The growth of a diverse and talented technology community within the North West of England

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University of Salford MANCHESTER

pwc

Contents

Foreword from PwC

Ben Higgin
Head of Technology and Investments

The New Equation is PwC's global strategy to address the breadth and complexity of challenges facing businesses and society.

We're combining the expertise and services we offer in new, creative ways to build trust, deliver sustained outcomes and help clients solve their most important problems.

From investing in skills and new capabilities and technology to empower our people, to bringing together people from different backgrounds, with diverse experiences and viewpoints, we're committed to investing alongside our clients to deliver results that make the difference.

It all adds up to The New Equation.

As part of our investments, we recently announced our plans to create 1,000 technology focused jobs over three years at our newly launched technology hub in Manchester. We have been in Manchester for generations, and we are excited and proud to be building our technology hub in the North. It reflects the critical and growing role of new technologies to our business and our clients. It also underscores our commitment to regional growth and supporting regional rebalancing.

We know that there currently is not enough supply of technology talent to meet the growing demand. This shortfall is set to worsen as many businesses in the North West have big ambitions for growth and as further organisations relocate to the region. These ambitions are dependent on there being a diverse pool of technology talent available to stimulate innovation and growth.

We don't want our expansion plans in Manchester to exacerbate the problem. We want to play a role in solving this important challenge and in contributing technology talent to the market, as we have done across the accounting and consulting professions. This goes right to the heart of our purpose at PwC to build trust in society and solve important problems.

Our first step has been to commission this work by The University of Salford to help us to frame the problem and potential areas of targeted intervention by businesses such as ours. This work focussed on three key areas:

1. The structural imbalance between supply and demand for technology talent;
2. How technology roles/sectors are serving diverse communities, with a particular focus on women and ethnic minorities (and in particular Black talent) and neurodiverse talent; and
3. The level of fragmentation in the system and whether this will be a barrier to achieving a different outcome at scale for the Greater Manchester region.

This report shows not only the scale of the problem, but also the opportunity. We feel hopeful that the problem is solvable and are excited by the potential for the region.

It's fair to say that the issues are **complex relating to technology talent**. These include:

1. The data showing huge growth in actual and forecast demand, which far exceeds changes in supply:
    1. Globally, 9 out of the top 10 roles where demand is increasing are technology-related;
    2. In Manchester specifically, the number of technology jobs more than doubled in 2021 (164.6% increase); and
    3. The typical route into technology roles is undergraduate study, where the increase in technology degree university places falls well short of the increase in demand for technologists.

2. The technology talent pool is **not diverse**, for example:

    1. **Only 1 in 4 tech roles are held by females**, compared to a more even split across other industries, a trend which is also seen in the underrepresentation of females across a number of STEM-subjects, both in higher education and at A Levels;
    2. There is very little data available to allow us to understand the number of neurodiverse people in technology roles, albeit we believe they may be 'over-represented' compared to the population as a whole and have many skills particularly suited to some technology roles. However, anecdotally we know that **neurodiverse people are not adequately supported in the workplace**; and
    3. There is significant fragmentation across the current technology talent landscape, with a **staggering variety of options for study to get into tech roles, which is confusing** for those making decisions about their careers and for those advising on career choices.

We recognise that many of the challenges set out in this report relate to issues businesses have been grappling with for some time. We believe that the findings of this work form an important basis and framework for us to create a set of targeted interventions to solve these important and complex problems. The data shows that this is a problem affecting businesses now and at a huge scale, which is only set to continue. We strongly believe that addressing this problem in collaboration with others will allow progress to be made at a greater scale than we could do individually, which is critical to ensuring success at the scale and pace we all need to ensure the region fulfils its potential for growth.

But there are lots of things to be positive about too:

- The **increase in the population of 18-year olds in 2021**, following a demographic decline of 5,155 (6.2%) between 2017 and 2020 in the North West, meaning there are more people available to meet the demand;
- **Positive trends in the subjects studied at A Level**, with increases in science-based subjects, including a significant 10% increase in students studying Computing A Level between 2020 and 2021;
- Based on our own experiences and from our discussions with other businesses, Black people are underrepresented in technology roles, albeit there is a lack of data quantifying this assumption. However, there are **positive trends in STEM subjects increasingly being studied by Black people**, which represents an opportunity for businesses to ensure this converts into Black people entering into technology careers;
- The annual data illustrating the flow of university students across the North West shows that **the region is one where graduates stay and also return to for work**, with 24,915 students finding work in the North West. Compared to the 25,285 students who are from the North West, this demonstrates that the region is not losing large volumes of students to jobs outside the region; and
- We know from the data around changes in demand for certain professions that **jobs will be disrupted by digitisation and this creates an opportunity for this to be a new pool of potential talent available to be reskilled**, which is not being adequately tapped into at present**.**

With the young talent who will be available for businesses to nurture and invest in, along with the potential for reskilling of people who are either returning to work or who will be disrupted by the digitisation of roles, the foundations are there. With the right interventions, the opportunities for talent in the region are exciting and numerous.

Foreword from The University of Salford

Dr Janice Allan
Dean of Salford Business School at The University of Salford

As a civic institution, The University of Salford welcomed the opportunity to work with PwC to examine the issues surrounding the shortage of technology talent within our region, together with the commitment to enhance the diversity and inclusivity of the workforce.

As a civic university, we have a clear mission to:

- Educate the next generation of modern industrialists, innovators, creators, entrepreneurs, and leaders;
- Develop the skills and knowledge needed to capitalise on the next industrial revolution; and
- Work in collaboration with public and private sector partners to address local and global economic and societal challenges.

