Horizon Scanning: Post-16 Education and Skills Infrastructure

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Rye Tait Consulting
cambridge econometrics
clarity from complexity

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2. The findings in this report focus on the six sectors deemed of most importance in the West of England based on their growth prospects and/or volume of people employed. They are Advanced Engineering & Aerospace; Construction; Creative & Digital; Health; Professional Services; and Tourism, Culture & Hospitality. The six sectors add around £24bn in GVA to the West of England economy each year.
3. It is important that the reader bear in mind throughout this report that it was researched and written in the early stages of the UK's departure from the European Union, in the second year of the Covid-19 pandemic, and, as the final drafts were prepared, in the early stages of the Ukraine War. No UK Government in the past eighty years has had to face such profound impacts on the nation's social and economic life and those effects are being felt – and will continue to be felt – at every level of government including local authorities and a wide range of regional bodies. Perhaps the most important outcome of these seismic shocks is that they have made predictions of any kind extremely difficult. All foresight and horizon scanning depends to a large extent on the regression analysis of existing statistical trends. They rely, in other words on a statistical version of "all other things being equal" by which one can assume that only the main variables change in the future. As of early 2022 that is not a reliable assumption.
4. The table at the end of the Executive Summary sets out some of the key comparative statistics for the relevant sectors.

Advanced Engineering & Aerospace

5. The Advanced Engineering and Aerospace sector is a globally significant industry vital to providing high value employment. It includes chemicals, pharmaceuticals, advanced manufacturing and the automotive industry as well as aerospace.
6. Within the West of England it directly employs approximately 25,700 people and generates over £2 billion in GVA annually. Over £34 billion worth of aerospace goods and services are exported from the UK every

year, from aerospace companies that, together, account for 7% of the UK's total R&D annual spend. In addition, the aerospace sector supports 20,000 to 30,000 extra jobs through the supply-chain.[1]

7. Historic and projected job loss in Advanced Engineering and Aerospace has continued, but at a much lower rate in the West of England than nationally.
8. Although forecast to increase in overall GVA contribution to the regional economy, the sector is, based on recent trends, predicted to reduce in employment terms by around 0.7% pa over the next fifteen years. The net employment requirement based on net replacement demand would therefore be around 16,500 jobs over this period.
9. Total demand for science, research and technical occupations will be around 36,000 people. These will include nuclear, chemical, and pharmaceutical industries in addition to the growing aerospace sector.
10. The drive towards 'net-zero' will underpin a need for new and enhanced 'green' skills which will focus on design, building and managing new infrastructure and manufacturing facilities in all component sectors and on a focus towards managing the progression towards zero-emissions among senior technicians and managers.
11. The research revealed that employers and providers are well aware of the need to focus on STEM-related education and skills and on digital and green skills in particular. Providers expressed some concern as to the investment required to meet these needs for such a high-tech sector as technology develops – e.g. automated and robotised production lines for pharmaceuticals and for advanced manufacturing, automotive and aerospace. The rapid advances in advanced manufacturing will place high levels of demand on providers to create new teaching facilities and to upskill their teaching staff in areas as diverse as bio-genetics and composites.

Construction

12. The construction sector employs just under 48,000 people in the West of England area and growth in the sector is predicted to be strong – at around 1.6% per year up to 2036.
13. Accounting, with housing and development, for around £2.5 billion in annual GVA the sector is heavily dominated by smaller firms, with 99% being SMEs.
14. Growth and replacement demand will require the filling of around 30,100 jobs by 2036.
15. The demand for employees will be shifting steadily over the time period towards technician and higher skill roles and away from purely manual occupations.

[1] Acuity Analysis (2020) Economic and social importance of the UK's aerospace sector

16. Housing, retrofit and energy installations will constitute the key areas of demand and these will require technical and green skills over and above those already being taught, as well as the upskilling of substantial numbers of current employees.
17. Employers and providers are aware of the increasing pace of change in the sector – specifically the move away from manual skills and towards robotics, 3D printing, and software solutions such as BIM and Digital Twinning and are asking for greater depth to digital and green elements in construction courses.
18. The predictions are made more difficult by the fact that certain policy decisions that appeared firm three years ago are now in flux; decisions such as the speed of retrofitting and of the installation of energy efficient heating systems, the amount of new housebuilding, and the possibility of new policy decisions on nuclear energy (e.g. Small Modular Reactors).
19. Demand for apprentices is already higher than supply and this and other research shows that there is considerable 'latent' demand from employers.

Creative & Digital

20. The West of England is an extremely important region for these sectors which employ around 65,000 people and which have a predicted annual growth rate of 0.7% through 2036.
21. They add some £2.6bn to the economy each year. Replacement and expansion demand look to be around 40,000 jobs over the fifteen year period.
22. There is expected to be strong growth in drama and other live entertainment, but the main growth is set to come from expansion in digital games, media, and related software.
23. Employers are seeking more digitally-aware recruits and apprentices with well-developed soft and digital skills.
24. More effective careers education, information, advice and guidance in schools is required to increase awareness of the wider opportunities within the Creative and Digital sector.
25. Providers are seeking ways of keeping their IT equipment and software up to date when technological change is extremely rapid. They also need ways of retraining and up-skilling existing staff and finding placements for digital and creative students.

Health

26. In the West of England Combined Authority region, Health accounts for around £2.6bn in GVA for the West of England economy each year. The number of health businesses increased by 25% between 2016-2019, in line with the national average and is predicted to continue rising against a background of increased demand.

27. Growth in employment is forecast at about 0.9% per annum.
28. Numbers required over the next fifteen years are around 69,900 health professionals.
29. Quite apart from the tremendous pressures on the health service as a result of Covid-19 the sector is facing structural change due to an ageing population, advances on health interventions, new technology, an increased focus on mental health and pressures from increased digitalisation and some automation.
30. Apprentices are in urgent need across the health and caring professions and the sector is keenly aware of the need for upskilling and re-skilling within its existing workforce.

Professional Services

31. In the West of England, the Professional Services sector encompasses a wide range of activities across financial, legal, and business.
32. In 2019 it added over £13bn in GVA.
33. The sector provides employment for around 150,000 people and is predicted to grow at around 0.5% per year in the period to 2036.
34. The sector will, therefore, need to fill over 88,000 jobs over the period.
35. The core skill needs will be in soft skills – particularly communications and leadership – in digital skills and in the skills needed to lead and manage the green agenda and the zero-emissions targets.
36. Education and training priorities will be around green skills for managers – e.g. green finance and sustainability awareness and abilities – and digital skills and upskilling.

Tourism, Culture & Hospitality

37. This important sector employs over 51,000 people in the West of England area (around 8.5% of total employment). It was worth some £1.2bn in GVA in 2019.
38. The sector was hit quite hard by the Covid-19 pandemic – initially losing over 5% of all jobs and employers continue to say that the exit from the EU continues to have a negative effect on recruitment of staff (due to a high dependence on Eastern European staff prior to the UK leaving the European Union).
39. It is, however, expected to grow by about 1.4% per year to 2036 resulting in a net total requirement of around 40,000 jobs.
40. There will be a tourism impact from the successful Bridgerton Netflix series but tourism is already a major contributor to the regional economy from a range of famous historical sites such as Bath and the continuing attraction of Bristol and the coast.

41. As with other sectors, employers say they would like to see more emphasis on more detailed and accurate careers advice and support.
42. Major provider and employer comments on skill needs centre on digital skills and sustainability.

Infrastructure and Provision

43. As mentioned several times above, the main concerns of providers surround the issues of digitalisation and the climate agenda. Considerable demand is foreseen from the need for retrofit and energy installation, from enhanced digital technology and the rapid change in both hardware and software, the expansion of the health and care services and their need for highly trained staff, and social and cultural changes.
44. Change in society is driving a number of difficult-to-solve problems – including the increasing reluctance of young people to travel (for work and study), the massive increase in home-working, the potential (perhaps not yet realised to any meaningful extent) of remote learning, the difficulty of engaging with employers, and the need to refocus on special educational needs.
45. The study mapped the geographical location of providers by course type and level but the question of 'travel-to-learn' patterns was not addressed due to its underlying complexity. For example, the fact that young people will travel further to attend certain types of course, and the fact that no rigorous study has yet been undertaken to examine motivational issues v physical (e.g. transport, accommodation) issues behind the subject.
46. Around 285,000 job roles will need to be filled over the next fifteen years to 2036 (some 19,000 jobs per year) across the six key sectors. Each sector will require staff at different levels possessing different skills at the given level. For example the digital awareness and skills required in the health sector will differ from those required by advanced engineering and aerospace.
47. Just under half of all relevant courses in the West of England area are concentrated in the four largest colleges.
48. Specific facility needs are discussed in Section 9 of this report, including the issue of fixed space and limited capacity, but providers are almost unanimous in their requests for more help on IT and digital skills – in terms of the strategy for the renewal of expensive and rapidly obsolescent IT equipment and the recruitment, upskilling, and retraining of IT and digital teaching staff.
49. Additionally, there appears to be an urgent need to consider investing in digital infrastructure which supports all the equipment and activity/ learning, ensures it is cyber secure, and complies with all the security requirements of funding bodies and employers. Providers appear to be struggling with the pace of digital change, under which the increases in the level of complexity and sophistication have impacted

very quickly. Without efficient and secure infrastructure employers and funders will be reluctant to enhance their relationships and communications of data with the providers.

Comparative Statistics

West of England	*SIC*	Employment 2019 ('000s)	Net employment need over period ('000s)	GVA £bn 2019 (*)
Advanced engineering and Aerospace	*20-30*	25.7	16.5	£2.2
Construction	*41-43*	47.7	30.1	£2.5
Creative and digital	*58-63; 71; 90-91*	65.6	40.0	£2.6
Health	*86-88*	68.2	69.9	£2.6
Professional services	*64-70; 72-75; 77-82*	148.3	88.5	£13.1
Tourism, culture and hospitality	*55-56; 92-93*	51.8	40.0	£1.2

(*) Source: ONS Regional gross value added (balanced) by industry: International Territorial Level (ITL) regions. Figures use ITL3 – UKK11, UKK12 = TLK11, TLK12.

1. Introduction

1.1 Aims and objectives

In 2021, the West of England Combined Authority commissioned Pye Tait Consulting and Cambridge Econometrics to undertake a two-part demand and supply forecasting assessment of the region's post-16 estate and infrastructure in order to establish the extent to which it will be able to meet its future skills and training needs. The task included:

- An analysis of the forecast[2] occupational changes within six sectors of importance to the region covering how these are influenced by drivers for change and innovation, the skills that are required as a result, and the way in which training needs to adapt to respond.
- An assessment of whether the current post-16 education and skills estate meets current and future needs including suggestions on areas which could be addressed to ensure the post-16 estate is able to deliver the skills and training required.

Geographic coverage

Figure 1: Geographic coverage of the study

Source: The West of England Combined Authority

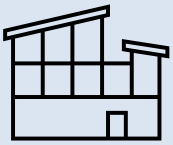
[2] Timeframes in the employment and occupational change analysis are: 1996-2019 for historical trends and 2020-2036 for future forecast projections.

The geography in scope for this study includes the three local authorities in the region (Bath & North-East Somerset, Bristol, and South Gloucestershire) as well as North Somerset Council through the West of England LEP, with which the West of England Combined Authority works closely (see Figure 1). In addition, where applicable, cross-boundary areas are also considered.

Sectoral coverage

The findings in this report focus on the six sectors deemed of most importance in the West of England based on their growth prospects and/or volume of people employed (Figure 2). The six sectors are aggregated from 45 sector definitions (see Appendix 2: Forecasting analysis - Cambridge Econometrics). As is the case with almost all "sector" definitions, these six sectors are not necessarily mutually exclusive. There is overlap between them. For example, the advanced engineering and aerospace "sector" is also one which is closely engaged with IT and digital skills, and with professional skills.

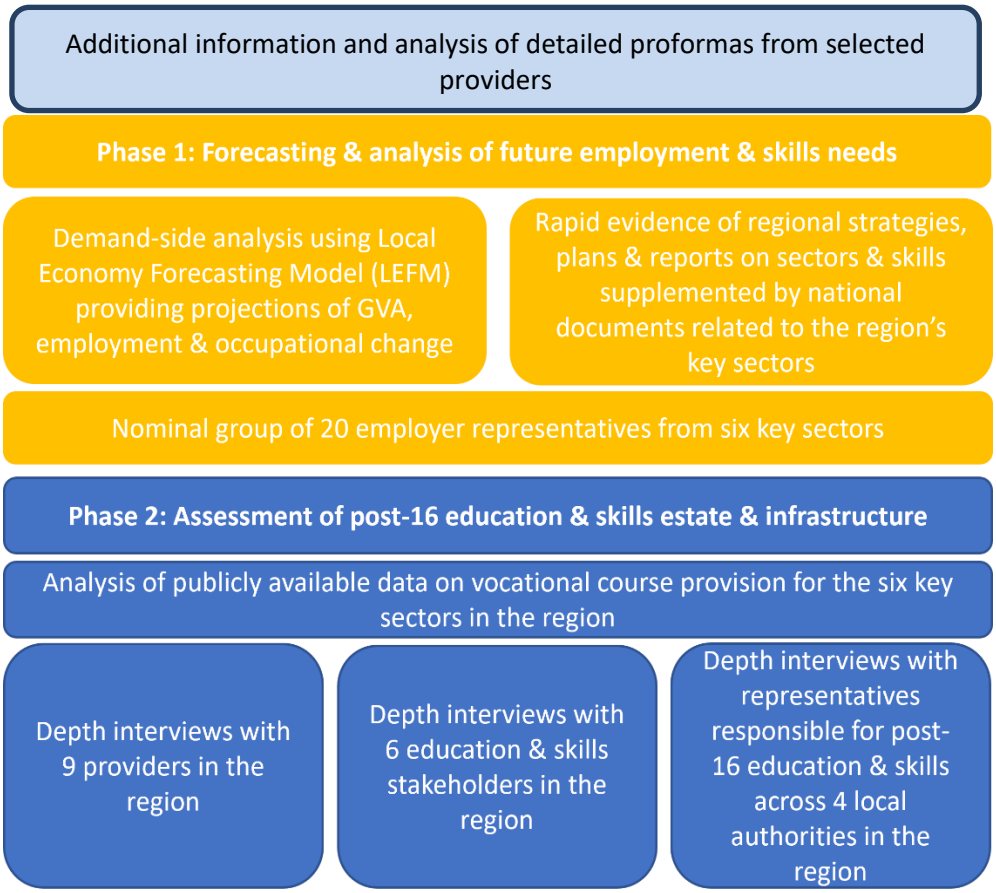
Figure 2: The Six Focal Sectors

Advanced Engineering and Aerospace 	**Construction** 	**Creative and Digital** 
Health 	**Professional Services** 	**Tourism, Culture and Hospitality** 

1.2 Methodology

The research and analysis activities underpinning the findings in this study are summarised in Figure 3. Further detail on the fieldwork undertaken can be found in Appendix 1: Further methodological detail.

Figure 3: Summary of fieldwork undertaken for the study



1.3 Report structure

Chapters 2 to 7 focus on each of the six key sectors.[3] Each presents the occupational changes forecast for the sector, how these are influenced by drivers for change and innovation, the skills that will be required as a result of these changes, and the training needed to provide these skills. The chapters predominantly draw on the findings from Cambridge Econometrics' Local Economy Forecasting Model (LEFM) and Pye Tait's

[3] Advanced Engineering and Aerospace, Construction, Creative and Digital, Health, Professional Services, and Tourism, Culture and Hospitality

rapid evidence review, nominal groups with employer representatives and depth interviews as illustrated in Figure 3.

Chapter 8 provides an assessment of how well the region's existing post-16 infrastructure meets current and future skills needs, and what facilities, curriculum and/or services need to be in place to respond effectively. It is also based on the analysis of the vocational course mapping exercise and the depth interviews with providers and stakeholders of post-16 infrastructure in the West of England including officers responsible for skills from the four local authorities in the region.

The final chapter provides recommendations on areas which could be addressed over the short, medium, and long-term to ensure the West of England's post-16 estate and infrastructure is able to deliver the skills and training required to meet the needs of the region's key sectors and adapt to new modes of delivery.

Appendix 1 includes further methodological detail of the various Phases for the study and Appendix 2 describes Cambridge Econometrics' forecasting analysis.

1.4 Supporting Map Application

In addition to the report itself Pye Tait Consulting designed and produced an online mapping application which is able to illustrate courses available in the region by level and applicable to the six sectors within Local Authority boundaries. Two illustrative maps are included in this report (see Appendix 1 -Phase 2).

2. Advanced Engineering and Aerospace

2.1 Introduction

The Advanced Engineering and Aerospace sector is seen to be a globally significant industry that is overall vital in providing high value employment. Within the UK it directly employs approximately 102,000 people and generates £9 billion in GVA annually. Over £34 billion worth of aerospace goods and services are exported every year, and aerospace companies account for 7% of the UK's total R&D annual spend. In addition, it is widely reported that the aerospace sector supports 20,000 to 30,000 extra jobs through the supply-chain.[4]

It is a critical sector in the West of England, where it accounts for:

- 4% of sub-regional employment in 2019 with 2,700 jobs[5] and approximately 4% of GVA based on the sector definition used in this study (see Appendix 2)[6];
- a third of all UK aerospace jobs and employing 28,000 people in high-skill and high-value jobs;
- a higher-skilled workforce compared to the national average;[7]
- fourteen of the world's 15 major aerospace firms with bases in the region, mostly focused on the UK's largest aerospace cluster at Filton in North Bristol, which includes Airbus, BAE Systems, GKN, Renishaw, Rolls-Royce and Rotork;[8] [9] and
- approximately 180 aerospace companies located in the area in 2019.[10]

2.2 Key Occupational Changes and Drivers

Historic and projected job loss in Advanced Engineering and Aerospace has continued, but at a much lower rate in the West of England than nationally (see Table 1 and Table 2). This is likely to result from the advancement of technology and automation in this sector which has made it more efficient and, thereby, requiring fewer workers.[11]

[4] Acuity Analysis (2020) Economic and social importance of the UK's aerospace sector
[5] See Appendix 2
[6] West of England Combined Authority (2020) Recovery Taskforce Sector Skills Report
[7] West of England Combined Authority (2019) Local Industrial Strategy
[8] West of England Combined Authority (2021) ELSNA report
[9] West of England Combined Authority (2019) Advanced Engineering and Aerospace: West of England Local Sector Skills Statement 2019
[10] West of England Combined Authority (2021) Green Skills Market Report – a further aerospace company located in the region in 2022 – Aeralis.
[11] West of England Combined Authority (2019) Advanced Engineering and Aerospace: West of England Local Sector Skills Statement 2019

Table 1: Historic employment demand in the Advanced Engineering and Aerospace sector in the West of England Combined Authority area

1996 - 2019	Job loss rate of 1.3% per year (9,400 jobs) was lower than the UK average (2.0%)
2019 position	Employed 25,700 – 4.2% of total employment
COVID-19 impact 2019 - 2021	2.5% rate of job loss was much lower than nationally, at 5.9%.

