blue is indicative of areas of expertise only; it does not indicate a specific level. This chart includes courses on animation via organisations such as Leeds Arts, Leeds Beckett and York St. John universities. Whilst expertise in the areas of Paper to Digital Processes and Web to Order are blank it is considered that aspects exist either within other themes or certainly that relevant expertise is available within several of the institutions.

Digital Theme / University	Huddersfield	Leeds	Leeds Arts	Leeds Beckett	Leeds Trinity	Bradford	York	York St John	Sheffield
Additive Manufacturing	■	■				■			■
Augmented & Virtual Reality	■	■	■	■		■	■	■	■
Big Data & Artificial Intelligence	■	■		■	■	■	■	■	■
Circular Economy	■	■				■	■		
Continuous Improvement									■
Cybersecurity	■			■	■	■	■		■
Design for Manufacture	■								■
Digital Manufacturing Readiness									■
Digital Twin & Simulation	■	■				■	■		■
Digitally Assisted Assembly	■								■
Factory Floor and Production Systems	■								■
Flexible Manufacturing	■								■
Industrial Energy Efficiency	■	■		■			■		
Industrial Internet of Things	■	■		■		■	■		■
Mass Customisation		■							■
Paper to Digital Processes									
Predictive Maintenance	■	■		■					■

Robotics and Automation								
Sensors								
Servitization								
Supply Chain Integration								
Web to order								

Digital apprenticeships are one way forward and represent an area that school leavers can understand, embrace and see working in real life. A range of digital apprenticeships is available from Levels 2 to 7: a total of seventeen in all. That number will need to grow significantly given the importance attached to the ever increasing impact of digitalisation on our lives.

Perhaps unsurprisingly, digital marketing apprenticeships form a majority of the digital apprenticeships on offer at lower levels, up to and including Level 3. No fewer than 75% of digital apprenticeships from a total of 143 on offer fell within this category in a recent search[30].

For subjects such as data analytics Level 3 seems appropriate for an introduction with higher levels going into greater detail and depth. Specialisation begins at Level 4 with cyber related, data analytical and business analytical qualifications being offered, for example, across a range of locations in Bradford, Halifax, Ilkley, Leeds and Wakefield.

An argument could be marshalled suggesting that the importance of these areas should entail their take-up at an earlier stage. Secondly, the apparent absence of specific training in important areas around A/VR and AI as just two examples points to a potentially serious gap in skills related training, although they might be included as content in other apprenticeships. Training and consultancy around Digital 4.0 is another area where provision in Yorkshire is lacking.

Currently, four digital degree apprenticeships are available[31]:

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[30] Survey conducted via the Findanapprenticeship website on 13th September 2019 with 40 mile a search radius from Sheffield:
https://www.findapprenticeship.service.gov.uk/apprenticeships?ApprenticeshipLevel=All&Hash=-410475343&Keywords=digital&Latitude=53.37455&Longitude=-1.534861&Location=s10%203lw&LocationType=NonNational&PageNumber=1&ResultsPerPage=50&SearchAction=Sort&SearchField=All&SearchMode=Keyword&SortType=Relevancy&WithinDistance=40&DisabilityConfidentOnly=False.
[31] https://www.instituteforapprenticeships.org/apprenticeship-standards/?routes=Digital&levelFrom=5&includeApprovedForDelivery=true

Cyber security technical professional (integrated degree)
ST0409
Approved for delivery from 24 Sep 2018 Level 6 48 months Max funding: £24000
Leading teams which manage cyber security risks.

Data scientist (integrated degree)
ST0585
Approved for delivery from 17 Aug 2018 Level 6 36 months Max funding: £19000
Finding information in diverse datasets to address complex problems and improve organisational processes

Digital and technology solutions professional (integrated degree)
ST0119
Approved for delivery from 26 Mar 2015 Level 6 36 months Max funding: £25000
Creating digital and technology solutions that enable businesses to develop new products and services and increase productivity.

Digital and technology solutions specialist (integrated degree)
ST0482
Approved for delivery from 07 Aug 2018 Level 7 18 months Max funding: £21000
Investigating, identifying and implementing technological strategic solutions

A further two standards are in development[32] with one further (AI data specialist Level 7) at the proposal stage.

