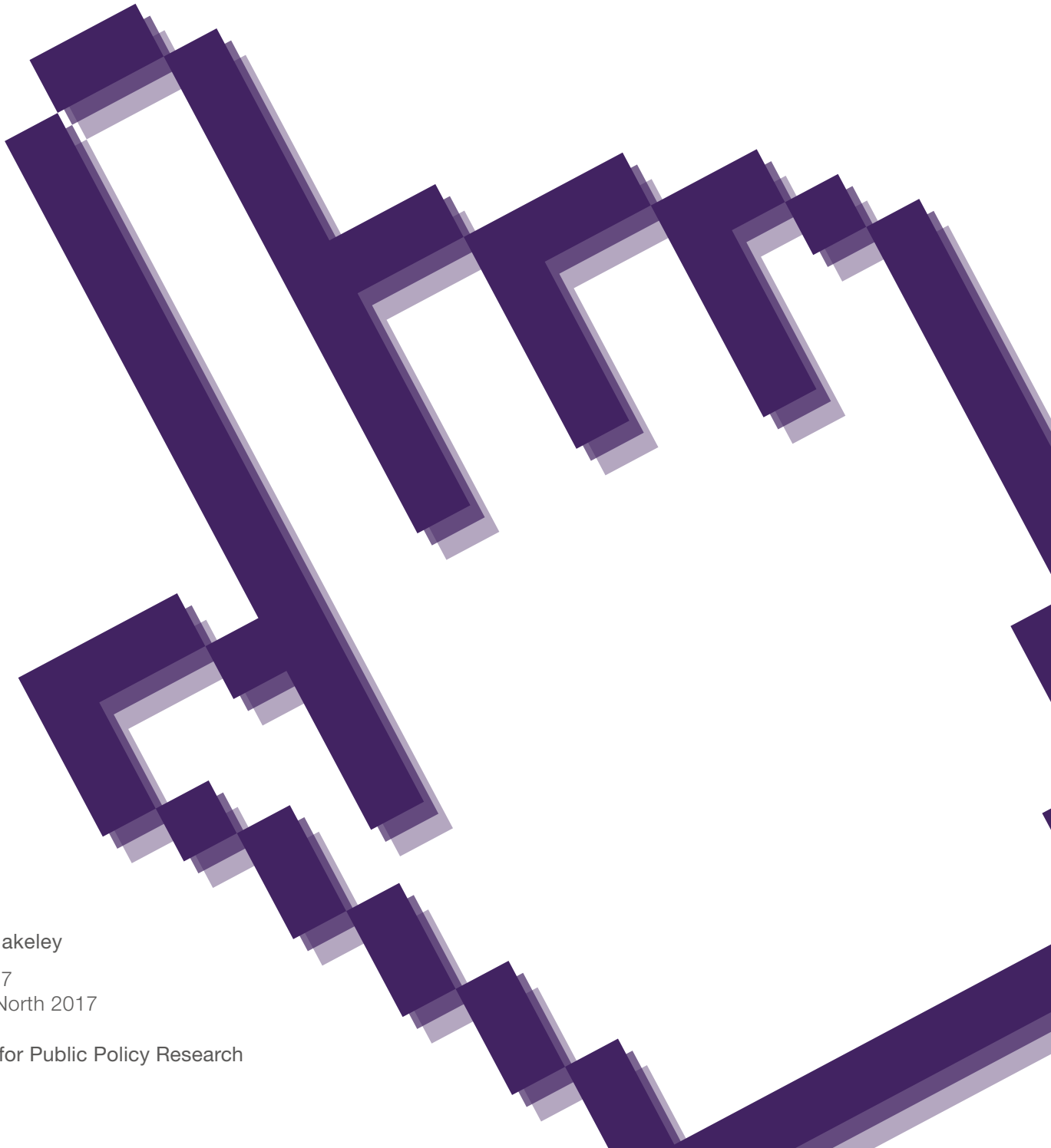
IPPR NORTH

REPORT

DEVO DIGITAL

DIGITAL SKILLS FOR THE NORTHERN POWERHOUSE



Grace Blakeley

April 2017

Institute for Public Policy Research

ABOUT IPPR NORTH

IPPR North is IPPR's dedicated thinktank for the North of England. With its head office in Manchester and representatives in Newcastle, IPPR North's research, together with our stimulating and varied events programme, seeks to produce innovative policy ideas for fair, democratic and sustainable communities across the North of England.

IPPR's purpose is to conduct and promote research into, and the education of the public in, the economic, social and political sciences, science and technology, the voluntary sector and social enterprise, public services, and industry and commerce.

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FOREWORD

DAC Beachcroft is proud to support this important report. Digital skills are crucial to all our futures and need to be placed at the heart of economic growth policies.

The development of these skills are relevant for the entire country but, as the report highlights, there are particular circumstances in the North that require even more support to be given to skills education to help reduce and close the gap.

There are many welcome, clear and practical recommendations, in some cases inspired by experiences in other countries. Many of these are underlined by a spirit of collaboration between local authorities, business and education; also by knowledge-sharing so that more young children and young people are made aware of the exciting opportunities presented by a career in the sector.

DAC Beachcroft seeks to make a difference in all we do; for our clients, colleagues and the communities in which we live and work. I believe that this report shares that ambition. Its findings and suggestions deserve close scrutiny to establish what role we can each play in ensuring that the North has the skills it needs for the future.

Michael Peeters
DAC Beachcroft: Regional Senior Partner, Leeds

SUMMARY

60-SECOND SUMMARY

The digital economy is booming, and the North is currently at the forefront of this transformation. Each of the North's regions has a unique digital specialism – from data analytics in Leeds, to digital media in Manchester, to gaming in Sunderland – and the North's digital economy as a whole is worth £9.9 billion to the national economy, accounting for 5.2 per cent of the region's GVA.

But if the North is unable to provide sufficient talent to facilitate the sector's continued growth, then a huge opportunity will be lost. Across the whole of the UK, many digital tech companies currently find it very hard to access skilled talent and the sector faces a large skills gap, but this is a particular problem in the North. Currently we rely on skilled migrant labour to fill this gap, but the spectre of Brexit is causing many to question whether they will have access to the talent necessary to grow their businesses in the coming years.

This digital skills gap, combined with a continued failure to invest in the North's digital and transport infrastructure, is perhaps the greatest threat to the success of the digital tech sector in the North over the coming years.

The North should learn from best practice from around the country, and around the world, to identify innovative solutions to close the skills gap. In this report, we highlight examples of such best practice – from digital degree apprenticeships in Sheffield, to integrated digital education in Estonia – and identify the lessons learned from these examples. We also recommend short- and long-term solutions to address the problem.

ANALYSIS

IPPR North has worked with Emsi[1] and Burning Glass[2] to analyse the skills gaps for the digital sector in the North, and we find that there are substantially more vacancies for high-skilled digital tech professionals than there are applicants to fill them. Specifically, we have found that:

- **all of the North's regions** have substantial digital skills gaps for digital tech workers educated to **higher education** level or equivalent
- in contrast, **none of the North's** regions have digital skills gaps for digital tech workers educated to **further education** level or equivalent
- the greatest digital skills gaps exist in the North West, and the lowest in the North East
- the highest level of demand for digital workers as a proportion of the economically active population is found in Cheshire and Warrington, followed closely by Greater Manchester.

1 http://www.economicmodelling.co.uk/
2 http://burning-glass.com/

- salaries for digital tech workers are highest in the North East and lowest in Yorkshire and the Humber
- proportionally more ICT apprenticeships are undertaken in the North than elsewhere in the country; the North East has by far the highest proportion of ICT apprenticeship starts.

We identify reasons for these skills gaps at every stage of the education and skills system, some of which include:

- ICT education is not integrated enough with the wider curriculum, and many ICT teachers do not have the necessary skills to teach the curriculum
- the further education system is subject to too much policy turbulence, and does not have enough funding, to provide students with the education necessary to enter the digital tech sector
- there are not enough students undertaking higher-level apprenticeships in general, and ICT apprenticeships specifically, for this to constitute a significant route into the sector.

We then look at examples of best practice from around the world relating to each of these challenges, including:

- the ProgeTiger Programme in Estonia, which provides integrated ICT education from preschool upwards
- Webactivate in Ireland, which gives unemployed young people the opportunity to gain digital qualifications, while giving them on-the-job training with local businesses
- Sheffield University's Digital Degree Apprenticeships, which allow students to gain a BSc honours degree while providing practical on-the-job training.

RECOMMENDATIONS

Reducing the skills gap to 2020

1. **Local enterprise partnerships should build on existing work to draft digital skills strategies**, in partnership with relevant local and combined authorities, and the third and private sectors. Strategies should include plans to map local digital skills provision, provide digital skills training for NEETs (young people not in education, employment or training), make the best use of further education, promote diversity and encourage collaboration.
2. **Local businesses should pool the funding they will receive as part of the apprenticeship levy and invest this in a set of agreed strategic initiatives to promote digital skills in their area**, as detailed in the LEP digital skills strategies outlined above.
3. **Greater powers over funding for adults' skills should be devolved to local and combined authorities**, who should work with LEPs, and the private and third sectors to ensure further education is meeting the needs of private businesses, particularly in relation to the digital sector.
4. **If the Brexit agreement includes provisions to end free movement of people from Europe into the UK, this should be accounted for by increasing overall tier 1 and 2 visa issuances for digital tech workers**. Alongside this, tier 1 visa conditions should be devolved to

northern combined authorities, who should work with TechCity UK to deliver an expanded and North-focused version of the Tech Nation Visa Scheme.

Closing the skills gap to 2050

5. Curriculum: The latest digital technologies should be used in all lessons, by both teachers and learners, from Early Years to secondary school, in order to **embed digital skills throughout the curriculum**.
6. CPD: **More funding should be provided for career and professional development training (CPD) for all teachers**, especially targeted at those teaching the new coding curriculum. This should take the form of public investment in social infrastructure, which – through eventual uplifts in employment – will pay for itself in the long term.
7. Careers: **Government should provide schools with adequate funding to discharge their statutory duty to provide independent careers advice and guidance**. The National Careers Service should be extended to allow it to perform this supporting role for schools.
8. Collaboration: **Schools careers services should take the lead in establishing relationships between businesses, schools and the voluntary sector**, and in identifying how businesses and the voluntary sector could productively engage career advisory activities within the curriculum.

1. BACKGROUND AND CONTEXT

In this chapter, we analyse the evolving policy context in which the digital skills system is situated. As the UK negotiates its withdrawal from the European Union, pulls together an industrial strategy and attempts to close the regional prosperity gap, closing the digital skills gap should be high on the agenda. Brexit in particular is likely to severely impact the digital sector, which is reliant on immigration and free trade. This is likely to have an even more severe effect in the North, where the economy is less resilient and the sector smaller.