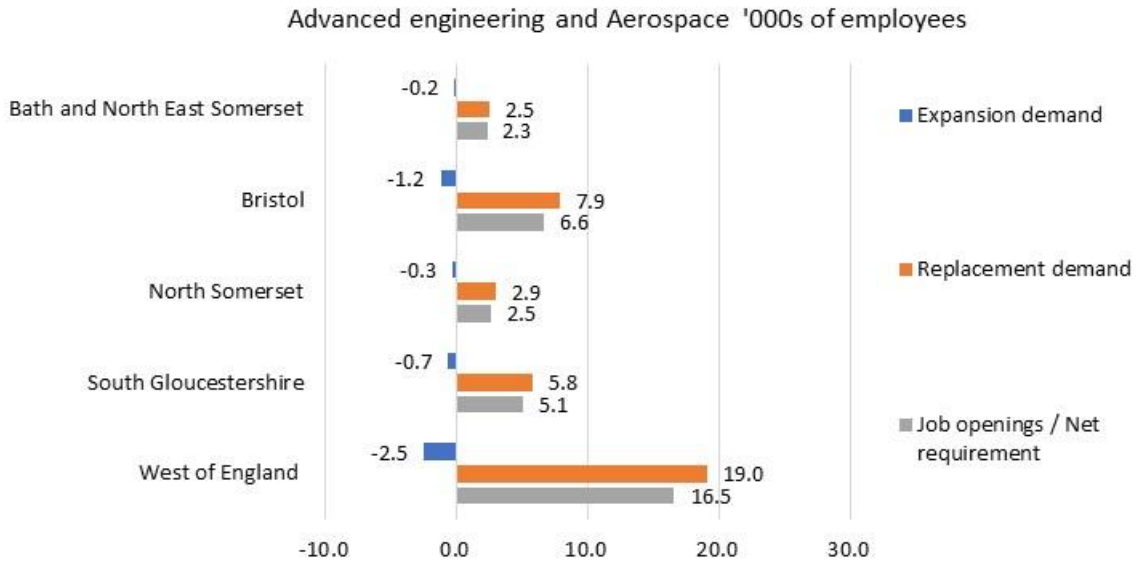
Source: LEFM (March 2021), Cambridge Econometrics

Table 2: Future employment demand in the Advanced Engineering and Aerospace sector in the West of England Combined Authority area

2020-2036	Job loss is expected to continue at 0.7% per annum, with a net loss of 2,500 jobs over the period. However, replacement demand will result in a net demand for around 16,500 recruits over the period. It must also be pointed out that workforce projections over a sixteen year period are prone to quite large margins of error.
Occupation	A high level of job openings is forecast in Science, research, engineering and technology professionals (36,500). This amount is, in theory, net of the possible reduction in engineering/aerospace and will cover all SRET professionals across all sectors.

Source: LEFM (March 2021), Cambridge Econometrics

Figure 4: Employment demand projections for the Advanced Engineering and Aerospace sector 2020-2036



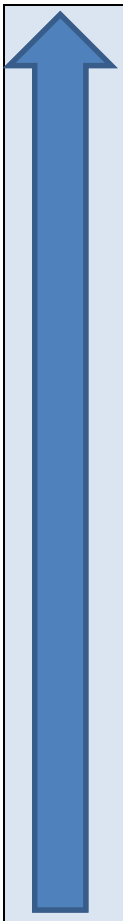
Source: LEFM (March 2021), Cambridge Econometrics

As illustrated in Figure 4:

- Replacement demand at 19,000 jobs means that the net requirement over this period is for 16,500 job openings.
- There is a slight but continued contraction across all four local authority areas. However:
    - Replacement demand is quite high in Bristol and South Gloucestershire in particular, resulting in a net requirement for 6,600 and 5,100 job openings respectively.

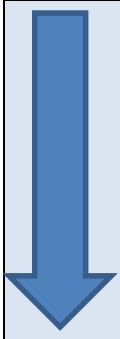
The drivers for employment and occupational change in the Advanced Engineering and Aerospace sector are outlined in Table 3.

Table 3: Drivers for employment and occupational change in the Advanced Engineering and Aerospace sector



- **The region's net zero 2030 goal** is predicted to increase the number of jobs in the sector - 10% of additional low carbon jobs expected to be manufacturing-based comprising approximately:
  - 800 low carbon aerospace manufacturing jobs;
  - 500 nuclear energy jobs;
  - 800 jobs in the production of energy efficiency measures (e.g. efficient lighting, insulation and controls and monitoring)
  - 560 jobs in the manufacture of insulation and controls
  - Plus demand for jobs to increase to help manufacture and assemble low-carbon and alternative-fuelled propulsion engines and systems.[12]
- **Emergence of new technologies**
  - Use of innovative materials in the region e.g. 3-D manufacturing and propulsion technology means the region is at the forefront of technological advances. These developments are anticipated to result in 1,000 additional engineering jobs as well as up to 1,500 in the supply chain in the next two to three years.[13]
  - Modular nuclear reactors for example will require further upskilling of the workforce in the nuclear engineering sector and the development of future nuclear sites in the region e.g. Hinkley Point C will provide future high level job demand for such skills.[14]
  - GKN's newly opened £32million Global Technology Centre in Bristol focussing on additive manufacturing will support 300 new engineering roles and the Institute of Advanced Automotive Propulsion Systems (IAAPS) will create 300 new jobs for Research PhD's, Engineers and Technicians. The IAAPS will support the development of ultra-low emissions vehicles, (battery and electric)

[12] West of England Combined Authority (2021) Green Skills Market Analysis Report
[13] West of England Combined Authority (2019) Advanced Engineering and Aerospace: West of England Local Sector Skills Statement 2019
[14] West of England Combined Authority (2021) Green Skills Market Analysis Report

	and link into the aerospace sector with electrically-powered personal aircraft vehicles.[15] ○ The drive towards net zero and particularly the increasing recognition that carbon reduction is by no means the only or best measure of progress is introducing new technologies at an almost unprecedented rate. These include new composite facilities and new companies focused on high tech products and services.
	- **Leaving the EU** represents a significant threat to the supply of engineering skills. EU graduates who studied in the UK may not be eligible to work in the UK which might result in massive labour and skills shortages for the sector.[16] However, evidence from desk research and interviews suggests that the impact of the UK exiting the European Union has not been anywhere near as negative as had been feared and aerospace and engineering companies have continued to flourish and even to expand in the region. Small innovative companies like Aeralis and Vertical Aerospace have established themselves here. - **Advancement of technology, automation and artificial intelligence** will disrupt current occupations with an anticipated decline in those dependent on traditional manual crafts, such as machining and welding, and the need for lower-skilled workforce roles.[17] [18] Regarding the latter, nominal group participants highlighted the risk to supply chain related roles from the adoption of blockchain[19].

[15] West of England Combined Authority (2019) Advanced Engineering and Aerospace: West of England Local Sector Skills Statement 2019
[16] Engineering UK (2018) The State of Engineering
[17] SMMT (2015) The future of UK automotive manufacturing in 2025 and beyond
[18] West of England Combined Authority (2019) Advanced Engineering and Aerospace: West of England Local Sector Skills Statement 2019
[19] Blockchain is the digital technique by which a "block" approach to recording transactions enables a database to contain secure and verifiable records. The technique originated in cryptocurrencies and is increasingly being used by financial/banking companies, games designers, lawyers (for contract control), and logistics companies among others.

2.3 Impact of Occupational Changes on the Skills Required

The impact of the occupational changes anticipated in the Advanced Engineering and Aerospace sector on the skills required are set out in Table 4.

Table 4 Skills required in the Advanced Engineering and Aerospace sector as a result of anticipated occupational changes and drivers

Green skills 	- Specific skills to deliver green technology design within the Advanced Engineering and Aerospace sector, including nuclear and low carbon aerospace design. These include engineers with the requisite skills for site design, installation and maintenance of a broad range of infrastructure. ○ However, almost half (47%) of engineering employers had difficulty recruiting people with the right skills and 46% had difficulties with the skills in their internal workforce. ○ Make UK's recent report into digital and green innovation states that the top three green skills needed by the sector are: resource efficiency, e.g. carbon counting; low-carbon economy, e.g. nuclear and renewable energy generation; and, development of new or amended products, e.g. design and production of electric vehicles.[20]
Nuclear skills 	- Replacement demand, from both anticipated levels of retirement and impact of the UK exiting the European Union is expected to be acute for the nuclear sector where the supply of required skills is already in shortage and retaining highly skilled workers is important[21] as their loss could have implications for delivery.

[20] Make UK (2021) Unlocking the Skills Needed for a Digital and Green Future

[21] A total of 44% of the workforce in nuclear are in Level 4-8 roles, with 13% being in Level 7 and 8 roles according to West of England Combined Authority (2021) Green Skills Market Analysis Report

Engineering skills 	- Nationally, it is estimated that there is an annual demand for 203,000 people with Level 3+ engineering skills through to 2024 with the top three skills in demand being: problem solving, communication skills, and specific technical skills.[22]

2.4 Adaptations Required to Post-16 Training Provision[23]

The adaptations needed to post-16 training provision to meet the anticipated changes to skills in the Advanced Engineering and Aerospace sector are described in Table 5.

Table 5: Key adaptations for post-16 education and skills provision for the Advanced Engineering and Aerospace sector

Education and skills	- Providers need to ensure the delivery of STEM subjects in the region,[24] particularly those related to high demand STEM e.g. big data, robotics, and use of sensors.[25]
Apprenticeships	- Providers and employers will need to work together to ensure these learners gain the practical experience they require in order to fill the sector's future job openings in the region. Take up is strong (Engineering and Manufacturing Technologies was the third most popular apprenticeship subject with a total of 1,800 apprenticeship starts in the region in 2019 in subjects relevant to advanced manufacturing and engineering). Continuing provision of nuclear graduate and apprenticeship programmes is required to meet the future high level job demand of Hinkley Point C and other future potential nuclear sites in the region.[26]

[22] West of England Combined Authority (2019) Advanced Engineering and Aerospace: West of England Local Sector Skills Statement 2019

[23] These points constitute an amalgamation of points drawn from the literature review and the various interviews and nominal group activity. They are based on the broad sense of what respondents were saying and should be considered accordingly.

[24] West of England Combined Authority (2021) Regional Insights and Labour Market Intelligence JUNE

[25] SMMT (2015) The future of UK automotive manufacturing in 2025 and beyond

[26] West of England Combined Authority (2021) Green Skills Market Analysis Report

Training existing workforce	- Elements of the existing workforce that may have been negatively impacted by digitisation and automation need to be retrained, upskilled and repurposed.[27] The need for enhanced tutor skills in digital and green skills for engineering and aerospace was stressed by providers in interviews and in the "pro-forma" process which is described in Section 9.

[27] West of England Combined Authority (2019) Advanced Engineering and Aerospace: West of England Local Sector Skills Statement 2019

3. Construction

3.1 Introduction

The Construction industry has been historically dominated by smaller enterprises in the UK, with 956,000 SMEs accounting for 99% of businesses in the sector as of 2016, leading to an overall fragmented industry. In the West of England, there were 6,281 start-ups recorded in July 2020 to June 2021, and overall Construction was the second largest start-up sector in the region at 1,125. Housing, Construction and Development accounted for 21% of sub-regional GVA in 2018.[28]

3.2 Key Occupational Changes and Drivers

The Construction sector has been a source of strong employment growth in the past in the region, and this is forecast to continue (see Tables 6 and 7).

Table 6: Historic employment demand in the Construction sector in the West of England Combined Authority area

1996-2019	2.6% per annum, more than double the UK average (1.1%)
2019 position	Employed 47,700 - 7.8% of total employment
COVID-19 impact 2019 - 2021	2.0% rate of job loss was higher than nationally (1.8%) – likely to be short-term as the sector saw output levels quickly pick up in the second half of 2020[29]

Source: LEFM (March 2021), Cambridge Econometrics

Table 7: Future employment demand in the Construction sector in the West of England Combined Authority area

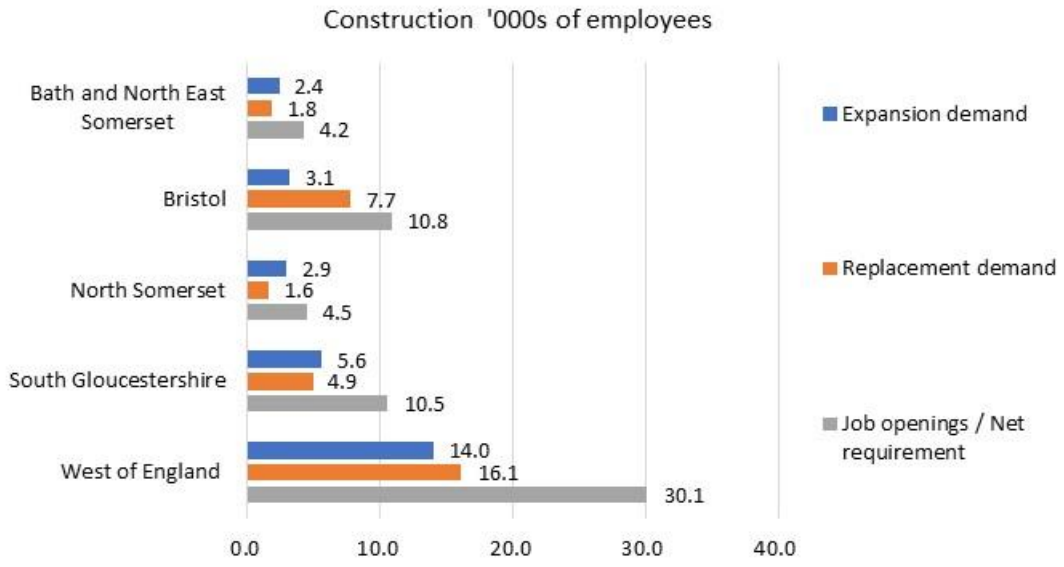
2020 -2036	Job growth is forecast to increase at 1.6% per year (double the national rate of 0.8%), a net increase of 14,000 jobs
Occupation	A substantial number of job openings are forecast for *Skilled construction and building trades*

[28] West of England Combined Authority (2021) West of England Quarterly Economic Bulletin Quarter 3 2021
[29] CITB (2021) Construction Skills Network: the skills construction needs – 5 year outlook 2021-2025

	(21,000), predominantly driven by replacement demand (17,900) resulting from retirements and the UK exiting the European Union

Source: LEFM (March 2021), Cambridge Econometrics

Figure 5: Employment demand projections for the Construction key sector 2020-2036



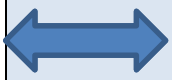
Source: LEFM (March 2021), Cambridge Econometrics.

As illustrated in Figure 5:

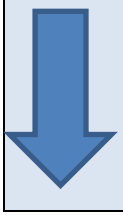
- Replacement demand is significant over this period, at 16,100 jobs – resulting in a net requirement for 30,100 job openings.
- Both expansion and replacement demand are positive across every local authority area:
    - With net requirements between 2020 and 2036 for Bristol of 10,800 job openings and South Gloucestershire of 10,500 job openings
    - Followed by North Somerset (4,500 job openings) and Bath and North East Somerset (4,200 job openings).

The drivers for employment and occupational change in the Construction sector are outlined in Table 8.

Table 8: Drivers for employment and occupational change in the Construction sector

	- The **drive for net zero** was the most commonly cited change by sector representatives in the nominal group. The region's net zero ambitions are predicted to result in 52% of the green jobs created being in the sector. These will be primarily in retrofitting existing buildings with energy efficient and green measures, including: o Over 11,000 additional jobs in the installation of heat pumps o 2,500 additional jobs in installing insulation.[30] - The West of England's growth and post-pandemic recovery plans: o The West of England Combined Authority's 'Employment Land Spatial Needs Assessment (ELSNA) Summary' of 2021[31] takes the Spatial Development Strategy forward by identifying a number of key targets and outcomes including: a shortage of medium and small sites to support the advanced manufacturing and engineering sectors, and a limited supply of land in this area if demand continues to grow. The ELSNA also identifies a particular need for smaller scale 'last mile' distribution premises. The summary also highlights the possibility that land shortages for employment contexts may be put at risk should industrial and commercial premises be converted to housing and flats. ◦ The West of England Combined Authority's Recovery Plan seeks to create 750 construction jobs a year across its investments.[32]
	- Nationally, the surge in **innovation and application of technology** is predicted to continue in the next ten years. On construction sites robotic bricklayers, diggers, scrapers, and helpers, together with 3D printing of building components and the use of lidar-equipped drones and surveying equipment is revolutionising the construction industry. Whilst with the green agenda, there is a move to offsite manufacture and modern methods of construction (MMC) and Sustainable Building. These technological advancements will require a change in approach to education and training

[30] West of England Combined Authority (2021) Green Skills Market Analysis Report
[31] West of England Combined Authority (2021) ELSNA Summary
[32] West of England Combined Authority (2020) Recovery Plan

	for construction occupations, e.g. building engineers, building managers, building technicians and architects.[33]
	- **Ageing workforce** - the anticipated retirement of 30% of workforce in the coming decade - **Impact of the UK exiting the European Union** - 8% of UK construction workforce being non-UK nationals and mainly from the EU or EEA.[34]

3.3 Impact of Occupational Changes on the Skills Required

The impact of the occupational changes anticipated in the Construction sector on the skills required are set out in Table 9.

Table 9: Skills required in the Construction sector as a result of anticipated occupational changes and drivers

Green skills 	- Skills & knowledge is needed to retrofit existing buildings and implement low carbon standards in new developments, such as installing insulation and heat pumps.[35] Both of these are highlighted for investment by the West of England Combined Authority's £50m Green Recovery Fund.[36] However, the region's sector leads have identified a shortage of skills relating to the retrofit market.[37] However, there are opportunities for upskilling those currently employed in certain areas such as plastering or rendering professions, which could be upskilled to work with external wall insulation.[38] - Other green skills to support offsite manufacture, MMC and Sustainable Building.[39] Nominal group findings indicate that the prioritisation of MMC or retrofitting skills will depend on the approach adopted for decarbonising properties.