Creative digital design professional (integrated degree)
ST0625
In development Level 6
Current status
Proposal Standard Assessment plan

Digital user experience (UX) professional (integrated degree)
ST0470
In development Level 6
Current status
Proposal Standard Assessment plan

Leeds Beckett and Leeds Trinity universities offer one digital degree apprenticeship (ST0119) each. Sheffield Hallam University offers that apprenticeship in Yorkshire but outside the LCR. Arden University offers the degree apprenticeship via office addresses in Leeds and Sheffield but requires monthly attendance in Birmingham

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[32] https://www.instituteforapprenticeships.org/apprenticeship-standards/?routes=Digital&levelFrom=5&includeInDevelopment=true

with the rest delivered online. Only Sheffield Hallam University delivers the specialist course (ST0482). Only York St John delivers the Data Scientist degree (ST0585) and no organisation in Yorkshire delivers the Cyber security qualification (ST0409) currently.

Coding was an acknowledged gap in earlier years but a consortium of universities, businesses and industry experts (led by the University of Sheffield) is aiming to tackle this as an ongoing concern through its Institute of Coding, as one example. Currently, the picture appears much stronger now. Whilst only a handful of courses appear on the WY Consortium of Colleges course finder (under either coding or programming and offered either by QA Ltd. or The Knowledge Academy) there are many others offered across the region covering many programming types. Leeds appears as the main delivery centre although many providers – mainly commercial private sector – will use other locations where demand requires it. The vast majority of courses offered here are up to 5 days duration. Northcoders offer bootcamps at two levels (Introduction to Programming – 2 evenings and The Developer Pathway – 12 weeks) in Leeds. Other sources of training are available: looking specifically at Raspberry Pi sees a number of fora available for discussions, information sharing and the like across various places in Yorkshire[33].

This type of training is flexible enough to be run anywhere at any time – subject to the commercial criterion of profitability – so capacity is not an issue from the supply side per se. Capacity to deliver from within the LCR might be more problematic and leads to the possibility that much of what demand there is might be satisfied by out of region providers with a consequent loss of income generation. Secondly, how many companies send their employees to be trained outside the region, why and for what, would be worth knowing.

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[33] https://www.creativekirklees.com/kirklees-libraries/raspberry-jam-huddersfield/, https://u3asites.org.uk/york/page/97404, https://www.eventbrite.co.uk/e/raspberry-jam-leeds-2nd-october-2019-tickets-69572247465?aff=erelexpmlt, and https://events.theiet.org/raspberry-pi-jam/ (York), for example.

Training provision that is either specific or closely aligned to the 9 digital occupations identified by TCLF appears to be patchy; it may be that many aspects are covered as parts of courses with wider content but it seems likely that gaps exist. Provision covering supply-chain, digital marketing and research & development information researcher roles can be found in several existing courses whereas Finishing is more problematic. Data analysis will be an element required within many of the job descriptions and again there is provision offered within the region. Product Lifecycle Management is available as a three day course in London run by Product Focus (Product Management and Product Marketing for technology-based products). 280 Group also offers Optimal Product Management and Product Marketing Training courses in London. If nothing exists that meets any specific needs now or in the future it may be that, as elsewhere, existing course content could be adapted to create something new or that a modular approach is taken.

Although this report is essentially focussed on the provision of skills it is worth a brief examination of what users are looking for currently where that information is to hand and especially with regard to digital technologies. Take up of ICT and digital technologies by the T&C sector is common amongst these companies, a point noted in various reports, e.g. Textile Intelligence's on AI and AR in apparel, and includes companies in the LCR[34]. In addition, the TCoE has undertaken a limited number of discussions with some of its manufacturing members and identified some common themes that can be investigated further as part of ongoing research – and due regard to LTRS Segment 2.

AI and machine learning are creating opportunities across much of the fashion and textile industry: predictive maintenance, trends analysis and production scheduling being just three examples for the sector; some of these were highlighted in the Future Fashion Factory projects abovementioned. AR/VR technologies have been used for developing training content (Oxford Brooks University with some textile specific applications and the AMRC with automotive, for example).