1.1 THE FOURTH INDUSTRIAL REVOLUTION AND THE DIGITAL ECONOMY

The fourth Industrial Revolution (4th IR) is a fundamental change in the global economic system resulting from transformation in technology, built on cyber-physical systems, artificial intelligence and big data (Schwab 2016).

The 4th IR is already starting to impact our economy: the logic of production at zero marginal cost means firms must increasingly act as monopolies, while the automation of complex jobs is hollowing out the labour market (McAfee and Brynjolfsson 2014). Partly as a result, regional and socioeconomic inequality, low levels of productivity and increasingly insecure employment have become the norm in many parts of the country. The recovery from the financial crisis has been slow and uneven; when adjusted for population growth and capital outflows, national income per capita has barely grown since 2008 (Jacobs et al 2016).

Adapting to this new global economic reality will require changes in the way the UK organises its economy. As the labour market becomes increasingly polarised, and traditional industries adapt to economic change, digital skills will become more important than ever for ensuring widespread, even and sustainable growth.

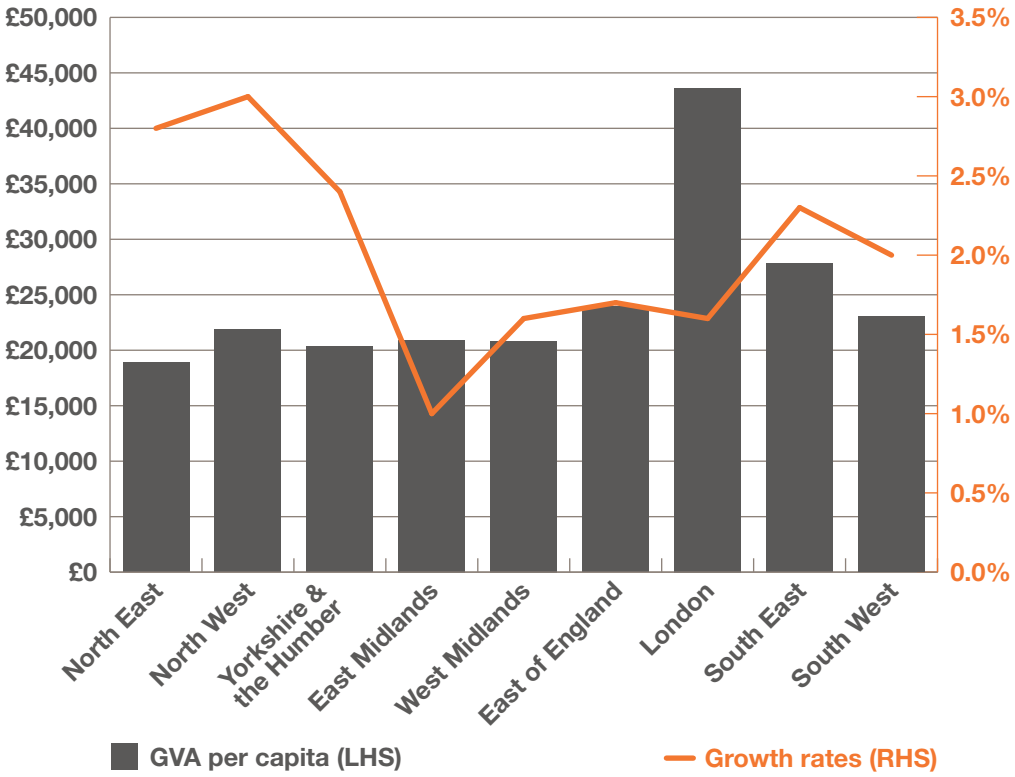
The fourth Industrial Revolution and the northern powerhouse

The fourth Industrial Revolution is having a differential impact on the North than the South. This has to be seen in the context of wider structural issues with the UK economy as a whole. There is a longstanding prosperity gap between the North and the South; while the North is beginning to show signs of improved growth rates, it still underperforms significantly in terms of GVA (see figure 1.1).

FIGURE 1.1

While GVA is still lower in the North than the rest of the country, growth rates are increasing

GVA and growth rates by region, Q4 2016



Source: Office for National Statistics, 'Regional gross value added (income approach)' (ONS 2017)

While the digital sector was highlighted as a core competency for the North as part of the Independent Economic Review, it actually underperforms in terms of GVA relative to the national average (SQW 2016). According to TechCity UK (2016), digital tech only constitutes 4.2 per cent of the North's jobs and 5.2 per cent of its GVA, compared to 7 per cent and 12 per cent respectively in London and the South East. The digital tech sector is fundamental to the success of the northern powerhouse – both as a sector in itself, and as a key enabler of other high-value sectors such as health innovation and advanced manufacturing – if the North is to prosper during the fourth Industrial Revolution.

Brexit and industrial strategy

The economic impact of the referendum has been benign thus far; growth and employment have both defied expectations, and consumer confidence appears to have recovered after a post-referendum fall (Giles 2017). However, there are already signs that the reduced-value sterling is contributing to inflation; this is likely to impact real wages, which have been slow to recover from the financial crisis (Jacobs et al 2016). More worryingly for the digital tech sector, Brexit could have a substantial impact on the availability of talent for digital tech firms in the UK if substantial curbs on migration are introduced as a result of Brexit (Tech City News 2017).

Brexit is also likely to have a larger impact on the North than other parts of the country (Cox et al 2016). The UK as a whole is more dependent on the EU than any other of its trading partners, but the regions outside London are even more reliant, depending on EU trade between 50 and 100 per cent more than London does (ibid).

However, there is some indication that the new political administration has adopted a different strategy when it comes to the economy. The industrial strategy green paper was a welcome departure from the more laissez-faire approach of previous governments (Raikes 2017). The proposed place-based approach of the strategy is particularly encouraging as, if properly developed, this could help to rebalance economic growth (Cox et al 2016).

1.2 GOVERNMENT DIGITAL POLICY

TABLE 1.1

Government policy initiatives on digital skills, 2013–2016

2003	Global Entrepreneur Programme	Targets overseas entrepreneurs and startups with assistance to relocate their businesses to the UK
2011	Entrepreneur Visa	Tier 1 visa for foreign nationals securing investment to start a business in the UK
2011	Investor Visa	Tier 1 visa for foreign nationals willing to invest £1 million in UK businesses
2013	Graduate Entrepreneur Visa	Tier 1 visa for international students looking to take forward (viable) business ideas
2014	Exceptional Talent Visa	Tier 1 visa route for talented foreign technologists to work in a UK technology firm
2014	Sirius Programme	A competition for foreign graduates with tech talent to win a place at a UK accelerator and receive financial and business support
2014	Computing Curriculum	Introduction of computing into the curriculum for 5–16-year-olds, including coding and understanding how computers work
2014	Investment in the Tech Partnership	Further investment for the business-led Tech Partnership
2014	The Shadbolt Review	A review into the accreditation of computer science degrees
2014	Master Teachers Programme	A £3 million investment was announced to extend the Master Teachers network in order to support teachers to deliver the new coding curriculum
2015	Broadband Universal Service Obligations (USOs)	USOs will give everyone in the country the legal right to request that their broadband provider delivers their broadband at a minimum speed, for a reasonable price
2016	Digital Engagement Council	The council, to be chaired by Ed Vaizey, will replace the Information Economy Council
2015	Digital Degree Apprenticeships	The first digital degree apprenticeships were launched in 2015, with 'over 40 employers and nine universities collaborating to create a curriculum that meets industry sector needs'
2015	Institute for Coding	The government announced further funding to the Ada National College for Digital Skills, as well as funding for the creation of the Institute for Coding to support 'high level skills'
2016	Further funding for computer science courses	A competition was announced by the government, managed by the Higher Education Funding Council, to provide funding for a select group of computer science degrees

Source: Adapted from Copeland and Scott, *Silicon Cities* (Copeland and Scott 2014) and House of Commons Science and Technology Committee, *Digital Skills Crisis* (HoC 2016)

While there are still many challenges to address in the digital skills system, previous governments, especially the Coalition, have been fairly proactive when it comes to digital tech policy. According to one recent report, governments of various shades have implemented at least 40 initiatives to promote the digital economy over the last 20 years: ranging from the Future Fifty initiative, to the Super Connected Cities programme, to the founding of TechCity UK (see Copeland and Scott 2014: 36–39). The success of the UK's digital economy has to be seen in the context of the consistent government support that the sector has received over many years.

Government policy on digital skills has been equally forward-thinking, and has historically included the initiatives outlined in table 1.1.

More recently, the government has implemented a 'coding curriculum'. Since 2014, children aged five and above have been learning how to code in order to fill the UK's digital skills gap. The programme was introduced to 'ensure that all pupils can understand and apply the fundamental principles and concepts of computer science' (DfE 2013). This curriculum has been welcomed as a world-leading initiative that will go some way to improving the digital tech skills of children entering the workforce in the coming decades.

Government digital strategy

Further to this, the government recently released its digital strategy (GDS). Advocates for the digital tech sector seem to agree that the digital strategy is too vague, announces a lot of initiatives that are already in place and is not radical enough to address the scale of the problem (TechCity News 2017). The government has had several years now to put the strategy together, and it has involved a wide-ranging consultation process with individuals, businesses and the rest of government. The report seems to mention a lot of challenges that are outlined later in this report – such as the lack of funding for career and professional development training (CPD), issues with diversity and the need to link up the public, private and third sectors – but in response, it simply reannounces existing initiatives, or announces high-level changes that do not easily translate into substantive policy change.

Furthermore, the GDS is spatially-blind and fails to recognise that the digital economy looks different in different parts of the country. The digital skills challenges faced by the North are very different to those in different parts of the country, both because the North has specific sectoral capabilities to cater for, and because its education and skills outcomes differ from other parts of the country. It is to these matters that our report will now turn.

2.
NORTHERN DIGITAL SKILLS

In this chapter we analyse the state of the digital tech economy in the North, outlining the size of the sector, as well as its wider contribution to the regional economy in terms of jobs, GVA growth and productivity. We then examine the digital skills challenge for the North in greater depth, with an analysis of the supply and demand for digital skills across the different local enterprise partnership (LEP) areas. With Emsi data (2017), we look at demand for digital tech workers using the number of job postings per capita as a proxy, and with the support of Burning Glass,[3] we analyse the 'opportunity score' for the sector in the North, which is a bespoke metric that gives a ratio of demand to supply for talent in different regions and different sectors. We also analyse the latest apprenticeship data to gain an insight into the role of apprenticeships in filling the digital skills gap in the North.

What are digital skills?

'Digital skills' can mean anything from basic digital literacy – the ability to use digital technologies to complete tasks – to advanced professional skills such as writing code. The UK Digital Skills Taskforce (2014) maps these categories onto the workforce to devise a fourfold distinction between 'digital citizens', 'digital workers' and 'digital makers', adding a fourth category of 'digital muggle' for those with none of the aforementioned skills.