[33] UKCES (2014) The Future of Work: Jobs and Skills in 2030
[34] West of England Combined Authority (2021) Annual Skills Report
[35] West of England Combined Authority (2021) Annual Skills Report
[36] Approved late 2021 and combining £30m of public funds with £20m match funding.
[37] West of England Combined Authority (2021) Green Skills Market Analysis Report
[38] West of England Combined Authority (2021) Retrofit skills Market Analysis Report
[39] West of England Combined Authority (2021) Green Skills Market Analysis Report

Digital skills 	- Digital skills respond to technological changes on the construction site as well as cloud computing, machine learning and artificial intelligence.[40] - Digital skills to support the region's green ambitions e.g. using Building Information Modelling (BIM) and 3D printing to retrofit homes.[41]
Traditional trade skills 	- Traditional trade skills which are already in short supply; anticipated replacement demand resulting from retirement levels, and EU/EEA nationals leaving following the UK's exit from the European Union.[42]
Softer skills	- Communication skills to impart energy saving advice to customers linked to the region's net zero ambitions.[43] The need for innovation, communications, problem-solving are needed as the sector incorporates green skills.
Management Skills	- While not specifically mentioned by local interviewees or by participants in the nominal groups, desk research[44] reveals a general construction employer need for project management and operational management skills as well as leadership skills for supervisory levels.
Basic skills	- Good levels of numeracy and literacy to write up reports for monitoring and auditing purposes.[45] Nominal group participants also considered these to be important.

3.4 Adaptations Required to Post-16 Training Provision[46]

The adaptations needed to post-16 training provision to meet the anticipated changes to skills in the Construction sector are described in Table 10.

[40] Construction Leadership Council (2019) future Skills Report
[41] West of England Combined Authority (2021) Green Skills Market Analysis Report
[42] West of England Combined Authority (2021) Annual Skills Report
[43] West of England Combined Authority (2021) Retrofit skills Market Analysis Report
[44] West of England Combined Authority (2021) Green Skills Market Analysis Report
[45] West of England Combined Authority (2021) Retrofit skills Market Analysis Report
[46] These points constitute an amalgamation of points drawn from the literature review and the various interviews and nominal group activity. They are based on the broad sense of what respondents were saying and should be considered accordingly.

Table 10: Key adaptations for post-16 education and skills provision for the Construction sector

Education and skills	- Introduce retrofitting and installation courses to meet green skills needs (for new entrants and existing workforce) – however also need to continue provision of existing skills for gas engineers as many property owners will continue to use existing gas boilers (identified by nominal group participants). - Digital skills – both advanced to respond to technological changes and basic to ensure the sector's investment in software and digital solutions are maximised (identified by nominal group participants). - Move away from the provision of vocational skills in silos to enable greater flexibility and use of transferrable skills across the sector. This will enable the fluid transition of trades people from one occupation to another in response to changes (identified by nominal group participants).
Apprenticeships	- More sector apprenticeships with digital skills incorporated – the digital engineering technician apprenticeship is reportedly the only standard to have digital skills defined as a learning requirement.[47] - Increasing need for training provision at apprenticeship level as 40% of employers in the sector do not provide training. Key to this is providers overcoming low levels of engagement by construction SMEs in training and development (identified by nominal group participants).
Training for existing workforce	- Retraining in green skills required for sustainable building and retrofitting. - Increase knowledge of thermal performance of buildings and understanding of how to reduce environmental

[47] Construction Leadership Council (2019) future Skills Report

	impacts to embed in practice and advise customers effectively (identified by nominal group participants).

4. Creative and Digital

4.1 Introduction

The UK Creative Industries have been one of the fastest growing industrial sectors for the past decade and this is reflected in the West of England's Creative and Digital sector:

- Twenty-seven per cent growth in digital and creative employment between 2015 and 2017;
- 865 active high-growth businesses in the sector as of July 2021, with Bristol being one of only two cities outside London in the top 10 for both creative and high-tech clusters.[48]
- Bristol and Bath have been cited by Tech City UK (2017) as the third largest and the most productive tech cluster in the UK, with over 36,000 digital workers and an £8.1bn digital tech turnover.[49]
- Accounted for 7% of sub-regional GVA in 2018, however this is likely to be an under-representation as the figure does not consider freelancers who cannot easily be allocated to particular Standard Industrial Classification codes.[50]

4.2 Key Occupational Changes and Drivers

The Creative and Digital sector has experienced faster than average growth in the last thirty years and is forecast to grow at least in line with UK rates of economic growth (Tables 11 and 12). The growth has been driven by internet factors (websites, databases, social media, cybersecurity, etc) as well as by the digitalisation of entertainment (streaming, games, etc.).

[48] West of England Combined Authority (2021) Quarterly Economic Bulletin, Quarter 3
[49] West of England Combined Authority (2019) Local Industrial Strategy
[50] West of England Combined Authority (2020) Recovery Taskforce Sector Skills Report

Table 11: Historic employment demand in the Creative and Digital sector in the West of England Combined Authority area

1996 - 2019	Employment growth rate of 2.7% per year, higher than the UK average (2.3%).
2019 position	Employed 65,600 – 10.8% of total employment
COVID-19 impact 2019 - 2021	A job loss of 6.3% (4,100 jobs), much higher than nationally (0.5%) but is possibly temporary.

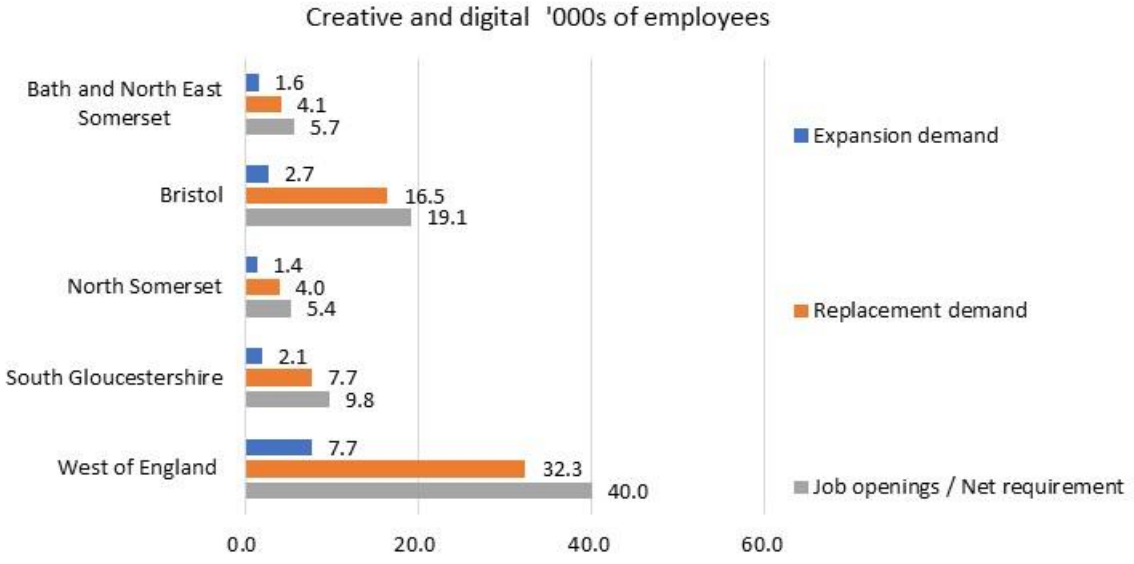
Source: LEFM (March 2021), Cambridge Econometrics

Table 12: Future employment demand in the Creative and Digital sector in the West of England Combined Authority area

2020 - 2036	Job growth anticipated of 0.7% per year (slightly lower than nationally, 0.8%), a net increase of 7,700 jobs.
Occupation	A substantial number of job openings are forecast for *Culture, media and sports occupations* (12,600), overwhelmingly driven by replacement demand (12,200).

Source: LEFM (March 2021), Cambridge Econometrics

Figure 6: Employment demand projections for the Creative and Digital key sector 2020-2036



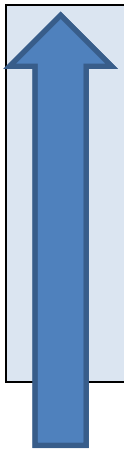
Source: LEFM (March 2021), Cambridge Econometrics.

As illustrated in Figure 6:

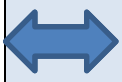
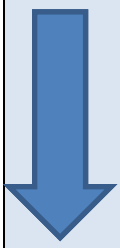
- Strong replacement demand of 32,300 jobs means that the net requirement is for 40,000 job openings between 2020 and 2036.
- Both expansion and replacement demand are positive across every local authority area:
    - Particularly high net requirements between 2020 and 2036 for Bristol (19,100 job openings) and South Gloucestershire (9,800);
    - Followed by job openings in Bath and North East Somerset (5,700) and North Somerset (5,400).

The drivers for employment and occupational change in the Creative and Digital sector are outlined in the table below.

Table 13: Drivers for employment and occupational change in the Creative and Digital sector

	- **Increased demand for drama production** in Bristol – 13 major drama productions were underway in the city in the first quarter of 2020/21 compared to four in the first quarter of 2019/21.[51] - Demand for **digital skills engaged in low-carbon activity** will increase, and overall, around a quarter of jobs needed by 2030 will be engaged in low-carbon services such as green finance, digital and advisory services (legal and technological). The low-carbon services sector is anticipated to account for around one-third (33%) of GVA across the West of England

[51] The Guardian (2021) Why TV crews are falling over each other to film drama in 'Bristolywood' Tom Wall, Saturday 11 December 2021 (see: https://www.theguardian.com/uk-news/2021/dec/11/bristol-film-tv-crews-drama-locations-bristolywood)

	Combined Authority, with significant value-added predicted for low-carbon digital services followed by advisory services and green finance[52].
	- Significant skills **shortages in wider skills and knowledge** required for example, for the business side of the industry such as finance, marketing, and problem solving.[53]
	- **Adoption of new technologies and the automation** of business activities are anticipated to result in marginal declines pre-pandemic in the media, finance and personal services parts of the Creative and Digital sector. Those working in arts, entertainment, recreation, and personal services are considered to be most at risk of redundancies.[54] - **Limited job opportunities available during the pandemic** for the 650 apprenticeships in subjects relevant to the sector.[55] Many businesses in the sector were closed short-term or unable to support work experience opportunities due to economic uncertainty and/or social distancing requirements. This situation risks losing these future employees to other more stable sectors.

4.3 Impact of Occupational Changes on the Skills Required

The impact of the occupational changes anticipated in the Creative and Digital sector on the skills required are set out below.

Table 14: Skills required in the Creative and Digital sector as a result of anticipated occupational changes and drivers

Business skills 	- Transferrable business skills required to address shortages and gaps e.g. marketing and communication, and finances. [56]

[52] West of England Combined Authority (2020) Recovery Taskforce Sector Skills Report
[52] West of England Combined Authority (2021) Green Skills Market Analysis Report
[53] Creative & Cultural Skills (2016) Building a Creative Nation: Current and future skills needs
[54] West of England Combined Authority (2020) Recovery Taskforce Sector Skills Report
[55] West of England Combined Authority (2020) Recovery Taskforce Sector Skills Report
[56] Creative & Cultural Skills (2016) Building a Creative Nation: Current and future skills needs

Digital skills 	- Basic digital literacy capabilities will be required to ensure digital proficiency to reflect technological change and rapid digitalisation. o To address these changes, the West of England has already secured £238,000 funding from the Department for Digital, Culture, Media and Sport (DCMS) for a new programme to encourage women into digital jobs, education and training (WIDJET), and there is the aim of flexing the Adult Education Budget to increase access to and take-up of basic digital skills by the most vulnerable and disadvantaged groups.[57] - Specific digital skills including analytics, cyber security, games and animation, networking and cloud infrastructure, and programming and software development as well as proficiency in programming language such as Python, JavaScript, SQL, and C# are in high demand according to literature and nominal group participants.[58] As observed for latter by highest number of job posts for digital jobs being for programmers and software development professionals who are likely to have these technical skills.[59]

4.4 Adaptations Required to Post-16 Training Provision[60]

The adaptations needed to post-16 training provision to meet the anticipated changes to skills in the Creative and Digital sector are described below

Table 15: Key adaptations for post-16 education and skills provision for the Creative and Digital sector

Careers education	- More effective careers education, information, advice and guidance in schools required to increase awareness of the

[57] West of England Combined Authority (2020) Recovery Plan
[58] West of England Combined Authority (2021) Annual Skills Report
[59] 2,110 postings in the West of England in December 2020 cited in West of England Combined Authority (2021) Digital Skills Pack
[60] These points constitute an amalgamation of points drawn from the literature review and the various interviews and nominal group activity. They are based on the broad sense of what respondents were saying and should be considered accordingly.

	wider opportunities within the Creative and Digital sector to address current skills shortages.[61]
Curriculum	- Trainers need to keep pace with rapid advancements in digital technology and methods in the industry e.g. through short-term placements within the sector for trainers (identified by nominal group participant).
Apprenticeships	- Support the development of flexi-job apprenticeships for this sector where project-based working is the norm and employers are typically unable to meet the government's 12-month duration requirement for placements. The approach enables apprentices to be placed with multiple employers over their apprenticeship timeframe and would enable Creative and Digital employers to realise the benefits of the apprenticeships.[62]

5. Health

5.1 Introduction

Nationally, even prior to the COVID-19 pandemic, Health has been one of the sectors predicted to see the strongest growth in both employment and GVA compared with the other broad sectors, supported largely by increased demand for health services as the size of the population increases and it ages.[63] In the West

[61] Creative & Cultural Skills (2016) Building a Creative Nation: Current and future skills needs
[62] For further information, see: https://www.gov.uk/guidance/flexi-job-apprenticeship-offer
[63] DfE (2020) Working Futures 2017-2027: Long-run labour market and skills projections for the UK

of England Combined Authority region, Health accounted for 8% of sub-regional GVA in 2018.[64] The number of health businesses increased by 25% between 2016-2019, in line with the national average.[65]

5.2 Key Occupational Changes and Drivers

The Health sector continues to grow, and is forecast to have significant labour demand requirements.

Table 16: Historic employment demand in the Health sector in the West of England Combined Authority area

1996 - 2019	Historic rate of annual growth of 2.1% is slightly higher than the UK rate (2.0%)
2019 position	Employed 68,200 in 2019, accounting for 11.2% of all jobs in the West of England
COVID-19 impact 2019 - 2021	Jobs declined by 2,600 between 2019 and 2020

Source: LEFM (March 2021), Cambridge Econometrics

Table 17: Future employment demand in the Health sector in the West of England Combined Authority area

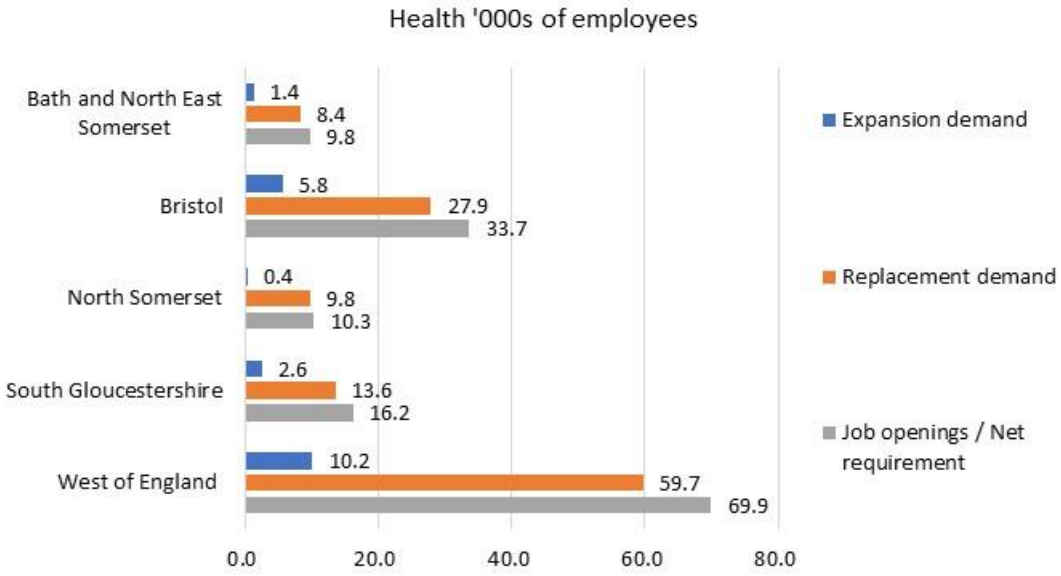
2020 - 2036	Health employment is forecast to increase by 10,200 (0.9% annually), a similar rate to nationally (1.0%)
Occupation	Highest number of job openings in the region are forecast to be in *Caring personal service occupations* (51,000 openings), made up of expansion demand of 14,700 FTE jobs and replacement demand of 36,300 FTE jobs, which is primarily a result of high retirements expected. This reflects a national requirement for 627,000 extra social care staff needed to improve services and meet demands, which is four times greater than the increases of the last ten years.[66] Alongside this, a substantial number of job openings are forecast for *Health professionals* (27,100), which again is similar to demand seen across England up to 2030, for an estimated 488,000 general health care staff, to meet

[64] West of England Combined Authority (2020) Recovery Taskforce Sector Skills Report
[65] West of England Combined Authority (2019) Local Industrial Strategy
[66] The Health Foundation (2021) Health and social care funding projections 2021

	pressures and recover from the pandemic. This is double the growth seen in the last decade.

Source: LEFM (March 2021), Cambridge Econometrics

Figure 7: Employment demand projections for the Health key sector 2020-2036



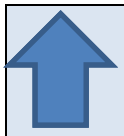
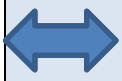
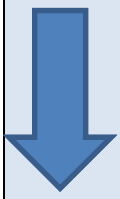
Source: LEFM (March 2021), Cambridge Econometrics.

Figure 7 shows that:

- Demand is significant over this period, at 69,900 job openings.
- Both expansion and replacement demand are positive across every local authority area, with particularly high net requirements between 2020 and 2036 for Bristol and South Gloucestershire with 33,700 and 16,200 job openings respectively.

The drivers for employment and occupational change in the Health sector are outlined in Table 18.

