

Digital Skills Analysis Update

Hull & East Yorkshire Local Enterprise Partnership

Final Report – July 2023



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Executive Summary



The demand for digital skills is growing at all levels and across all industries and occupations. Investment in digital skills will **reduce the high risk of exposure to automation** identified in HEY (50% in Hull and 45% in East Yorkshire) and facilitate industry digitalisation.



Women and young adults are under-represented employees in Hull's digital sector, whilst digital connectivity in rural areas of East Yorkshire remains low. Investment in digital infrastructure, hardware, software and digital skills is a prerequisite to **closing the digital gap and supporting inclusion**, career progression and technology adoption by businesses.



Investing in higher level digital skills and digital innovation will contribute towards **closing the productivity gap which exists in HEY**, particularly in the 'Information and communication' sector (-47% below England on GVA per FTE). This requires tailored provision and support mechanisms aligned to employer needs.



Digital skills provision aligned to demand, and inspiring people to pursue digital careers, can stimulate investment in digital skills and respond to **identified growth in the digital technology sector** (+30% growth in jobs since 2017).



Most businesses surveyed to inform the LSIP (84% of respondents) are currently **experiencing digital skill shortages**, but only a third of these respondents experiencing skill shortages can fully access the **digital skills training they need**. Digital skills provision offering choice at all levels can facilitate progression to higher level digital skills acquisition to meet demand.



The **LSIP needs to account for digital skill demands** and provide recommendations on how providers can respond to identified needs.

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Note about data sources and approach:

ekosgen was appointed by HEY LEP to undertake an analysis of digital skills in Hull and East Yorkshire (HEY). This report provides an update of all available data as of March 2023.

Data used in the report include ONS, Lightcast, Department for Education, Department for Digital, Culture, Media and Sport, Office for Students, HEY Employer Skills Survey, Higher Education Statistics Agency, and the ESFA DataCube.

Introduction

In 2020 the former Humber LEP undertook a Digital Skills Analysis to inform the work of the Humber Digital Skills Partnership (DSP). The Digital Skills Analysis study aimed to support providers and employers to respond effectively to Humber's digital skills priorities. The study was undertaken in a pre-COVID environment and given the way in which the pandemic has changed the demand and supply of digital skills, ekosgen was appointed by HEY LEP to update the evidence base for Hull and East Yorkshire (HEY) as of March 2023.

The approach includes:

- **Demand analysis:** The data analysis explores digital skills needs based on current and future demand and implications arising from automation and Artificial Intelligence (AI). Data used in this section include ONS, Lightcast, Department for Education, and the HEY Employer Skills Survey.
- **Supply analysis:** Data used in this section include ONS, Ofcom, Department for Education, Department for Digital, Culture, Media and Sport, Office for Students, Higher Education Statistics Agency, and the ESFA Localities DataCube. As education and training statistics only provide detail by subject sector area – such as 'Information and Communication Technology' or 'Computing' – the supply analysis is based on specific digital/ICT provision and doesn't capture the digital skills embedded in other learning programmes.
- **Key Findings:** Summary of key findings from the analysis and the implications arising for strategic skills planning.

Introduction

This report forms part of a suite of digital studies including a Digital Framework undertaken by Kada Research Ltd and a Digital Prospectus produced by AMION Consulting commissioned by HEY LEP, TEC Partnership and Local Digital Skills Partnership (LDSP).

The **Digital Framework** provides an overarching strategy for the advancement of the digital economy and drive investment in skills, infrastructure and innovation. Opportunities related to digital skills identified in the report include:

- **Digital for everyone**, with a focus on expanding digital literacy provision, making it fully accessible and achievable for young people and adults in all HEY's communities.
- **Strengthening the digital skills pipeline**, with a focus on business-providers co-designing and co-delivering education and training that meets current and future skills needs.

The **Digital Skills Prospectus** provides employers with insight into provision offered by education, learning and skills providers in HEY and guides investment in workforce skills. The report highlights the need to develop core digital skills as well as skills in the following course areas:

- Programming, Coding and Applications
- Web and Creative Digital Design
- Data Science and Analytics
- Industrial Design and Engineering
- Digital Technology and Security

This Digital Skills Analysis has considered these aligned studies to ensure read across and consideration in the implications arising.

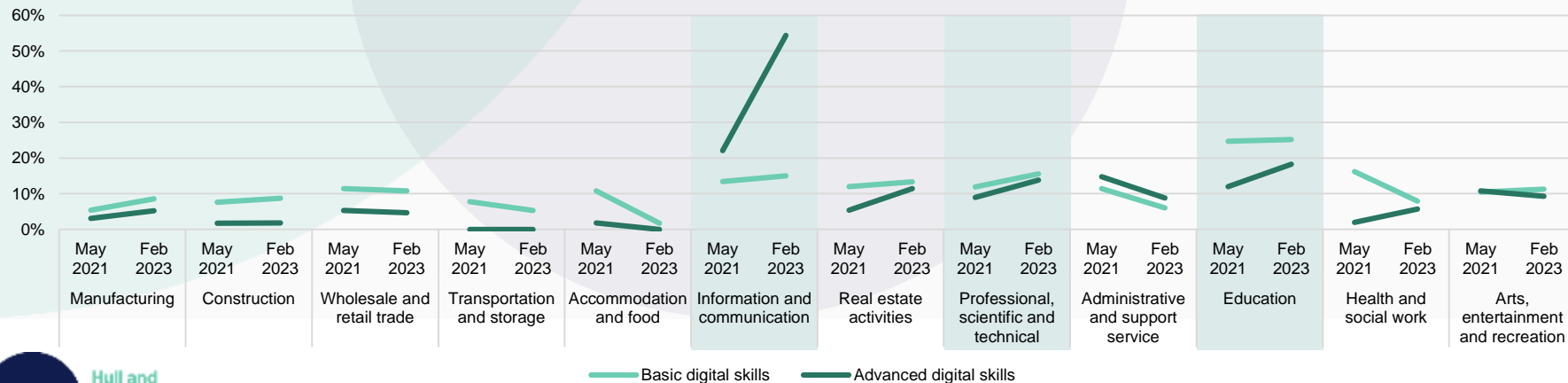
Demand Analysis of Digital Skills

Digital Skills and Employers – National Context

According to the last wave of the Business Insights and Impact on the UK Economy Survey (February 2023), 10% of businesses had a high demand for basic and advanced digital skills in the previous 12 months. In the case of advanced digital skills, this proportion has increased three percentage points in the last two years.

Apart from information and communication and administrative and support services, the sectors presented a higher demand for basic digital skills compared to advanced digital skills. The highest increases in demand for basic digital skills are shown in professional, scientific and technical activities (4 percentage points increase) and manufacturing (+3 p.p.). In the case of advanced digital skills, the highest increases are found in the information and communication sector (+32 p.p.) as well as in education (+6 p.p.) and professional, scientific and technical (+5 p.p.).

Businesses with a high demand for digital skills in the last 12 months in UK, May 2021 - February 2023



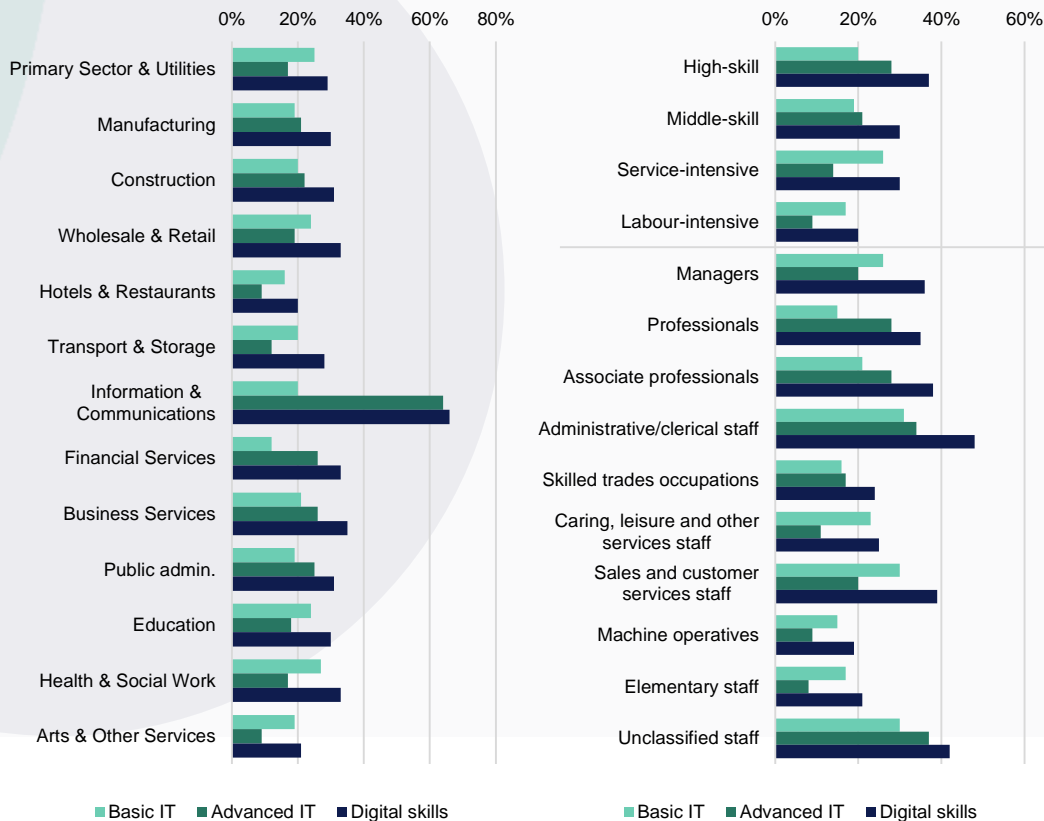
Digital Skills and Employers – National Context

The National Employer Skills Survey, 2019 provides further detail about the skills lacking in applicants as well as a breakdown by industry and occupation for England. The survey shows that a significant proportion of employers found digital skills – basic and advanced – difficult to find. For all occupations and industries, at least 19% of employers reported digital skills as difficult to obtain.

By industry, over 65% and 35% of employers in information & communications and business services, respectively, reported digital skills as difficult to obtain. In both cases, advanced IT skills appear harder to find relative to basic IT skills (by 44 percentage points in the case of the information and communication sector).