We remain true to our origins as the Royal Technical Institute, created in 1896 to provide the workforce that powered the Industrial Revolution. We may have grown over the past 126 years to have a global reach through our alumni and our partnerships, but we are still passionate about having an impact in our local communities across Salford and Greater Manchester. We are raising educational aspirations in our community, helping to solve the productivity puzzle by producing highly skilled, work-ready graduates, and working in partnership with industry to address the major challenges that face our society, such as the growth of digital technologies.

This report explores the underlying challenges in identifying and growing technology talent within the Northwest region. There have been multiple initiatives to address one or more of the issues presented below but, to achieve sustained change, we recommend a more integrated and coordinated approach with clearly articulated requirements and delivery plans.

The challenges identified in this report can be grouped into three main themes:

1. The need to keep pace with the growing demand for tech roles;
1. The need to increase the diversity of tech teams; and
2. The need to adopt an integrated approach between employers, education, and policy makers.

Demand

The success of Greater Manchester as digital city region, coupled with the global acceleration of digital transformation, has resulted in a situation where the demand for technology talent is increasing at a greater rate than supply. Data from EMSI Burning Glass[1] shows increasing IT job postings whilst data from UCAS population estimates[2] shows recent demographic decline in the number of 18 year olds. We should not, however, overlook the opportunity this presents to consider mid-career changers and non-traditional entry routes.

[1] Data source: Emsi Burning Glass, 2022.

[2] Copyright UCAS, https://www.ucas.com/data-and-analysis/undergraduate-statistics-and-reports/ucas-undergraduate-sector-level-end-cycle-data-resources-2021, shared via Creative Commons Licence, CC BY 4.0

Inclusivity

This report focuses on gender, ethnicity, and neurodiversity. As part of our analysis, we sourced specific SICs (standard industrial codes) that underpin the core industries relevant to PwC from the Office for National Statistics and this shows a sustained gender inclusivity gap over 5 years[3]. The gap on Black inclusivity is closing but there was limited data available on seniority in post, making it difficult to assess how embedded that change is. There is a general lack of data relating to neurodiversity within technology and other sectors and there is, therefore, limited understanding on how best to support individuals within the workplace.

Diversity data in this report is shown at aggregate proportion level. A key consideration needs to be the expected pace of change: even if there is proportional representation at entry level, that may not be replicated through the levels of seniority. Too often initiatives focus on entry level instead of addressing the talent drain at mid to senior levels and this means the impact of any real change could take several years.

A joined-up model

The scale of the challenges outlined below requires a new integrated model with schools, colleges, universities, local authorities, and employers working together to support learners in the choices they make. This needs to be supplemented by a dual approach to longer term work that (a) supports the choice making of students and those who can demonstrate capability for the technology industry and (b) employer-provided training support for mid-career switchers.

Greater Manchester is uniquely placed with its growing tech and digital sector, the support of the Greater Manchester Combined Authority, and the strength in the regional education sector to be a testbed for medium- and long-term solutions around the tech talent pipeline.

[3] Numbers of people in the digital sector and other industries, 2016/2017 to 2020/2021, by sex and ethnicity - Office for National Statistics (ons.gov.uk)

Background

The world of work is changing with an increased focus on digital. A recent World Economic Forum (WEF) report identified increasing shifting patterns of demand.[4] Within the report, there are forecasts of labour market evolution, based on the Future of Jobs Survey 2020. In the context of this work, there are two key forecasts: the perceived barriers to the adoption of new technologies, and the estimate of roles that are growing and declining in demand.[5]

Perceived barriers to the adoption of new technologies:

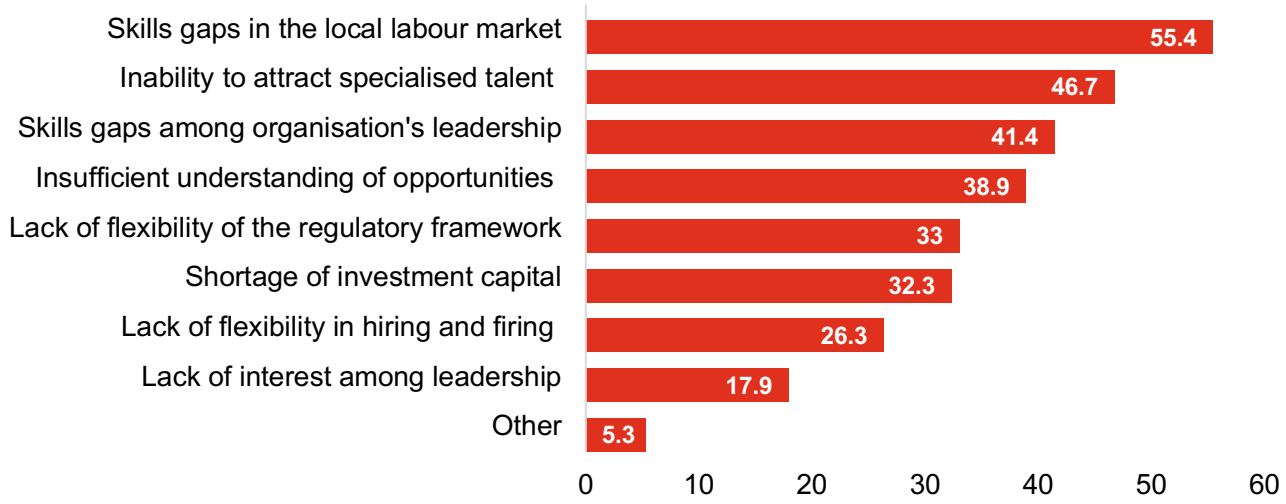


Figure 1: Perceived barriers to adoption (source: The Future of Jobs Survey, WEF, fig.26)

The two top perceived barriers to the adoption of new technologies were skills gaps in the local market and the inability to attract specialised talent, **55.4%** and **46.7%** respectively. The report also noted that skills gaps are more acute in emerging professions.