Table 18: Drivers for employment and occupational change in the Health sector

	- Rapid growth of the sector in the West of England driven by **nationally significant scientific research centres,** such as the Bristol and Bath Science Park in Emersons Green.[67]
	- **Ageing population** is both increasing the demand for health and care services but also leading to a workforce of retirement age employees. This will require an ever growing need to encourage the uptake of new trainee workers and training provision to replace lost skills.[68] - Social and technological change will also require a workforce which is increasing agile, flexible and multidisciplinary. Nominal group participants cited innovations such as the hospital at home model, developed in response to increasing pressures on providing hospital beds, where patients with acute conditions are provided with intensive level hospital care at home.[69] These new models to health and social care delivery, as well as immersive technologies and virtual reality applications which are starting to be developed to support better care of patients at home, will require the workforce to develop new skills including important digital and communication skills.
	- **COVID-19** made it more challenging to recruit new workers by putting pressure on the education pathways to employment in the sector; despite c.2.650 apprenticeship starts in the West of England, capacity for the sector to support these apprenticeships during the pandemic is challenging. Following the pandemic, there is a need to ensure that the students who remain in the region have access to meaningful employment opportunities and work experience.[70]

5.3 Impact of Occupational Changes on the Skills Required

The impact of the occupational changes anticipated in the Health sector on the skills required are set out below.

Table 19: Skills required in the Health sector as a result of anticipated occupational changes and drivers

[67] West of England Combined Authority (2021) ELSNA report
[68] Public Health England (2016) Fit for the Future – Public Health People
[69] Further information can be found at: https://www.hospitalathome.org.uk/
[70] West of England Combined Authority (2020) Recovery Taskforce Sector Skills Report

Digital skills 	- Nationally, the workforce needs skills in data, digital, information technology, and knowledge-management services to help implement data-driven healthcare, digital transformation, and technology-supported organisational change.[71]
Care worker and nursing skills 	- Skills of care workers and nurses are in most demand in the region, with high demand recorded as well for nursing auxiliaries and assistants, medical practitioners, health service and public health managers and directors, and other administrative occupations. The most high-level skills requirements noted in these posts involved working with mental health, patient care, care planning, dementia cases, rehabilitation, staff management, administrative support, customer service, budgeting, and learning disabilities.[72] Nominal group findings highlighted demand for social care workers to have more health-related skills to meet needs of ageing population and drive for more health care delivery at home.
Multidisciplinary skills 	- Skills to support agile, flexible and multidisciplinary working to enable the transformation of care pathways and clinical practice, many of which will be delivered in the community.[73] Nominal group participants identified that such multidisciplinary teams will require training in health care and leadership skills to work effectively across different occupations.

5.4 Adaptations Required to Post-16 Training Provision[74]

The adaptations needed to post-16 training provision to meet the anticipated changes to skills in the Health sector are described below.

[71] NHS Health Education England (2021) Data Driven Healthcare in 2030: Transformation Requirements of the NHS Digital Technology and Health Informatics Workforce
[72] West of England Combined Authority (2021) Health and Social Care Skills Pack
[73] Public Health England (2016) Fit for the Future – Public Health People
[74] These points constitute an amalgamation of points drawn from the literature review and the various interviews and nominal group activity. They are based on the broad sense of what respondents were saying and should be considered accordingly.

Table 20: Key adaptations for post-16 education and skills provision for the Health sector

Apprenticeships	- Training providers need to work closely with sector employers to ensure meaningful employment and work experience opportunities exist for health apprentices so these individuals remain in the region and/or sector to fill future job openings. - Trend for closer alignment in practice between health and social care would benefit from the development of rotational apprenticeships (this is a joined-up approach between Health & Social Care to increase capacity and to enable the workforce to become more flexible). They combine health and social care training so a single professional could deliver both personal and medical care.
Upskill existing workforce	- Workforce development required to **increase health literacy and engagement of population** as prevention becomes increasingly important as means of most effectively managing health and social care services and resources.[75] - Re-training opportunities to ensure sector employees they have the relevant skills to respond flexibly to social and technological advances and that these are aligned with real job opportunities from employers to motivate them and provide security to provide the necessary confidence to invest their time.[76]

6. Professional Services

[75] Public Health England (2016) Fit for the Future – Public Health People
[76] West of England Combined Authority (2020) Recovery Plan

6.1 Introduction

The Professional Services sector is a significant pillar of the UK economy providing 5.5 million jobs across the UK, almost three quarters (73%) of which are located outside the capital.[77] In the West of England, the Professional Services sector encompasses a wide range of activities across financial, legal and business, and is recognised for the following:

- Accounting for 11% of sub-regional GVA in 2018;[78]
- Making a significant contribution to exports (valued at £4.6bn in 2016, a 19% increase from 2015);
- Attracting large enterprises such as Lloyds Banking Group, PwC, Hargreaves Lansdown, Aviva and Royal Bank of Scotland, all of which have offices in the region, as well as having a significantly large expanse of SMEs; and
- Supporting a large Professional Services cluster within the Temple Quarter Enterprise Zone in Bristol (around 4,000 jobs in over 350 businesses in this cluster alone).[79]

6.2 Key Occupational Changes and Drivers

Professional Services have had strong historic growth, but growth is forecast to continue at a slower rate in future years.

Table 21: Historic employment demand in the Professional Services sector in the West of England Combined Authority area

1996 - 2019	Slightly slower historic rate of annual growth (2.0%) than nationally (2.3%)
2019 position	Employed 148,300 - 24.4% of all jobs in the West of England
COVID-19 impact 2019 - 2021	900 jobs were lost at a rate similar to the national average (0.6%)

Source: LEFM (March 2021), Cambridge Econometrics

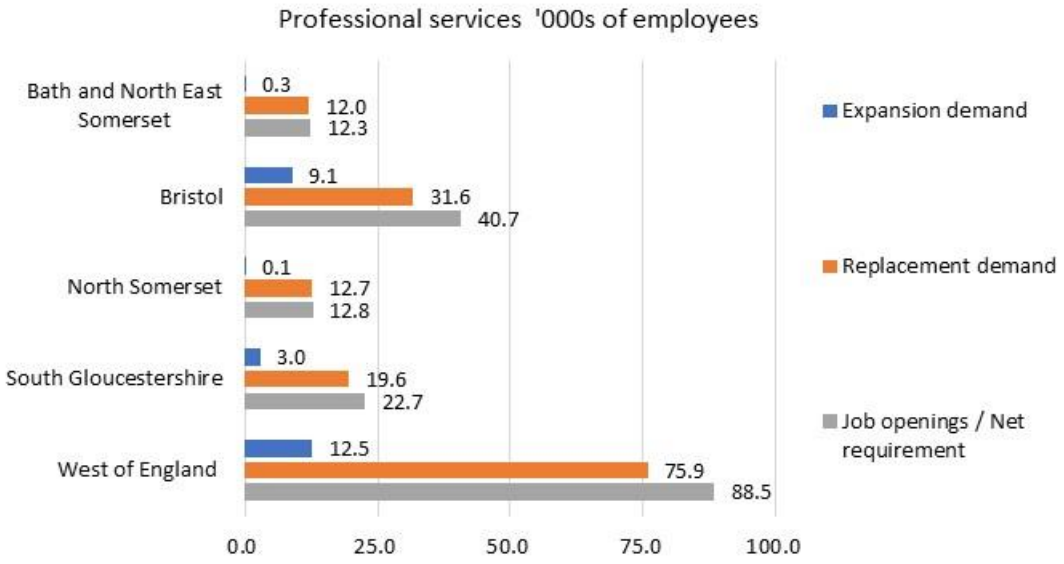
Table 22: Future employment demand in the Professional Services sector in the West of England Combined Authority area

[77] Financial Services Skills Commission (2021) Skills for future success
[78] West of England Combined Authority (2021) Adult Education Budget
[79] West of England Combined Authority (2021) ELSNA report

2020 - 2036	Employment is forecast to increase by 12,500 (0.5% per year), a slightly lower rate than nationally (0.7%)
Occupation	A high number of job openings are forecast for *Business, media and public services professionals* and *Business and public service associate professional* (44,100 and 42,800 respectively), mostly driven by replacement demand

Source: LEFM (March 2021), Cambridge Econometrics

Figure 8: Employment demand projections for the Professional Services key sector 2020-2036



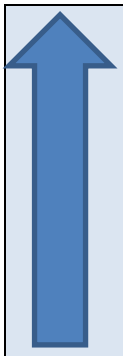
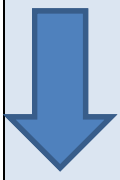
Source: LEFM (March 2021), Cambridge Econometrics

Figure 8 illustrates that:

- Replacement demand is significant over this period, at 75,900 jobs – resulting in a net requirement for 88,500 job openings.
- Both expansion and replacement demand are positive across every local authority area, with particularly high net requirements between 2020 and 2036 for Bristol (40,700 job openings) and South Gloucestershire (22,700),

The drivers for employment and occupational change in the Professional Services sector are outlined below.

Table 23: Drivers for employment and occupational change in the Professional Services sector

	- The sector **adapted well to the pandemic** with a large proportion of the workforce able to work from home. This transition is likely to continue for many with office employment becoming more flexible with a move from central office locations to local flexible workspace and home.[80] This will influence the skills employees need to adapt to these working practices and the methods they use to communicate with each other and clients/customers. - **Low carbon agenda** is leading to the development of new business purposes within the sector such as environmental law and green finance. Due to the high qualification levels of many in the sector there are few significant concerns regarding recruiting people with the relevant skills to these new positions.[81] Furthermore, as organisations transition to become net zero compliant, it is anticipated that demand for low-carbon specialist advisers in the sector will increase.[82]
	- **Automation and digitisation** are anticipated to cause a decrease in low skills employment within finance and insurance as businesses adopt new technologies and consolidate their business activities.[83] Nominal group findings highlighted the move away from being a traditionally paper-based sector to one supported by digital solutions instead of employees performing administrative roles.

6.3 Impact of Occupational Changes on the Skills Required

The impact of the occupational changes anticipated in the Professional Services sector on the skills required are set out in the table below.

[80] West of England Combined Authority (2021) ELSNA report
[81] West of England Combined Authority (2021) Green Skills Market Analysis Report
[82] West of England Combined Authority (2021) Green Skills Market Analysis Report
[83] West of England Combined Authority (2020) Recovery Taskforce Sector Skills Report

Table 24: Skills required in the Professional Services sector as a result of anticipated occupational changes and drivers

Green skills 	- To develop the low carbon specialists and advisors to support businesses in all sectors transition to be net zero compliant.
Digital skills 	- To upskill and reskill existing workforce to avoid threat to lower skills roles from automation and digitalisation.[84] - To work effectively remotely with colleagues and clients following rapid transition to this mode of working following the pandemic including greater proficiency of mobile working, cloud technologies and user experience (identified by nominal group participants).
Technical skills 	- Technical skills identified as lacking in the financial services sector nationally are: o User experience - research, design, analysis and selling skills; o Agility – skills in navigating a fast-paced work environment and managing different aspects of projects; o Cyber security – threat management and risk assessment, including digital skills; o Machine learning and artificial intelligence – high-level skills including computer science fundamentals, programming, probability and statistics, and data science.[85]
Behaviour skills	- Need to address the shortage of behavioural skills across the Professional Services sector in general nationally, including:

[84] Financial Services Skills Commission (2021) Skills for Future Success
[85] Financial Services Skills Commission (2021) Future Skills Framework

	○ Adaptability – involving personal skills, such as being able to embrace change, and learn from experience. ○ Empathy – including self-awareness, understanding peoples' perspectives and engaging with opposing opinions. ○ Relationship management - including communication skills and being professional and trustworthy. ○ Teamwork – based on communication and collaboration skills, with focus on maintaining healthy working environments within teams.[86]

6.4 Adaptations Required to Post-16 Training Provision[87]

The adaptations needed to post-16 training provision to meet the anticipated changes to skills in the Professional Services sector are described in Table 25.

Table 25: Key adaptations for post-16 education and skills provision for the Professional Services sector

Curriculum	- Deliver newly developed qualifications related to the green finance sector to support the development of skills and knowledge to address climate change with sustainable finance principles.[88]
Upskill existing workforce	- Train employees in digital skills so they can work efficiently and effectively following the rapid transition to remote working following the pandemic (identified by nominal group participants).

[86] Financial Services Skills Commission (2021) Future Skills Framework
[87] These points constitute an amalgamation of points drawn from the literature review and the various interviews and nominal group activity. They are based on the broad sense of what respondents were saying and should be considered accordingly.
[88] West of England Combined Authority (2021) Green Skills Market Report

7. Tourism, Culture and Hospitality

7.1 Introduction

The Tourism, Culture and Hospitality sector is a key pillar of the UK's broader economic and social success, and employs approximately three million people, equating to approximately £66 billion in GVA nationally. There are certain job types, such as skilled trades (e.g. chefs), where the proportion of

vacancies that are hard to fill because the skills are hard to find is above the sector average (17%) at 39%.[89]

In the West of England, Tourism is seen as one of the larger employers within the sector with significant seasonal peaks particularly within Bath and Weston-Super-Mare. Tourism, Culture and Hospitality is especially broad and is comprised of major travel and accommodation employers like Bristol Airport, Great Western Railway, Premier Inn, and Marriott, as well as a large proportion of independent micro and artisan businesses. [90] Overall, Tourism accounted for 4% of sub-regional GVA in 2018.[91]

7.2 Key Occupational Changes and Drivers

Tourism, Culture and Hospitality job growth has been at a higher rate of growth in the region than nationally (see Table 26).

Table 26: Historic employment demand in the Tourism, Culture and Hospitality sector in the West of England Combined Authority area

1996 - 2019	Jobs growth occurred at a much higher rate (2.8% annually) than nationally (1.9%)
2019 position	Employed 51,800 – 8.5% of total employment in the West of England
COVID-19 impact 2019 - 2021	Hit hard by the pandemic, losing 2,700 jobs (5.3%), although this is slightly lower than the national job loss rate (5.5%)

Source: LEFM (March 2021), Cambridge Econometrics

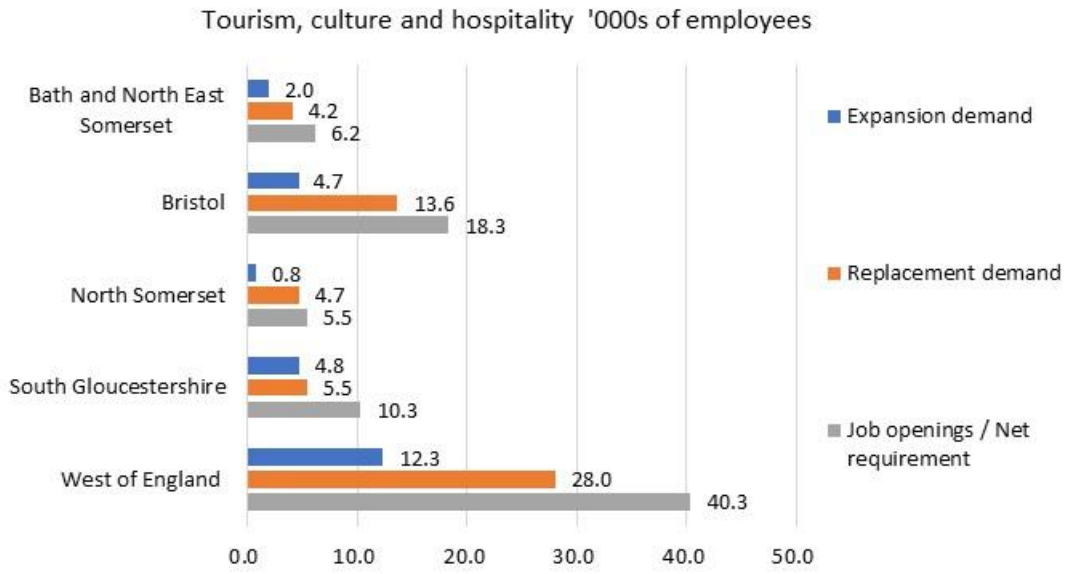
Table 27: Future employment demand in the Tourism, Culture and Hospitality sector in the West of England Combined Authority area

2020 - 2036	Expected to gain 12,300 jobs, an annual rate of growth of 1.4%.
Occupation	A substantial number of job openings are forecast for *Leisure, travel and related personal services occupations* (11,900).

Source: LEFM (March 2021), Cambridge Econometrics

[89] Economic Insight (2019) Hospitality and Tourism workforce landscape (for DCMS)
[90] West of England Combined Authority (2021) ELSNA report
[91] West of England Combined Authority (2020) Recovery Taskforce Sector Skills Report

Figure 9: Employment demand projections for the Tourism, Culture and Hospitality key sector 2020-2036



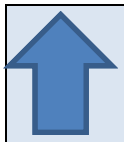
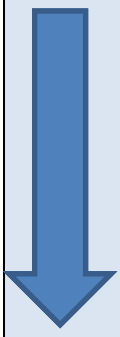
Source: LEFM (March 2021), Cambridge Econometrics

As illustrated in Figure 9:

- Replacement demand over this period is 28,000 jobs – which means a significant level or net requirement, for 40,300 job openings.
- Both expansion and replacement demand are high across all local areas, with a particularly strong net requirement for 18,300 job openings between 2020 and 2036 for Bristol.

The drivers for employment and occupational change in the Tourism, Culture and Hospitality sector are outlined Table 28.

Table 28: Drivers for employment and occupational change in the Tourism, Culture and Hospitality sector

	- **TV tourism** boom – Bath is anticipated to gain £1.5m from fans visiting locations filmed in Netflix's second biggest global hit Bridgerton which was recorded in the city.[92]
	- **Digitalisation** along with an increased focus on sustainability and accessibility is also influencing changes in the skills required in the sector. According to nominal group participants customer demand within Culture and Tourism sectors will require enhanced and more sophisticated use of technology to improve visitor experience and access, whether physical or financial, through the development of digital content and interactive methods, such as virtual reality.
	- The Tourism and Hospitality industry experienced massive labour shortages with an estimated 1,100 job vacancies in Bristol and Bath according to a nominal group participant. Anecdotal evidence reported by skills officers indicates this at least partly resulted from many hospitality workers reflecting **during the pandemic** on the industry's long hours and choosing to leave the sector. It is also likely to result from sector employees moving into more stable areas of the economy less negatively impacted by the pandemic. - **The UK's exit from the European Union** has exacerbated the labour shortages as it has become more difficult for EU nationals, on which the sector was heavily dependent, to work in it.[93]

7.3 Impact of Occupational Changes on the Skills Required

The impact of the occupational changes anticipated in the Tourism, Culture and Hospitality sector on the skills required are set out below.