Digital modelling has proved to be of interest in two areas: firstly, in respect of planning for new buildings; secondly, in respect of planning new or changed work and production flows. In fact, the two can be linked. The gap here is likely to be less with provision capacity – there is expertise amongst several of Yorkshire and the Humber's universities, for example – but more likely with the availability of course content in the best format for delivery to the audience. That might be compounded by companies themselves who may not have the necessary expertise in-house to develop or support the use of this technology.

Accurate trends analysis is a skill much required within the T&C industry: furthermore, it is another area where digitalisation is likely to play an increasingly

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[34] Burberry's take up of AR to find new ways of engaging with its customers online is detailed on pages 23 and 25.

important role through AI. Applications can be many and various but those worthy of particular consideration in a skills context should include predictive analytics based upon past sales and especially predictive analytics utilising current thoughts, opinions and ideas from consumers, for example through social media content.

Developing virtual co-design spaces online is seen as a requirement by some organisations encompassing both a manufacturing and a retail element to their business. This is a step further than using relatively simple mobile applications, e.g. 3D scanning, and calls for an element of co-design on the part of the end-user as well as the designer / manufacturer. It offers the possibility for reduced lead times between concept and delivery of a customised finished article, especially where distance is involved and face-to-face customised fittings are either difficult of impossible. What is clear is that not all organisations have the required skills available internally in order to take swift advantage of potential solutions –technology led or through digital marketing expertise.

Amongst potential solutions there are two interesting opportunities with scope for digital involvement: one through an AR/VR route and a second through a digitalisation of the weaving process where sensors/optics can identify a likelihood of errors before they occur (preventive analytics).

From the demand side the requirements could be:
- Appropriate levels of demand
- Aggregation of demand to meet minimum numbers
- Ability to pay

Gaps and opportunities

Gaps (on the provider side) can be identified via a number of avenues including but not exclusive to:

1. A lack of accredited or non-accredited training provision covering a geographic area
2. A lack of accredited or non-accredited training provision in a specific subject area or subset
3. A lack of accredited or non-accredited training provision in a specific subject area or subset at a particular level
4. A lack of accredited or non-accredited *local* training provision in any or all of the above
5. Accredited training available but little or no provision available
6. Accredited or non-accredited training provision available but its delivery type might not be applicable to target audiences
7. Accredited or non-accredited training provision available but queries over the quality of delivery

It seems entirely possible that some gaps, either perceived or actual, could be the result of a lack of awareness, knowledge or understanding of what provision exists on the part of the varied audiences as recipients. That might be as a result of a lack of engagement on the part of a provider network, that available provision does not appear to meet the needs of an audience or that the multiplicity of search mechanisms leads to confusion or out of date information, for example. A third instance could be that there are pockets of knowledge and expertise requirements that are insufficiently identified by the provider side; engagement with the target audiences here might be able to identify specific needs in order that solutions could be offered, perhaps through aggregation of demand.

Gaps have been identified in all three areas but in two of the three in particular: the textiles and clothing sector and digital, although this has significant implications for businesses in terms of their leadership and management capacities. The digital agenda itself is, of course, a cross-cutting theme and ubiquitous to modern life but there appears to be one significant area where a gap exists for both the textiles sector specifically but significant areas of the local manufacturing sector in general. That is partly in the act of providing awareness sessions on the digital agenda but very specifically in the act of taking that awareness into deeper levels of understanding, identifying practical opportunities for adoption, planning and rollout.

1. As a general point it is evident that a great deal of commercial training is delivered in the region by companies from without. Why that might be the case is a separate question. In itself, that is not a negative state of affairs but it does offer the region's providers an opportunity to create more locally based business, through HE, FE college or private sector routes.

2. Attention has been drawn above to some current issues within the delivery of apprenticeships to non-levy payers and to the non-delivery of available apprenticeship qualifications in this region. Hopefully, these will be temporary in nature.

3. Notwithstanding these specific items above, there is a relative lack of training or qualifications at Levels 4 and 5 that might need to be addressed going forward for both the manufacturing and fashion / design ends of the sector.

4. At Level 3 and below consideration could be given towards whether, and if so, how, more might be done to promote pathways from the local offerings of sewing classes into higher level and more in-depth training with consequent work opportunities, either as employees or potentially through self-employment or small businesses start-ups.

5. Finding sufficient mending expertise is a problem within the region, partly due to an ageing workforce. Anecdotally, a certain amount of poaching occurs within the existing workforce but this provides only a measure of short-term relief. No

formal training framework exists although it is feasible that at least some aspects of the work could be undertaken via digital technologies.