For the purposes of this report, our analysis will be confined to the skills gap for 'digital makers', or digital skills for IT professionals. TechCity (2016a) calls these 'digital tech jobs', and divides them into three categories. A digital worker can be a 'native' (a digital worker within the digital tech industry), 'support' (a non-digital worker within digital tech industries) or a 'transformer' (a digital worker in traditional industries). We will be using TechCity's definition of 'digital tech jobs' throughout this report to discuss the digital skills gap.

In this sense, we are focusing on the professional skills that are needed to support the UK's emerging digital tech sector.

2.1 THE DIGITAL TECH SECTOR IN THE NORTH

According to TechCity's most recent data analysis, the sector employs 283,500 people in the North (TechCity 2016a). This means that 1 in 20 of the North's workforce is employed in the digital economy, while 18 per cent of the nation's tech workforce is based in the North (ibid). The digital tech sector contributes £9.9 billion to northern GVA each year, which accounts for

3 http://burning-glass.com/

5.2 per cent of the region's economic output (ibid). Employment in the digital tech sector has risen 28 per cent in the past five years – 10 times faster than the North's non-digital sectors (ibid). These workers are 53 per cent more productive than the region's non-digital workers – this translates into a pay premium of around 60 per cent of average salaries (ibid).

The Northern Independent Economic Review

The Northern Independent Economic Review (NIER) produced by Transport for the North laid out seven 'prime' and 'enabling' capabilities for the northern economy which, taken together, account for over 2.1 million jobs and £100 billion in GVA in the region (SQW 2016). Each of the capabilities is highly differentiated, and functions as a distinct comparative advantage for the UK economy; moreover, each is highly productive, and is growing faster than most other sectors.

The four prime, and three enabling, capabilities are:

- **advanced manufacturing** – including materials and processes and agri-foods
- **energy** – including generation, storage and low-carbon technologies
- **health innovation** – including life sciences, pharmaceuticals and e-health
- **digital** – including high-performance computing, artificial intelligence, software design, data analytics, computer simulation and media
- **financial and professional services** – particularly business support, insurance and financial services
- **logistics** – particularly ports and airports
- **higher education** – both in terms of education itself and research and development.

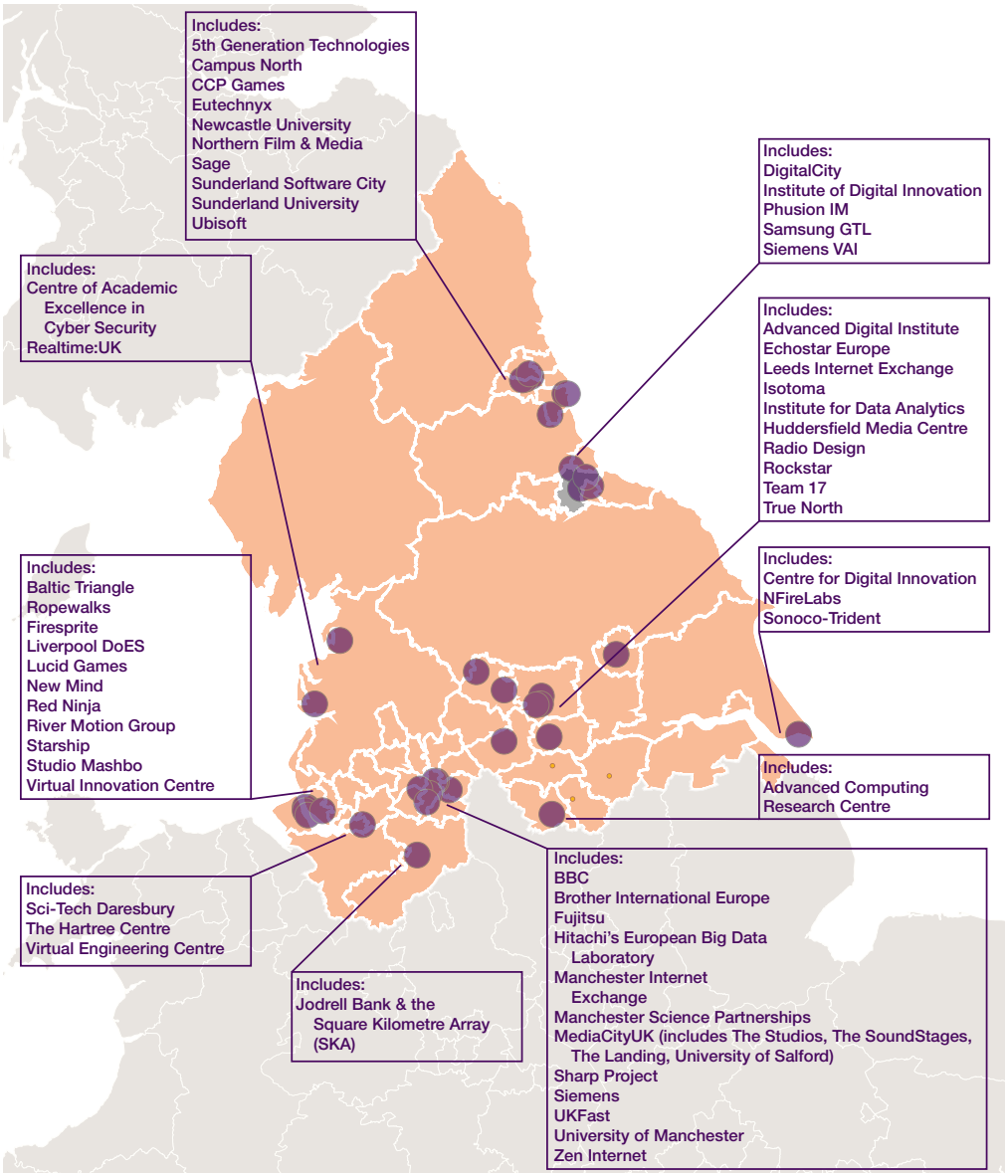
The digital sector in the North is particularly focused on 'high performance computing, cognitive computation, data analytics, simulation/modelling, and machine leaning' (ibid). Based on SQW's methodology, it comes up as a 'mixed picture' capability, underrepresented in GVA and jobs, but high productivity. The contribution of IT in terms of GVA is also much higher than jobs, reflecting wider trends in newer 4th IR industries.

It also, however, functions as an enabler, supporting growth in other industries, and particularly in the other six capabilities (TechCity 2016a). The digital sector has the potential to catalyse and accelerate innovation in other fields such as advanced manufacturing and health innovation through, for example, robotics and data analytics. The development of digital clusters also has the potential to drive productivity and growth in a wide range of sectors – for example the Media City complex in Salford has attracted a wide range of large and small businesses, from the Landing to the University of Salford.

The digital capability is spread across the North's economy, with particular specialisms including data analytics in Leeds, media and communications in Salford, and animation and software development in the North East (SQW 2016). These are supported by a broad and deep network of institutions, including the Advanced Computing Research Centre in Sheffield, to the Leeds Institute for Data Analytics, to the Institute of Digital Innovation in the Tees Valley.

FIGURE 2.1

Map of the North's digital assets



Source: adapted from Transport for the North, *Northern Powerhouse Independent Economic Review: Final Executive Summary Report* (TfN 2016)

2.2 DIGITAL SKILLS IN THE NORTH

In order to maintain current levels of growth in the sector, the North will need to produce 80,000 digital workers by 2020. If current rates of growth continue over the next 25 years, then 1.23 million workers will need to be supplied by 2050. This is, however, a fairly blunt metric which doesn't take into account existing skills gaps in the sector – it should therefore be treated as a floor level necessary to maintain the current performance of the sector. The number of people that could be recruited will be significantly higher given existing skills gaps in the sector.

Job postings

With the support of Emsi, we have been able to analyse the number of postings for ICT jobs by LEP area. Headline findings are given in this section, while a detailed breakdown for each LEP area can be found in the appendix. The data on job postings found in this section gives an indication of demand for skills by area, but no indication of supply.

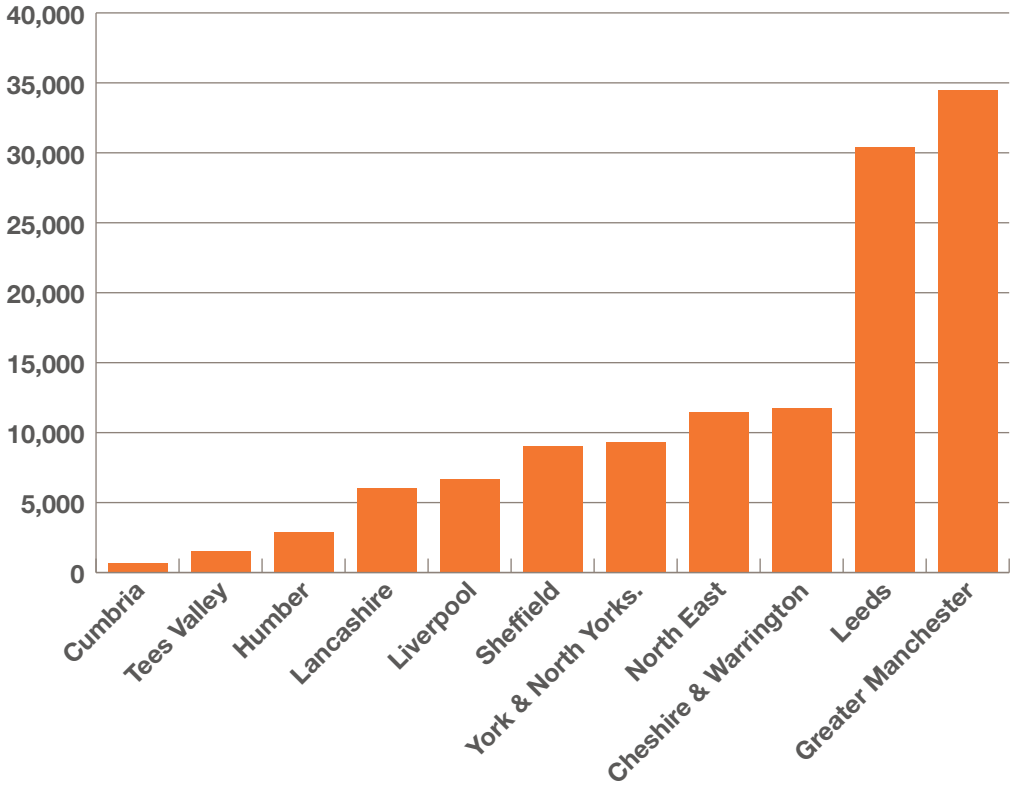
Overall postings for ICT positions can be found in figure 2.2. Overall numbers are highest in Greater Manchester, Leeds and Cheshire and Warrington. Humber, Tees Valley and Cumbria have the lowest overall numbers of postings.