Table 29: Skills required in the Tourism, Culture and Hospitality sector as a result of anticipated occupational changes and drivers

Digital skills	- The move to digitalisation to improve the visitor experience, as well as pressure to increase sustainability and accessibility, will require much of the workforce to have basic digital skills and

[92] The Guardian (2021): Netflix's Bridgerton and Rebecca fuel tourism boom in south-west England, Mark Sweney, 4th November 2021 (see: https://www.theguardian.com/business/2021/nov/04/netflix-bridgerton-rebecca-tv-tourism-boom-south-west-england)

[93] Economic Insight (2019) Hospitality and Tourism workforce landscape

	knowledge of technological opportunities (identified by nominal group participants).
Multiple skills 	- Key skills required for new entrants to the sector, according to national research, include technical skills such as industry knowledge, computer literacy/basic IT skills, and problem-solving skills related to specific situations, and soft skills e.g. teaming working, customer handling, and flexibility.[94]

7.4 Adaptations Required to Post-16 Training Provision[95]

The adaptations needed to post-16 training provision to meet the anticipated changes to skills in the Tourism, Culture and Hospitality sector are described below.

Table 30: Key adaptations for post-16 education and skills provision for the Tourism, Culture and Hospitality sector

Curriculum	- Provision of advanced digital skills to support development of enhanced user experience to ensure competitiveness of Culture and Tourism offer in the region. - Embedding of technical, problem-solving and soft skills within courses to ensure that employees in the sector provide high quality customer service.

8. Provision - Post-16 Education and Skills

[94] Economic Insight (2019) Hospitality and Tourism workforce landscape

[95] These points constitute an amalgamation of points drawn from the literature review and the various interviews and nominal group activity. They are based on the broad sense of what respondents were saying and should be considered accordingly.

This chapter examines how well the West of England's existing and planned post-16 infrastructure meets current and future skills needs, any gaps in the provision, and what facilities, curriculum and/or services need to be in place to respond effectively. It is based on the analysis of the vocational course mapping exercise and the in-depth interviews with providers and stakeholders of post-16 infrastructure in the West of England including officers responsible for skills from the four local authorities in the region.

Interviews with local authority officers responsible for skills within the area covered by the West of England Combined Authority indicate that the authorities are at different stages in their assessment of supply and demand for post-16 education and skills provision. For example, Bristol City Council has produced a post-16 strategy to help its learners[96] whilst Bath and North East Somerset Council is due to develop its employment and skills plan having recently launched its vision for 2030.[97] Whilst there is a lot of activity taking place to increase learners skills and engage under-represented learners in employment opportunities, across all four local authorities there is a recognised deficit of data about employer and sector demand for skills.

The chapter considers the effectiveness of post-16 education infrastructure from two perspectives: the key issues surrounding demand for education and training related to the sectors, and the supply of relevant courses from learning providers.

8.1 Demand issues

Increasingly rapid change

The importance of change cannot be overstated. The vital difference in the current world is that change has increased in pace and is no longer simply a matter of machines and technology. The whole of the UK economy is facing cultural and social change, mechanical and technological change, and both on top of extremely rapid digital change. In a wide variety of sectors these developments are outstripping the ability of employers and providers to keep pace.

As many of the interviewees and provider representatives said they are now having to adjust to a cultural situation in which the expectation of fewer hours of work with the same or increased rewards is becoming extremely common. At the same time young people emerge from school with high and perhaps unrealistic expectations and with a certain view regarding certain types of work – based on perception of the work in the sectors (dirty, outdoors or even short-lived).

Employers have also remarked that their employees tend to move on much quicker (leading to higher recruitment and training costs and difficulties in developing deep in-house expertise. Technology is advancing at an ever-faster pace and most employers and providers find it more difficult to keep their staff up to date and competent. In addition, the whole basis of our economy has advanced into Industry

[96] Bristol City Council (2019) *Improving Bristol Post 16 – Education, Skills and Careers Pathways – Strategy 2019-24*
[97] Bath and North East Somerset Council (2021) *Bath with NES: Ambitious together for a fair, green, creative and connected city region – one shared vision*

4.0 almost without many people noticing. Providers and employers are experiencing a revolutionary change in the way work is structured and the skills that are needed.

Having said all this, and bearing in mind that demand issues are based on a much wider set of requirements both employer and provider interviewees point to two major cross-cutting issues that they feel will drive demand for skills in the coming decades (these represent macro-drivers over and above more traditional factors such as job-related skills):

1. The increasing need for what are called "**green skills**" – that is the ability of employees to be able to master the challenges of zero-emissions and carbon reduction; and
2. The all-pervading march of **digital skills** and the increasing complexity of the demands that will be placed upon employees in skills ranging from basic computer literacy, through fundamental applications usage (e.g. Word, Excel, etc.) to advanced programming and robotic management to blockchain, digital twinning and quantum computing,

These cross-cutting themes are discussed briefly, below, in the context of the West of England.

Green skills

The importance of delivering education and training to meet demand for green skills, particularly in relation to the Advanced Engineering and Aerospace and Construction sectors is recognised by the vast majority of interviewees.

However, the most serious issue is that an impasse currently exists because not only do employers (as a whole) not yet fully understand what will be required, but providers also lack a full understanding of the specific skills which will be demanded and therefore how to develop training to meet these needs (Table 31).

Table 31: Summary of green skills post-16 provision challenge

Employer perspective	Provider perspective	Impasse
Limited demand (as yet) from customers for green technology e.g. electric vehicles, electric vehicle charging points, air source heat pumps. Limited understanding of any deeper implications of net-zero. Lack of subsidies to increase consumer demand Little need to upskill workforce in green skills until demand increases No real understanding yet of the need for each individual company to begin to reduce its emissions footprint and develop formal plans to do so.	Limited demand from employers for providing green skills to current or future workforce Need to balance provision to meet existing demand for current technology e.g. gas central heating engineers and develop new curriculum for anticipated technologies e.g. air source heat pumps and retrofitting but regarding the latter technology is still evolving and number of jobs needing to be filled is unclear	Uncertainty regarding demand and supply for green skills creates a barrier to post-16 training provision development. Neither employers nor providers fully understand the needs and both are focussing for the time being on the "known" issues – which tend to be around existing technology and not around future zero-emissions requirements.

A potential solution to this impasse proposed by one interviewee is funding for a regional innovation pilot. Funding could boost the West of England's ecosystem by giving providers confidence to develop training programmes with input from green suppliers to meet anticipated need (as long as the "green suppliers" are themselves sufficiently aware of the full picture). It would need to be flexible in terms of scope as green technologies are evolving and the apprenticeship standards and qualifications would need to be able to respond to this. Alongside this promotional work with the future workforce, through local authorities' career work in schools would be required to create an appetite among young people to learn these green skills.

A further urgent need is for short courses to help employers build their knowledge and understand the zero-emissions agenda and the need for them (as companies) to begin planning. Awareness at this level will also help to drive understanding of more advanced green issues.

Digital skills

All providers interviewed recognise the need to meet employer demand across all sectors for basic digital skills among the workforce, as even lower-skilled workers are increasingly likely to be required to use digital devices and technology. Providers are seeking to embed basic digital skills across their courses but this would appear to be somewhat behind the curve, and can be hindered by the availability of digital infrastructure which is variable across the region.

Colleges are, however, making rapid strides. The West of England Institute of Technology and the University of Bath via the Institute of Coding, have accessed the government's National Skills Fund to offer free, flexible courses of up to 16 weeks for eligible learners over 19 to improve their basic and advanced digital skills. These include both generic courses, for example cyber security and cloud technologies, and those for specific occupations, for instance data science for project managers in the construction industry.[98] Providers in the West of England are also accessing funding from the Adult Education Budget (AEB) to support digital skills and training. West of England Combined Authority's Digital Skills Investment Programme (DSIP) is also being used to progress key targets in digital skills such as essential workers, sports specialists, and a range of 'bootcamps' on digital topics.

Employers we spoke to were extremely supportive of this kind of development.

Regarding advanced digital skills to meet the needs of the creative and digital sector, funding from the Department for Education and the West of England Combined Authority supported the launch in 2020 of the West of England Institute of Technology.[99] It is anticipated that this centre, based at Weston College, will provide the specific skills required for young people and those already in work to fully exploit new technologies and digital innovation. West of England Combined Authority has also invested around £300,000 into the iStart digital skills initiative in Bath and has been a major driving force behind the DETI programme: the Digital Engineering Technology & Innovation (DETI) is a strategic programme of the West of England Combined Authority delivered by the National Composites Centre, in partnership with the Centre for Modelling & Simulation, Digital Catapult, the University of the West of England, the University of Bristol, and the University of Bath. Industry partners include Airbus, GKN Aerospace, Rolls-Royce, and others.

Concerns remain among interviewees about the ability of learners across the region to access the courses and the current capacity at other providers to deliver their own advanced digital skills. The key issues raised are the ability of providers to firstly, understand the skills required due to the rate of change and secondly, given this rapid pace the challenge to ensure teaching staff have the experience to deliver these.

[98] Department for Education (2021) Guidance: List of Skills Bootcamps (see: https://www.gov.uk/government/publications/find-a-skills-bootcamp/list-of-skills-bootcamps)
[99] West of England Combined Authority (2019) Local Industrial Strategy

8.2 Supply issues

Education and skills providers face a similar set of challenges to employers but across all sectors of the economy. Like employers, providers are experiencing problems due to a lack of detailed intelligence about the way things are changing, a shortage of qualified staff, and a particular shortage of qualified staff with the skills that will be required in the coming years.

They also suffer from price competition in the market for skilled staff. They argue that the private sector is able to pay more for the skills that are in highest demand.

For interviewees the most important supply side issues are sufficiency, digital and green skills, transport, and special educational needs. The topic is discussed at further length in Section 9.

Table 32: Education and training provision for the six key sectors in the region

24	**Top level relevant providers**
47	**Relevant providers including private providers**
51,150	**Learners in FE and Skills Funded Provision**
63,400	**Apprentices across all disciplines.**[100] • **Advanced Engineering and Aerospace = 27%** • **Construction = 13%** • **Creative and Digital = 11%** • **Health = 45%** • **Professional Services**[101] • **Tourism, Culture and Hospitality - 5%**
1,052	**Courses relevant to the key sectors**[102] • **Advanced Engineering and Aerospace = 144 (14%)** • **Construction = 122 (12%)** • **Creative and Digital = 275 (26%)**

[100] ESFA (2019) *FE learner and skills participation by provider, local authority, funding stream, learner and learner characteristics: 2018-2019 and ONS accessed on 24-03-2022*

[101] Professional Services encompasses a large number of Apprenticeships for Business, Administration and Law.

[102] The breadth of the definition of Creative and Digital – potentially two sectors encompassing a range of courses for Dance to IT - is reflected in the much higher number of courses over the other five sectors.

	• **Health = 159 (15%)** • **Professional Services = 173 (16%)** • **Tourism, Culture and Hospitality = 179 (17%)**

Data from the Education and Skills Funding Agency (ESFA) for West of England in 2018/19 and from Pye Tait Consulting research for this study.

Sufficiency

Interviews with officers responsible for skills in several West of England local authorities highlighted an anticipated increase in the number of 16-19 year olds in coming years and a larger proportion of these moving into further education rather than sixth forms or Universities. This will be driven they say by the increased focus, nationally, on apprenticeships and on T-Levels (many of which will lead directly into existing vocational courses). The issue of growing numbers is likely to be exacerbated by significant planned housing growth, particularly around SGS College's Filton Campus in South Gloucestershire, which was expected to result in demand outstripping supply in provision.

Interviewees were unsure about the extent to which capacity within the post-16 infrastructure could accommodate this and similar increases in population demand in coming years. The interview findings suggest that only limited analysis has yet taken place at a local authority level to assess supply and demand for post-16 provision in the light of population growth and movements, and government focus on apprenticeships.

Volume of provision and the anticipated need for more highly skilled tutors are anxieties that are rendered more complex in terms of solutions by the disproportionate growth in certain sub-regional areas caused by specific economic growth factors and by new housing concentrations. These drivers will impact further upon supply in given colleges and providers but will also cause "overspill" (where demand is transferred to more distant providers. Learners from South Gloucestershire are already reportedly having to travel outside their local authority area for training in construction, engineering, and care as there is limited space to increase capacity of course provision. Interviewees believe this is placing added financial and social burdens on learners in terms of the travel to learn cost and time away from jobs and home.

These points and more were mentioned by the institutions completing detailed proformas on their facilities, resources and plans.

Remote Learning

COVID-19 resulted in a rapid transition to online remote learning which was only partially successful. Funding for providers enabled the provision of laptops to those who did not have the financial means to purchase their own. However, the interview findings suggest that the majority of post-16 provision had returned to face-to-face teaching in recent months. This is the preferred method for several reasons:

1. Many vocational subjects involve practical teaching and technical equipment which is difficult to deliver effectively remotely.

2. Practical mentoring of hand skills and even of digital skills is considered by many tutors to be only possible in a face to face context.
3. Whilst access issues to equipment such as laptops for disadvantaged learners were surmounted in most cases, barriers in relation to internet access (whether due to financial reasons for economically-disadvantaged learners, connectivity problems for those living in some rural areas in the region) or inappropriate environments for effective learning at home were not as easy to overcome.
4. A significant proportion of learners find remote learning – without direct access to the tutor and without the support and encouragement of fellow-learners – too difficult for long term use.
5. Even academic subjects which can more easily be taught online and in which many learners reportedly achieved better exam results during the pandemic, are argued by some tutors and learners to facilitate greater personal wellbeing when delivered in person.

However, interviewees also said that the return to in-person teaching creates barriers for some groups which thrived under remote learning. For example learners with young children found remote teaching/learning far easier to manage around their responsibilities when compared to having to find child-care while they were at college.

For remote learning to be a prominent method of post-16 delivery in future, the following are required:

- Recognition that different people and groups of people do better with different teaching/learning approaches.
- Understanding that a dual approach to on-line and in-person learning may be very effective. This is not "blended" learning but totally separate "classes" for those who wish to learn face-to-face and those who choose to take their courses online. Colleges may have to consider ways of offering their "products" in three modes: pure face-to-face; blended face to face and online; and purely online.
- Support to overcome barriers for on-line learners, such as internet access (e.g. through subsidised data plans or improvements to rural broadband infrastructure).
- More training for staff to be able to design and manage effective online learning; and
- Further technological advances in the delivery of vocational education and training using augmented and virtual reality. Some initial steps to achieving this are already underway with West of England Institute of Technology's virtual classroom.

Weston College in 2020 launched the UK's first virtual classroom in further education to support the West of England Institute of Technology. It seeks to enhance opportunities for remote-access to education with innovative technology, such as mobile extending cameras, large 55-inch screens and virtual classroom software to provide an integrated experience for learners and teachers.[103]

Access to transport

The interviewees emphasised that state-of-the-art facilities to meet the skills needs of each key sector cannot be located within each college and not even within each local authority comprising the West of England. Finance and staff skills dictate that certain courses and specialist facilities will be concentrated. Therefore, learners will need to be able to access these facilities wherever they are located.

Yet access to public transport in the region is regarded by our interviewees as being a major barrier to this. Improving reliability, accessibility and affordability of bus services are critical improvements required to ensure that learners can effectively access provision.

Costing the benefits will be problematic but it is clear that the region will gain a good deal from ensuring that aspiring learners are conveyed efficiently and at the lowest emissions-costs to suitable providers.

Employer engagement

Addressing the impending supply issues for high quality education and training cannot be successfully achieved without engaging more closely with employers. There is no longer any doubt that rapidly increasing skills demands and limited capacity for public-sector provision will only be satisfied by collaboration and cooperation on a scale hitherto not seen.

Employers have the capability (although perhaps not the capacity in many instances) to provide much-needed practical experience and high level, up-to-date tutoring knowledge. Some of the larger employers also have training facilities which might offer a little more capacity if used effectively. In some subjects private training providers also offer the possibility of capacity and skills which might be used to extend and expand public offerings in a limited number of subject areas.

There are many examples of providers working effectively with larger private employers from the Advanced Engineering and Aerospace or Professional Services sectors as well as Health Care Trusts and University Hospitals for the Health sector to deliver courses to meet skills demands. Provider engagement with employers in sectors dominated by SMEs, such as Construction and Creative and Digital, is more challenging.

[103] Jisc.ac.uk (2020) *Weston College launches UK's first virtual classroom for further education* 12 October 2020 see: https://www.jisc.ac.uk/news/weston-college-launches-uks-first-virtual-classroom-for-further-education-12-oct-2020

So, too, is the funding model which tends to limit providers' ability to operate small "uneconomic" courses. The current model tends to emphasise financial viability in terms of costed staff and resource terms against a fairly simple set of metrics associated with the numbers and types of learner. There are multiple sophistications to the model but interviewees tell us that the approach still does not allow sufficient weight for the importance of the course to local and regional priorities.

The time commitment for providers involved in such tasks as mapping potential SMEs, contacting them, and then holding multiple meetings to develop training solutions to deliver skills for a relatively small number of learners are disproportionate costs and therefore barriers. Some local authorities also highlighted challenges in engaging employers known to have recruitment issues, such as care and hospitality, in programmes like Kickstart which are providing people with the skills to work in these sectors.

There is some evidence of steps being taken to address at least some of these challenges:

- Bootcamps and the I-START programme at Bath College are being co-designed with SMEs to provide highly necessary skills to young people and to the existing workforce to meet the demands of the Creative and Digital Sector.

I-START

A new digital skills training centre to be developed at Bath College, with £300,000 funding from the West of England Combined Authority, and in collaboration with the University of Bath, Bath Spa University, Bath & North-East Somerset Council. The intention is to provide digital skills to enable learners to enter high quality jobs in the area's thriving Creative and Digital Sector

- Several local authorities are working intensively on place-based approaches in the region to develop an appetite among SMEs for apprenticeships. They are doing this by working with community groups and providers to recruit and train local learners, who might be disadvantaged economically for example, to become apprentices.
- Bristol City Council has taken a strategic approach, particularly with large employers, to link investment in the city with the development of post-16 skills.

Building Bristol

Bristol City Council has developed a systematic approach to connect post-16 skills with development opportunities in the region. Any major planning application coming to the city is required to make a financial contribution to skills development of young people.