6. Addressing some aspects of the designer's journey, as encapsulated by the Snakes 'n' Ladders board would promote greater understanding of the various elements within the supply-chain. That includes many of the aspects covered by the Snakes 'n' Ladders design themes and other, related areas such as trends analysis. Some of these are, or will be, aided through digital technologies and applications. UKFT has begun to address some aspects nationally but there is an opportunity locally too.

7. New or more delivery across some of these gaps might require the development of appropriate expertise to cover them, either by product area or at higher levels. That might not be easy to achieve given the historic problems of recruitment here.

8. A possible gap in the leadership and management market has been highlighted by two courses offered by Leeds Business School, both of which target SMEs and not the oft used large and corporate case studies. Perhaps more could be developed, either to create something SME specific or with a greater level of content relevant to SMEs within existing courses.

It appears that a gap remains in the LCR, and probably all Yorkshire, around awareness training and consultancy around Digital 4.0 for businesses, notwithstanding the worthwhile work undertaken already through projects such as Digital Enterprise and the Future Fashion Factory. This is being addressed elsewhere through other initiatives or services, such as the Scottish Manufacturing Advisory Service, the Catapults and the Digital Shoestring project at various stages of development. Certainly, there is a significant awareness programme being rolled out by various bodies across the LCR (referred to elsewhere in this document) but a rolling programme of events that follow up in some detail, and with specific actions for companies to follow, seems to be much less prevalent. Part of the rationale for this suggestion is that a proportion of training offered across the region is being provided by agencies from outside the region so there are opportunities for greater participation from within. A second rationale is offered by the TCLF's comment that many of the digital occupations identified from its research are likely to be covered by one person in SMEs. On that basis it is perhaps unlikely that many of the courses currently on offer are likely to be taken up in their existing format. A third rationale, articulated by delegates at a recent Digital Shoestring event, for example, suggests that many SME businesses might take up some digital solutions more readily if they are seen to be small chunks but with the capacity to be incremental rather than massive projects; this approach might also facilitate easier demonstrations of ROI for decision making.

9. Training in writing cases able to demonstrate ROI, when requesting funds, may well be another gap within the context of some manufacturing companies at least[35] and could be fulfilled via short courses.

Introductions to digital manufacturing opportunities for F&T companies (at least) remain a requirement as a precursor to more deep strategic thinking, particularly for SMEs. In addition, more detailed sessions should follow on as a result of the initial bouts of interest that have been created. This has been set in motion for the textiles sector via the Future Fashion Factory programme, for example.

There is a clear role here for HE and industry bodies in particular to address this, as is happening in both the north-west and north-east. Perhaps a more modular approach, focussing on individual elements in bite-size chunks could be one way forward; another could be a workshop approach at both strategic and operational levels. Three options (9, 10 & 11) can be presented.

10. Top Team workshops
This would see industry working in partnership with the HE sector to organise and deliver a number of short, residential sessions to a small number of organisations, typically between one and a maximum of three at one event. Each organisation would be invited to bring up to five people from its senior management team to learn about the digital agenda and to focus on up to five key digital themes in detail, utilising knowledge and expertise from both industry and the universities in the process.

The residential element, incorporating visits to appropriate areas of expertise, would allow for teams to focus outside their normal environments in order to identify key opportunities for each business. The facilitated workshops would work with each team to produce an action plan to be put into practice in the business and could allow for an additional element of consultancy expertise to be used to do so.

11. Operational workshops
An alternative version of the Top Team workshops would see a slightly different mix of company personnel – combining senior management with production operation management – in order to develop practical action plans. A version of this suggestion is being piloted in the north-east via the local Digital Catapult representative.

12. Workplace workshops
A third version of these workshops could be offered to company workforces with potential benefits as below. These would see a combination of senior company

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[35] A point made indirectly by many delegates attending the Digital Shoestring event in Cambridge in September 2019.

management and external facilitation take employees through the digital changes relevant to that business, employees' roles therein and the knowledge and skills requirements that would be needed. A skills audit of the employee base could be used to identify existing or untapped skills or skill gaps that could be utilised or addressed over a defined period to create the necessary improvements for each business. A ready example can be suggested by an individual's take up of technology, e.g. mobile phones, home technologies or skype that demonstrates an ability to use digital products in ways that could be translated into the work arena. A second example could see younger workers who are already digitally aware paired with older workers with the requisite engineering or technical experience where both can learn from each other.