ICT job postings as a proportion of the economically active population can be found in figure 2.3. Cheshire and Warrington LEP has the highest proportion of ICT job postings per capita, followed by Greater Manchester and Leeds, and Humber, Tees Valley and Cumbria come last again.

FIGURE 2.2

Greater Manchester, Leeds and Cheshire and Warrington LEPs have the highest number of overall job postings for ICT positions in the North

ICT job postings by LEP area, January 2016–February 2017

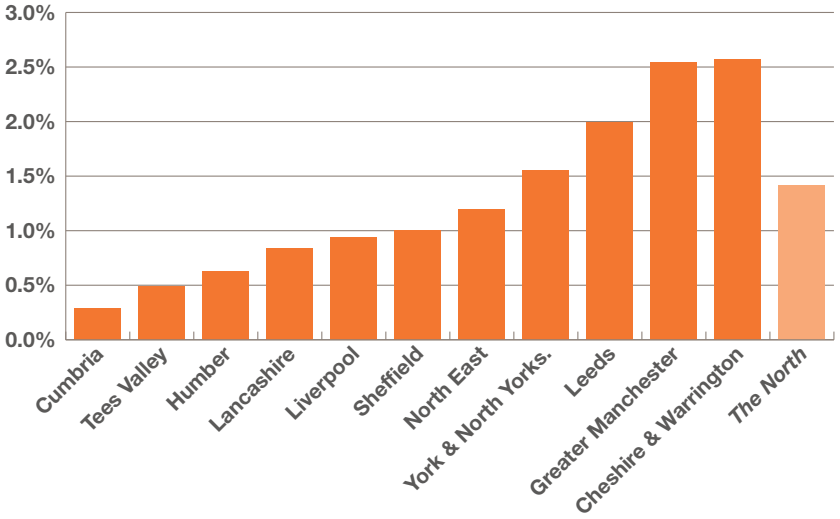


Source: Emsi Job Postings Analytics, dataset, provided privately to IPPR (Emsi 2017)

FIGURE 2.3

Cheshire and Warrington has the highest number of ICT job postings as a proportion of the economically active population in the North

ICT job postings as a percentage of economically active population, January 2016–February 2017



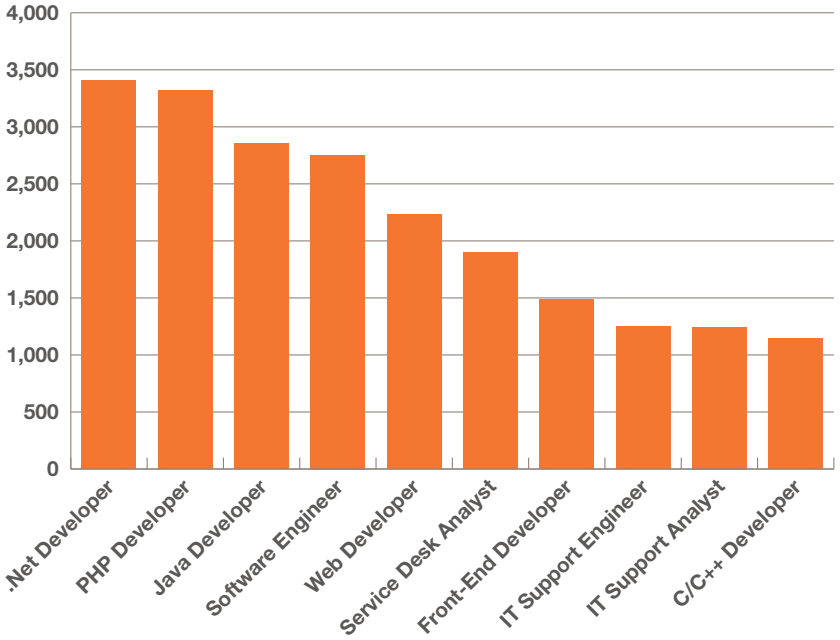
Source: Emsi Job Postings Analytics, dataset, provided privately to IPPR (Emsi 2017)

The top job titles advertised in the North are net developer, PHP developer and Java developer, as shown in figure 2.4. The top advertised skills are 'server (computer science)', management and SQL.

FIGURE 2.4

Net, PHP and Java developers are the top advertised job titles in the North

Top advertised job titles for ICT positions in the North, January 2016–February 2017

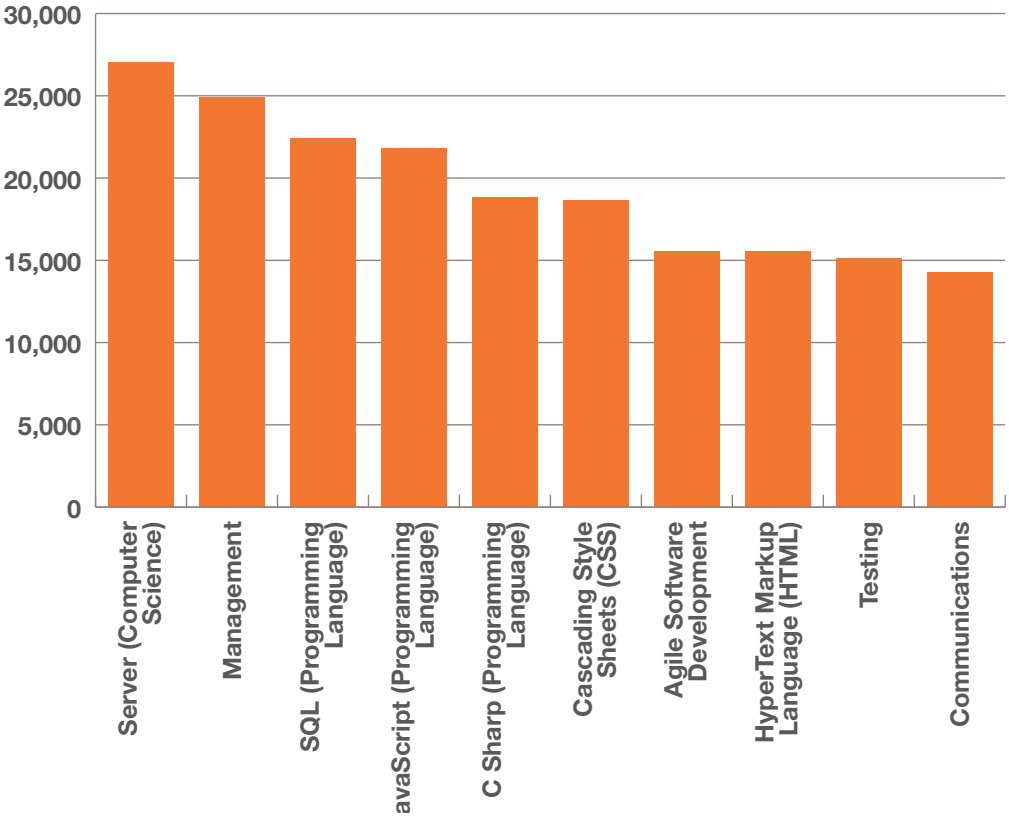


Source: Emsi Job Postings Analytics, dataset, provided privately to IPPR (Emsi 2017)

FIGURE 2.5

Management is the second most frequently mentioned skill in job postings in the North

Top advertised required skills for ICT positions in the North



Source: Emsi Job Postings Analytics, dataset, provided privately to IPPR (Emsi 2017)

Job opportunities

IPPR has been working with Burning Glass since 2014 to analyse demand and supply for skills for different professions in different regions across the UK. The opportunity score[4] is a unique metric which has been created by Burning Glass and IPPR to act as a proxy for the skills gaps for particular occupations in particular places. Specifically, it gives an indication of the number of people applying for particular positions relative to the number of positions available. The scores vary from 0 (very low – no skills gap, few opportunities for employment) to 100 (very high – very large skills gap, plenty of opportunities for employment). Figure 2.6 gives an indication of opportunity scores for higher education (HE) and further education (FE) leavers in each of the North's regions for ICT jobs, compared to the average opportunity scores for England as a whole for HE and FE leavers.

Across England, for all sectors, the average FE opportunity score is 49.6, and for HE it is around 78.7 – as such, this can be seen as a benchmark figure. We will treat scores above these averages as indicating a skills gap. Across the UK, the average opportunity scores for both HE and

4 Definition: 'demand supply ratio of FE/HE postings within a geography'.

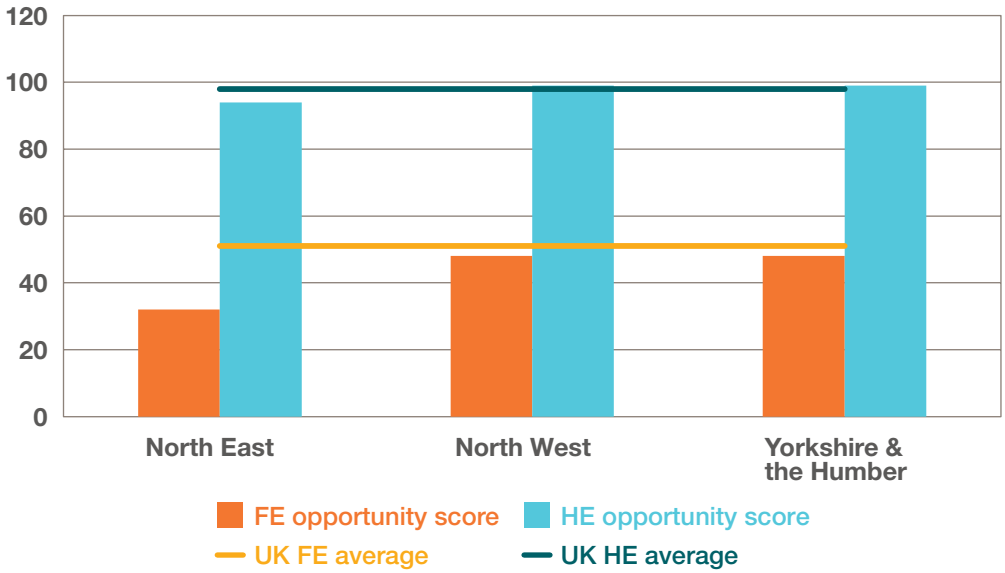
FE leavers applying for digital tech jobs are much higher than these benchmark figures, indicating that there is a UK-wide digital skills gap for ICT technicians. However, the skills gap for those with a degree is much greater than that for FE leavers.

The opportunity score in the North East for FE leavers applying for ICT jobs is lower than the UK's average opportunity score for FE leavers in all sectors, indicating that there is no real skills gap for digital tech workers at FE level in the North East. However, for HE leavers, opportunity scores are above the UK average for all sectors, indicating that a skills gap does exist, though one that is slightly smaller than average for the UK as a whole.