The interviewees who took part in this study would welcome a regional framework to support and increase the efficiency of their locally place-based efforts. Their concern is what they view as a largely uncoordinated regional effort in the context of divergent but promising local initiatives. Many similar activities currently appear to be duplicated across the four local authorities covered by the West of England Combined Authority with each authority undertaking its own strategic planning (to varying extents) and initiating its own skills and training initiatives. Several participants in the nominal groups also pointed to what they see as a failure to consider the wider implications of this situation: specifically the failure to integrate crucial skills on a regional basis – notably zero-emissions, high level digital skills, technician skills, and managerial and entrepreneurial skills – and what were argued to be failings in considering social and cultural developments and transport needs and their effects upon skills demand and provision.

We must urgently begin to see skills and training as part of the whole and take account of the way people live, the terrible state of public transport, and the critical need for new approaches to getting skilled people into local firms.

Nominal Group Participant

Two interviewees mentioned what they argued was a need for the region (or the UK) to stop using EU size-definitions for companies. Their point was that they see the Large/SME segmentation as not merely unhelpful but actually damaging to policy making. One of these respondents argued that despite most studies segmenting into a more realistic set of categories: micro, small, medium and large, the continued use of the acronym "SME" makes smaller companies feel abandoned and ignored (because they are combined into a group of larger companies employing up to 250 people). The respondent said that the mere use of the term SME made him feel that his own small-company concerns could never be visible to policy-makers.

An integrated and top-down approach could help identify the skills required by smaller companies in key sectors alongside those for larger companies. It might also provide strategic direction for the more intensive relationship-building work happening between key parties on the ground in localities.

Special educational needs

High quality skills provision for learners with special educational needs is available in the region, such as the City of Bristol College's Ashley Downs Centre independent living centre, Weston College's centre and Bath College's facilities. However, such facilities only meet the needs of a limited number of learners. Interviewees are clear that more services are required to meet demand. Learners with special educational needs in South Gloucestershire for example are reportedly having to travel outside the local authority for post-16 education and skills provision.

9. Infrastructure Assessment & Gap Analysis

9.1 Demand and Workforce Predictions

The research and analytical work carried out for this study relied on official Government statistics gathered and published by the Office for National Statistics (ONS). Data specific to the West of England were identified and analysed by Cambridge Econometrics and are summarised in Appendix 2.

These figures and projections must be considered with caution – especially given the lengthy forecasting period of sixteen years between 2020 and 2036. Developments and needs over this long period of time are almost impossible to predict with any genuine degree of certainty. In 2010, predictions for the logistics sector based on ONS statistics forecast that Royal Mail and parcel services would decline at a rate of around 0.5% per annum in financial terms and some 0.85% pa in employment terms between 2010 and 2025. In reality the success of online shopping and the significant growth of courier-delivery services led to employment growth in the sector averaging 1.5% per year between 2010 and 2020.

Changes in technology affect predictions but so do global events and Government policies. It goes without saying that Covid-19 totally upended previous workforce predictions for the UK and the Ukraine War and its immense impacts on global energy supplies and shifts in supply-lines will doubtless do the same.

Recent successful Government injections of relatively small amounts of money into aerospace, for example, have begun to change what people might have predicted even five years ago. The space sector is on course to develop radically new services for the future – such as vertical and horizontal space launchers, new satellite swarms, and new technologies to clear orbital junk. Few would have been predicted five or ten years ago and all offer the possibility that current predictions will quickly become irrelevant.

The ONS figures for the West of England Combined Authority show a predicted decline in employment for aerospace in the region of -0.7% pa between 2020 and 2036 from a current workforce of 25,700 to a predicted 2036 workforce of just under 23,000 – a loss of 2,700 skilled people. This prediction may or may not come to pass but several recent developments – including new plans by space companies and electric aircraft manufacturers and the opening of AERALIS's new HQ in Bristol might significantly amend it over a sixteen year period. Predictions based largely on regressive economic data and recent labour-market trends should be used carefully and with due concern for possible unforeseen disruptive interventions and events.

The workforce predictions, in other words, provide a broad indication of possible growth and decline and the net requirements for expansion and replacement staff, a vision of what might happen based on economic predictions from 2019/2020.

Table 33: West of England Combined Authority Change by Employment

West of England	Employment 2019	Projected change +/-	Employment 2036	2020-2036
Sector of interest (aggregated from 45 sectors)	**'000s**	**'000s**	**'000s**	**% pa**
Construction	47.7	14	61.7	1.60%
Professional services	148.3	12.5	160.8	0.50%
Tourism, culture and hospitality	51.8	12.3	64.1	1.40%
Health	68.2	10.2	78.4	0.90%
Creative and digital	65.6	7.7	73.3	0.70%
Advanced engineering and Aerospace	25.7	-2.5	23.2	-0.70%
Total	**407.3**		**461.5**	

The ONS data show a pattern consistent with predicted national trends but may not fully take into account the full impacts of the supply-chain disruption due to Covid-19 or the possible impacts of the Ukraine War and the almost certain rises in energy costs.

If provision and budgets were to be influenced by these ONS data, the key considerations would be the extent to which the net requirement for new employees in any sector required education and training.

Table 34: Change by Rate of Sector Growth

West of England	Employment 2019	Projected change	Employment 2036	2020-2036	Net Requirement*	Annual Net Requirement
Sector of interest	**'000s**	**'000s**	**'000s**	**% pa**		
Construction	47.7	14.0	61.7	1.60%	21.0	1,313
Tourism, culture and hospitality	51.8	12.3	64.1	1.40%	24.5	1,531
Health & Care	68.2	10.2	78.4	0.90%	80.0	5,000

Creative and digital	65.6	7.7	73.3	0.70%	30.0	1,875
Professional services	148.3	12.5	160.8	0.50%	40.0	2,500
Advanced engineering and Aerospace	25.7	-2.5	23.2	-0.70%	12.0	750
Total	**407.3**		**461.5**		**207.0**	

(*) estimated from Appendix 2 using single and multiple job role groups.

A proportion of replacement and expansion demand will be met from people who left the sector and are now returning to it and from people attracted into the region from other UK and overseas locations. The actual proportion will differ between sectors and between the type and level of staff required. The following table provides an indication of the additional education and training requirement per sector on the basis of four assumptions as to the proportion of recruits who will require education and training both ab initio and upskilling.

Table 35:Additional Education and Training Requirement by Sector

West of England	**Net Requirement (000s)***	**Annual Net Requirement**	**15% Ed/Tr'ng**	**25% Ed/T'rng**	**50% Ed/Tr'ng**	**80% Ed/Tr'ng**	**Capacity (starts pa **)**
Construction	21	1,313	197	328	657	1050	1,066
Tourism, culture and hospitality	25	1,531	230	383	766	1225	227
Health & Care	80	5,000	750	1250	2500	4000	1,259
Creative and digital	30	1,875	281	469	938	1500	793
Professional services	40	2,500	375	625	1250	2000	846
Advanced engineering and Aerospace	12	750	112	187	375	600	885
Total	**208**	**12969**	**1945**	**3242**	**6486**	**10375**	**5,076**

(*) Sector of interest (aggregated from 45 sectors).
(**) Current capacity for four major colleges only – those that responded to the proforma exercise providing capacity data by sector.

These figures do not include provision by other colleges and by private providers or the training and upskilling of the existing workforce but logically they include initial training and apprenticeships. Proforma information includes, City of Bristol College, Bath College, SGS, and Weston College which, together account for 518 relevant courses of the 1,052 (49%) discovered for the Providers' Course Database.

Making the assumption that the remaining providers supply 51% of relevant course-places, the annual capacity of provision in relevant subjects for the West of England Combined Authority region would be a maximum of around 8,500 places. However, many of the smaller providers may not offer technical or higher-level courses so it may be more accurate to estimate the total amount of annual provision for the West of England (in the sectors of interest) at around 6,000 to 7,000.

Going back to the table above this would imply a 'training need' for around half of all recruitment, but evidence from interviews, etc. indicates that providers are experiencing excess-demand in key subjects even now and that certain apprenticeship courses are over-subscribed.

ONS data in Table 43 (see Appendices) predict an increase in the size of all sectors with the exception of advanced engineering and aerospace and that two – construction and tourism, culture and hospitality – will grow at a reasonably rapid rate of around 1.6% and 1.4% per year respectively. These changes are taken into account in the 'net requirement' figures, but they assume a 'steady state' in terms of skill needs. Any change in the skill requirement – e.g. a significant new need for upskilling in digital, green, or other technical skills will increase the pressure on the post-16 education and training system beyond those it is already experiencing.

Equally an economic recession of the type being feared at present as a result of energy-price increases will reduce demand in unpredictable ways. A further consideration, that would have been considered almost unthinkable a few months ago, is now of central concern – the potential move of western economies away from the globalised production and supply chains that have dominated commerce for more than thirty years towards greater localisation. There are signs that this may already be taking place but, if this trend becomes generalised, colleges may well have to pivot quite quickly to supplying provision in manufacturing, logistics and high tech skills of a different order to those currently being supplied. Events in 2022 have also highlighted the pressing need for all types of company and public sector organisation to focus on cyber-security – which may also drive additional demand for related courses.

9.2 Infrastructure Suitability

In terms of geographic distribution and availability the current locations of provision in the West of England Combined Authority area appear from desk research and interviews to be considered reasonably suitable. Feedback from our research indicates however that structural issues with public transport – its availability, frequency, and cost – are of greater import.

Where the facilities themselves are concerned, a number of issues would need to be considered. These include the rapid change in social and cultural expectations where education and training are concerned and the extremely rapid change in technology. The latter affects not only the construction and advanced manufacturing, engineering, and aerospace sectors but all others – hospitality, culture and media, professional services, and the fast-growing health and care sectors. Social expectations of education are changing almost as rapidly than the technology and infrastructure which now underpins communication. Our interviews have confirmed other research showing that workers and young people are less prepared to travel even moderate distances for education and training. While students tend to prefer face to face teaching for obvious reasons there are now powerful economic and even emission-based reasons for dividing education and training provision into two reasonably discrete segments:

1. Education and training which can efficiently and effectively be provided and assessed online, and

2. Aspects of education and training which are essentially practical or based on human interaction which must be delivered in a face-to-face context.

Feedback from providers suggests that these questions have been addressed to some extent during the lockdown and restricted opening phases of the Covid-19 pandemic, but that Principals and senior staff remain undecided as to the balance between online and face to face provision and the precise definition of the elements which can best be provided in these ways. Current issues with facilities being inadequate or insufficient to meet growing demand will potentially drive the providers to find early solutions. However, this decision regarding balance comes to the forefront and adds pressure on providers who are needing to meet Ofsted and Funding Body requirements with regard to the amount of delivery allowable in a digital remote format.

Another issue which is exercising the minds of senior provider staff is that of change. The rapidity of change is now so great that colleges barely have time to upgrade software and equipment before they are already obsolescent.

"The rate of change in the digital sector is such that current equipment has a short obsolesce cycle and therefore remaining technically current with equipment is always a challenge. The expectation of students and employers is currency of equipment and resources".

Provider - West of England Combined Authority

Whilst, in the digital realm, that action on provider-based devices, software, and staff skill is necessary, it seems there may be an underlying lack of appreciation of the importance of investing in digital infrastructure which supports all the equipment and activity/ learning, ensures it is cyber secure, and complies with all the security requirements of funding bodies and employers. Providers appear to be struggling with the pace of digital change, under which the increases in the level of complexity and sophistication have impacted very quickly. In terms of digital infrastructure, as a joint activity alongside the action on skills, it seems critical that West of England Combined Authority look to liaison and coordination with Government to stress the very significant importance of investing in digital infrastructure. Without efficient and secure infrastructure employers and funders will be reluctant to enhance their relationships and communications of data with the providers.

The Resources Revolution

In the past forty years and particularly in the last twenty, there has been a revolution in industry and commerce underpinned by the extremely rapid development of IT equipment, computer programmes, and the phenomenal growth of the internet. This revolution has created a very different resource environment for providers which has evolved through at least two stages and is now entering a third.

In the fairly recent past this sort of issue has been addressed by purchasing new equipment and software on a fairly regular basis in order to try to stay ahead of the game. But the costs of such renewals are significant and growing and one has to ask whether the "chasing one's tail" approach is viable or sensible in the current technological environment. Technological equipment in areas as diverse as hospitality and health quickly becomes obsolescent and even "traditional" sectors like construction are now evolving rapidly towards automation, drones, robots, 3D printing, and new materials, and hospitality and tourism are using very advanced computer and AI systems to manage their businesses and market to customers. Software and equipment required to teach up-to-date high level skills are expensive; even "simple" laptops need replacing every two to three years, security software must be upgraded constantly – especially in the teaching of cyber-security, and software applicable to the skills required in all of the sectors is being developed and upgraded at a speed hitherto unknown.

This issue is a strategically vital one which must be addressed as a separate issue to that of straightforward finances.

Physical Infrastructure

Much of the feedback from providers with respect to physical resources focuses on what they perceive as a mismatch between demand (which they characterise as growing and increasingly technical) and some insufficient, or no longer suitable, physical resources at their disposal.

In recent years West of England Combined Authority has supported the system with a number of important investments under the Skills Capital Scheme:

Skills Capital Scheme	**Promoter**
BaNES Construction Skills Centre	Bath College
Increasing the Capacity of the BEMA Training Centre	BEMA
Advanced Engineering Centre Extension	City of Bristol College
North Somerset Enterprise Technical College	North Somerset Council
Weston College Future Technology Centre	Weston College
Law and Professional Services Academy	Weston College
Weston College Construction Skills Centre	Weston College
Weston College Health and Active Living Skills Centre	Weston College
Catering Facility	Bath College City Centre
Construction Centre	City of Bristol College Hengrove Park/South Bristol Skills Academy
Brunel Centre	SGS College

Nevertheless, all providers who submitted proforma responses to detailed questions around courses, capacity, and facilities expressed concern through an extensive list of specific needs associated with a lack of funding and new or expanded facilities. These comments have been passed on to the West of England Combined Authority separately.

Specific requests appear to be for facilities such as additional teaching space at several providers, at least one new NEET facility, a new adult/professional environment, new SEND facilities, new construction facilities – particularly for green construction and digital skills, expansion of facilities for teaching health and care, and replication/simulation facilities.

While all providers have mentioned significant investment items over the past 3 to 5 years, one comments that their construction facilities are now sixty years old and that they fear that, without urgent investment in new facilities, they will fail Ofsted inspections and be forced to abandon their courses.

Suitability of physical resources is also the focus for several comments around the use of external temporary accommodation forced on colleges by excess demand and limited internal space. Several comments were received which stressed the unsuitability of some external facilities, sometimes from a teaching viewpoint and sometimes from a 'professional' standpoint.

There may also be a need for deeper research to investigate the reasons behind apparent mismatches in demand between student motivations and their demands, and employer demand.

Human Resources

As has been discussed earlier in this report, all providers placed the issues around teaching staff among their top priorities. Virtually all interviewees stressed their difficulties in attracting and recruiting suitable staff. Salary levels and the difficulty of recruiting staff with up-to-date experience and qualifications against competition from the private sector were the most commonly cited issues.

Several interviewees also pointed to what they perceive as difficulty keeping staff up-to-date in a rapidly changing economic, business, and technological environment.

9.3 Gaps by Sector

Gaps in provision have been identified in three main ways – via desk research, through interviews, and via detailed proformas returned by the area's four main colleges. The constitution of, and issues concerning, the effectiveness of provision are summarised by sector below:

Table 36:Advanced Engineering and Aerospace sector

Current provision
• New large welding facility at West of England Institute of Technology to meet demand for welders at Hinkley • City of Bristol (CoB) College's Advanced Engineering Centre and Motor Vehicle Technology Centre – latter is helping to develop sustainable transport solutions.

- CoB also has a large hanger capable of storing two aircraft and an avionics laboratory as well as other technical facilities including a CNC workshop
- CoB buildings extended 2017 and re-opened 2018
- A Global Technology Centre engineering training facility for Higher and Degree apprentices – a joint £32M investment between GKN Aerospace and the UK Government through the Aerospace Technology Institute
- University of Bath's new Institute of Advanced Automotive Propulsion Systems (IAAPS) seeks to help address the skills shortage in the automotive industry
- University of West of England's robotics lab (second largest in Europe) and School of Engineering including cutting edge virtual reality and full immersion area
- Weston College's Construction and Engineering Centre of Excellence (CECE)
- Weston College's Future Technologies Centre (Locking Road)
- West of England Institute of Technology and virtual classroom (Locking Road)

- **Planned provision**

- Weston College is improving engineering provision to meet the needs of aerospace and related advanced manufacturing industries, including, for example, nuclear skills in response to demand from Hinkley

Gaps

- Need training and facilities to deliver skills for zero emission technology for future aerospace and engineering as well as new fuel and energy systems e.g. development of electric vehicles and installation of electric vehicle charging points.
- Battery technology is a current partial gap (much is already covered but the technology is developing apace and new technologies will soon need to be covered (e.g. lithium-polymer batteries and new carbon nanotube electrode, lithium-sulphur, aluminium air batteries and several other technologies.
- In the area there is delivery of apprenticeship programmes for all the prime aerospace engineering employers in the region (Airbus, Rolls Royce, GKN, MoD etc) as well as other major engineering/manufacturing employers (ie: Wessex Water) and

SMEs such as National Composites Centre, Ipeco etc from levels 3 to 6. Demand outstrips capacity currently – and Weston College – selected to work with the employers named above - requires additional facilities to meet this regional employer demand. With most of the aerospace employers based in Filton, the IoT has recently opened a small facility inside the Global Technology Centre to deliver Degree Apprenticeships. However significant additional space is required in the area to meet the longer term requirements of these key regional employers.

- A further provider's engineering facilities are dated and have limited space (landlocked) to meet increased demand
- All providers have pointed to an underlying need for more digital and green skills in order to support existing and future training needs.
- There is a current gap in hydrogen-focused training which will quickly become a major need in the aviation sector and possibility in automotive.

Support Requested by Providers

- All providers request more support for enhancing digital education and training – particularly in terms of relevant software
- Providers request further facilities to teach advanced manufacturing and 3D printing as well as composite manufacture
- Aerospace providers request facilities and teaching staff skills to teach hydrogen skills for aviation and for automotive
- Several providers have requested funds to expand physical teaching resources

Table 37:Construction sector

Current provision
• City of Bristol College's £9m Advanced Construction Skills Centre, a state-of-the-art facility in south Bristol opened in 2021 delivering higher apprenticeships and courses for young people as well as qualifications for the existing workforce. • CoB has existing facilities for plumbing and electrical – due to be moved in summer 2022. Total investment £360,000 - £200k from IoT+ and £160k from college.