Advanced IT skills are more difficult to find in high-skill occupations (28%) and basic IT skills are difficult to find in service-intensive occupations (26%). Specifically, for managers, professionals, associate professionals, administrative, and customer service, over 35% of employers reported digital skills as difficult to obtain.

Skills found difficult to obtain from applicants in England, by industry and occupation, 2019



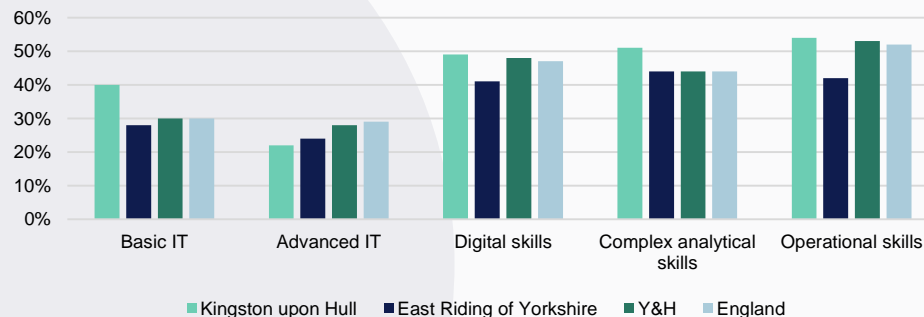
Digital Skills and Employers – Local Picture

Within Hull and East Yorkshire (HEY) digital skills were reported as needing development in the workforce in the next 12 months by 41% of employers in East Yorkshire and 49% in Hull. Compared to national and regional levels, the East Yorkshire presents a lower need to develop these skills.

The demand for basic IT skills points to a higher development need compared to advanced IT skills, with the highest demand in Hull (40% of employers).

Skills related to using new or updated software are those most needed to be developed in the workforce in Hull and East Yorkshire, with foundation digital skills such as turning on devices, typing, changing passwords, and connecting to the internet also identified in the top skills needed to be developed.

Skills that will need developing in the workforce according to employers, by area, 2019



Top IT skills that will need developing in the workforce according to employers in HEY, 2019

Kingston upon Hull		East Riding of Yorkshire	
IT Skill	% employers	IT Skill	% employers
Skills using new or updated company software or systems	75%	Skills using new or updated company software or systems	50%
Basic Microsoft Office applications	9%	Specialist software or hardware / internal systems	14%
Foundation digital skills	6%	Foundation digital skills	13%
Building and maintaining IT systems and networks	5%	EPOS / till systems	7%
Graphic design / design engineering skills	4%	Social media / digital marketing skills	7%

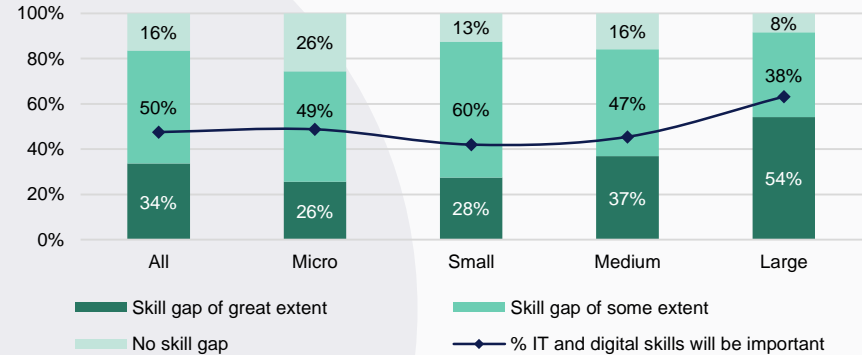
Digital Skills and Employers – Local Picture

In January 2023, ekosgen conducted a survey to inform the development of the Local Skills Improvement Plan (LSIP) for HEY. The survey had a response rate of 278 businesses.

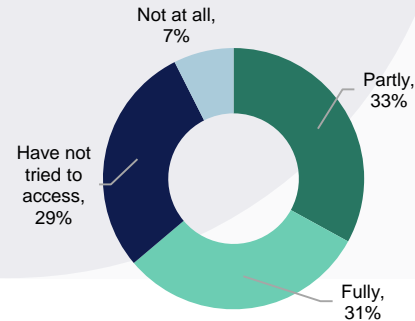
For 48% of respondents, IT and digital skills will be important over the next three years, and 84% of them consider that there are current skill shortages in this area. This proportion increases to 88% in the case of small businesses and 92% for large.

Amongst the respondents with digital skills gaps, only 31% can fully access the digital and technical training they need. To invest more in the development of their skills, 71% need financial support and 61% report they need provision that is better tailored to their needs.

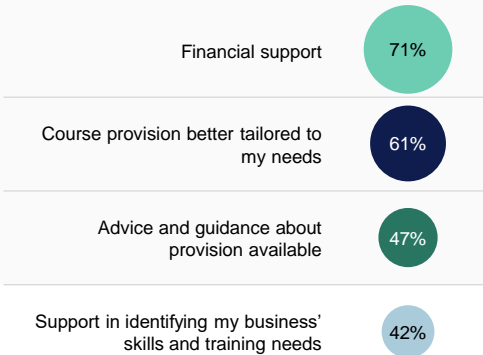
Extent of IT and digital skills shortages in HEY, by company size, 2023



Access to digital and technical skills training, 2023



Support needed to invest more in skills development, 2023

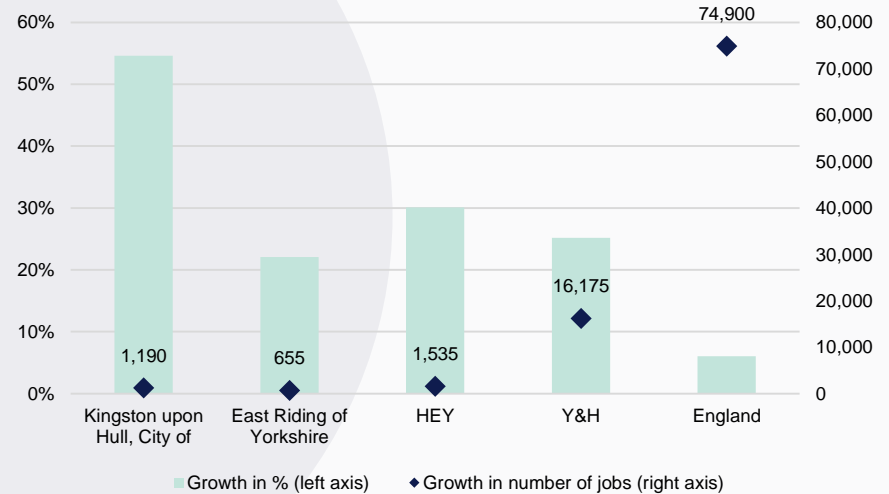


Growth in Jobs

Digital skills demand cuts across all sectors. However, a specific focus on the digital technology sector in HEY identifies that 6,640 people were employed in 2021, which represents 3% of the total number of jobs in the area. Hull and East Yorkshire has shown a 30% growth in the number of digital jobs since 2017 – higher than England and Y&H by around 22 and 5 percentage points respectively – accounting for 1,535 additional jobs in absolute terms.

Within Hull and East Yorkshire, growth has been driven by Hull, which registered 1,190 additional jobs over the period (+55%). Hull is the second highest performing local authority within Y&H on the basis of % growth in digital jobs and is within the top 10% of all local authorities in England on this metric.

Growth in digital technology* employment, by area, 2017-2021

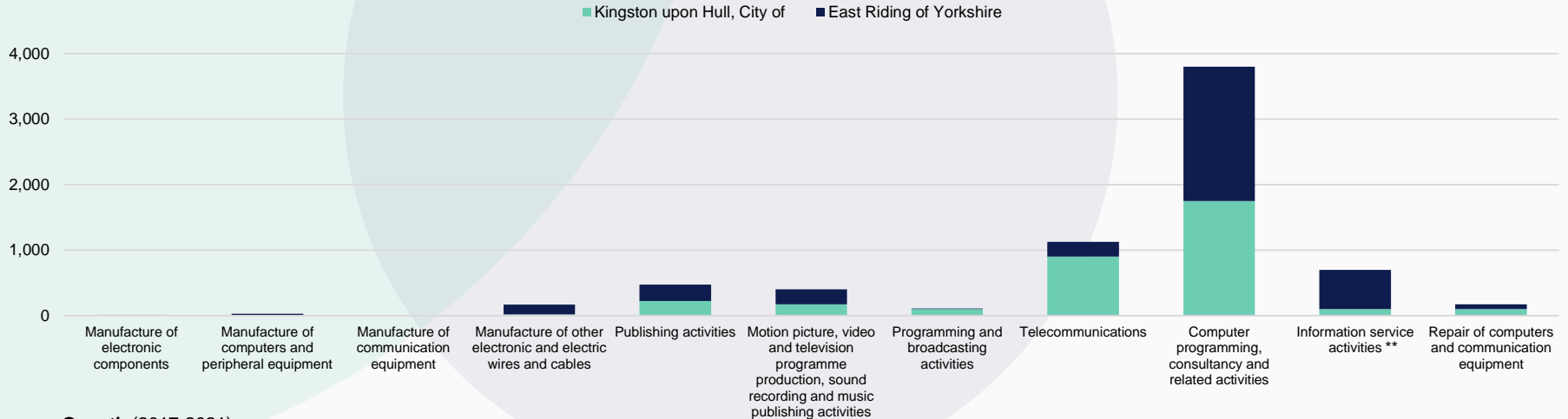


The 2021 Tech Nation Report identifies the city of Hull as a ‘tech hub’ and cites impact tech start up investment including Octopus Energy, Arrival and Connexin. Hull stands out for venture capital investment in the digital economy, ranking 6th in the UK with £81.4m. £80m was raised by smart city business Connexin, providing a key example of how high-growth businesses in emerging technology can drive regional economic growth.

Growth in Jobs Cont'd

Computer programming and related activities is the largest sub-sector (3,550 jobs) in HEY and has seen a strong employment growth of +37% since 2017. This growth contrasts with employment decline in manufacturing sub-sectors such as manufacturing of communication equipment (-100%) and other electronic and electric wires and cables (-50%).