[4] WEF_Future_of_Jobs_2020.pdf (weforum.org)

[5] These figures have been represented here for context but that does not represent any form of endorsement of this report or its findings from WEF, shared via Creative Commons — Attribution 4.0 International — CC BY 4.0.

The table below from the WEF report shows the job roles in increasing and decreasing demand across industries. The trends expected by employers in 2025 focused on machines and automation. Of the roles decreasing in demand there may be opportunities for individuals to reskill and make mid-career switches, particularly for accountants and auditors.

9 out of the top 10 roles in increasing demand are technology-related

Demand for technology professionals in the UK and across Greater Manchester

Demand across the UK

The most recent survey on vacancies by industry published by the Office for National Statistics ("ONS")[6] shows there is growing demand UK-wide in information and communications professionals with a year-on-year change of 120%. The vacancy rate (vacancies per 100 employees) for information and communications is 5.5, ahead of all vacancies by 1.4 and the second highest industry grouping in the period from October to December 2021.

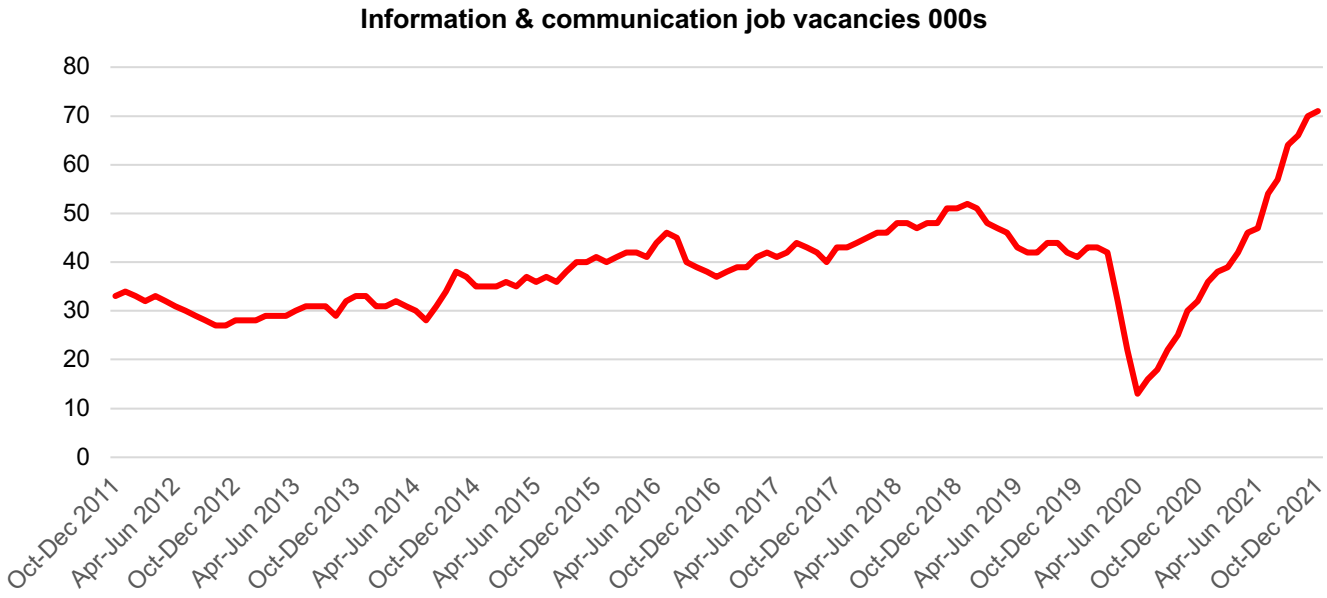


Figure 2: Information and communication job vacancies (source: ONS seasonally adjusted vacancy survey Oct 11 – Dec 21)

[6] VACS02: Vacancies by industry - Office for National Statistics (ons.gov.uk)

Demand in the North West

Data sourced from Emsi Burning Glass shows the growth in information technology job posts in Greater Manchester. This shows a year-on-year increase of 101%.

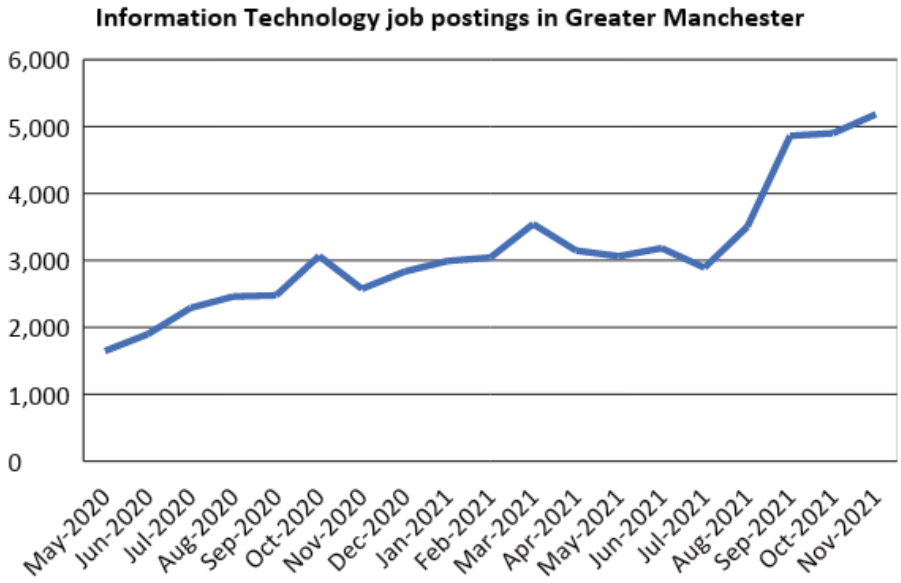


Figure 3: Information technology job postings in Greater Manchester (source: Emsi Burning Glass, 2022)