FIGURE 2.6

Opportunities in the digital tech sector are very high for HE leavers, but lower than average for FE leavers, in the North

Opportunity scores for ICT jobs for HE and FE leavers, 2014



Source: Burning Glass and IPPR North, 'Where the work is' website. http://wheretheworkis.org/

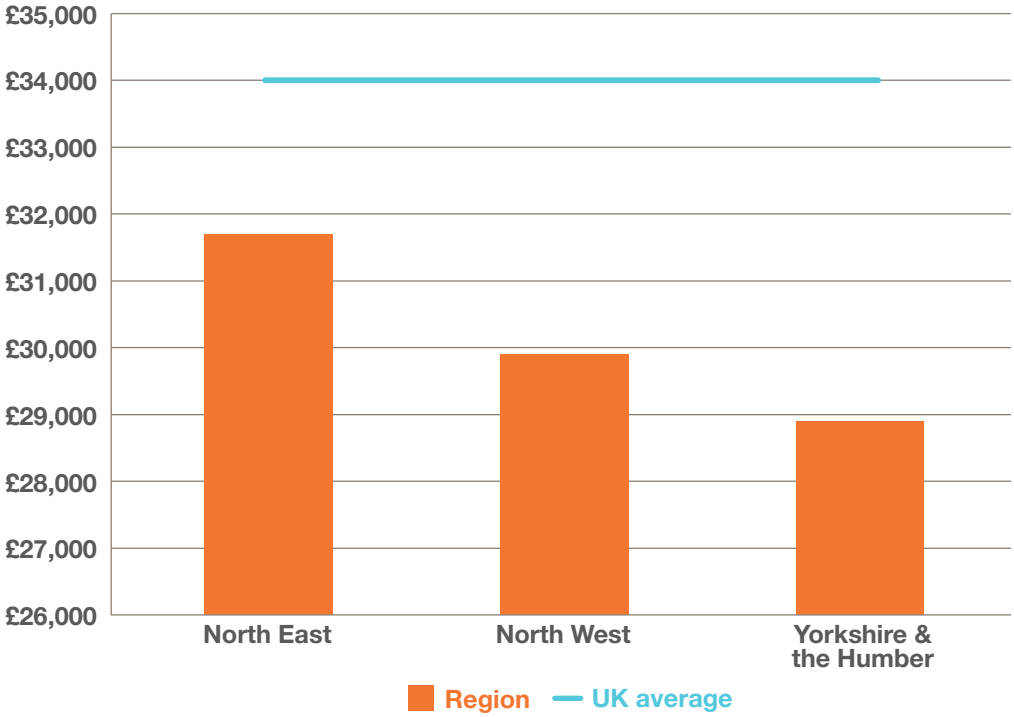
As shown in figure 2.6, in the North East the opportunity scores for those applying for ICT jobs at both FE and HE levels are lower than the average opportunity scores for those applying for ICT jobs in the UK as a whole. In the North East and Yorkshire and the Humber, the FE scores are lower than average, but the HE scores are higher than average.

However, the opportunity scores for higher education for those applying for ICT jobs are all much higher than the national average opportunity score for all sectors. The opportunity score across the UK for all sectors for higher education leavers is 78, while it is 94 in the North East, and 99 in both the North West and Yorkshire and the Humber. The national average opportunity score for all sectors for further education leavers is 50, and this is higher than the opportunity score for FE leavers applying for ICT positions in all regions of the North. This indicates that there is a substantial skills gap for ICT jobs when it comes to higher education leavers, but there is no skills gap for further education leavers.

Salaries in the North are significantly below national averages. Average salaries for all professions in the North East is £28,000, in the North West is £29,000 and in Yorkshire and Humber is £28,000, while the average salary for ICT professionals are £31,700 in the North East, £29,900 in the North West and £28,900 in Yorkshire and the Humber. As such, salaries for IT professionals compare favourably with regional averages. The biggest premium is in the North East, despite the relatively low skills gap in the region.

FIGURE 2.7

Salaries for digital tech jobs in the North are lower than UK averages
Salaries for ICT jobs, 2014



Source: Burning Glass and IPPR North, 'Where the work is' website. http://wheretheworkis.org/

2.2 APPRENTICESHIPS AND FURTHER EDUCATION

As indicated by figures 2.8 and 2.9, all of the North's regions compare favourably with national averages and with the capital when it comes to apprenticeship starts per capita; although a greater proportion of total apprenticeship starts are taken up by intermediate apprenticeships, and far fewer by higher apprenticeships. In fact, 55 per cent of apprenticeship starts are accounted for by level 2 apprenticeships, and 40 per cent for a level 3, leaving only 5 per cent for higher apprenticeships. This compares with 50 per cent level 2 apprenticeships, 42 per cent level 3 apprenticeships,and 7 per cent higher apprenticeships in London.

This pattern is replicated in the North East which has the most apprenticeship starts by region, but a higher proportion of total apprenticeship starts are for intermediate apprenticeships. Apprenticeship take-up at all levels is, however, higher than national averages. The North West does better when it comes to

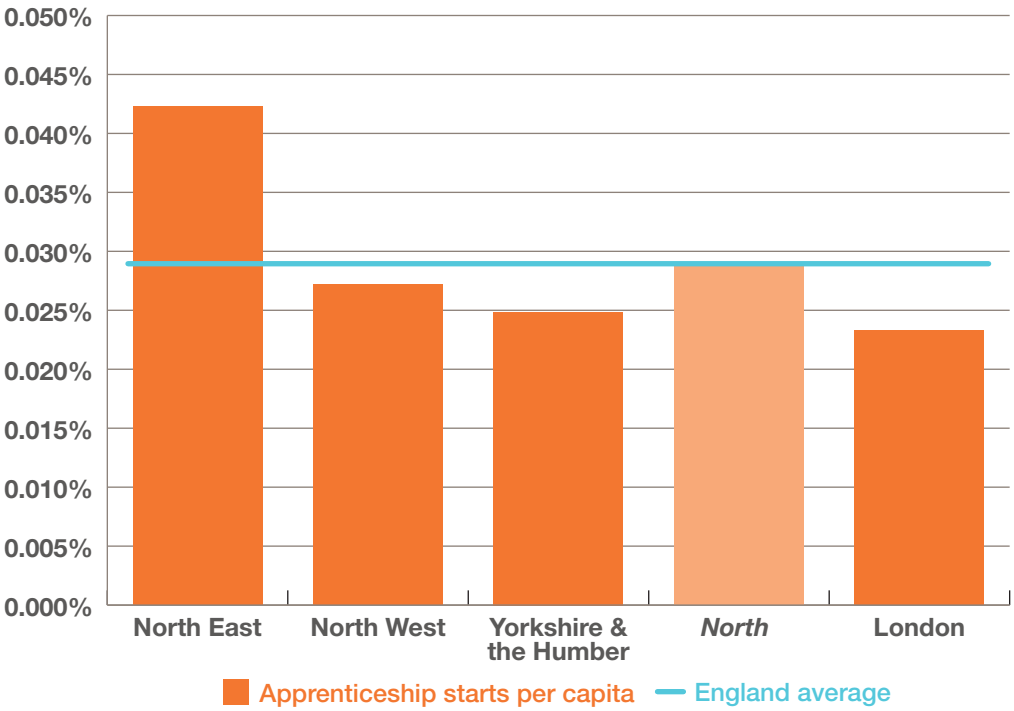
the proportion of apprenticeships at intermediate versus higher levels, rivalling the proportions in London.

Currently, however, very few digital tech jobs are accessed via the apprenticeship route: in 2016/17, ICT apprenticeships represented only 3 per cent of the UK's apprenticeships. In the North, this stands at only 2.4 per cent, compared to 4.7 per cent in London. Moreover, this figure has been declining in recent years, from its peak at 5.2 per cent in 2010/11.

FIGURE 2.8

The North East has by far the highest number of apprenticeship starts per capita in the North

Total apprenticeship starts per capita by region, 2015/16

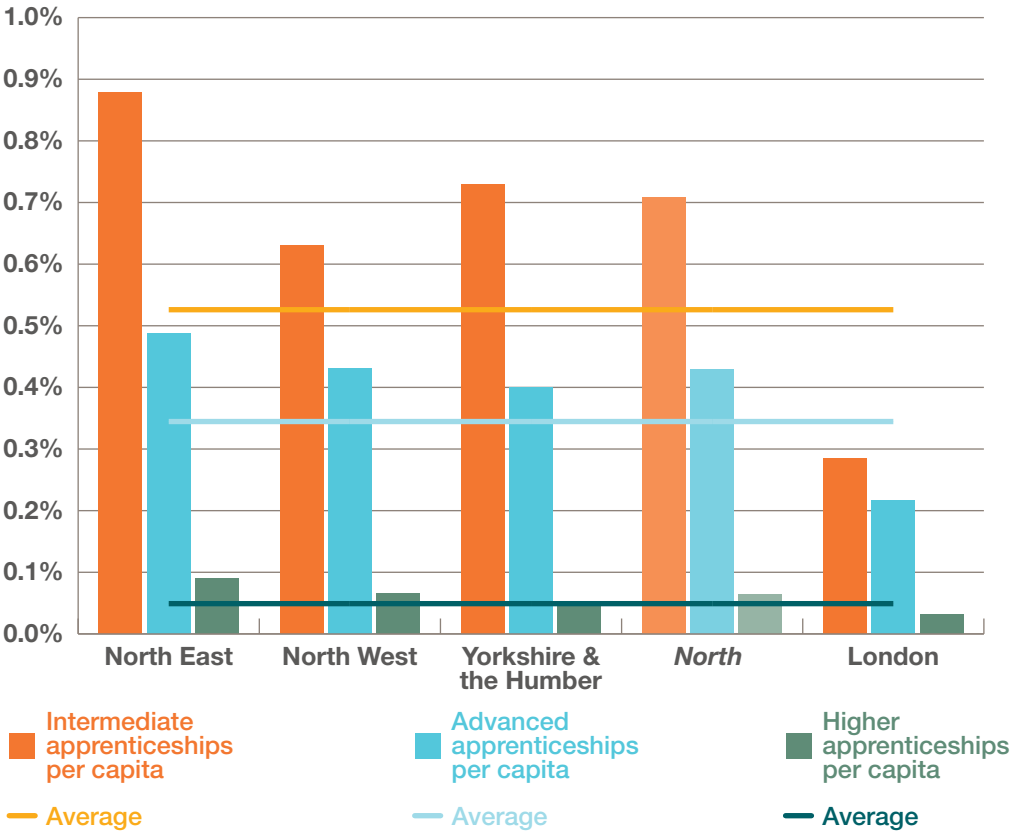


Source: Department for Business, Innovation and Skills, 'Apprenticeships by geography, equality & diversity and sector subject area' (BIS 2016)

FIGURE 2.9

The North has more apprenticeship starts per capita than average, but they are more likely to be entry-level apprenticeships

Apprenticeship starts per capita by region and level, England, 2015/16



Source: Department for Business, Innovation and Skills, 'Apprenticeships by geography, equality & diversity and sector subject area' (BIS 2016)

3. CHALLENGES

The North faces a large challenge in providing enough digital tech workers to fill the rising number of vacancies for digital tech jobs. In this section, we will analyse the barriers at every point in the system that are preventing people from acquiring digital skills and engaging with the digital economy. We will also look at wider challenges such as the lack of diversity within the digital tech sector, the fragmentation of the skills system and the need to move towards a system based on lifelong learning.