Digital technology sub-sector employment in HEY, 2021



Growth (2017-2021):

0%

0%

-100%

-50%

50%

60%

-33%

17%

37%

40%

300%

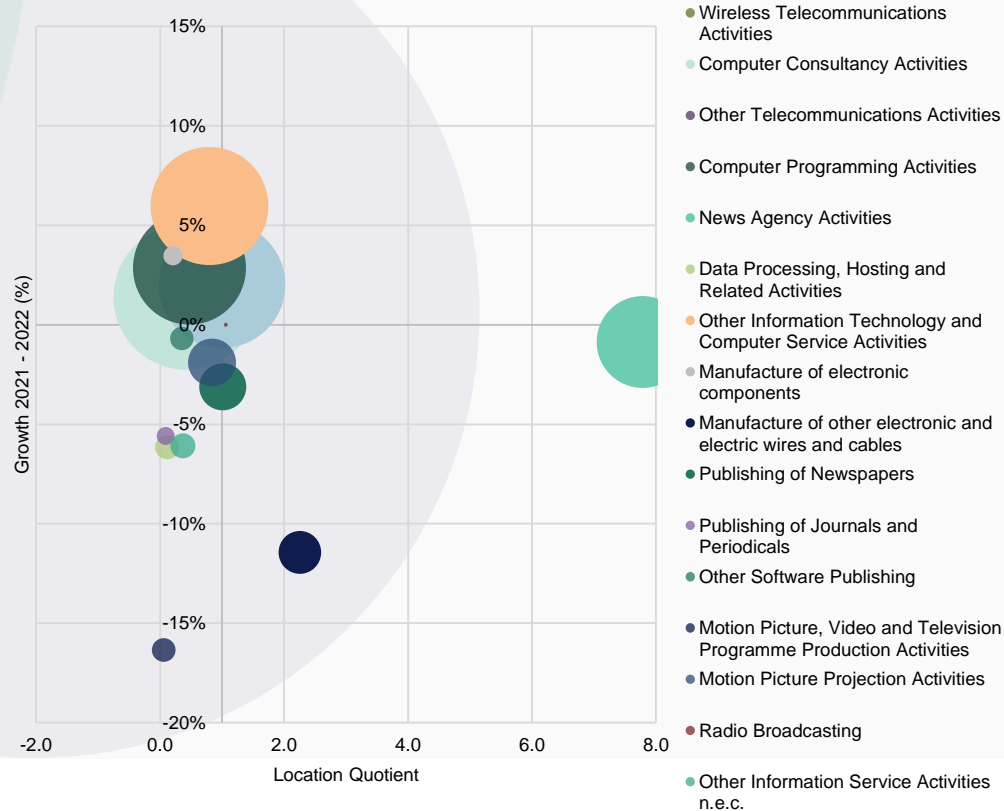
Growth in Jobs – Sub-sector Breakdown

The chart plots the growth in employees in each digital sub-sector as well as its Location Quotient (LQ). The LQ measures how concentrated employment is in HEY compared to the national average, with a LQ above 1 indicating a higher proportion of jobs.

In the last year, the number of digital jobs in HEY has increased by 2%. Sub-sectors with the highest number of employees such as other IT and computer activities (906 jobs in 2022) and other telecommunications activities (1,040) experienced the highest increase in jobs (+6% and +2%, respectively). Most of the other digital sub-sectors experienced a small to moderate decline in the number of employees (from -1% to -12%).

Only three digital sub-sectors in HEY have a LQ higher than 1, including news agency activities, radio broadcasting and publishing of newspapers, accounting for approximately 800 jobs which have experienced a small decline over the past two years (from -1% to -6%).

Digital sub-sector* employment growth since 2021 and LQ, 2022



Jobs Postings – Top Roles

The adjacent chart shows the top 15 roles in HEY by number of job advertisements and job posts for the period 2018-2022 that require IT skills.

There is no explicitly digitally focused roles amongst the 15 most posted jobs in HEY. However the importance of digital skills across all sectors is noted in the breadth of roles requiring IT skills including administration and health and social care. Only 22% of the top 15 roles requiring IT skills are explicitly found within the digital sector (i.e. software developer, computer support specialist, web developer).

Despite the relative low prevalence of IT skills in job advertisements (17% in HEY vs. 24% in UK), the demand for IT skills has grown significantly in the last five years (+127% in HEY compared to +71% in UK).

Top roles by jobs postings in HEY, 2018-2022



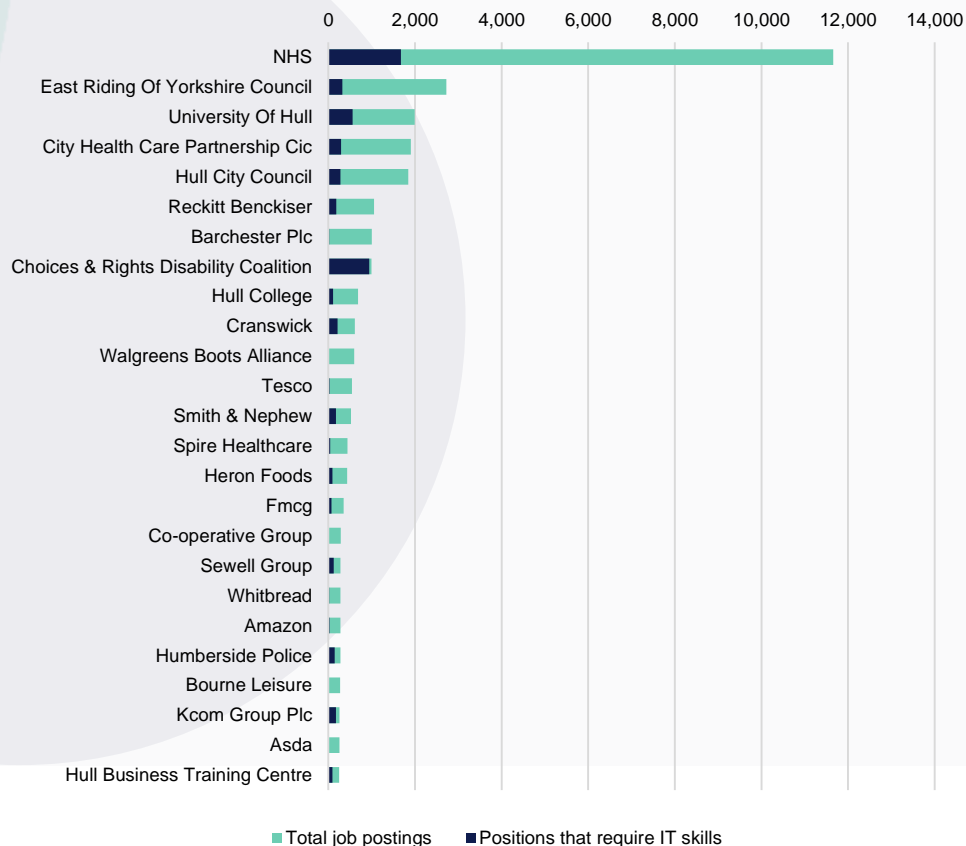
Jobs Postings – Recruitment Firms

The adjacent chart shows the 25 top companies in HEY by the number of unique job vacancies posted between 2018-22, which accounts for 26% of the total number of unique job postings in HEY.

On this list, only Kcom Group Plc operates in the digital technology sector, however, all of the 25 top companies report requiring IT skills in their workforce. The number of unique posted jobs requiring IT skills represents 19% of the total unique job postings in these companies.

The NHS has the highest number of unique jobs advertisements and have sought to recruit over 1,600 people with IT skills in HEY since 2018. Choices & Rights Disability Coalition, an organisation that supports disabled people, required IT skills for 95% of its job postings, particularly in relation to data processing.

Top companies* by unique job postings in HEY, 2018-2022



Jobs Postings – Occupation Breakdown

Within HEY, 5% of the job postings have been for digital occupations* between 2018-2022. The adjacent table lists all of the digital occupations that were included in the job postings for HEY as well as the growth in number of postings between this period.

Programmers, software developers and IT user support technicians are the occupations with the highest demand in the last five years, accounting for half of the jobs postings for digital occupations in HEY.

Postings for telecommunications engineers, IT and telecommunication directors, and IT specialist managers have grown more than 120% during the period. In contrast, web designers and developers have seen a large reduction in the total number of postings since 2018 (-54%).

Unique job postings by digital occupations, 2018-2022

Occupation	Unique job postings	Change (%) 2018-2022
Programmers and Software Development Professionals	1,783	↑ 65%
IT User Support Technicians	1,182	↑ 80%
IT Business Analysts, Architects and Systems Designers	907	↑ 37%
IT Operations Technicians	586	↑ 64%
Information Technology and Telecommunications Professionals n.e.c.	561	↑ 97%
Web Design and Development Professionals	493	↓ -54%
IT Project and Programme Managers	317	↑ 98%
Telecommunications Engineers	187	↑ 175%
Information Technology and Telecommunications Directors	147	↑ 167%
IT Specialist Managers	93	↑ 121%
IT Engineers	11	↑ 50%

Automation – Occupation Breakdown

In 2017, the ONS estimated a relatively high probability of automation of jobs in Hull and East Yorkshire (50% and 45%, respectively), with Hull amongst the top 20% local authorities with the highest probability of automation and proportion of jobs with medium and high risk of automation in England.

In HEY, elementary administration and service occupations account for 10% of all occupations and their number of employees has grown 8% in the last five years. Occupations within this category have a probability of automation that ranges between 56% to 73%. This is followed by administrative occupations, accounting for 9% of all jobs and a probability of 47% to 61%. This indicates a high level of exposure to automation in HEY.

In contrast, highly skilled occupations such as science, research, engineering and technology professionals have a lower likelihood of automation (between 22% and 32%).