Figure 4: Top 10 Occupations within IT job listings in Greater Manchester (source: Emsi Burning Glass, 2022)

Total Gross Value Add ("GVA") contribution from the North West's tech sector in 2018 was just under £9 billion – third amongst English regions after London and the South East. Tech GVA figures in the North West are dominated by Greater Manchester, which accounted for 12% of total tech GVA in 2018 (£1.8 billion).[7]

Amongst the 263,000 businesses based in the North West of England in 2020, 5% or 14,000 were classified as being tech sector firms. By number, the largest concentrations of tech businesses were located in Manchester, Cheshire East, and Trafford.[8]

There are around 131,000 tech specialists based in the North West of England (2019 figures) representing 4% of the local workforce and 10% of all tech specialists in England. Across the North West, Manchester is home to by far the largest number/proportion of tech specialists (approximately 15,000 or 11% of the regional total) and tech specialists account for 6% of employment within the Authority, putting representation well above the norm for England.[9]

The number of tech professionals in the North West is forecast to grow by 104% between 2020 and 2050 to 274,000 people or 11% of all tech employment at that time. The level of growth anticipated is notably higher than that for England as a whole (84%) and equal fourth highest amongst the English regions.[10]

According to the UK's Digital Economy Council's Levelling Up Power Tech League Table published in December 2021, Manchester places second, narrowly behind Cambridge. In that league table, based on adzuna data, the number of tech jobs in Manchester increased by 164.6% in 2021[11].

[7] https://www.local.gov.uk/publications/councils-role-supporting-digital-skills-pipeline

[8] https://www.local.gov.uk/publications/councils-role-supporting-digital-skills-pipeline

[9] https://www.local.gov.uk/publications/councils-role-supporting-digital-skills-pipeline

[10] https://www.local.gov.uk/publications/councils-role-supporting-digital-skills-pipeline

[11] https://www.gov.uk/government/news/uk-tech-sector-achieves-best-year-ever-as-success-feeds-cities-outside-london

Challenges and opportunities in the supply of technology professionals

In a simple model there are two routes into work post-16 education: A Levels, degree and potentially postgraduate degree; or post-experience reskilling/career swap. The following section reviews the data for employment supply, starting with the estimate of 18-year-olds within the population.

Looking at data from UCAS on end of cycle population estimates, there has been a demographic decline of 18-year-olds in recent years.[12] From 2017 to 2020 there were 43,820 fewer 18-year-olds, a decrease of 5.9%; in the North West this represented a decline of 5,155 and 6.2%. In 2021 this decline began to reverse and 11% of 18-year-olds are now estimated to be in the North West.[13]

Midlands	54,390	52,185	50,915	49,915	51,570	7%
of England	70,025	68,210	67,300	66,155	67,775	9%
don	91,795	92,180	92,255	91,005	95,650	13%
h East	28,860	28,035	27,155	26,655	27,460	4%
h West	82,765	80,235	78,610	77,610	79,170	11%
hern Ireland	24,200	23,195	22,395	22,265	22,340	3%
land	57,345	55,570	53,850	53,140	55,160	8%
h East	104,940	102,165	100,625	98,550	101,845	14%
h West	61,200	59,480	57,370	56,165	58,685	8%
es	35,525	34,400	33,600	32,515	33,070	5%
t Midlands	68,045	66,945	65,410	64,795	66,525	9%
shire and The Humber	61,800	59,725	58,350	58,300	59,620	8%

ole 2: UCAS 18-year population estimate (source: EOC data resource 2021008191). Note, due to the mbers being rounded to the nearest 0 or 5, there are minor casting differences between the source and this le.

When the subjects studied at A Level are reviewed, this shows positive trends around science-based subjects

[12] Copyright UCAS, https://www.ucas.com/data-and-analysis/undergraduate-statistics-and-reports/ucas-undergraduate-sector-level-end-cycle-data-resources-2021, shared via Creative Commons Licence, CC BY 4.0.

[13] Copyright UCAS UCAS Undergraduate sector-level end of cycle data resources 2021 | Undergraduate | UCAS, shared via Creative Commons Licence, CC BY 4.0.

Subject grouping	Jun-20	Jun-21	% change in entries
Mathematics	89,730	90,290	1%
Psychology	63,490	68,315	8%
Biology	61,130	63,765	4%
Chemistry	53,435	55,485	4%
History	41,120	41,585	1%
Sociology	36,965	39,825	8%
Art & Design Subjects	39,145	39,370	1%
Physics	35,740	37,560	5%
English Literature	38,310	36,135	-6%
Business Studies	33,260	35,285	6%
Economics	30,865	32,700	6%
Geography	27,470	31,810	16%
Media / Film / TV Studies	19,525	19,025	-3%
Political Studies	16,455	17,065	4%
Religious Studies	14,680	15,685	7%
Mathematics (further)	14,475	14,850	3%
English Language	14,715	14,230	-3%
Computing	11,730	12,930	10%
Law	11,275	12,825	14%
Physical Education	10,355	10,755	4%
Other Subjects	8,095	8,890	10%
Drama	8,685	8,670	0%
Spanish	8,225	8,465	3%
Design & Technology	9,185	8,340	-9%
French	7,685	7,725	1%
English Language & Literature	7,250	7,155	-1%
Other Modern Languages	6,420	5,315	-17%
Music	5,035	5,045	0%
Classical Subjects	4,665	4,600	-1%
German	2,735	2,525	-8%
Total	**731,855**	**756,230**	**3%**

Table 3: Provisional A Level entries (source: see footnote[14])

[14] Provisional entries for GCSE, AS and A Level: summer 2021 exam series - GOV.UK (www.gov.uk)

The following data has been sourced from UCAS end of cycle resources showing acceptances by subject for the last three years. This shows a growing number of acceptances for science and computing subjects.

iness and management	59,205	61,115	66,380	7,1	12%

The diagram below shows the flows of university students across the North West. This illustrates that the North West is a region where graduates stay and work.[16] It is sourced from the graduate outcomes data which surveys students 15 months post-graduation. The table shows that 25,285 students are from the North West, 16,095 stay and study in the North West, joined by 10,005 students from the rest of the UK and in total 24,915 students find work in the North West.