3.1 BARRIERS TO DIGITAL THROUGHOUT THE SKILLS PATHWAY

Education

The recent implementation of the coding curriculum has been a welcome intervention. However, its implementation is being held up by teachers' lack of familiarity with the subject matter. According to the Digital Skills Taskforce (2015), 60 per cent of teachers don't feel confident delivering the new curriculum. One major reason for this is that not enough funding has been made available for training teachers tasked with delivering the new curriculum (ibid). The recent Master Teachers programme offers around £175 per school to train a cohort of teachers to teach the curriculum, which isn't enough to deliver the kind of CPD necessary to ensure teachers are proficient in what is effectively a new subject.

Moreover, implementing a new ICT curriculum is not enough to close the digital skills gap. For children and young people to develop their digital skills to the greatest possible extent, digital technologies need to be embedded throughout the organisation in which they are learning. A recent report by the House of Lords argued that there is widespread agreement about that need to 'better and more consistently integrate the acquisition of digital skills across the curriculum' (HoL 2015).

Another major issue preventing more young people from getting involved in the digital economy is that they don't have enough or the right information about what a digital tech career looks like. This is at least partly because parents and teachers – key influencers when it comes to careers – are ill-informed about the opportunities to be found in the sector (Digital Skills Taskforce 2015). Recent cuts to careers guidance mean that this support is not available to plug the gap, resulting in young people often not having enough information to make informed decisions about digital tech careers (Cox and Davies 2014).

There is also an issue surrounding the timing of interventions. Currently, interventions to improve employability are skewed towards secondary education, despite there being a wealth of evidence to suggest that early intervention is both more effective and more economical than interventions later in the life course (UKCES 2008). By the time a child has reached secondary education, the ability of teachers to improve skills such as

creativity, communication and perseverance is limited. While these are not 'digital skills' per se, the Digital Skills Taskforce (2015) recently argued that 'creativity, critical thinking and communication skills are just as, if not more, important than technical knowledge' to employers in the digital sector, but that these are currently lacking among digital tech workers.

Further education

As noted in the previous section, there appears to be lower than average demand for digital tech workers coming from further education (FE). The low opportunity scores for FE leavers are particularly stark when compared with the very large skills gaps for digital tech workers entering the workforce from higher education. As such, it is likely that FE leavers do not have the requisite skills to meet the needs of digital tech employers. This is a particularly large problem in the North, because a much higher proportion of students enter further education in the North than national averages.

The lower levels of opportunity for those leaving FE to enter the digital tech sector are related to wider problems with the system as a whole. One of the greatest problems with FE in the UK is the constantly changing policy environment. The Institute for Government (2017) argues that '[i]nstability in the further education sector has made the FE landscape complex and changeable'. These issues play out with regards to digital and tech in FE. The Coalition government announced that FE colleges would be invited to specialise in specific areas of provision, with many to become 'institutes of technology' (IoTs). Theresa May has now announced that FE will face a 'radical overhaul', with students being given the choice between 'academic' and one of 15 'technical' routes post-16 (ibid). While the T-Levels idea – and its associated funding – have largely been greeted positively by the sector, the government must ensure that this does not become just another initiative.

Moreover, there is simply not enough funding available in the system to support these initiatives. The FE sector has been suffering from 'years of underfunding and policy turbulence', with adult skills funding dropping by one-third between 2010/11 and 2015/16 (Exley 2017). The government has announced around £170 million to fund technical education, which will 'eventually' rise to £500 million. This is, however, a 'drop in the ocean that will do nothing to solve the funding crisis in further education' (ibid).

Higher education

The greatest issue with regards to higher education is the relatively high unemployment rates for computer science graduates. However, this comes from the lack of take-up for postgraduate qualifications in the subject, rather than computer scientists being unable to find employment (Digital Skills Taskforce 2015). While rates of employment are actually higher than average for computer science graduates, rates of unemployment are also higher because of much smaller numbers entering postgraduate education (ibid).

Good postgraduate courses are important to ensure that other graduates are able to convert their existing skills into a qualification relevant to a digital tech career, and to allow digital workers to retrain

at any point throughout their careers in order to keep their skills up to date as technology moves on. As such, it will be critical to increase both demand for and supply of good postgraduate computer science courses to combat the digital skills gap.

Apprenticeships

Currently, very few jobs are accessed via the apprenticeship route; nationally, only about 6 per cent of key stage 4 (KS4) students and 7 per cent of KS5 students went on to apprenticeships in ICT in 2013/14. In the North, the figure is slightly higher, at around 8 per cent for both cohorts. However, as indicated in chapter 2, apprenticeships in the North are generally lower skilled than in other parts of the country. Given that in 2016/17, ICT apprenticeships represented only 3 per cent of the UK's apprenticeships, and only 2.4 per cent of the North's, it is unlikely that the apprenticeship route will be a major route into the digital tech sector.

Part of the reason for this is that schools are not incentivised to put students through the apprenticeship route, and the majority of teachers do not feel comfortable advising their students about apprenticeships (ibid). This is compounded by the aforementioned lack of awareness of the potential benefits of pursuing a career in the digital sector. This contrasts with the evidence on the value of apprenticeships; a recent study found that apprenticeships deliver around £1.8 billion of net economic benefits to UK organisations, with a bottom line boost of around £2,000 per apprentice (AAT 2014).

Another problem with the current apprenticeship system is their complexity – this applies across the board, but is a particular issue for digital SMEs. Traditionally, SMEs have been less able to engage with the apprenticeship route because of an 'excessive number of frameworks, the different levels, complexity within funding arrangements and a lack of clear information about training providers' (Digital Skills Taskforce 2015). It is too early to tell whether or not the apprenticeship levy will increase or reduce this complexity; it will, however, be critical for businesses to have support to take advantage of the system while it is implemented.

Informal training

The informal sector is composed of private and third sector provision of training courses which, though they don't lead to formal qualifications, can lead to industry-accredited ones. There are a wide variety of organisations operating in this space – from Apps for Good, to TeenTech, to Young Rewired State. The government's plans to have the private sector play a greater role in the provision of education and training as part of the digital skills strategy was a welcome move, which could increase the scale and visibility of the sector.

The main issue with informal provision of digital skills is that it is split between a vast number of organisations operating nationally, regionally and locally, with little or no collaboration between them. This often means that, despite all the opportunities available in the informal sector, 'too often schools, students, parents and prospective volunteers are unaware of what exists' (ibid). As pointed out by the Digital Skills Taskforce (2015), there is much greater 'scope for collaboration and learning between organisations operating in this space, which could help to share best practice'.

3.2 WIDER ISSUES

Digital diversity

Stereotypes about the sector and a lack of reliable information to undercut these mean that the digital sector currently has serious issues with diversity. As the government's digital strategy (GDS) points out, only 17 per cent of people who work in the tech sector, and only 9.5 per cent of computer science students are female. There is also a significant pay gap; the median pay for female IT specialists is 16 per cent less than the figure for men (DCMS 2017).

The government plans to develop the Tech Talent Charter and expand a number of third and private sector initiatives that focus on increasing the number of women in the digital tech sector – from CyberFirst Girls, to TechFuture Girls to Techmums – as part of the GDS. The overall target is that 50 per cent of students at Ada, the National College for Digital Skills, will be women by 2020.

However, this does not go nearly far enough. A recent survey has shown that 50 per cent of women in tech were actively discouraged from entering a technology career by people close to them and 76 per cent said they did not view technology as an attractive career path at school, even though 100 per cent reported that they had since enjoyed their tech career (The Tech Partnership 2017a).

Lifelong learning

Digital technologies often move much faster than organisations, meaning it can be a struggle for firms in the sector to keep up with the latest developments, let alone continuously train their staff to use cutting-edge new hardware and software. One recent study showed that professional-level workers not in the digital sector were almost twice as likely to have received education or training in work as IT and telecoms staff in equivalent jobs (Digital Skills Taskforce 2015).

The speed of change in the digital era means that businesses, as well as government and public sector organisations, need to commit to an ethic of lifelong learning. This is especially the case in the context of the extension of working lives as a result of demographic changes. Businesses, the public sector and education and training establishments have failed to adapt to the necessities of lifelong learning in the digital economy, and this has exacerbated the digital skills gap.

Fragmentation

Digital skills provision in the UK is fragmented, with lots of different providers offering different forms of digital training in different areas. This means that businesses are not as involved as they could be in secondary, further and higher education, and small business in particular find it difficult to engage with these organisations in a way that could be mutually beneficial (ibid). This flies in the face of much evidence which suggests that gaining work experience while in education or training is highly beneficial in terms of employability (UKCES 2008).

Fragmentation also inevitably leads to gaps in provision opening up. Coding clubs, for example, are concentrated in certain areas of the country – particularly urban areas. A report from the House of Commons

(2016) says that coding clubs' 'accessibility across schools around the country has been patchy'. Without the ability to coordinate provision across their local areas, local authorities remain unable to tackle this geographic fragmentation in order to close gaps in provision.

Migration

While the government's focus on improving digital skills in education is welcome, this will only have an impact as those currently in the education system enter the workforce. In the meantime, northern digital tech businesses will continue to face a large digital skills gap unless immediate measures are taken to plug the gap now. This is an important issue during what is a critical juncture for British digital industry. As the UK leaves the EU, and potentially the single market, there are no guarantees that Britain will remain 'open for business', both in the sense of openness to trade and to free movement.

As argued by TechCrunch, the government seems to be responding to these concerns by adopting an 'upskill for victory' approach (TechCrunch 2017). This is welcome, but it is only likely to address long-term skills gaps, without giving businesses access to the talent they need now. A number of leading businesspeople in the sector have expressed concern about the government's lack of consideration of the sector when it comes to Brexit negotiations (ibid).

4. INNOVATIONS

In this chapter, we look into examples of best practice in tackling the digital skills gap, both from within the UK and from abroad. We then highlight some 'lessons learned' from these case studies, for both central and local government and their partners.