Top occupations in HEY and probability of automation, 2022





















Top occupations in HEY	Occupation share in HEY (2022)	Growth in jobs (2017-2022)	Range of probability of automation within the occupation category (2017)
Elementary Administration and Service Occupations	10%	↑ 8%	56% – 73%
Administrative Occupations	9%	↑ 8%	47% – 61%
Corporate Managers and Directors	7%	↓ -3%	23% – 37%
Caring Personal Service Occupations	7%	↓ -16%	42% – 56%
Business and Public Service Associate Professionals	5%	↑ 25%	28% – 45%
Sales Occupations	5%	↓ -23%	48% – 65%
Teaching and Other Educational Professionals	5%	↑ 9%	20% – 27%
Science, Research, Engineering and Technology Professionals	5%	↑ 81%	22% – 31%
Business, Media and Public Service Professionals	5%	↑ 40%	22% – 32%
Health Professionals	5%	↓ -15%	18% – 27%

Automation – Industry Breakdown

A similar analysis by industry shows that retail trade and food and beverage services are amongst the largest industries in HEY by number of employees (8% and 6%, respectively). These sectors are also among the most exposed to automation, with a probability of automation score of 58% and 63%, respectively. In the case of retail trade, since 2017 the industry has experienced a 16% decline in employment.

Other large sectors in HEY include education and health activities, which account for 9% and 8% of employees, respectively. Both sectors are among the least exposed to automation, with a probability of 34% in both cases. In addition, these sectors have shown an increase in employment since 2017 (+5% and +18%, respectively).

Top industries in HEY and probability of automation, 2021

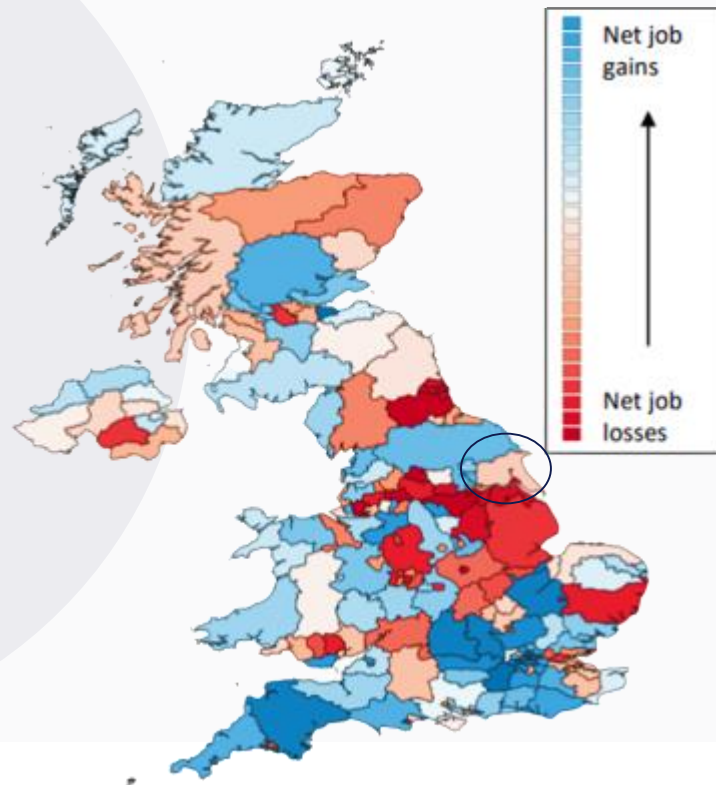
Top sectors in HEY	Industry share in HEY (2021)	Growth in jobs (2017-2021)	Probability of automation (2017)
Education	9%	 5%	 34%
Retail trade, except of motor vehicles and motorcycles	8%	 -16%	 58%
Human health activities	8%	 18%	 34%
Food and beverage service activities	6%	 0%	 63%
Public administration and defence; compulsory social security	5%	 -7%	 36%
Manufacture of food products	4%	 0%	 53%
Wholesale trade, except of motor vehicles and motorcycles	4%	 0%	 54%
Employment activities	4%	 -18%	 43%
Social work activities without accommodation	4%	 13%	 40%
Residential care activities	3%	 -11%	 50%

Potential impact of Artificial Intelligence

The ONS' estimations of the impact of automation have not been updated since 2017. However, a recent PWC report of the impact of Artificial Intelligence on UK provides insights that are aligned with the 2017 ONS estimates:

- **Hull and East Yorkshire**, shaded in red in the map, are expected to see net job losses as a result of AI over 20 years, with Hull amongst the regions with the most negative impact of AI in UK.
- **Professional occupations** are expected to see high net job gains, as AI adoption will likely be a tool or platform to perform specific tasks.
- Net job creation is also estimated in **managerial occupations**, which tasks are difficult to automate.
- **Manual roles and jobs in wholesale and retail** will decrease as technologies such as robot process automation roll out across the economy.
- The largest net employment gains may be seen in the **health and social care sector** because of its high demand due to an ageing population.
- **Information and communications and other professional, scientific and technical services** will also see significant employment gains, including highly skilled jobs linked closely to AI and other emerging technologies.

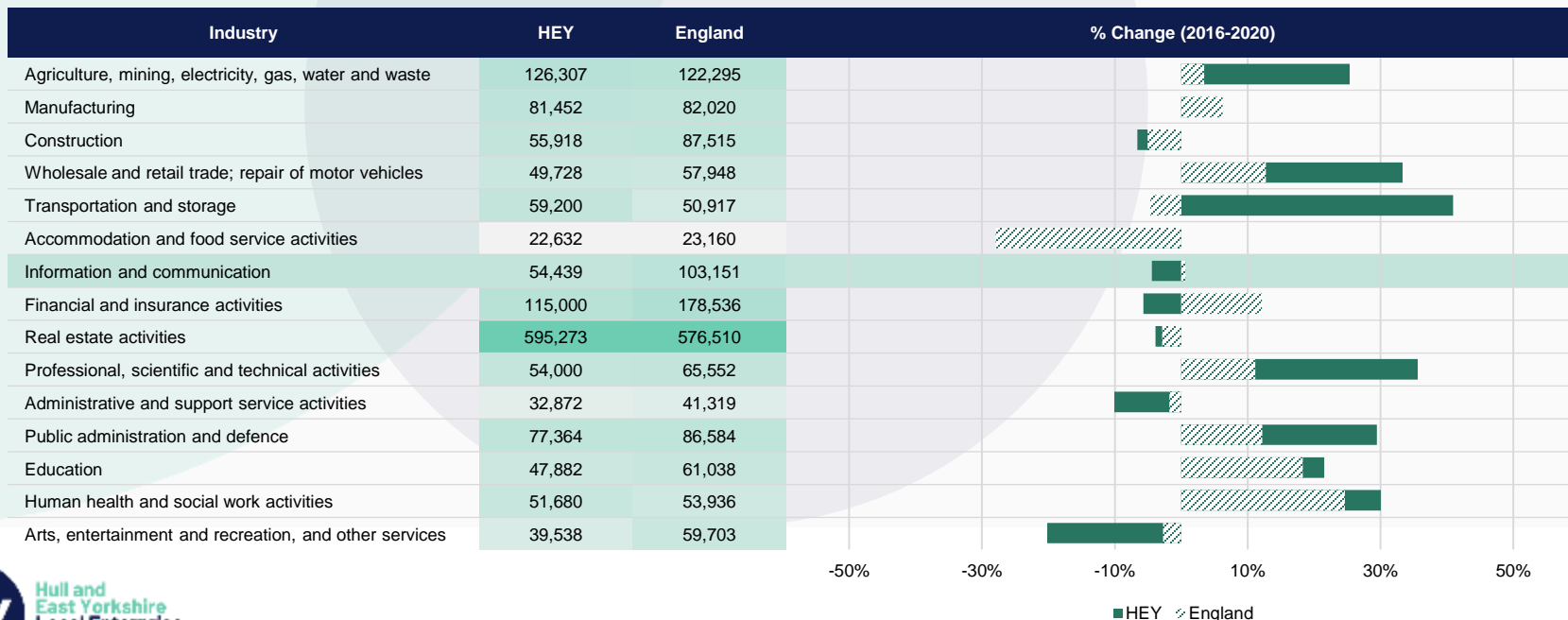
Net employment effects of AI industries in HEY and probability of automation, 2021



Productivity

One key measure of productivity is total economic output (GVA) per full-time equivalent worker (FTE). The information and communication sector accounts for £54k per FTE in HEY and is the sector with the highest productivity gap compared to England (-47%). From 2016 to 2020 productivity in this sector has also decreased by 4% in HEY, whilst in England there has been a small but positive growth (+1%).

GVA per FTE by industry and area (£), 2020



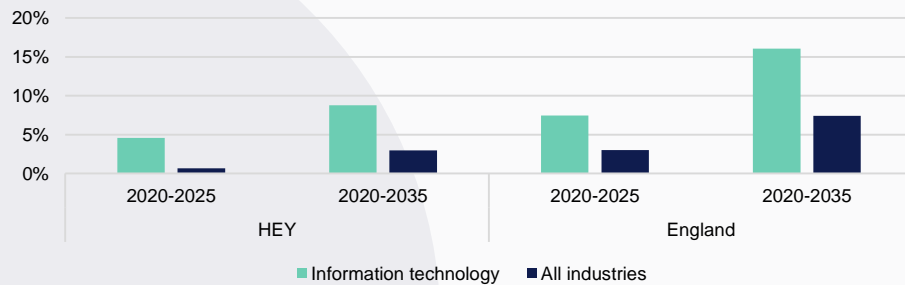
Future Demand

The Department for Education has provided a forecast of the UK's labour market up to 2035.