- SGS College's construction centre at Filton
- Construction and Engineering Centre of Excellence (CECE) at Weston College offers a wide range of courses/training and Apprenticeships in Carpentry, Brickwork, Electrical Installation and Performing Engineering Operations
- A LEP supported Construction Training Centre – opened in 2019 at Weston College. The Centre is the only FE provider in the region with the facilities to deliver scaffolding, heavy plant and ground works training for industry
- Bath College's Construction Centre at Westfield Campus – is one of only very few providers of stonemasonry apprenticeships.

Gaps

- Limited provision of MMC – ideally a site which enables expansion of scaffolding, logistics and sites modern methods of construction, including potential for off-site fabrications skills
- Limited provision of BIM and Digital Twinning
- Lack of green skills provision to support delivery of sustainable building, retrofitting, and low carbon heating installation
- Robotics, 3D printing, and building automation also not sufficiently well covered or well resourced in teaching terms (interviewee response).
- Insufficient construction facilities in north Bristol/South Gloucestershire to meet learner demand (and likely to be exacerbated by a green skills drive)
- A provider's construction facilities are dated (60 years old) and have limited space (landlocked) to meet increased demand

Support requested by providers

- Strategic leadership to ensure sufficient high quality construction training provision across the region with public transport infrastructure plans to enable learner access
- Capital investment in construction to meet demand for places in north Bristol/South Gloucestershire

- Subsidised public transport to enable learners access to construction facilities in south Bristol
- Any construction facilities to be developed flexibly so methods used can be updated at least every five years to adapt to changes in the market including for MMC
- Requirement for Air Source Heat Pump and Gas workshops to meet short term demands
- SGS College's construction centre at Filton has 60 year old accommodation that is no longer fit for purpose and needs replacing
- The lease for the Construction Training Centre expires in 2024. It was built in a modularised format so it can be moved to where the demand is greatest and where land can be made available for a non-commercial rent (e.g. North Bristol/ South Gloucester).

Table 38: Health & Care sector

Current provision
At Weston • Health & Active Living Skills Centre – HALSC (opened 2019) • Simulation Suite: A fully-functioning simulation ward that has 6 x beds and a wide range of clinical equipment. • Wet Lab: A fully functioning laboratory with water and gas. Capacity to hold 24 learners + teacher/trainer. The ability to complete health related biology, chemistry and physics activities. • Dry lab: A functioning space that allows for physiological testing. Key equipment allows for cardiovascular and respiratory function and testing, whilst also being able to perform altitude training. • Gym and Multi-use Room: The sports performance gym boasts a lifting area, free weights area and is equipped with cardiovascular equipment, such as Wattbike, skillmill treadmill, skierg and rowing etc. Additionally, the multi-use facility is an

excellent space for rehabilitation and conditioning protocols, with relevant equipment with access to a sports hall and outdoor pitches.

- Relevant Classrooms

At Bath College

- Recent T-Level refurbishment including 2 science laboratories
- Planned £85k on capital equipment

At SGS

- Eight classrooms
- Planned £250k investment in simulation facilities
- Extensive sports facilities that include: Indoor sports hall, Eight-lane Olympic-sized track, 12 five-a-side pitches, 3G artificial floodlit pitch, Eight-lane 400m athletics track, Strength and conditioning gym, American football grid iron and a Boxing suite

At City of Bristol

- Classrooms and IT facilities (recently upgraded from college funds)

Gaps

- Rapid growth in the demand for health and care courses is driving the need for additional space and facilities (applies to all relevant colleges)
- Realistic training for all health/care staff is required in simulated environments
- Digital skills training required
- Simulated home environments for learners to develop experience in providing home or social care

Support requested by providers
• HALSC is already over capacity – new additional space required • Requests from NHS and others for live clinics on site mean there is a need for additional space • Staff CPD limited due to NHS being so busy • Placements for T-Levels • Further medium and long term investment to meet the increasing needs of the health and care sector • In the short, medium and long term there is a need for realistic replica/simulation facilities

Table 39: Creative & Digital sector

Current provision
Weston Loxton Campus which has an art, design, media and music focus including: • Dark rooms • TV & recording studios • Two PC animation suites • Two photo editing suites • One Mac suite • Creative arts workshop space • Art and graphic design studios • Rehearsal, performance and exhibition space

Bath

- Refurbished two teaching floors
- Employer lounge
- Classrooms, breakout area, learning pods, capital equipment.
- Refurbishment of one teaching floor for Digital T-Level
- Classrooms, more flexible teaching spaces, cyber lab, VR room.

SGS

- New Brunel Centre for 400 students in digital media (12 creative classrooms) including recording studios at SGS College
- Bristol School of Art (ageing centre) for 100 students
- Digital suites at Filton Campus

City of Bristol

- Various IT computer suites including audio and video editing.
- Games development
- AutoDesk Accredited Training Centre (Computer Aided Design)
- Art rooms, photography studios and dark rooms, pottery rooms.
- £100k college-funded investment in new IT equipment

Gaps

- Teaching staff need to be kept up to date on the latest technology and programming
- Skills to teach 'green' construction management
- Skills and software to teach advanced construction digital skills (esp BIM and Digital Twinning)

Support requested by providers
• Additional computer and software resources required for games/animation courses • New Mac computers required across all courses • Medium & long term need for more space as demand increases for digital skills and for green construction management job • Rolling three-year investment process for refreshing computing and software resources • Long term investment plans to keep software up to date • Software and Hardware equipment releases and equipment that falls behind industry standard and increased costs (Red). • Medium term requirement for Work Placements that are substantive in readiness for T-levels. • Skillset of practitioners who can teach and provide expert knowledge in digital sector limiting opportunities to broaden offer, particularly in apprenticeship routes (red)

Table 40: Professional Services sector

Current provision
Weston • £19m Law and Professional Services Academy (University Centre, Winter Gardens) 16+, Adult, Apprenticeships and HE • Classrooms and IT suites • Library with bookable IT equipment • Conference Centre

- West of England Institute of Technology and virtual classroom (Locking Road)

SGS

- Six shared classrooms at Filton
- Relocating to University's WISE campus for a more professional environment

City of Bristol

- Classrooms and IT suites
- College-funded new computers

Gaps

- Green skills - urgent need for immediate enhancement of courses and tutor knowledge in zero-emissions and sustainability
- Digital skills – rapid change is driving significantly increased needs for new upskilling and education/training in a range of digital areas
- Technical skills – cyber-security is the most pressing area for improvement in order to protect companies and jobs, but the environment is also demanding what amounts to a new philosophical approach to a matrix of inter-connected issues
- Behavioural skills – leadership skills (and links to teamwork and agility) are the most in demand.

Support requested by providers

- Currently using space in conference centre for teaching – request new space to free up the conference centre
- Support for the upskilling of tutors in a wide range of topics as above.
- Availability and affordability of ICT hardware/software to renew estate.

Table 41:Tourism, Culture, & Hospitality sector

Current provision
Weston • A training kitchen and restaurant (to seat 40). • Demonstration area for masterclass sessions • Working kitchen space for practical service and assessment. Bath • Refurbished small restaurant • One production kitchen • One training kitchen SGS • Three classrooms within Filton Campus for travel and tourism and cabin crew City of Bristol • Several classrooms including simulated aircraft cabin and • Travel hub – created September 2019

Gaps
• Upskilling required for tutors to meet the needs of new hospitality and tourism technology and software • Digital skills • Green skills for sustainability

Support requested by providers
• Kitchen and other equipment need renewing • Concerns about fitness-for-purpose of facilities given the new demands of T-Levels • Replica cabin requested for cabin crew training

9.4 Opportunities

The researchers were asked to "identify opportunities where the region has assets that could be used to a greater extent/more effectively".

The questions asked of providers did not permit a detailed investigation of the allocation of space and of the ways in which resources are being used – e.g. tutor teaching time on various courses, assessment of demand and trends for different courses, timetabling, use of space, etc. Consequently it is not possible to make any reliable statements about areas where resources might be used more effectively.

In this equation the purpose of education and training is the fundamental question and it could be argued, for example, that some of the space devoted to academic subjects could be more effectively devoted to technical and digital teaching. This and other considerations underpin the use of the word "effective" and surround the entire debate regarding educational resources.

Interviews, desk research, and detailed response pro-forma all tend to the conclusion, however, that providers are operating at close to capacity and that, in many areas, they are over-subscribed for the facilities and teaching staff they currently possess, and it can only be concluded that further use of existing post-16 educational resources must depend on either expansion or reallocation between subjects or levels. Gaps section (9.3) above illustrates the ways in which even a small number of significant providers feel their offerings currently fall short and in which further investment is (in their view) necessary.

The region's assets appear to be almost fully engaged and providers say that demand is rising in a great many sectors and subject areas. The larger colleges report over-subscription in many sectors and courses and, without reallocation of facilities, these problems can only be addressed by

capital expenditure either direct to those providers or directed towards the creation of non-specialist, flexible teaching hubs.

Opportunities are therefore more strategic than tactical and depend essentially on decisions about expansion or the reallocation of resources between sectors/subjects/levels of course. We would also point out that, in the light of a significantly changed social and market environments, and possible shifts in the economic background, a strategic review is necessary to set out the philosophical and policy-foundations for post-16 education and training for the next half century or so. Specialising colleges and other providers so that teaching and other resources can be maximised is probably not feasible given 'travel to study' issues but it may be possible to use expert staff more effectively by using them as, perhaps, visiting experts for other providers.

10. Recommendations

This report draws together a high level analysis of a complex set of demand and supply for post-16 education and training across six sectors in the West of England Combined Authority comprising three local authorities (Bath & North-East Somerset, Bristol, and South Gloucestershire) plus North Somerset Council.

The gaps and stated needs for each of the six sectors have been discussed in Section 9 but the wide differences between them mean that it is only possible here to highlight common needs and higher level strategic issues. It has also not been possible in this study to delve deeply into the precise nature of the courses on offer. The vocabulary may, for example, seem relevant but the sufficiency or suitability of any given course depends very much on the type of qualifications and background of the tutor as well as the syllabus and supporting equipment and infrastructure.

Our recommendations have therefore been divided into three broad categories:

1. strategic recommendations relating to the overarching post-16 education and training environment in the West of England;
2. recommendations concerning cross-cutting issues such as digital and skills for net zero which are relevant to all six sectors; and
3. those with reference to infrastructure and provision.

These are summarised in the diagram below and explained in greater detail in the following narrative recommendations.

Strategic

1. Review Employment & Skills Plan to ensure currency/ up to date with respect to recent and current economic and social considerations.
2. Continue to work with the Skills Advisory Panel (SAP) employer and sector representatives to understand the ongoing priority skills needs by sector and generically.
3. Continue to engage closely with providers to understand provision based on no.2 including where possible understanding travel/catchment area consideration.
4. Work with strategic partners and providers to understand changing needs and seek to influence the focus and location of post-16 education and skills capital infrastructure investment, On a national scale the DfE is currently working on ways of minimising competition between providers and optimising collaboration - the Combined Authority can support this.
5. Identify ways to disseminate provider/employer discussions which widen the audience for contributions.
6. Support initiatives taking place at local authority level that are designed to engage under-represented young people and adults in apprenticeships and encouraging smaller companies to invest in apprentices.

Skills

1. Continue to work with Skills Advisory Panel employer and sector representatives to understand the ongoing priority skills needs by sector and generically.
2. Establish an overarching approach to skills for zero-emissions.
3. Work closely with stakeholders, businesses and providers to ensure early identification of changing digital skills requirements/needs (including cross-cutting and sector specific).

Provision

1. Convene an overarching group/forum to help identify/investigate innovative ways of addressing the capacity/capability problems outlined in this report. This may include a deeper dive exercise to look at provision and accommodation to cater for specialist sector skills, T-levels and other technical qualifications.
2. In view of the incredible pace of technological change (both in terms of physical equipment and software and applications) West of England Combined Authorityto maintain a watching brief and continue dialogue with providers over their changing digital infrastructure needs to meet current and future demand, including for emerging technological advances
3. Establish a central "register" of companies willing to donate expert staff for specific hours/subjects.
4. Review (on an ongoing basis) the support requested by training and education providers.

1. Strategic issues

This study has considered post-16 education by sector, identifying discrete issues raised by employers as well as the providers' views as to their own individual infrastructure problems and the possible solutions.

In view of the overlaps in requirements and the fundamental and radical nature of recent changes in the social and economic environments we suggest that there is now an urgent need to adopt a strategic approach. Issues for consideration in such an approach might include:

- delivery: the way in which education and training is provided within different disciplines and sectors (e.g. the balance between online and face to face).
- handling challenges around staffing: the way in which providers may be forced by existing resources to run and fill courses that their current staff can teach while avoiding those which may be required by employers but for which it is very difficult to find suitably qualified tutors.
- new methods of delivery: new ways to deliver education and training in terms of tutors and courses (must, for example, everything be delivered by an educationally-trained teacher/tutor or could material be adequately delivered by “approved” experts from outside education?
- centres of excellence: an examination of whether certain courses should be centralised into highly skilled and well equipped centres rather than across different providers with students provided with free or subsidised transport to and from the centres.
- private vs public: what should be the role of private provision? Should public provision duplicate it and could private provision be harnessed to address shortage subjects?
- plus, detailed work to identify employer needs in real terms and to critically examine the way in which education appears to be 'student-demand-led' to a significant degree (and possibly skewed by advisory systems) and the extent to which new metrics of 'need' as opposed to demand might not be more economical and useful, plus several other issues.

From a strategic point of view the issues which beset post-16 education are arguably national ones. They have to do with the crucial debates around education as a public good and the extent to which publicly-funded education should meet social needs as well as those of the UK economy. The West of England, alone, cannot resolve such issues but any strategic approach to post-16 education in the region must also consider how scarce public resources are allocated and, to a very large extent, take such decisions with full understanding of the way those fundamental philosophies are to be embedded.

An ambitious and detailed 'Employment & Skills Plan' is already in place, but we would **recommend that the ESP be reviewed to ensure it provides an updated strategic ambition, taking into account current and future skills demands** as illustrated in this report. The existing plan describes West of England Combined Authority's philosophical approach to the reasons for education and training and the main policy avenues that will be followed to attain its goal:

> *By 2036, the West of England will be internationally recognised for its sustainable, inclusive and diverse economy, providing a high quality of life, prosperity and opportunities for all its residents. Our people will be skilled, healthy and able to access pathways of opportunity to achieve their potential. Our businesses will play an active role in shaping employment and skills provision across the region and they will be able to find the skills and talent they need to innovate, add greater value and thrive"*

However, economic, social and technological change is moving at an ever faster pace and there is a need for revisions to take account of the significant pressures facing post-16 education and training.

Identify/confirm against the findings of the current study, the priority skills needs a) in each sector, and b) as generic needs (e.g. zero-emissions, digital, management, etc).

Undertake **a detailed review of provision and demand based on geographical/transport considerations** (travel to learn) and taking into account new housing, population-shift data and new patterns of delivery e.g. blended and/or digital.

Based on the above and the demand and supply analysis in this report, **plan the focus and location of post-16 education and skills infrastructure to influence capital investment** collaboratively across local authority borders and between institutions, rather than in competition, to ensure the best outcomes for learners in terms of course choice and access. On a national scale the DfE is currently working on ways of minimising competition between providers and optimising collaboration[104].

Interviewees and nominal group participants were largely ignorant of the work going on to gather employer and provider views on vital skills issues. The West of England Combined Authority launched its Skills Advisory Panels for this purpose to bring together employers, providers and

[104] This study has identified construction as one area for capital investment to meet the demand for construction skills, in particular related to the delivery of green skills, MMC, and more advanced digital/robotic skills in north Bristol/South Gloucestershire. A recent study by the Centre for Vocational Education Research clearly demonstrated the returns on such investment, including qualification success, increasing enrolment in higher education, and improved employment outcomes, in addition to the economic and productivity benefits to the sector.

local stakeholders but these approaches and their deliberations do not appear to be widely known. **It would be beneficial therefore if a way could be found to disseminate provider and employer discussions and widen the audience for contributions** on strategic issues surrounding the need for critical skills.

Progress the means to support initiatives taking place that are designed to engage under-represented young people and adults in apprenticeships and encouraging smaller companies to invest in apprentices. This could be via a regional support service to coordinate efforts and an online application system for traineeship and apprenticeship opportunities. The latter, as proposed in the Mayor's Manifesto would bring together all relevant information in one place enabling easy access and regular alerts about offers for young.[105]

Consider initiating a regional strategic "travel to learn" study and policy. This will entail identifying travel networks and their timing and frequency to identify gaps. Instead this research has shown great concern among employers and stakeholders as to the route network and the frequency of services. Costing the benefits will be problematic but it is clear that the region will gain a good deal from ensuring that aspiring learners are conveyed efficiently and at the lowest emissions-costs to suitable providers.

2. Skills issues

Skills issues – both from the demand and the supply sides – are extremely complex. This report has examined six important economic sectors against both their overall demand for skills and the provision which exists for them. These have been discussed in the sectoral sections earlier, including setting out the 'needs.' In addition to these, it is recommended that the following be considered:.

- Continue to work with Skills Advisory Panel employer and sector representatives to understand the ongoing priority skills needs by sector and generically. Each sector is a heterogeneous mix of sizes of companies and specialisms spread across a fairly wide geographic area. Sub-sectors are being driven by slightly different factors and require slightly different skillsets to those of the sector as a whole. On top of these issues, the recruitment for some sectors is being impacted by subtle cultural changes and particularly by the expectations of young people and adults.
- **Establishing an overarching approach to skills for zero-emissions**. These skills are largely generic at management level and focus on understanding the policy area and being able to

[105] Labour, Dan Norris (2021) Ambition for the West of England: Dan Norris 2021 Manifesto

set up and monitor corporate zero-emissions plans. At sector level the needs are more complex and will need to be addressed in detail for each sector.

- **Work closely with stakeholders, businesses and providers to ensure early identification of changing digital skills requirements/needs (including cross-cutting and sector specific).**. For example, in construction the issues of digital twinning are now becoming more important than the subset of skills required for BIM. The mathematical requirements of creative game developers are also of great importance. A permanent "future-scanning" process is required which will produce quarterly briefs for each sector – for employers and providers.

3. Provision & Infrastructure Issues

Where facilities are concerned West of England Combined Authority has invested significantly. However, it is not possible from our desk research, interviews and proformas to question what providers are saying with respect to new requirements. This is because these new needs are not necessarily directly-related to existing resources and recent investment – examples are green skills, electric vehicles, excess aerospace demand, domiciliary care facilities, NEET and SEND facilities, and so on. We would suggest that this is an area for future research.