[15] EOC_data_resource_2021_046_2 UCAS https://www.ucas.com/data-and-analysis/undergraduate-statistics-and-reports/ucas-undergraduate-sector-level-end-cycle-data-resources-2021 (copyright sharing does not imply endorsement)

[16] https://www.hesa.ac.uk/data-and-analysis/sb260/figure-15

Table 5 shows the level (undergraduate and postgraduate) and the mode (full-time and part-time) of the total number of learners in higher education. When reviewing data for part-time study in higher education, a potentially significant route for career switches, the trend is far from positive with a 13% decline at undergraduate level over a five-year period.

	2015/16	2016/17	2017/18	2018/19	2019/20	Increase/Decrease
Full-time Undergraduate	1,481,865	1,523,200	1,554,755	1,574,675	1,611,375	**129,510**
Part-time Undergraduate	319,700	295,365	278,450	279,465	278,100	**-41,600**
Full-time Postgraduate	303,565	324,445	347,990	365,720	403,945	**100,380**
Part-time Postgraduate	227,690	233,965	234,470	237,285	238,965	11,275

Table 5: Level and mode of study at Higher Education Providers (source: HESA, see footnote[17])

[17] https://www.hesa.ac.uk/data-and-analysis/sb258/figure-3

Diversity in technology talent

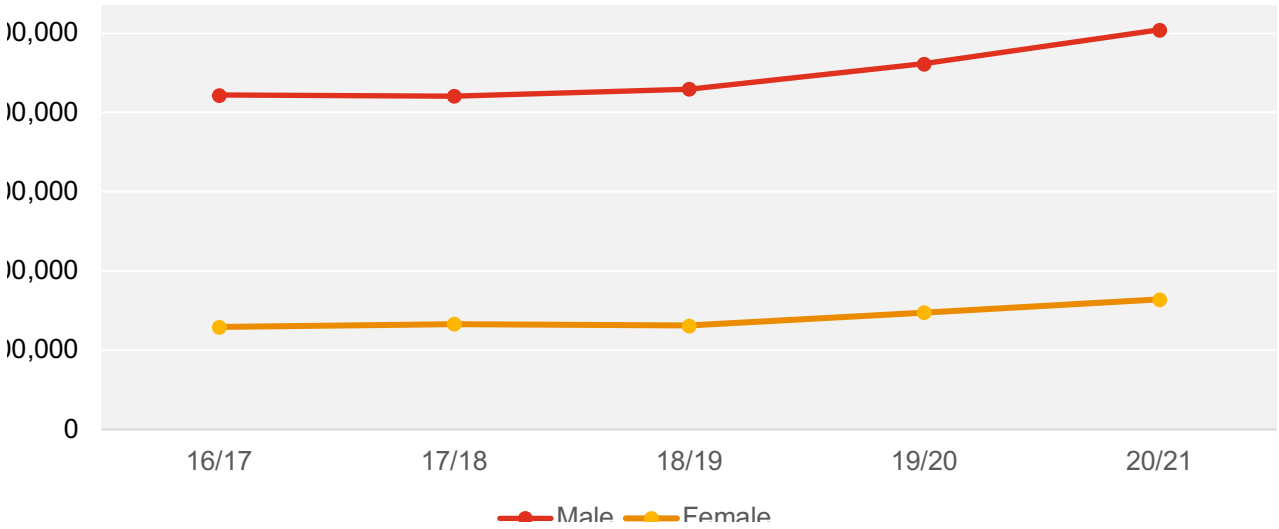
This section focuses on gender, ethnicity (in particular Black representation) and neurodiversity.

Gender

As part of this review, a bespoke dataset was sourced from ONS which looked at a smaller set of technology standard industrial codes ("SICs") for gender and ethnicity, to look at the annual population survey.[18] The graph below shows that 1 in 4 tech roles are held by females, compared to a more even split (51.2% male 48.8% female) across other industries.

Only 1 in 4 tech roles are held by females, compared to a more even split across other industries

Males / Females in technology roles



ure 6: Males/Females in tech roles (source: ONS, based on a survey and therefore subject to a margin of certainty)

[18] Numbers of people in the digital sector and other industries, 2016/2017 to 2020/2021, by sex and ethnicity - Office for National Statistics (ons.gov.uk)

Although there are direct routes into tech careers pre-degree, the graph above showing underrepresentation of females in technology roles seems to reflect some of the trends in higher education, as shown in the table below.[19]

ɔject	% Female
Computing	16%
:al	56%

Looking at a subset of science-based A Levels there is lower female participation in Maths, Physics and Computing.[20]

ɛmistry	55%
thematics (Further)	29%

[19] https://www.hesa.ac.uk/data-and-analysis/students/table-46

[20] A-Level-and-AS-Results-Summer-2021-v3.pdf (jcq.org.uk)

Ethnicity

The data below sourced from UCAS end of cycle resources shows university acceptances by ethnic group, by subject. Maths has a lower level of diversity with business studies being the most diverse of the subjects in focus.