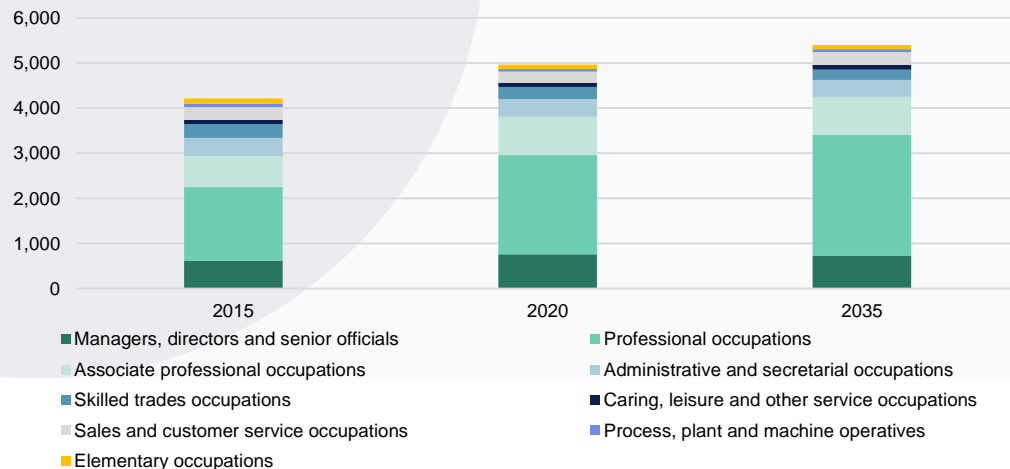
In HEY, the data projects that the total number of employees will increase by 3% from 2020 to 2035, and the information technology sector will experience a 9% growth. This sectoral growth is expected to be lower than the national trend (16%) while the share of employees in the sector with respect to the total number of employees in HEY will remain similar to current levels (1.8% in 2020 vs 1.7% 2035).

Occupations in the information technology sector are mainly highly skilled (77% in 2020) and this will continue to be the case by 2035 (79%). By 2035, professional occupations in the sector will increase by 22% percentage points (from 2,192 in 2020 to 2,686 in 2035), while other highly skilled occupations such as managers and associate professionals will experience a decline in employment by 5% and 2%, respectively.

Employment growth by area, 2020-2035



Employment in HEY by occupation in information technology, 2015-2035



Driving growth of the Hull and East Yorkshire economy for the benefit of our communities

Source: Department for Education, Labour market and skills projections:2020 to 2035

Future Demand – Digital Sectors Breakdown

Lightcast provides projections of the labour market and specifically for the digital sector in the short term.

Lightcast predicts an increase of 3% of jobs in the digital technology sector of HEY by 2027. Digital sub-sectors within information and communication (SIC codes 58-63) are expected to grow by 4%, similar rate to the rate projected by the Department for Education (5% for 2020-2025).

The four largest digital sub-sectors by number of employees include computer consultancy, other telecommunication activities, other IT and computer services, and computer programming which are predicted to grow at least 4% by 2027. The rest of the sub-sectors, although they only account for 25% of the digital employment in HEY, will mainly face a decline in jobs, with negative rates of up to -52%.

Projected growth in jobs by digital sub-sector in HEY, 2022-2027

Sub-sector	Jobs 2022	Growth 2022-2027
Computer Consultancy Activities	1,376	4%
Other Telecommunications Activities	1,040	5%
Other Information Technology and Computer Service Activities	906	15%
Computer Programming Activities	834	8%
News Agency Activities	548	-2%
Motion Picture Projection Activities	149	-5%
Publishing of Newspapers	144	-9%
Radio Broadcasting	110	-14%
Manufacture of other electronic and electric wires and cables	119	-35%
Other Software Publishing	36	-2%
Other Information Service Activities n.e.c.	40	-18%
Data Processing, Hosting and Related Activities	38	-18%
Manufacture of electronic components	24	9%
Wireless Telecommunications Activities	32	-38%
Motion Picture, Video and Television Programme Production Activities	37	-52%
Other Publishing Activities	33	20%
Publishing of Journals and Periodicals	21	-16%
Repair of Computers and Peripheral Equipment	20	-42%
Publishing of Computer Games	10	28%

Driving growth of the Hull and East Yorkshire economy for the benefit of our communities

Source: Lightcast, 2022-2027

Supply Analysis of Digital Skills

Local Context

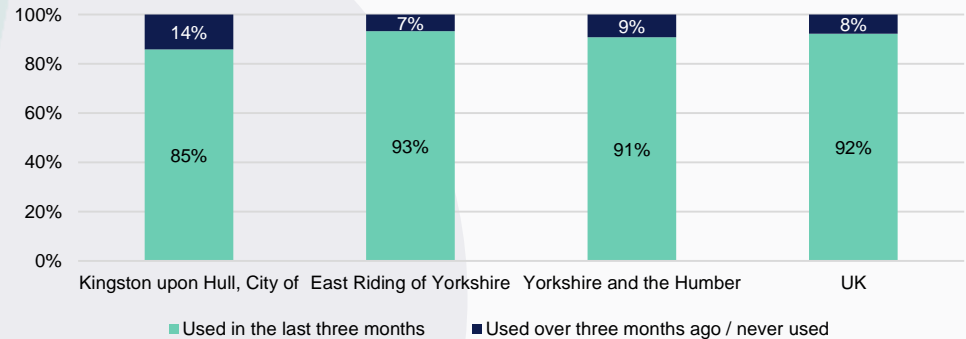
Access to digital technology and broadband connectivity is essential for digital upskilling.

By September 2022, 98% of businesses and homes in Hull are able to receive gigabit-capable services*, positioning it as the local authority with the highest value in this metric in UK. By contrast, this proportion of businesses and homes decreases to 76% in East Yorkshire, and to 36% in the rural areas of East Yorkshire.

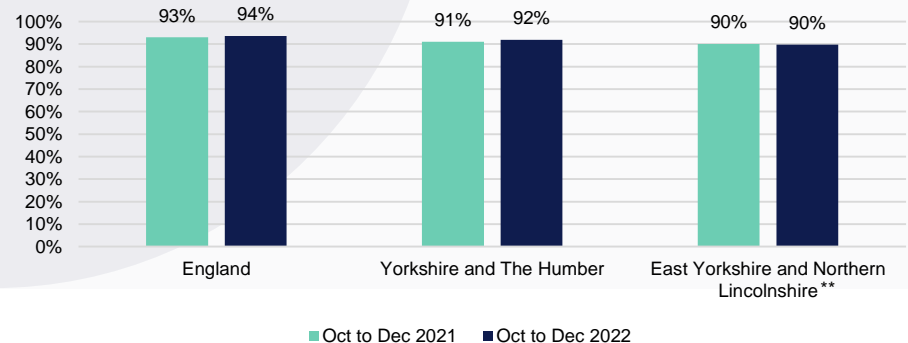
Despite this performance, Hull is the local authority with the second lowest proportion of people using the internet in the last three months in Y&H (85% in 2020), while East Yorkshire remains around national levels (93% vs 92%).

Recent data from the DCMS Participation Survey suggests that internet usage has not increased in HEY despite the national trend of higher use of internet since the pandemic.

Internet users by area, 2020



Use of internet by area, 2021 - 2022

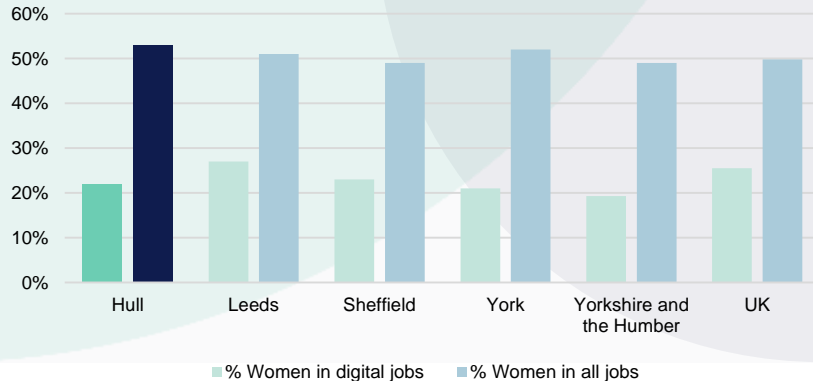


Diversity in the digital workforce

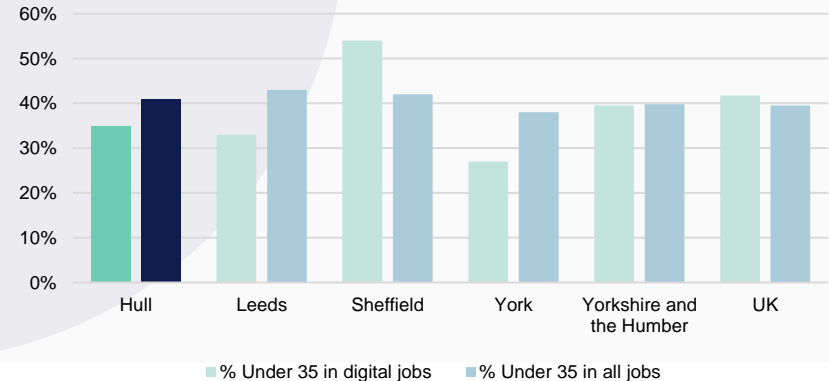
In the city of Hull, the proportion of women in jobs accounts for 53% of the total. However, women remain heavily under-represented in the digital sector (22% of digital jobs) – below the average in UK (26%) and other ‘tech hubs’ in the region such as Leeds (27%) and Sheffield (23%).

Hull also has a relatively small proportion of tech employees under 35 years of age (35%) compared to the average in Y&H (40%) and UK (50%). This suggests that there is still work to be done to achieve greater diversity in the digital sector in Hull and East Yorkshire.

Women in digital jobs by city, 2019



Under 35 years old in digital jobs by city, 2019



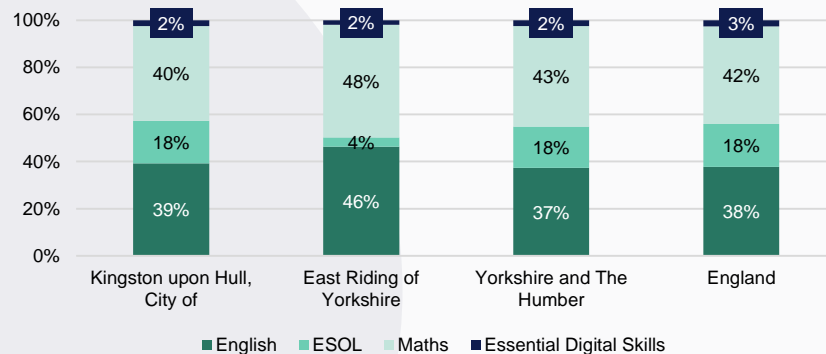
Essential Digital Skills Provision

The demand analysis highlighted the need to develop basic IT skills in HEY's workforce. Basic skills courses offer the necessary skills for life, work, and pursue further training. Since 2021, the Department for Education reports statistics in new essential digital skills. It should be noted that digital skills will be embedded in most learning programmes, and this dataset only reflects participation in essential digital skill courses defined by the Department for Education.