4.1 EDUCATION

Estonia: ProgeTiger Programme

The ProgeTiger Programme is an Estonian government programme aimed at incorporating technology education into the core curriculum from preschool upwards (ITFE 2015). The programme is based on a three-pronged approach to digital education, incorporating engineering sciences, design and technology and information and communications technology (ibid). It therefore moves past the narrow ICT-based approach that can prevail in other settings to influence the curriculum more broadly.

As such, both digital and technological skills are described as 'general competences', rather than individual subjects. The goal of the curriculum is to create students who are able to 'use modern technologies purposefully and who are comfortable in the rapidly changing technology-rich living, learning and working environments'.

Core elements of the programme involve training teachers to a high standard in the digital and technological competences, encouraging young children to engage with new technologies, and to ensure that all schools and colleges have the equipment they need to teach these competences effectively. To achieve these goals, the programme focuses on activities 'related to the integration of three thematic fields' – engineering sciences, design and technology, and information and communications technology – into the teaching and learning of different subjects and extracurricular activities' (ibid). This approach is depicted in figure 4.1 below.

FIGURE 4.1

ProgeTiger Programme approach

Lessons learned

- Embedding digital across the school curriculum can improve students' digital skills more than a simple focus on expanding ICT provision.
- Digital skills are diverse, and they are linked to a number of different 'soft skills' such as creativity and communication.

- Training all teachers to ensure that they have a basic level of digital skills is critical to embedding digital across the curriculum.

Italy: Programma il Futuro

Program the Future is a programme launched recently by the Italian government and higher education sector aimed at providing a suite of tools that can be used to design and deliver interactive lessons in computer science (Programma il Futuro 2017). Teachers and students are given the materials at no cost, they are also made available for businesses and the general public. The tools are specifically designed so that they can be delivered by teachers with little to no prior training in the area.

The programme is based on the idea of introducing 'computational thinking' at an early age; the earlier, less advanced courses that are delivered at primary level are focused on ensuring that children are able to develop the cognitive processes to pick up more advanced digital skills later in life (ibid).

The initiative has recently been recognised as an example of outstanding practice by the European Commission, having rolled the programme out to more than 1 million students, through 15,000 teachers in 5,000 schools across the country (European Commission 2016). This has translated into 10 million hours of computing over the first two years of the project (ibid).

Lessons learned

- Collaboration between different sectors is critical for ensuring that children and young people are learning the right skills for employment in the digital tech sector.
- Learning digital skills does not just involve technical training, it also involves a suite of cognitive skills that have to be taught alongside technical ones.
- Early intervention is critical to ensure that children are able to pick up digital skills quickly and easily later in life.

4.2 FURTHER EDUCATION

Liverpool: City of Liverpool Microsoft Associate College

In order to promote digital skills in further education, Microsoft recently announced an Associate College Programme across the UK. FE institutions can apply to Microsoft to become associate colleges, and will be selected based on their ability to 'demonstrate a wide range of practice and commitment to 21st-century learning making full use of Microsoft technologies'. In return, the colleges gain access to a suite of world-leading Microsoft resources to improve students' digital skills.

The City of Liverpool College signed up as an associate college on 27 June 2016, and on the back of this it recently implemented its 'classroom of the future' concept (Microsoft 2016). These smart classrooms are equipped with 'flexible, colourful' creative technology such as tablets and smart boards, and have space for 'technology-based' activities to take place within them. The classrooms also make use of data by tracking students' movements around the room and allowing them to report their reactions to lessons (ibid).

The smart classrooms have proved very popular with students, and since their implementation attendance and engagement have both improved considerably. The chief information officer at City of Liverpool College says that the model should be a challenge to the sector, by '[blurring] the boundary between classroom and online learning' (ibid).

Lessons learned

- Making the best use of digital technologies in the classroom can improve student engagement and outcomes.
- Joint working between the FE and private sectors can yield significant benefits to both parties.
- Digital technology does not have to be limited to ICT lessons – embedding it across the school can help to support learning in a wide range of settings.

Ireland: Webactivate

Webactivate is an Irish programme launched by Dublin's Digital Skills Academy, aimed at improving SMEs' access to talent while also enhancing employment among young people. Young people who have been unemployed for more than 12 months will be able to access the training for free, and hundreds of Irish businesses will be able to access the talent at the end of the training course (European Commission 2011).

The eight-month programme includes instruction in online publishing, digital marketing and entrepreneurship. While on the programme, learners also have access to 'structured freelance work placements', enhancing their employability. Course graduates receive a professional development diploma in digital, awarded by Dublin Institute of Technology.

Of those who completed the training 56 per cent were in employment within three months (European Commission 2011). Moreover, 250 businesses had launched websites as a result of hiring talent from the programme; businesses claimed that this had had a significant and positive impact on customer service, revenues and opening up new markets (ibid).

Lessons learned

- The digital skills gap is an important component of wider unemployment – digital skills training is therefore critical in supporting people back to work.
- SMEs need more and better support to gain access to digital talent – the public sector can act as an intermediary between the education and training, and private sectors.
- Training by itself is unlikely to be enough to support someone into employment – exposure to the digital tech sector itself is also critical.

4.3 HIGHER EDUCATION

Spain: Telefónica Talentum Startups

Telefonica Talentum Startups is a scholarship programme based in Spain and run by Telefonica, which aims to attract new graduates seeking to develop their digital skills in order to pursue a career in the digital tech sector (Talentum Startups 2017).

The 'strongly educational' programme is open to current university students, and is intended to be combined with an existing degree course (ibid). The students receive one to one professional training with experienced tutors, as well as 'performing tasks to support advanced research projects in the field of ICT'. Thus far, it has supported almost 500 people with grants, and over 300 startups have received 'high level technological training resources', while 70 new projects have been created (ibid).

Lessons learned

- Collaboration between business and education is critical for ensuring that businesses can gain access to the digital talent they need to grow.
- Digital skills will be critical for the next generation of entrepreneurs, and therefore for the wider economy.
- Digital entrepreneurs require support and guidance in the early stages of founding a digital tech business.

4.4 APPRENTICESHIPS

Sheffield: Digital degree apprenticeships

Sheffield Hallam University has recently launched a 'Digital and Technology Solutions Professional' degree apprenticeship, which will commence in September 2017 (Sheffield Digital 2017). The course has been designed around a set of standards which were developed by the UK's largest digital employers under the mantle of the Tech Partnership.

Graduates will leave the programme with a BSc Honours degree, and supporting employers must commit to providing employment for the graduate at the end of the three-year programme. The programme will be funded through the apprenticeship levy, meaning that 90 per cent of costs are covered for employers below the wage bill threshold (ibid).

The programme has been designed with significant input from employers, and has wide-ranging support from the business community. It ensures that businesses have access to a stable pipeline of high-skilled employees, and allows them to fill specific digital skills gaps which have emerged within their organisation.

Lessons learned

- Closing the skills gap requires businesses to coordinate with educational establishments in order to shape courses around the sector's talent requirements.
- Apprenticeships can and should function as routes to formal qualifications.
- It is critical to incorporate work placements into any education or training routes in order to ensure that graduates gain the soft skills and on the job experience required by most employers.

4.5 INFORMAL PROVISION

Scarborough: Northern Exposure

Northern Exposure is a summer school run by GCHQ Scarborough, designed to teach cyber skills relevant to GCHQ's work. The school offers students the chance to learn about how GCHQ protects the UK

against cyber threats, and teaches students skills related to a wide variety of topics such as information assurance, the internet's structure and coding languages (GCHQ 2015a).

The course is not aimed at specialists, but targets those who enjoy 'learning about new things and solving problems' (GCHQ 2015b). The only qualifications are that applicants have two good A-levels and 5 GCSEs or equivalent qualifications (GCHQ 2015c). Organisers hoped to attract applicants from a wide range of backgrounds; and during the first round of applications, 300 people applied for the 32 places; the eventual intake was one-third female (ibid).

Lessons learned

- Many public sector organisations are at the forefront of digital innovation, and the public sector is potentially a large source of employment for the digital sector.
- Experience working in a digital environment is significant in terms of influencing employability.
- Skills gaps for nationally strategic sectors such as cyber security should be prioritised, both for strategic and economic purposes.

4.6 DIVERSITY

CodeFirst: Girls

CodeFirst: Girls is a UK-based social enterprise which offers training courses for young adult and working-age women to develop their digital skills, including 'technical skills in coding and programming', as well as softer skills such as creativity and communication (CodeFirst: Girls 2017a). Free community courses are offered around the UK, everywhere from the South West to the North East.

Level 1 courses teach HTML, CSS, JavaScript and more related to front-end programming. Learning these coding languages teaches students how to design, create and improve websites and publish them online. Level 2 courses teach more complex coding languages such as Python and Ruby, which teach students how to 'make forms, databases, and how to make web-based applications'.

Over the past four years, CodeFirst: Girls has taught over 2,000 women how to code, and has delivered over £2 million worth of free courses (ibid). Using its contacts with business it has supported course graduates into employment.

Lessons learned

- Voluntary organisations can target individuals who fall through the gaps in formal provision.
- Offering programmes targeted at underrepresented groups such as young women can help to tackle stereotypes and encourage them to learn digital skills.
- Combining teaching technical skills with soft skills is the best way to meet the skills needs of the digital tech sector.

4.7 LIFELONG LEARNING

Sweden: PROMPT

Delivered by a coalition of Swedish universities and businesses, PROMPT (Professional Master's Education in Software Development) is an initiative targeted at IT professionals seeking to improve or update their digital skills. The courses are advanced-level courses designed for 'professional engineers and software developers who need to be able to combine work and studies' (European Commission 2016).

The curriculum is designed around five subject-related areas, including: process and methods for developing software-intensive systems; software testing; dependable software; architecture and design; and big data (PROMPT 2017). Graduates gain a degree-level qualification upon completion of the course. The long-term goal of PROMPT is to guarantee 'the supply of advanced software competencies and innovativeness in industry' (ibid).

Lessons learned

- It is critical to embed a culture of lifelong learning in digital tech businesses – digital tech workers will need continuous reskilling throughout their lives if they are to keep pace with changes in the sector.
- Collaboration between business and the education and training sectors is critical for ensuring that students are gaining the right skills for employment.
- Reskilling people currently in employment requires flexible, intensive and time-sensitive forms of training.

4.8 FRAGMENTATION

The Tech Partnership is a 'network of employers working to create skills for the UK's digital economy' (The Tech Partnership 2017b). The organisation has a wide variety of different schemes in place to achieve these goals, from providing schools with resources and ambassadors, to offering employers advice on apprenticeships and working with universities to develop degree programmes for the sector (ibid).

The organisation plays a significant role in bringing together public, private and third sector providers working in the digital skills space. For example, the Tech Partnership has recently launched a series of workshops in coordination with Leeds city-region LEP to provide CPD training for the coding curriculum for teachers in the region (The Tech Partnership 2017c).