13. More modular courses (using data analytics as an example)
There are several risks across the data spectrum ranging from under analysis through to difficulties identifying appropriate data from amongst the vast array on offer. Added to the mix are issues around the extraction of useful data from legacy equipment and an ability to extract and analyse data from different systems or platforms. Little of this is new to business but it seems likely that the increased scale of digitalisation will render data management ever more important, hence the appearance of data analytics amongst the nine emerging digital occupations.

It may be the case that knowledge gaps exist here for both large and smaller businesses, and for a variety of reasons. Larger businesses will almost certainly have an ICT team or department but data analysis should be seen as very much more than an IT issue – and very much a management concern. Anecdotal evidence suggests that some companies may not take advantage of appropriate or business critical training for other reasons. One example highlights this issue with regard to data analytics: a company's senior managers might not wish to discuss what qualitative data is available or its usage because they are embarrassed about what they hold or because they might not have the required analytical expertise in-house.

All businesses with whom discussions have taken place have identified the ever-increasing importance of data analysis for their organisations. A number of businesses have acknowledged that they do not, or might not have the necessary internal skills in data analytics to take full advantage of opportunities in this area. Amongst smaller businesses there is an expectation that the work required is likely to be met by the existing workforce taking on the additional roles and responsibilities at the expense of recruiting additional and specific talent – a confirmation of a point made by the TCLF report – but not, perhaps, the best way to improve business performance. If considered, then a skills audit of the workforce may identify untapped resources.

14. On current evidence there will be a gap in provision for the incoming suite of T Levels. This may be resolved between now and their launch in 2020 and might be ameliorated through the financial assistance offered via the government's recent announcement.

15. Cybersecurity is another area where a gap may exist, probably through the increased demand in the need for these skills rather than any current lack of provision per se.

16. Process Analyst courses appear to be in relatively short supply as a stand-alone subject. A number of related courses are available in London or online with only one identified for the LCR to date.

17. Product Lifecycle Management is a likely gap as a stand-alone subject if one considers that it is important enough for training to be delivered on that basis.

18. Trend forecasting as a specific course is delivered by two providers in London and one in Birmingham but seemingly not in the LCR. It is included here as a digital item because of the vital role that digital technologies can bring to bear, including through the aggregation of social media etc..

19. Animation is a second area where a gap may exist, again through the increased demand in the need for these skills rather than a lack of provision per se.

20. Delivery of more training using AR/VR technologies might become an ongoing requirement, particularly where there are gaps in delivery expertise or where recruitment of skilled labour is an issue, e.g. through an ageing workforce.

Interim conclusions

Many of the reports published nationally and regionally have highlighted a need to move towards greater provision and take up of higher level qualifications, both generally and specifically in a digital context. This report does not disagree with that notion. However, defining available provision primarily by qualification level may be overly simplistic given the volume of courses offered outside that framework; an attempt to map provision in this way reveals a gap between how predominantly public sector and predominantly private sector providers view the ways they sell their courses.

A complementary issue relates to differences between accredited qualification based courses and those not. This raises questions outside the scope of this report but of interest in terms of what criteria businesses might use when choosing what, if any provision to invest in.

The report identifies some of the many avenues open to businesses or individuals seeking provision. The construction of some kind of overarching and interactive database in order to simplify searches and identify appropriate courses more readily is worthy of consideration. Recourse to further research for more specific information would be required in any event; a harder issue to deal with is perhaps where courses will run only when a minimum number of learners has been recruited – solutions to that can be seen online.

The report acknowledges the role played by providers from outside the LCR in the provision of courses and content, particularly from the private sector. The threat from external sources cannot be overstated when one considers the market entry of an organisation such as Google. Nonetheless, there appears to be scope for developing a greater degree of local delivery – on and offline.

The gaps identified in this report are not viewed as an exhaustive list, rather as ones where opportunities might be grasped to offer or develop new content or different pathways, or to provide more options from within the region and fewer from without. Others will emerge as a result of further studies and work with relevant business sectors.