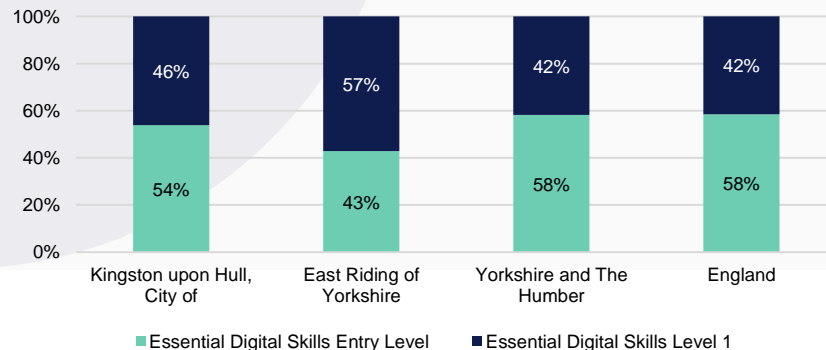
In 2021/22, 170 adults participated in essential digital skills courses in HEY, 100 in Hull and 70 in East Yorkshire. This represents 2% of total HEY participation in basic skills courses, similar to regional levels, although lagging slightly behind the national position (3%).

In line with the highest need for basic IT skills upskilling in Hull compared with East Yorkshire (40% vs. 28%), Hull's participation on essential digital skills courses are relatively more concentrated in entry levels (54% vs 43%).

Participation in basic skills courses by area and subject, 2021/22



Participation in Essential Digital Skills courses by area and level, 2021/22



Apprenticeship Provision

HEY maintained a steady level of apprenticeships starts, with 5,345 starts in 2021/22 compared to 5,398 in 2019/20. Apprenticeship achievements in contrast fell by 26% in HEY in the same period, well above the national figure (-7% in England) and likely attributable to the pandemic.

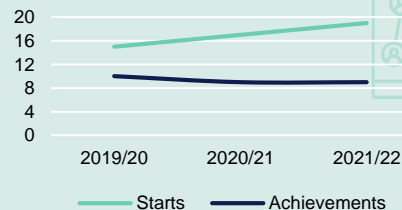
Apprenticeships starts for ICT subjects has increased from 164 in 2019/20 to 244 in 2021/22 (+49%), accounting for 5% of total starts in HEY. This strong performance is mainly explained by the 88% increase in apprenticeships starts for ICT practitioners from 127 to 239. Apprenticeships for media and communication subjects have also shown an increase in starts (+27%) but from a smaller base (15 to 19).

HEY's downward trend in achievements is also reflected in all digital areas, with ICT for users as the subject with the highest decrease from 42 in 2019/20 to 5 in 2021/22 (-88%).

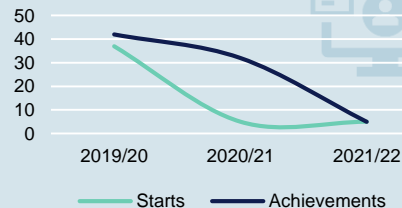
Apprenticeships by sector subject area in HEY, 2019/20 - 2021/22

Sector Subject Area	2021/22	
	Starts	Achievements
Agriculture, Horticulture and Animal Care	76	37
Arts, Media and Publishing	33	11
Crafts, Creative Arts and Design	14	2
Media and Communication	19	9
Business, Administration and Law	1,074	490
Construction, Planning and the Built Environment	573	154
Education and Training	102	32
Engineering and Manufacturing Technologies	1,427	495
Health, Public Services and Care	1,101	328
Information and Communication Technology	244	68
ICT for Users	5	5
ICT Practitioners	239	63
Leisure, Travel and Tourism	67	20
Retail and Commercial Enterprise	645	474
Science and Mathematics	3	1
Total	5,345	2,110

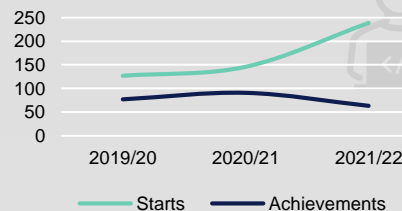
Media and communication



ICT for users



ICT practitioners



Apprenticeship Provision

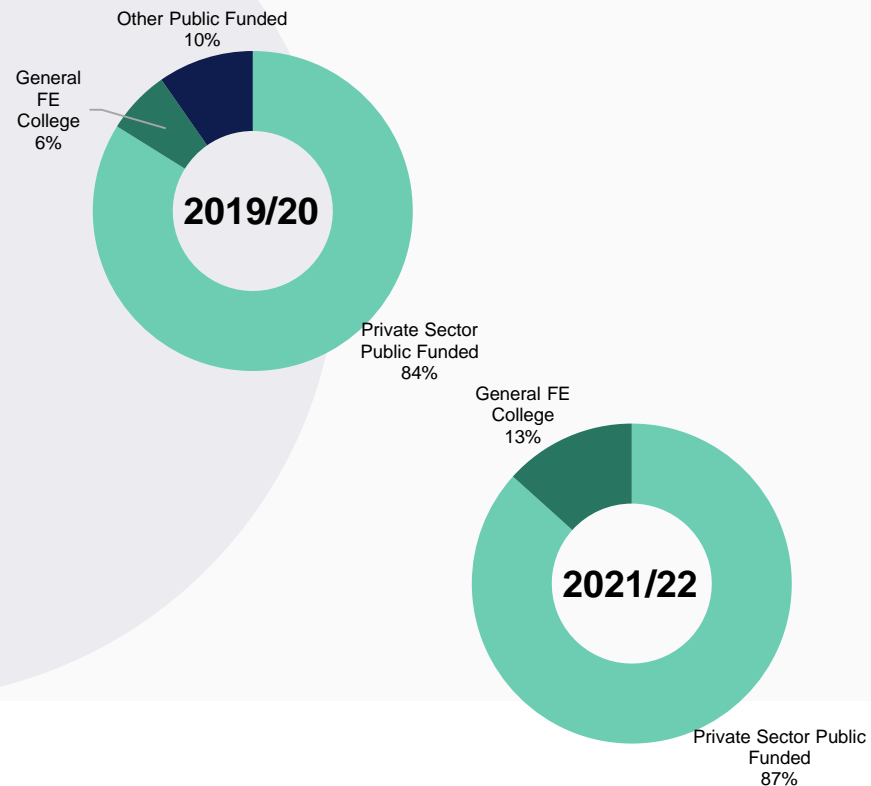
The supply of apprenticeships in HEY for the Information and Communication sector consists of five providers, two of them registering apprenticeships starts in 2021/22: Hull Business Training Centre Limited and Hull College.*

Providers in HEY can be grouped in three types:

- FE Colleges, which includes Hull College and East Riding College;
- Private Sector Public Funded, which includes Hull Business Training Centre Limited and Encompass Consultancy Limited; and
- Other Public Funded, such as Kingston upon Hull City Council.

Private sector public-funded apprenticeships represent the largest share of ICT starts (87% in 2021/22). General FE Colleges have obtained the highest increase in apprenticeships starts from 2019/20 (+200%), while other public funded providers paused delivery since the pandemic.

Information and communication apprenticeships by provider type in HEY, 2019/20 - 2021/22

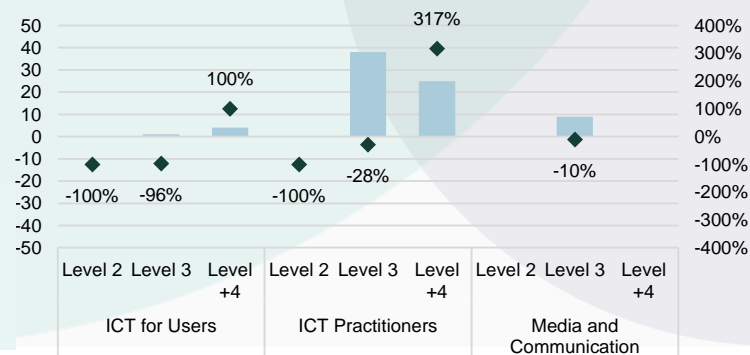


Apprenticeship Provision

The delivery of advanced apprenticeships (Level 3) has been the most common in HEY ICT sectors (62% of achievements). In the media and communication subject sector, all the achievements were advanced. In the ICT subject sector, intermediate apprenticeships (level 2) experienced the largest and continuers decline, from 15 and 18 for users and practitioners in 2019/20, respectively, to 9 and 2 in 2021/22, and to zero in 2021/22 for both sectors. Higher apprenticeships (Level +4), in contrast, increased by at least 100%.

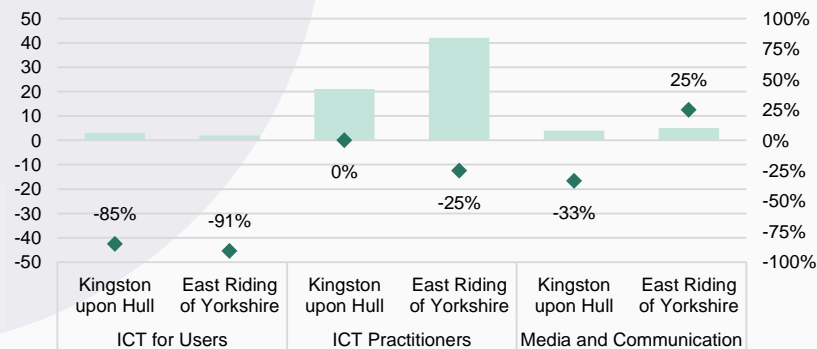
Achievements in digital subjects are concentrated in East Yorkshire (64%). The main differences with Hull are found in the number of achievements for ICT practitioners subjects (42 in East Yorkshire vs. 21 in Hull), and in the variation in achievements for media and communications subjects (+25% vs. -33%).

Apprenticeships achievements in HEY by level and sector subject area, 2021/22



■ Apprenticeships achievements 2021/22

Apprenticeships achievements in HEY by local authority and sector subject area, 2021/22



■ Apprenticeships achievements 2021/22 ◆ % Change 2019/20 - 2021/22

HE Provision – University of Hull

The University of Hull is the main provider of higher education in Hull and East Yorkshire. In 2021/22, there were 15,075 enrolments at the University of Hull, 71% accounted for undergraduate students and 29% for postgraduate students (13 percentage points more than in 2019/20).