Subject acceptances	Asian	Black	Mixed	Other	Unknown/prefer not to say	White	Total
Mathematical sciences	1,465	325	415	115	115	5,290	7,725
%	19%	4%	5%	1%	1%	68%	100%
Engineering & technology	5,395	2,520	1,425	925	425	15,970	26,660
%	20%	9%	5%	3%	2%	60%	100%
Computing	5,280	2,645	1,330	800	570	15,950	26,575
%	20%	10%	5%	3%	2%	60%	100%
Business & management	12,285	7,015	3,115	2,400	2,505	39,060	66,380
%	19%	11%	5%	4%	4%	59%	100%
Other subjects	43,015	30,145	18,855	7,555	4,885	260,225	364,680
%	12%	8%	5%	2%	1%	71%	100%
Total	**14%**	**9%**	**5%**	**2%**	**2%**	**68%**	**100%**

Table 8: University acceptances by ethnic group, by subject[21]

[21] Copyright UCAS, EOC_data_resource_2021_046_2 UCAS https://www.ucas.com/data-and-analysis/undergraduate-statistics-and-reports/ucas-undergraduate-sector-level-end-cycle-data-resources-2021, shared via Creative Commons Licence, CC BY 4.0.

Neurodiversity

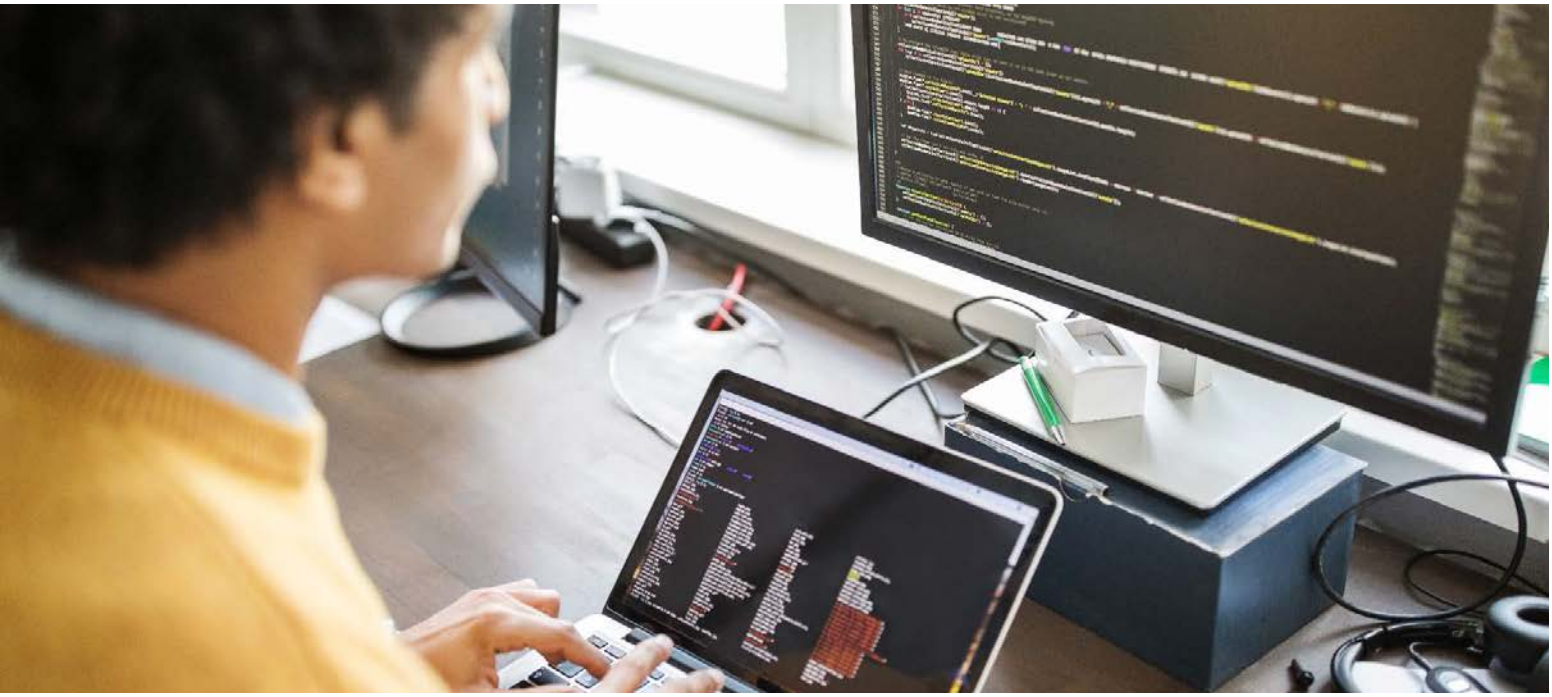
There is a lack of recorded data on neurodiversity and further work is needed to identify appropriate data sources and to consider the implications for how employers best support their neurodiverse employees.

It is estimated that around 1 in 7 people (circa 15% of people in the UK) have neurodivergent conditions, meaning that the brain functions, learns and processes information differently; this includes Attention Deficit Disorders, Autism, Dyslexia and Dyspraxia.[22] During the research time available, no data has been found on the proportion of neurodiverse workers in the tech sector.

Any data that is available should be treated with caution since (a) a proportion of those in the workforce are undiagnosed; and (b) some individuals who have been diagnosed with a neurodivergent condition do not disclose this to their employer for fear of being treated less favourably than their neurotypical colleagues.[23]

However, there is good evidence to suggest that neurodivergent individuals are not well served in employment generally. Research by the Institute of Leadership and Management[24] found that:

- Most organisations do not include neurodiversity within policy and procedures, or provide training on inclusion;
- People who have neurodivergent conditions have worse experiences than their neurotypical peers perceive; and
- Over half of autistics (60%), dyspraxics (55%) and dyscalculics (53%) reported that people in their workplace behave in a way that excludes neurodivergent colleagues.



[22] Summary report: https://www.institutelm.com/resourceLibrary/workplace-neurodiversity-the-power-of-difference.html

[23] Lived experiences of neurodivergents; https://www.institutelm.com/resourceLibrary/workplace-neurodiversity-the-power-of-difference.html

[24] https://www.institutelm.com/resourceLibrary/workplace-neurodiversity-the-power-of-difference.html

Fragmentation in approach

There are many routes into tech careers, with a lack of consistency and the options are growing all the time.