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APPENDIX 1: Business support available currently for LCR companies

Initiative Name	Geography	Eligibility	Offer	Website
Ad:Venture Programme	LCR	Start ups, businesses in first 3 years of trading	Business support, grants for equipment, coaching and mentoring	https://ad-venture.org.uk/
The Future Fashion Factory		SMEs & possibly some larger businesses by discussion	Grants for Proof of Market, Proof of Concept, Innovation projects	https://futurefashionfactory.org/
The Supply Chain initiative	LCR	SMEs & selected larger companies - manufacturers only	Grants/expertise. New supply-chain analyst can offer larger cos up to 5 days of free/low cost project support.	https://3mbic.com/news/programme-to-support-regional-supply-chain-officially-launches/
Access Innovation	LCR	Business must be a small or medium sized enterprise (SME) defined as: Having fewer than 250 employees AND A turnover of under c£40m OR a balance sheet of under c£35m Not being part of a larger group of companies that takes it over this threshold Based in the Leeds City Region (excluding Barnsley), ie. it has a trading address in the Leeds City Region In an eligible sector – this generally excludes primary agriculture, banking and financial services, and those trading directly with consumers – eg. retail and hospitality.	**Collaboration projects:** We can fund up to 30% of the cost of accessing specialist expertise, equipment or facilities. There are different types of research organisation and innovation specialists we can put you in touch with to help you to develop your project. We can typically support projects of between £10,000 and £100,000 – ie. a maximum grant value of up to £30,000. Equipment purchases: We can also fund up to 20% of the cost of purchasing equipment to bring new products or processes to market. Equipment purchases may be between £10,000 and £100,000 – ie. a maximum grant of up to £20,000. Specialist innovation workshops and advice: Your business will receive support and coaching relevant to your company to help you tackle identified barriers and develop your approach to innovation. Activities and workshops include: A dedicated Innovation Specialist to understand your challenges and guide you through our programme Emerging technology insights based on your sector to inform and inspire your future innovation activity Networking events with peer interaction, inspiring stories and innovation expertise on-hand Bootcamp workshops to address specific practical innovation challenges. One-to-one in-depth innovation management coaching, drawing on a pool of innovation experts	https://www.the-lep.com/for-businesses/developing-new-products-and-processes/

			and consultancy resources	
PAPI (Product and Process Innovation	York, North Yorkshire, East Riding and LCR	B2B, SME. Must lead to a new product.. key sectors. 1 new job per grant required	40% towards the cost of equipment. Grants between £8k and £20k for product & process improvements.	https://www.papi.org.uk/
Innovate UK			If you want to develop an innovative product or service, you can apply for funding from Innovate UK for between £5,000 and £10 million. Innovate UK runs funding competitions to help you develop your innovative idea and make it successful. The competitions are open to all UK companies and winners are awarded funding to put their innovation into practice.	https://www.gov.uk/government/organisations/innovate-uk
Digital Enterprise Programme 2.0	LCR		*Free Digital Workshops/Masterclasses & Connectivity Vouchers. Grants for connectivity, hardware and software*	https://www.the-lep.com/for-businesses/growing-your-business/strategic-business-growth-programme/

		In order to be eligible for support, your business must be a small or medium sized enterprise (SME), defined as:
		   having fewer than 250 employees
		   a turnover of under £45 million OR a balance sheet of under £40 million
		   not being part of a larger group of companies that takes it over this threshold.
		 And also the business needs to:
		   be based in the Leeds City Region excluding Barnsley, i.e. a trading address in the Leeds City Region.
		   be in an eligible sector - this generally excludes primary agriculture, banking and financial services, education and social care and those trading directly with consumers - e.g. retail and hospitality
		   have been trading for at least three years.
			The package of support available for your business includes one to one advice, funding and specialist workshops. Advice - We offer impartial one-to-one support on all aspects of business growth including strategic business planning, sales, marketing, financial management and investor readiness. This will lead to us putting together a Growth Action Plan for your business. Specialist workshops – Available on a wide range of useful topics which focus on key elements of business growth. Companies can also benefit from practical advice and support from other businesses.	https://www.the-lep.com/for-businesses/growing-your-business/strategic-business-growth-programme/