Although digital skills are embedded in most learning programmes, advanced digital skills can be found in specific digital and ICT subjects such as design and creative arts; media, journalism and communications; and computing. These subjects concentrate 9% of enrolments and saw a 11% increase in enrolments since 2019/20. Computing and media, journalism and communications represent 5% and 2% of total enrolments, respectively, which is similar to the average in UK (6% and 2%).

Although the student population of these subjects are mainly undergraduates, the number of postgraduate students increased from 110 to 420 in the last two years (+282%).



University of Hull enrolments, 2019/20 - 2021/22

Subject	2021/22 Enrolments	Change 2019/20 – 21/22
Subjects allied to medicine	2,670	525
Social sciences	2,410	195
Business and management	2,080	145
Engineering and technology	1,660	435
Education and teaching	795	-150
Computing	770	80
Biological and sport sciences	685	-135
Medicine and dentistry	620	105
Psychology	585	-75
Law	580	55
Language and area studies	555	-60
Physical sciences	405	-105
Geography, earth and environmental studies (natural sciences)	335	25
Media, journalism and communications	310	90
Historical, philosophical and religious studies	255	-170
Design, and creative and performing arts	245	-40
Mathematical sciences	55	-30
Geography, earth and environmental studies (social sciences)	45	-55
Combined and general studies	10	-15
Architecture, building and planning	5	5
Agriculture, food and related studies	0	-5

■ Undergraduates ■ Postgraduates

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Source: Higher Education Statistics Agency, 2019-2022

HE Provision – University of Hull

Responding to a growing demand for data science and AI skills ...

The University of Hull's Centre of Excellence for Data Science, Artificial Intelligence, and Modelling (DAIM) brings together practitioners from across traditional disciplinary boundaries to be at the forefront of the development of new technologies in data science and AI. DAIM's ambitions encompass the provision of exemplary service within the University, and beyond to the public sector, that will enhance mutual goals and tackle complex industry issues.

The Masters conversion course takes in students from any discipline and trains them up for the workforce in AI and data science. Achievements include:

- 
864 students enrolled in the MSc Artificial Intelligence and Data Science since September 2020
- 
A wide range of graduate destinations, from banking and start-ups, to the high street and security
- 
A new £45m facility with state-of-the-art equipment to support computational teaching on campus



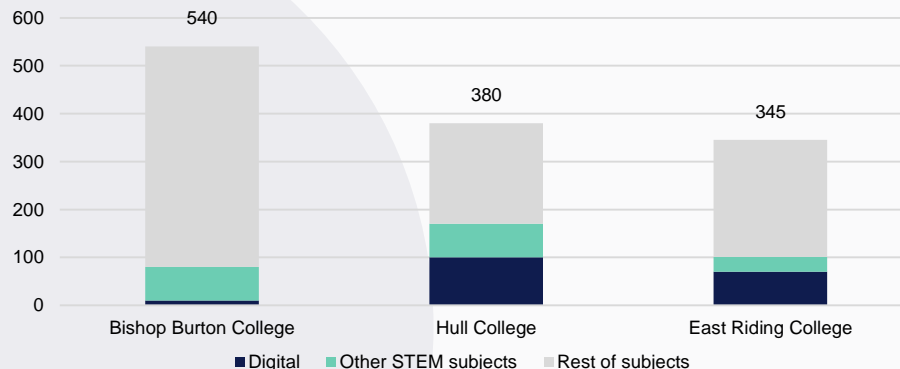
HE Provision – Colleges

Three colleges provide higher education in HEY: Hull College, East Riding College (part of the TEC Partnership) and Bishop Burton College.

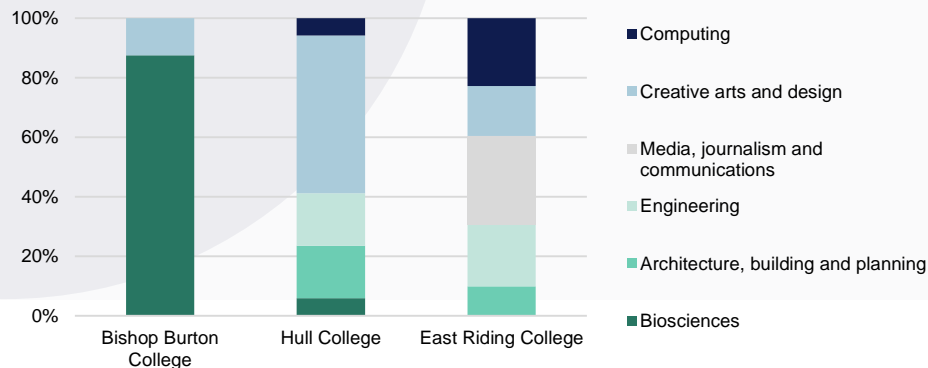
In 2021/22, there were 1,265 enrolments in these colleges; 14% of these enrolments were in specific digital subjects such as arts and design, computing, and media, journalism and communications. Digital skills are also embedded in other learning programmes. Bishop Burton College had the highest number of HE enrolments, but Hull College had the greater proportion of digital related enrolments (26%, which increases to 45% after considering other STEM subjects strongly related to digital skills such as engineering and architecture).

Amongst digital and STEM subjects, 23% and 6% of enrolments at East Riding College and Hull College were in computing subjects, respectively. Arts and design have a higher prevalence in HEY's colleges (33%), followed by biosciences and engineering (23% and 15%, respectively).

HE enrolments in HEY's Colleges, 2021/22



HE enrolments by digital and STEM subject, 2021/22



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Source: Office for Students, 2021/2022; East Riding College

HE Provision – Case Study

HEY colleges and universities are working together with other providers in the region to develop technical skills ...

The Yorkshire & Humber Institute of Technology (IoT) is one of twelve Institutes of Technology across England designed to increase access to higher level technical skills required by employers.

The IoT is based on a collaborative partnership between colleges, universities and employers in the region and delivers high quality, higher-level technical qualifications with a focus on STEM in the following subject areas:



**Engineering
and
Engineering
Technologies**



**Manufacturing
Technician**



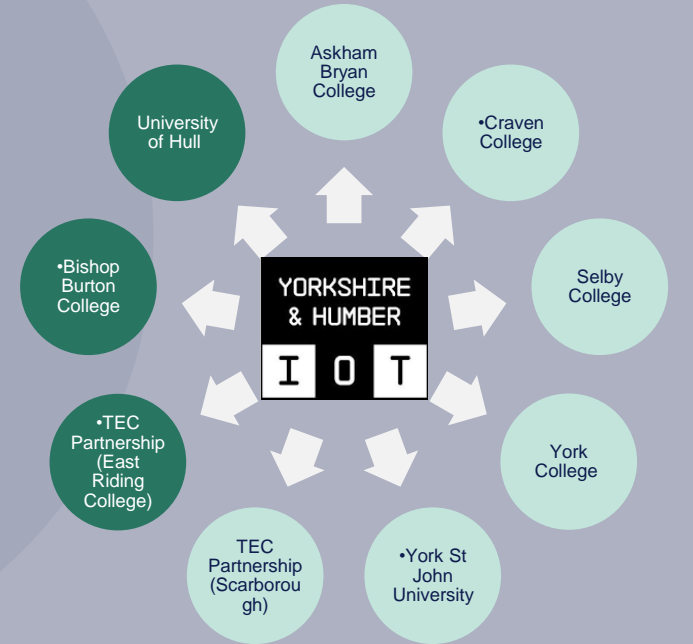
**Digital,
Computing
and Gaming**



**Precision
Agriculture
Technology,
Agricultural
Engineering**



**Construction
and the Built
Environment**



■ HEY delivery partners

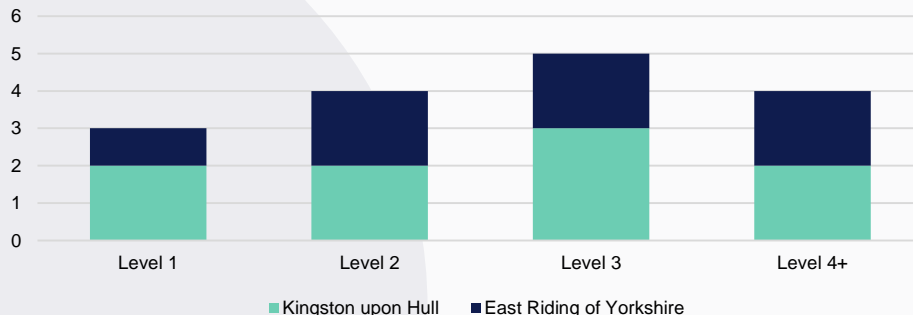
Education and Training Provision

The following analysis is based on desk-based research undertaken and reflects the available course information online of the colleges and universities in Hull and East Yorkshire. The findings should be treated only as indicative.

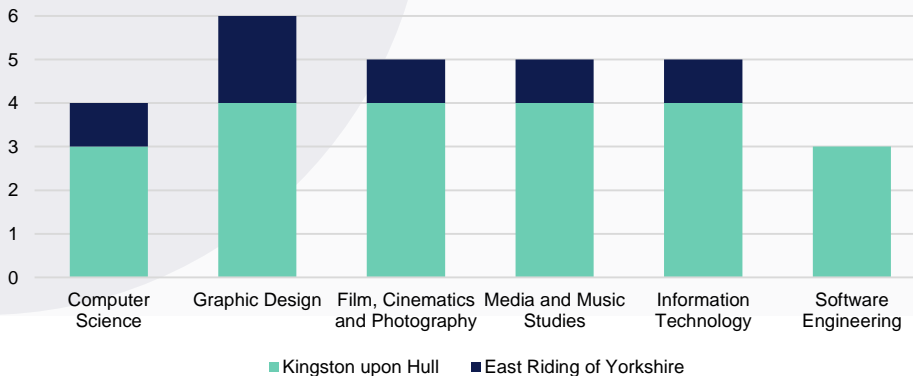
Digital courses are offered by the University of Hull and five colleges* in HEY. The five colleges in HEY deliver digital courses at Level 3, while Level 4+ provision is offered by four providers: the University of Hull, Hull College, East Riding College and Bishop Burton College.