New options include the recent introduction of **T Levels** aimed at school leavers and positioned as high-quality vocational qualifications of equal status as A Levels. T Levels were first launched in September 2020 with a further tranche of subject areas coming on stream from 2021.[25] Currently there are three 'digital' T Level routes, listed below, but since these are still very new qualifications there is no evidence at present on their effectiveness of meeting employer skills needs:

- digital business services (started September 2021)
- digital production, design, and development (started September 2020)
- digital support and services (started September 2021)

The government will cease to fund other level 3 applied general qualifications (AGQs) such as BTECs where these overlap with a T Level subject area. Details of precisely which AGQs will be defunded is not yet known. The Education Secretary has delayed the implementation of funding reductions until at least 2024.[26]

Higher Technical Qualifications (HTQs) are either new or existing Level 4 and 5 qualifications (such as HNDs/Foundation Degrees/Diploma HE) that have been approved by the Institute for Apprenticeships and Technical Education as meeting occupational standards for the relevant sector. These qualifications have been developed by awarding bodies in collaboration with employers and businesses; the intention is that students get the specific training, knowledge and skills required for their chosen career.[27] HTQs are even newer than T Levels: the first teaching of approved Higher Technical Qualifications will be available from September 2022 starting with Digital.

Alongside T Levels and HTQs, **apprenticeships** are a flagship government policy within technical education reform.

One of the major delivery mechanisms for HTQs and apprenticeships is a national network of **Institutes of Technology** (IoT). This government programme is designed to spearhead the delivery of higher technical education in STEM subjects. The first wave of 12 IoTs are being established across the country and a multi-million-pound bid for a new technical education institute in Greater Manchester was approved at the end of 2021. Led by The University of Salford with Wigan and Leigh College as the lead FE partner, the Greater Manchester Institute of Technology ("GMIoT") brings together a number of colleges and employers in the city region and will specialise in construction, engineering, health and digital skills.

The GMIoT will operate on a hub and spoke model, with capital funding being invested in a new centre at The University of Salford and hubs across Greater Manchester, with investment committed to the upgrade of existing facilities across partner colleges. It is envisaged that new students will be enrolling at the GMIoT from September 2023. The GMIoT will target both school and college leavers who might be considering a career in STEM and older learners looking to upskill or retrain.

Skills Bootcamps offer free, flexible courses of up to 16 weeks. They give adults aged 19 or over the opportunity to build up sector-specific skills and fast-track to an interview with a local employer. Bootcamps are available for

[25] https://www.gov.uk/government/publications/introduction-of-t-levels/introduction-of-t-levels

[26] Government pauses plan to abolish technical qualifications | Education | The Guardian

[27] https://www.gov.uk/guidance/htqs

those who are either in work or recently unemployed and live in England.[28] There are over 20 skills bootcamps in the North West region listed on the government's website.[29] A number of others are available in multiple locations or nationally so the actual number in the North West is likely to be larger.

At Salford, the more informal skills and project based Hackcamp give students a broader experience. See below for student quotes.

> s taught me a lot about working with other people in an environment where we have to meet a deadline for a ıt. In the future, it won't be as daunting an experience. I feel like this has really eased me into the whole ɛrience of working with a client and working to their needs

Some employers in the tech sector offer routes back into the industry for individuals wishing to return to roles in this area having spent time away. These schemes are largely targeted at females who are more likely to have taken a career break.[30]

[28] https://www.gov.uk/government/publications/find-a-skills-bootcamp/list-of-skills-bootcamps

[29] https://www.gov.uk/government/publications/find-a-skills-bootcamp/list-of-skills-bootcamps

[30] https://www.womenintech.co.uk/4-benefits-of-returnships-for-uk-businesses

The diagram below illustrates the current tech environment.