TechFuture Ambassadors, founded by the Tech Partnership, are 'tech and digital professionals' who work in the digital sector. They engage with schools on a voluntary basis, coordinated by the Tech Partnership, to teach children and young people about the sector, answer their questions and encourage them to develop digital skills.

The Digital Apprenticeship Company is a social enterprise founded by the Tech Partnership aimed at helping companies 'plan and implement high-quality apprenticeship programmes', and to ensure employers get

the most out of their apprenticeship contributions. Members gain access to resources to help them take full advantage of the apprenticeship system and understand the requirements of the apprenticeship levy.

Lessons learned

- There are substantial opportunities for the public, private and third sectors to work together.
- Organisational partnerships such as the Tech Partnership, which are loosely coordinated around their members' needs, often have advantages over more conventional organisational structures.
- Private sector-led organisations are often able to bring significant dynamism and innovation to the sector.

4.9 MIGRATION

TechCity UK worked with government to set up a Tier 1 Exceptional Talent Visa for Digital Technology, more commonly known as the Tech Nation Visa Scheme (TechCity UK 2016b). The visa covers those applicants who show 'exceptional talent' and promise in the digital tech sector. TechCity also offers a fast track route for applicants who 'intend to make a contribution in the North of the UK' (TechCity UK 2015).

Since being set up, the visa scheme has received 257 applications, with 76 per cent getting endorsement from the organisation (TechCity UK 2016c). One-third of the applicants have been female, with 42 per cent coming from Asia and the Pacific, 24 per cent from Europe (non-EEA), the Middle East and Africa, and 24 per cent from North America (ibid).

Moreover, TechCity also offers a fast track route for applicants who 'intend to make a contribution in the North of the UK'. This includes applicants who plan to work for a company, or set up one of their own, in one of the North's seven cities. Companies in the North wishing to recruit highly skilled talent from outside the UK can also contact TechCity UK to advertise vacancies.

Lessons learned

- There is significant demand for foreign nationals to come and work in the digital tech sector in the UK.
- Recruiting international talent can help to plug short-term skills gaps in specific industries and specific areas.
- Recruiting international talent can also help to reduce gender disparities in the digital tech sector.

5. DIGITAL SKILLS FOR THE NORTH

In order to remain competitive in a post-Brexit environment as new technologies fundamentally transform the global economy, the UK as a whole, and the North especially, must take both immediate and longer-term steps to transform a skills system that is underperforming. Over the short term, the North needs to fill at least 80,000 digital tech positions by 2020 – this requires swift action to fill skills gaps that exist now. Over the longer term, the North needs to build a skills system that ensures a reliable pipeline of talent for the digital skills sector as it continues to grow.

5.1 RECOMMENDATIONS: REDUCING THE DIGITAL SKILLS GAP TO 2020

Reducing the digital skills gap by 2020 will require a focus on those who could enter the digital tech sector within the next three years, as well as skilling up those currently in the sector.

Recommendation 1: Local enterprise partnerships should build on existing work to draft digital skills strategies, in partnership with relevant local and combined authorities, and the third and private sectors. Strategies should include plans to map local digital skills provision, provide digital skills training for NEETs, make the best use of further education, promote diversity and encourage collaboration.

The most pressing issue will be to target those young people currently at transition points in their education or training, in order to encourage them to choose a path which could lead them into a digital career. Precisely how this is done should be left up to local areas through their digital skills strategies. These should, however, have to include mechanisms for achieving the following goals.

- **Mapping local digital skills systems**: Combined authorities and local enterprise partnerships (LEPs) should work with businesses, schools and the third sector to map training provision together in their area, facilitated by the initial work completed on this by TechNorth, including information on the nature, costs and other requirements for the training provided by each organisation.
- **Focus on NEETS:** There is a real opportunity to solve two severe issues for the North by providing intermediate and advanced digital skills training to NEETs – both reducing the digital skills gap and reducing the number of NEETs in an area.
- **Further education:** Consider how FE institutions can collaborate with businesses in order to ensure they have the resources they need to teach the skills relevant to the digital tech sector.

- **Diversity:** Each strategy should set out a plan as to how the LEP will work to increase the diversity of the workforce in the digital tech sector, with specific and measurable targets set out in advance.
- **Collaboration and coordination:** The strategies should set out how the LEP plans to bring together the digital tech sector in their local areas in order to provide some coherence and cohesion to an otherwise fragmented system.

The LEP strategies should also be shared widely around the North, so that places are also aware of best practice from other areas. This will facilitate the spread of best practice and ensure different areas are able to coordinate with each other where they are geographically close or have similar problems or interests. TechNorth should play the role of coordinating between the different LEPs, mapping the provision that exists and ensuring that this information is widely available.

Recommendation 2: Local businesses should pool the funding they will receive as part of the apprenticeship levy and invest this in a set of agreed strategic initiatives to promote digital skills in their area, as detailed in the LEP digital skills strategies outlined above.

In order to provide an immediate fix for gaps in the digital skills system, digital tech businesses across the North should pool the funding they will receive as part of the apprenticeship levy, and invest this in strategic initiatives to improve the digital skills of the current workforce and upskill FE- and HE-leavers.

Recommendation 3: Greater powers over and funding for adults' skills should be devolved to local and combined authorities, who should work with LEPs, and the private and third sectors to ensure further education is meeting the needs of private businesses, particularly in relation to the digital sector.

Ensuring that the digital tech sector has access to the talent it needs over the next three years will require local authorities to gain more power over their skills systems, as well as greater control over funding and discretion over how to use it. Skills devolution has been a central part of most devolution deals so far; around 80 per cent of devolution deals have asked for greater powers over skills (Casebourne 2015). These powers will generally relate to restructuring further education and training to align with the needs of local businesses, but will not include power over apprenticeships (ibid).

If any of the issues outlined in this report are to be addressed, it is imperative that local authorities are devolved greater powers and funding for the skills systems in their local areas. To be able to act as place-shapers, local authorities need to be able to shape incentives for businesses, the voluntary sector and the public sector, but currently central government controls most of these. Devolution over adult skills is a step in the right direction, but it is not enough – greater powers over the skills system need to be devolved to all areas, regardless of the status of devolution in their area.

However, political devolution must be combined with substantive fiscal devolution that increases the resources available to local and combined authorities currently operating at the limits of their capacity. Local authorities need to gain power over integrated education and skills budgets if they are to bring providers together and meaningfully shape the skills system in their area. As such, and in line with much of IPPR North's recent research in this area, central government should rationalise and further devolve skills funding to combined authorities.

Recommendation 4: If the Brexit agreement includes provisions to end free movement of people from Europe into the UK, this should be accounted for by increasing overall tier 1 and 2 visa issuances for digital tech workers. Alongside this, tier 1 visa conditions should be devolved to northern combined authorities, who should work with TechCity UK to deliver an expanded and North-focused version of the Tech Nation Visa Scheme.

While the above recommendations will go some way to filling the digital skills gap in the North, it will take some time for these measures to take effect. In the meantime, during the critical period when the UK determines its future relationship with the EU, skilled digital tech workers should continue to be encouraged to come to the UK in order to fill these gaps. If we do leave the single market and the EEA, then this should be accounted for by increasing overall tier 1 and 2 visa issuances for digital tech workers.

As we argued in our recent report *Regionalising migration* (Murray and Smart 2017), this should be conducted as part of a regionalised approach to migration. Tier 1 visa conditions should be devolved to northern combined authorities to allow them to attract the talent they need to grow their regional economies. The northern combined authorities should also work with TechCity UK to deliver an expanded, and North-focused version of the Tech Nation Visa Scheme.

5.2 RECOMMENDATIONS: CLOSING THE DIGITAL SKILLS SAP TO 2050 – 'THE FOUR CS'

There are a number of wider systemic challenges associated with the digital skills system across the whole of the UK that will take longer to address. These have to do with the culture, funding and structure of the digital skills system in the UK, and can be broken down into 'Four Cs'.

Recommendation 5: CURRICULUM – The latest digital technologies should be used in all lessons, by both teachers and learners, from Early Years to secondary school, in order to embed digital skills throughout the curriculum.

Digital skills extend far beyond the technical skills needed to actually undertake tasks like software development; they require creativity, critical thinking and a 'digital mindset'. Embedding digital skills across the curriculum, rather than just teaching them in ICT, is a much more effective way of creating these digital mindsets, which have much wider benefits than simply improving people's technical skills.

Moreover, interventions to improve employability are currently skewed towards secondary school; however, studies have shown that interventions

in the earliest years go the farthest to improving soft skills such as creativity, communication and perseverance. Concentrating funding on early years will go some way to improving the soft skills of young people, making them more employable across the board, and making them more likely to pursue challenging careers in STEM subjects.

Recommendation 6: CPD – More funding should be provided for career and professional development training (CPD) for all teachers, especially targeted at those teaching the new coding curriculum. This should take the form of public investment in social infrastructure, which – through eventual uplifts in employment – will pay for itself in the long term.

ICT teachers need to be provided with enough CPD to ensure that they can teach the new coding curriculum effectively. More broadly, it is critical that all teachers have a minimum level of digital skills so that they are able to incorporate digital teaching methods into their lessons, embedding digital learning throughout schools.

Providing adequate CPD for all teachers will improve teaching across the board, and especially the teaching of the new coding curriculum; over time, this will improve educational outcomes for children and young people, increasing their employability and reducing skills gaps for the digital tech sector. This will lead to increased employment and productivity, and therefore higher GDP growth and tax revenues.

Recommendation 7: CAREERS – Government should provide schools with adequate funding to discharge their statutory duty to provide independent careers advice and guidance. The National Careers Service should be extended to allow it to perform this supporting role for schools.

As IPPR North pointed out in our 2014 report *Driving a generation* (Cox and Davies 2014), a lack of informed careers guidance means that young people are often not aware of all of the opportunities available to them in the digital tech sector. If the government wants to encourage young people to enter the digital tech sector, take up digital apprenticeships and apply for digital degrees, then it will have to ensure that young people have the information, and encouragement, necessary to do so. Careers support is inexpensive to provide and, as with CPD, will improve productivity, employment and, ultimately, GDP and government revenues.

Recommendation 8: COLLABORATION – Schools careers services should take the lead in establishing relationships between businesses, schools and the voluntary sector and identifying how businesses and the voluntary sector could productively engage career advisory activities within the curriculum.

As we argued in *Driving a generation*, secondary schools need to develop 'stronger relationships with major employers in their catchment areas' – this should also extend to voluntary sector providers of training, of which there are many in the digital sector (ibid). There is extensive evidence to suggest that schools engaging with businesses dramatically increases employability and school performance (UKCES 2012).

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