All six digital providers deliver courses in graphic design, and five providers deliver courses in film, cinematics and photography, media and music studies and information technology. Software engineering is under-represented on HEY with only three providers supplying this subject – all of them in Kingston upon Hull.

Digital providers in HEY by level of study, 2023



Digital providers in HEY by subject, 2023



Education and Training Provision

The **Digital Skills Prospectus** provides employers and individuals information about course areas and education and training providers in Hull and East Yorkshire. Five course areas are covered in the report. These subjects have a strong overlap with employer demand:



Programming, Coding and Applications



Computer programming and related activities is the largest digital subsector in HEY and has seen a strong employment growth in the last five years (+37%).



Web and Creative Digital Design



20% of businesses in East Yorkshire reported the need to improve design, animation and graphic skills – higher than England (6%) and Y&H (7%).



Data Science and Analytics



There were 1,302 jobs postings requiring data analysis and data science skills in HEY, 105% more than in 2018 and with an advertised salary 35% higher than the median in HEY.



Digital for Industrial Design and Engineering



60% of businesses surveyed in the manufacturing, engineering and construction sector consider digital technologies as essential or necessary, but only 30% can access all the digital skills training they need.



Digital Technology and Security



Around a third of businesses surveyed to inform the LSIP (31%) reported the need to develop cyber security skills within their business.

Key Findings and Implications Arising

Key Findings – Demand for Digital Skills

10% of UK businesses have a high demand for basic and advanced digital skills, and this demand is growing particularly in information & communication, professional, scientific and technical, and education sectors.

A fifth of all UK employers report digital skills as difficult to obtain across all occupations and industries. This is acute in information & communication and business services sectors. Demand to develop basic IT skills are highest and demand for advanced IT skills are growing.

The HEY LSIP survey identified that 84% of respondents are currently experiencing digital skill shortages, but only a third of them can fully access the digital skills training they need. Financial support and tailored course provision will help them to invest in workforce digital skills development.

The digital technology sector is growing in HEY, particularly within Hull. A key driver of growth is the computer programming and related activities sector. Key specialisms include radio broadcasting and publishing of newspapers.

Key Findings – Demand for Digital Skills

The demand for IT skills cuts across all sectors and has grown significantly in the past 5 years (127% in HEY) in the number of job postings. Programmers, software developers and IT user support technicians are in high demand.

HEY faces a high level of exposure to automation, particularly amongst prevalent elementary administration and service occupations, and sectors such as retail, food and beverage services. AI and related technologies are expected to generate relevant jobs losses in HEY.

HEY has a significant productivity gap in the Information and communication sector (-47% below England on GVA per FTE). Productivity has decreased in the sector in HEY compared to growth in England.

The information and communication sector in HEY is projected to grow by 9% in employment terms by 2035, particularly within professional occupations.

Key Findings – Supply of Digital Skills

HEY is well connected by digital infrastructure, particularly within Hull. However, despite this excellent connectivity, Hull has relatively low internet usage (85%) compared to East Yorkshire, indicating a digital skills gap.

Women and young adults (under 35 years old) are under-represented in Hull's digital sector compared to the average in UK and other tech hubs in the region. This suggests that there is still work to be done to achieve greater diversity in the digital sector in HEY.

Digital skills are embedded in most learning programmes. However, data from the Department for Education about basic skills training suggests that participation in essential digital skills courses in HEY has been on par with regional benchmarks (2%).

Apprenticeship starts for ICT subjects has increased over time and accounts for 5% of total starts in HEY. The number of achievements has fallen and is likely attributable to the impact of the pandemic.

Key Findings – Supply of Digital Skills

Five providers in HEY offer I&C apprenticeship provision. Private sector public-funded apprenticeships represent the largest share of I&C starts.

I&C apprenticeship achievements are concentrated at Level 3 and Level 4+. Level 4+ provision has grown over time. Provision is concentrated in the East Yorkshire (64%).

Digital HE provision accounts for 9% of all enrolments at the University of Hull and has seen an increase of 11% in enrolments since 2019/20. This includes design and creative arts, media, journalism and communications and computing. UoH's DAIM Centre of Excellence is supporting higher level digital skills and innovation.

Three colleges also provide HE provision in HEY. 14% of total HE enrolments were in digital subjects such as arts and design, computing, and media. STEM subjects are also closely aligned with digital provision. The Y&H IOT will increase access to higher level technical digital skills required by employers.

Digital Skills Policy Implications Arising from the Evidence

The demand for digital skills is growing at all levels, and across all industries and occupations. This has accelerated through COVID-19 and technological change. Investment in digital skills will reduce the risk of exposure to automation and facilitate industry digitalisation.

Digital inclusion is a key issue. Investment in digital infrastructure, hardware, software and digital skills is a prerequisite to closing the digital gap and supporting inclusion, progression and technology adoption.

Investing in higher level digital skills and digital innovation will contribute towards closing the productivity gap which exists in HEY. This requires tailored provision and support mechanisms aligned to employer needs.

Digital skill shortages are a barrier to growth and competitiveness. Digital skills provision aligned to demand, and inspiring people to pursue digital careers, can stimulate investment in digital skills and respond to identified growth in the digital technology sector.

Digital Skills Policy Implications Arising from the Evidence

Digital skills provision offering choice at all levels, accompanied by quality CEIAG, can facilitate progression to higher level digital skills acquisition to meet future demand. Targeting the emerging LSIF funding can provide investment in new facilities and equipment, support delivery and development of new courses and curriculum.

The LSIP needs to account for digital skill demands and implement recommendations on how providers can respond to identified needs.

The Digital Framework provides an overarching strategy for the advancement of the digital economy and drive investment in skills, infrastructure and innovation.

The Digital Skills Prospectus provides employers with insight into provision offered by education, learning and skills providers in HEY and guide investment in workforce skills.

Appendix

Digital Terminology

Artificial Intelligence (AI): the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings.

Autonomous Vehicles: vehicles that can drive itself from a starting point to a predetermined destination in “autopilot” mode using various in-vehicle technologies and sensors, including adaptive cruise control, active steering, anti-lock braking systems, GPS navigation technology, lasers and radar.

Big Data: extremely large datasets that may be analysed computationally to reveal patterns, trends, and associations, especially relating to human behaviour and interactions.

Cloud-Based Tools: applications, services or resources made available to users on demand via the Internet from a cloud computing provider’s servers.

Industry 4.0 Technologies: technologies which enable digital transformation of manufacturing/production and related industries and value creation processes; relating to automation and data exchange.

Industry 5.0 Technologies: advanced technologies, including robots and smart machines, working alongside people to achieve societal goals, economic growth and business objectives.

Internet of Things (IoT): the interconnection via the Internet of computing devices embedded in everyday objects, enabling them to send and receive data.

Machine Learning: an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed.

Robotics: the branch of technology that deals with the design, construction, operation, and application of robots.

Sensor Technology: a device which detects or measures a physical property and records, indicates, or otherwise responds to it.

Smart Homes: a residence that uses internet-connected devices to enable the remote monitoring and management of appliances and systems, such as lighting and heating.

Virtual Manufacturing: the use of simulation-based technology to aid engineers in defining, simulating, and visualizing the manufacturing process of a product.

Virtual Private Network (VPN): a network that is constructed using public wires—usually the internet—to connect remote users or regional offices to a company’s private, internal network.

Virtual Reality (VR): the computer-generated simulation of a three-dimensional image or environment that can be interacted within a seemingly real or physical way by a person using special electronic equipment, such as a helmet with a screen inside or gloves fitted with sensors.

Digital Technology Sectors Definition

SIC	Description
2611	Manufacture of electronic components
2612	Manufacture of loaded electronic boards
262	Manufacture of computers and peripheral equipment
263	Manufacture of communication equipment
264	Manufacture of consumer electronics
2732	Manufacture of other electronic and electric wires and cables
58	Publishing activities
59	Motion picture, video and television programme production, sound recording and music publishing activities
60	Programming and broadcasting activities
61	Telecommunications
62	Computer programming, consultancy and related activities
63	Information service activities
951	Repair of computers and communication equipment

Digital Technology Sub-Sectors Definition

SIC	Description
2611	Manufacture of electronic components
2612	Manufacture of loaded electronic boards
2620	Manufacture of computers and peripheral equipment
2630	Manufacture of communication equipment
2640	Manufacture of consumer electronics
2732	Manufacture of other electronic and electric wires and cables
5811	Book Publishing
5812	Publishing of Directories and Mailing Lists
5813	Publishing of Newspapers
5814	Publishing of Journals and Periodicals
5819	Other Publishing Activities
5821	Publishing of Computer Games
5829	Other Software Publishing
5911	Motion Picture, Video and Television Programme Production Activities
5912	Motion Picture, Video and Television Programme Post-production Activities
5913	Motion Picture, Video and Television Programme Distribution Activities
5914	Motion Picture Projection Activities

SIC	Description
5920	Sound Recording and Music Publishing Activities
6010	Radio Broadcasting
6020	Television Programming and Broadcasting Activities
6110	Wired Telecommunications Activities
6120	Wireless Telecommunications Activities
6130	Satellite Telecommunications Activities
6190	Other Telecommunications Activities
6201	Computer Programming Activities
6202	Computer Consultancy Activities
6203	Computer Facilities Management Activities
6209	Other Information Technology and Computer Service Activities
6311	Data Processing, Hosting and Related Activities
6312	Web Portals
6391	News Agency Activities
6399	Other Information Service Activities n.e.c.
9511	Repair of Computers and Peripheral Equipment
9512	Repair of Communication Equipment

Digital Occupations Definition

SOC	Description
1136	Information Technology and Telecommunications Directors
2133	IT Specialist Managers
2134	IT Project and Programme Managers
2135	IT Business Analysts, Architects and Systems Designers
2136	Programmers and Software Development Professionals
2137	Web Design and Development Professionals
2139	Information Technology and Telecommunications Professionals n.e.c.
3131	IT Operations Technicians
3132	IT User Support Technicians
5245	IT Engineers
5242	Telecommunications Engineers



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