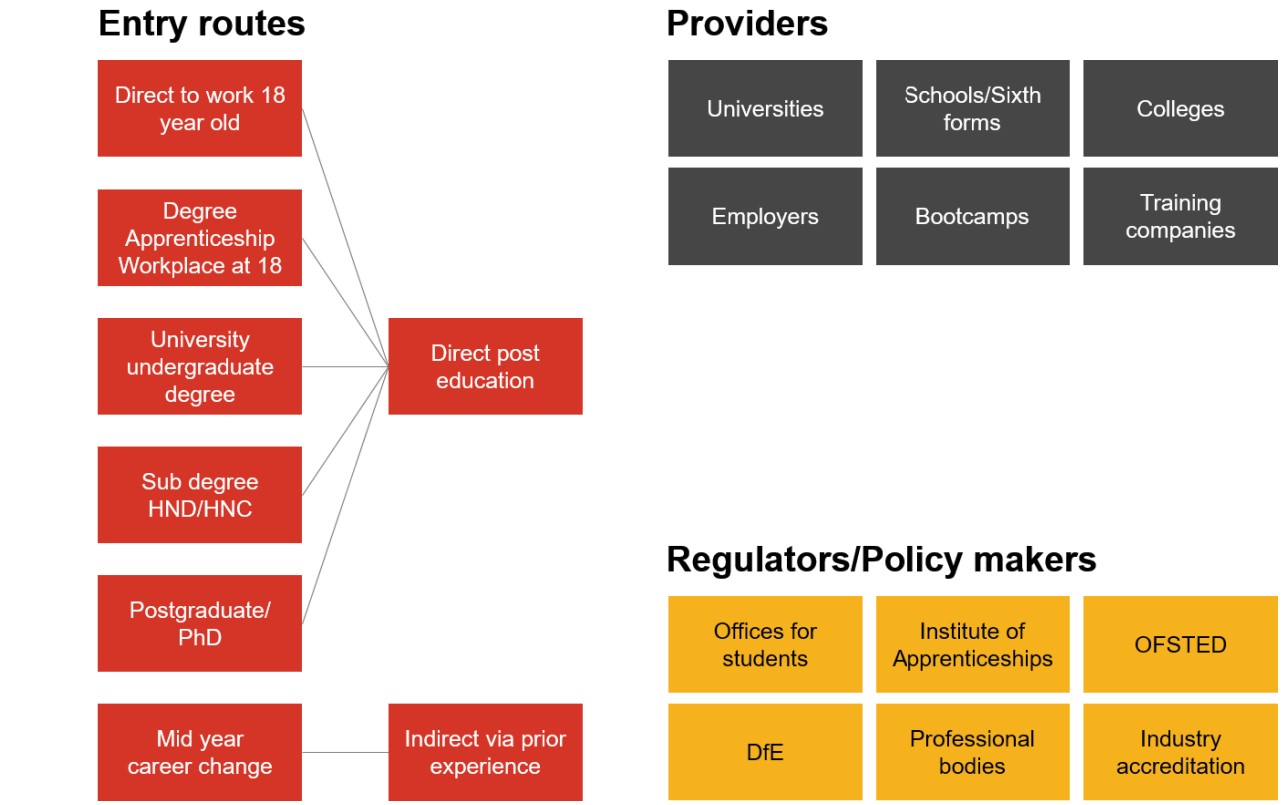


Figure 7: An overview of the tech environment

The table below shows the challenge around level 4 and 5 provision in higher education (HNC/HND) in terms of volume compared to undergraduate and postgraduate study. There are government initiatives to address this, including the new Institutes of Technology, but it may be some time before there is significant change.

Level of Study	2016/17	2017/18	2018/19	2019/20
Postgraduate				
Doctorate research	100,085	100,430	102,030	101,350
Other postgraduate research	12,435	11,325	10,950	9,325
Total postgraduate research	112,520	111,755	112,985	110,675
Master taught	320,720	345,955	367,450	411,500
Postgraduate Certificate in Education	24,030	24,960	26,365	25,890
Other postgraduate taught	101,135	99,790	96,210	94,845
Total postgraduate taught	445,885	470,705	490,025	532,235
Total postgraduate	558,410	582,460	603,005	642,915
Undergraduate				
First Degree	1,630,790	1,657,145	1,690,335	1,734,775
Foundation degree	38,100	35,055	33,645	31,520
HNC/HND	29,350	28,240	23,625	20,985
Professional Graduate – Certificate in Education	1,730	1,440	1,160	1,000
Other undergraduate	118,600	111,320	105,380	101,185
Total other undergraduate	187,775	176,055	163,805	154,695
Total undergraduate	1,818,565	1,833,205	1,858,140	1,889,475
Total	**2,376,975**	**2,415,660**	**2,457,150**	**2,532,385**

Table 9: Trends in higher education studies (source: HESA, see footnote[31])

[31] Figure 3 - HE student enrolments by level of study 2015/16 to 2019/20 | HESA.

Potential solutions to improve the talent pipeline within the tech sector need to consider the level of change that is possible through the targeted interventions.

Any interventions focused solely on entry level will lead to a slower pace of change as those individuals progress through their career. Therefore, there also needs to be a focus on mid-level workers to prevent talent drain and ensure a faster pace of change. It may be possible to model expected outcomes of the interventions based on further internal data from the organisations involved.

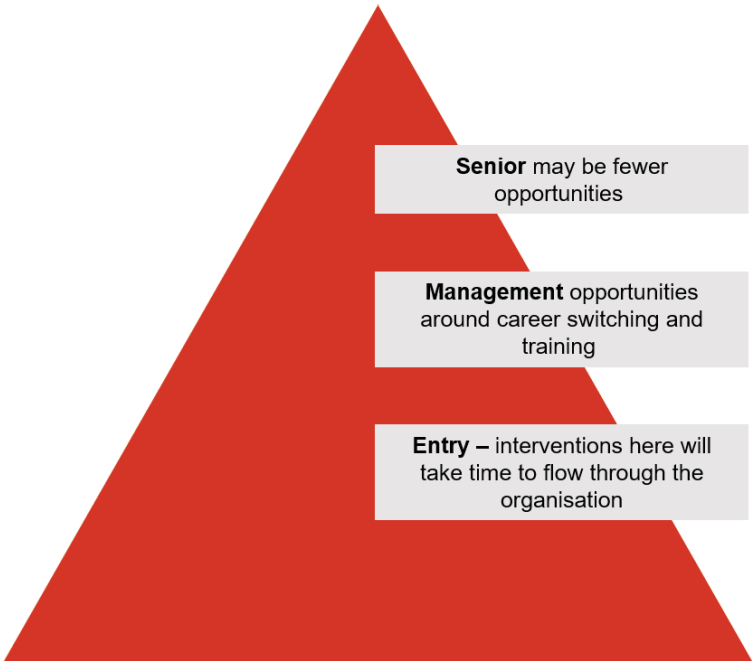


Figure 8: Focus of change interventions

Summary and possible next steps

There is a wide range of data in this report that supports a more structured approach to intervention, in order to address the challenges that have been identified. There have been themes identified around demand and supply, the diversity within the tech community and the fragmented approach. Some next steps for consideration could be:

1. What further targeted support could be given to students when selecting subjects for study?
2. Could employers work together on a key competency framework to underpin in-house training, which could also be extended for some form of capability testing pre-employment?
3. What additional focus could be introduced to bring in mid-career switchers to create another pipeline of talent and increase the pace of change?
4. How could existing recruitment processes be challenged and criteria applied to match the competency framework?
5. What further data could help organisations to identify areas to target interventions and formulate what a successful outcome would be, including consideration of equality, diversity and inclusion data sharing agreements?