Strategic Business Growth Programme	LCR			
ESIF 'Skills Service'		Connectivity Vouchers (mainly B2B).	40% grants for skills assessments and development at all levels Free sourcing of training providers. Some bespoke training available.	
Resource Efficiency Fund 2.0	LCR	B2B, SME. Business premises occupied more than 12 months to identify energy saving measures.	Free energy assessment of business premises Grant & Assessment. Reduction of energy bills/carbon footprint; Up to 40% grant to put measures in place, worth between £1k and £10k	https://www.the-lep.com/for-businesses/growing-your-business/resource-efficiency-fund/

		Referral into the programme is required.		
Business Growth Programme - Grant.	LCR	Grants are focused on small and medium sized businesses, which have been trading for at least 12 months. B2B, SME.Job creation requirement at a rate of 1 job per £7.5k to 12.5k of grant received.	Capital purchases for projects over £50k. Minimum Grant £10k	https://www.leeds.gov.uk/business/support-and-advice/grants-for-business-growth
Manufacturing Growth Programme	LCR	In order to be eligible for support, your business must be a small or medium sized enterprise (SME), defined as: having fewer than 250 employees a turnover of under £45 million OR a balance sheet of under £40 million not being part of a larger group of companies that takes it over this threshold based in the Leeds City Region excluding Barnsley, i.e. a trading address in the Leeds City Region be a manufacturer be able to demonstrate the intention to grow or improve – (through increased turnover, increased jobs and/or introduction of new products, services, or processes).	Specialist Manufacturing Growth Managers are in place to offer SMEs the opportunity to access grant funding of up to 30% towards the cost of consultancy and coaching.	https://www.the-lep.com/for-businesses/growing-your-business/manufacturing-growth-programme/

Enhancement Project	SCR	SMEs experiencing or planning for growth	Could include access to finance, skills development, incl. graduate recruitment to SMEs, or industrial led R&D	https://www.scrgrowthhub.co.uk/growth-hub-enhancement-project/
Advanced Manufacturing Catapult			Possible free / low cost support for projects of 5 days or less	https://www.amrc.co.uk/
Digital Catalyst	UK	The Digital Catalyst Programme is free to applicant companies and open to any British design or manufacturing SME.	The leading design and engineering universities in the UK will provide members of the initiative a student expert under a 'work experience' program to act as a "digital catalyst" to fast track your company's adoption of digital technologies and support the development of innovative, connected products.	https://www.autodesk.co.uk/futureofbritishmanufacturing/digital-catalyst
Investment Readiness Programme	LCR	In order to be eligible for support, your business must be a small or medium sized enterprise (SME), defined as: having fewer than 250 employees a turnover of under £45 million OR a balance sheet of under £40 million not being part of a larger group of companies that takes it over this thresholdThe business also needs to be based in the Leeds City Region excluding Barnsley, i.e. a trading address in the Leeds City RegionIn an eligible sector - this generally excludes primary agriculture, banking and financial services, and those trading directly with consumers - e.g. retailers and hospitality.	This package of support will help your business to better understand the full range of finance options and products currently available. We'll then support you in accessing the ones that are most suitable for meeting your business' individual growth needs. Activities will include workshops covering key themes related to finance (e.g. traditional funding options, Research & Development related funding, crowd-funding, asset/invoice finance and factoring, platform-based finance and other alternative funders, such as challenger banks). One-to-one support will also be made available that will provide more intensive, impartial support to strengthen your investment applications and support you in presenting yourself (on paper and in person) in the most attractive and investable manner.	https://www.the-lep.com/for-businesses/growing-your-business/investment-readiness/

Works Better	Kirklees, Calderdale & Wakefield	Employers		Work experience mainly targeting the over 25s: free recruitment support when businesses take on one of their candidates.	http://www.worksbetter.co.uk/do-you-need-support-with-your-recruitment-and-selection-process
Skills Funding	LCR	Courses from the Skills Catalogue will be considered for WYCC European Social Fund funding if participants are 18+, in employment, have the right to work in the UK. Businesses must operate within the Leeds City Region.		Funding of up to 40% may be available. Requests for training that is not listed in the Skills Catalogue will also be considered for funding. Conditions and eligibility will be discussed with your Skills Advisor following your enquiry.	https://www.the-lep.com/for-businesses/skills-and-training/the-skills-service/