The critical issue for provision of education and training is capacity. This is being squeezed by a number of very important constraining factors including: the shortage of skilled tutors, the geographical spread of courses and (in some cases) their duplication, fast increasing sector needs for new and expanded skillsets, rapid and profound technological change, efficient and secure infrastructure, increased demand for upskilling and new skills, and by demographic change – particularly new housing expansion. In order to attempt to meet these challenges we suggest that:

Convene an overarching group/forum to help identify/investigate innovative ways of addressing the capacity/capability problems outlined in this report. This may include a deeper dive exercise to look at provision and accommodation to cater for specialist sector skills, T-levels and other technical qualifications and to help **identify and investigate innovative ways of addressing these problems at the lowest possible financial cost.**

Such innovative approaches might include moving certain types of education and training to an 80:20 model of online and in-person learning in order to free up physical teaching space for more practical, hands-on subjects; finding more effective ways to stagger the college day; investigating hiring in skilled industry-based personnel to undertake specific teaching duties; making more use of training facilities within large local companies; using virtual approaches to make training more

effective (and therefore covering more ground, more effectively in less time); identifying courses that can more easily be delivered online and increasing the cohorts taking this route.

Providers have stressed in interviews and in the proforma process that they are experiencing space and resource issues as demand increases. Many are using spare space in the nearby community to hold teaching sessions. We would recommend, therefore, a short consultative process between the West of England Combined Authority, the West of England LEP and providers to investigate whether a division of physical resources between 'specialist/technical' and 'non-specialist/non-technical' might enable this partnership to establish a series of fully equipped non-specialist classrooms using accommodation such as libraries, village halls, community centres, and even empty retail and commercial property to deliver training more flexibly in communities without the need for significant investment in campus buildings or the requirement for learners to travel significant distances. A small permanent network of such hubs in more geographically-convenient locations would perhaps help to relieve pressure on in-college resources (even enabling them to re-allocate internal space to support specialist and technical courses) and would address the problem of some providers in being physically constrained in as far as expansion is concerned.

The local teaching hubs could be 'rented' by providers on whatever basis the consultation deems most effective (termly rentals, annual rentals, perhaps even monthly), and might be open to use by more than one provider as demand pressures require, and could be provided with high speed broadband connectivity and, in some cases, even study space to enable remote learning provision for learners experiencing limited access at home. The tutors could well be peripatetic – working from centre to centre – and might well be industry based (offered by companies on a free of charge basis in return for relevant expenses).

Such 'hubs' even though permanent might also be less expensive to develop and operate than redeveloping specific colleges.

Linking industry to education and training is usually handled at local authority level but there could be benefits **in establishing a central "register" of companies willing to donate expert staff** (who would be vetted prior to being engaged on the programme) for specific periods of time. The "helping hand" from industry would bring quite important non-financial rewards for the companies concerned. Their involvement would be publicised and the presence of their staff would promote jobs in those companies – hours or half days of skilled staff time could be regarded as a particularly effective replacement for long and expensive recruitment campaigns.

Given the unpredictability of future demand due to a number of geo-political and economic factors, future-proofing and flexibility should be a central objective of the development of post-16 education and training. The hubs mentioned above could be a way to ensure flexibility to adjust to unforeseen demands and their inherent flexibility as to what is being delivered through them will permit a degree of resilience against sharp changes in demand for existing formal courses. Consideration might be given to enhancing existing policy regarding the distribution of facilities

with a view to increasing current policies designed to create a diverse and flexible system of delivery.

In view of the incredible pace of technological change (both in terms of physical equipment and software and applications) West of England Combined Authority will maintain a watching brief and continue dialogue with providers over their changing digital infrastructure needs to meet current and future demand, including for emerging technological advances. Individual providers would undoubtedly benefit from a central project to consult on and provide best practice solutions for, ways of achieving greater economic and operational efficiency in this regard. Approaches might include coordinated ways of using cloud services and perhaps through the development or use of virtual systems which can be upgraded to accommodate rapid change and which will obviate the need to purchase very expensive new equipment on an all-too-regular basis.

Review (on an ongoing basis) the support requested by training and education providers (see Section 9) taking into account that the specific requests are from only a small sample of providers but that interviews and desk research may well be mirrored across the provision-sector. The focus should be a deeper dive to understand if there are sufficient places/provision and suitable accommodation to deliver the specialist sector skills required for the new T Levels and other technical qualifications.

Appendix 1: Further methodological detail

Phase 1: Forecasting and Analysis of Future Employment and Skills Needs

Local Economy Forecasting Model

The Local Economy Forecasting Model (LEFM) is a demand-led model that models the relationships between firms, households, government and the rest of the world in a highly disaggregated framework. It has been built specifically for local economic analysis, and enables the impact on the local economy of demand-side factors to be analysed. LEFM has been designed to project economic indicators for a local area by explaining the output of local sectors through an explicit representation of expenditure flows in the area and their links with the world outside the local area, as shown in

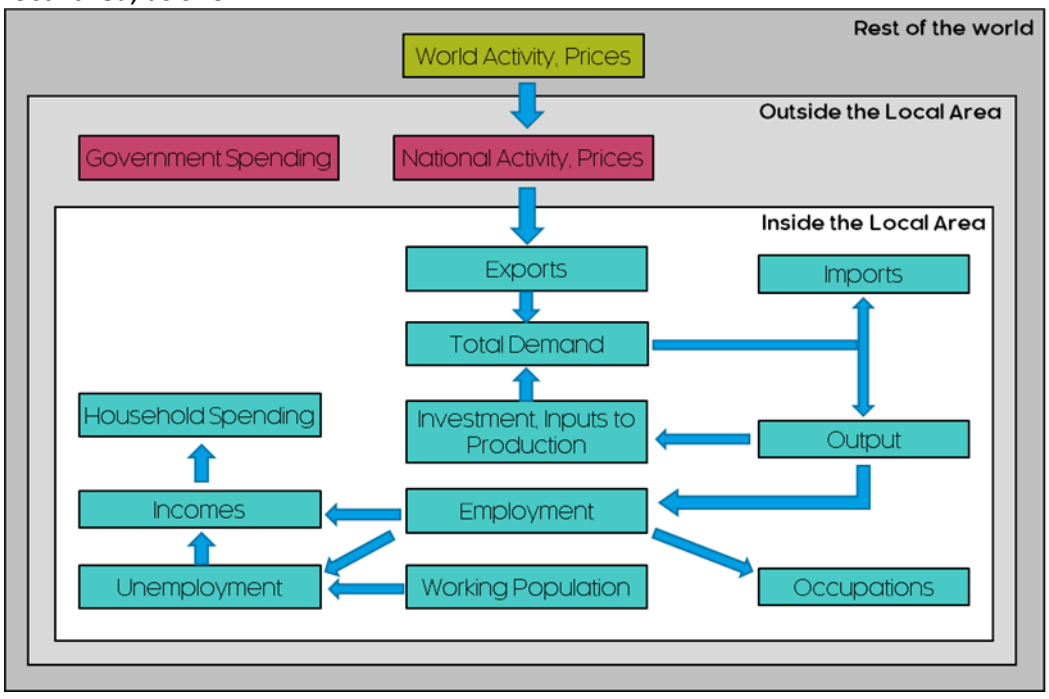


Figure 10.

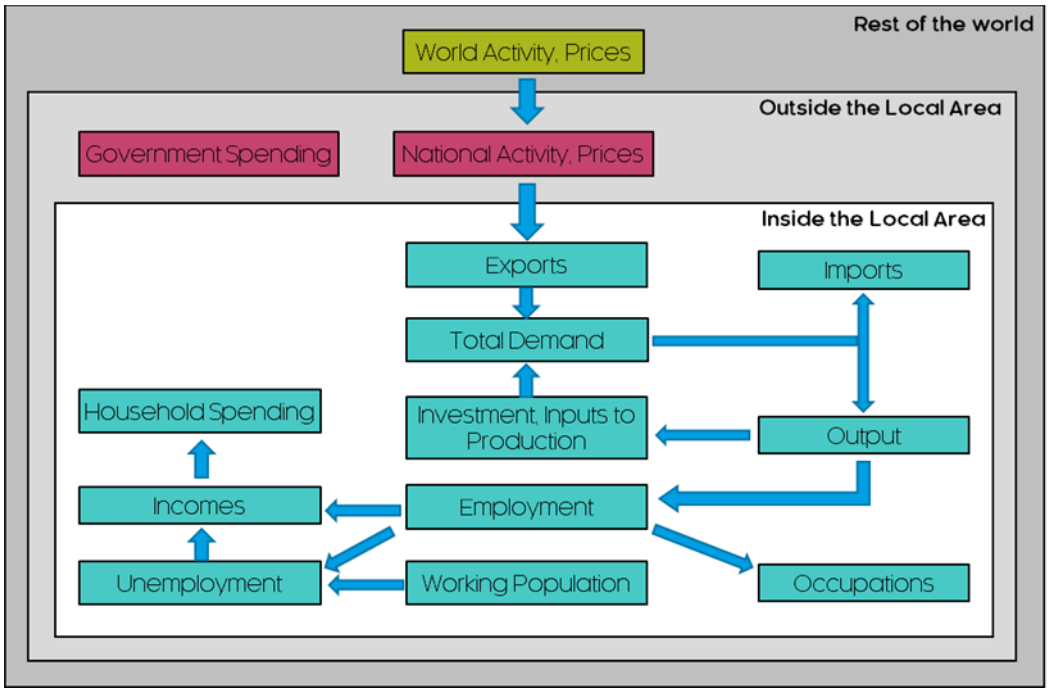


Figure 10: LEFM structure

Key inputs to the model are national and regional forecasts from Cambridge Econometrics' Multi-Sectoral Dynamic Model (MDM) of the UK economy, alongside assumptions for trends in local area sector shares of the local market and of national production.

Baseline projections

The local area LEFM baseline economic projections are based on historical growth in the local area relative to the region or UK (depending on which area it has the strongest relationship with), on a sector-by-sector basis. They assume that those relationships continue. Thus, if a sector in the local area outperformed the

sector in the region (or UK) historically, it will be assumed to do so in the future; and vice-versa (if the sector underperformed).

They further assume that economic growth in the local area is not constrained by supply-side factors, such as population and the supply of labour. They assume that there will be enough labour (either locally or through commuting) with the right skills to fill the jobs. If, in reality, the labour supply is not there to meet projected growth in employment, growth could be slower.

Expansion demand, replacement demand and the net requirement

Occupational employment in LEFM is expressed as:

- expansion demand, which reflects the change in the overall employment level that is driven by structural changes in the economy and labour market
- replacement demand, which reflects job openings that become available due to retirements, occupational mobility and migration.

Together the sum of these components provide the expected net requirement for newly trained entrants into each occupation. This measure provides what is probably the best indication of occupational change as far as training and education requirements are concerned, since it focuses on the net requirement for newly qualified entrants to the workforce.

Expansion demand alone provides the total change in employment over the forecast period, while replacement demand considers how jobs will become available or filled from retirements and occupational mobility.

Freelance and contract workers

The contribution of freelance and contract workers is measured by combining data from the Labour Force Survey (LFS) and the GVA forecast in LEFM. LFS respondents are classified as freelance or contract workers if in they are self-employed and received payment for work as a result of the following:

- as a sole director of their own business;
- running a business or professional practice;
- as a partner in a business or professional practice;
- working for self;
- as a subcontractor;
- undertaking freelance work.

To estimate the total contribution of freelance and contract workers in terms of the Gross Value Added (GVA) they generate, the share of self-employed freelance and contract workers (as defined above) of all employed people is applied to the GVA for each local area. This share is calculated in the LFS for those in the South West and is 17.9%. It is assumed to be constant through the forecast period and is applied across all local areas in West of England Combined Authority and North Somerset.

The contribution of freelance workers in creative and digital sectors utilises definitions based on 4-digit SOC[106] codes from Department of Digital, Culture, Media and Sport (DCMS)[107]. Using LFS data

[106] Standard Occupation Classification
[107] www.gov.uk/government/publications/dcms-sectors-economic-estimates-methodology

for the UK, so a large enough sample can be obtained, the share of freelance and contractor workers who work in creative and digital sectors, of those in employment (across all sectors) is applied to the GVA for each local area (1.2%). This produces an estimate of the contribution of freelance workers in creative and digital sectors. The share is assumed to be constant through the forecast period and the same across all local areas in West of England Combined Authority and North Somerset.

Rapid evidence review

A rapid evidence review of relevant regional strategies, plans and reports on sectors and skills provided by the West of England Combined Authority, supplemented by national policy documents and frameworks relating to the region's sectors of importance.

Nominal group

A nominal group[108] of 20 employer representatives from across the six sectors of interest was conducted in October 2021. Nominal group contacts were proposed by the West of England Combined Authority. The number of participants willing to engage in the exercise ranged from five representatives of the Construction sector to two from the Advanced Engineering and Aerospace and Professional Services sectors. In cases where the number of respondents for a sector were limited, the qualitative analysis has been bolstered by desk research findings to increase its robustness.

Phase 2: Assessment of post-16 education & skills estate & infrastructure

Analysis of vocational course provision

An internet search of providers in the region to identify the vocational courses to deliver the skills for the six key sectors. The name, type, and level of each course as well as its location and which of the six sectors it applies were recorded. The following providers were in scope:

- Providers proposed for interview by the West of England Combined Authority (including those which were not available for interview) - 4 further education colleges, 2 universities, 2 institutes and 3 sixth form colleges
- Providers delivering vocational courses in the region identified in the ESFA data,[109] but not included in the depth interview sample

[108] A method used by researchers to gather evidence from groups of experts. They are particularly helpful when studying topics that require uninfluenced personal views as they avoid any conscious or unconscious domination by one participant or the sector they represent. In this instance the participants were identified by the West of England Combined Authority and their participation facilitated by email.

[109] ESFA (2019) *FE learner and skills participation by provider, local authority, funding stream, learner and learner characteristics: 2018-2019*

- Independent training providers delivering vocational courses in the region, but not already covered included in the ESFA data.

Depth interviews

Interviews were conducted in October and November 2021. Contacts for the interviews were proposed by the West of England Combined Authority. The depth interviews were undertaken using the same topic guide. The following interviews were completed:

- 9 providers in the region comprising 4 further education colleges, 2 universities, 2 institutes and 1 sixth form colleges
- 6 stakeholders of post-16 education and skills in the region
- 6 representatives responsible for post-16 education & skills across 4 local authorities in the region

Provider Mapping

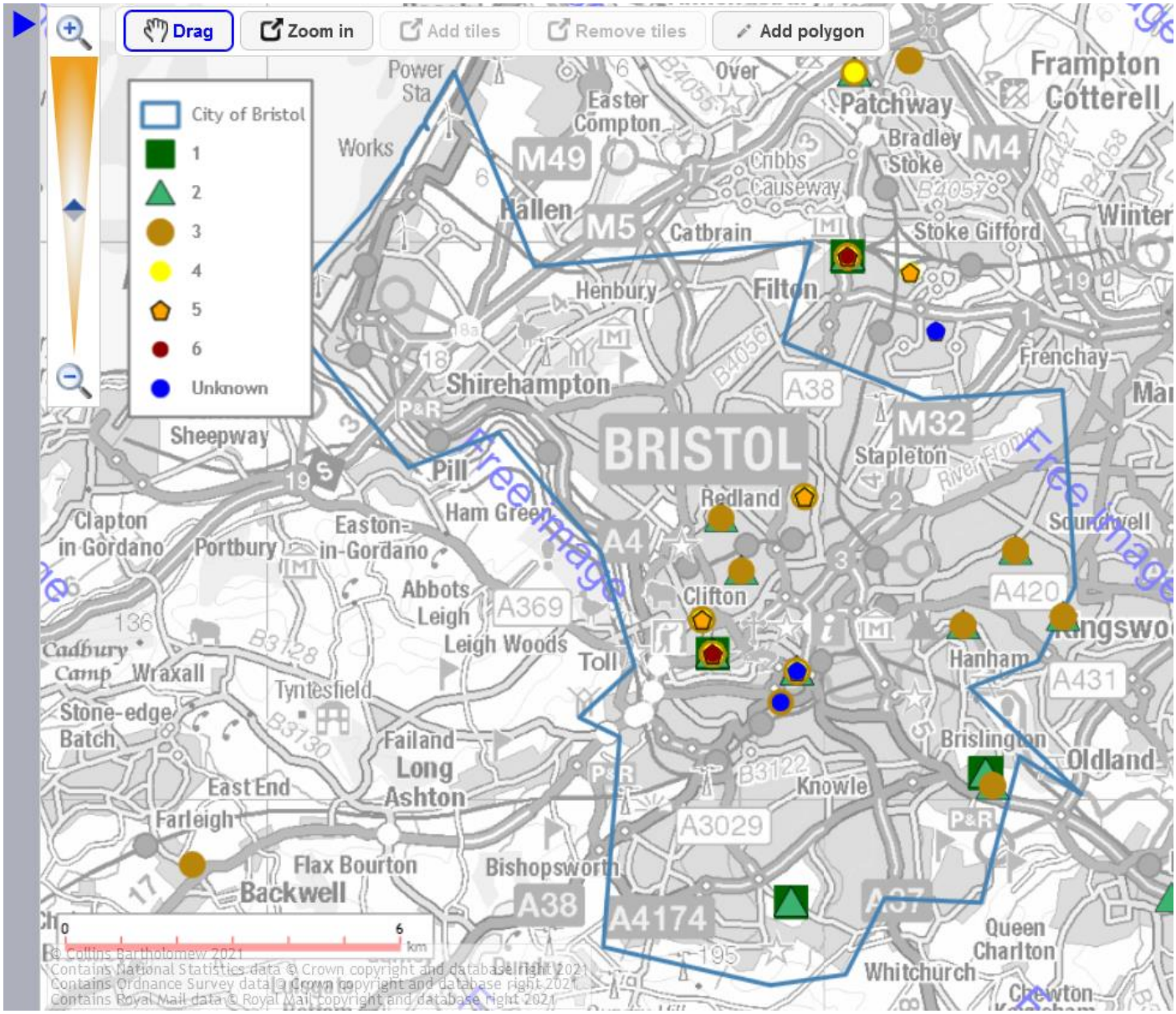
As part of this study, Pye Tait developed a database of courses in the West of England that are relevant to the six key sectors. The pivot-table database includes details of 1,052 courses and are selectable by the four local authority areas by level (1 to 6), type, and relevant sector. The database draws on a selection of 47 providers including all colleges and their campuses together with relevant private providers.

While the database itself can be searched and filtered using the pivot process we have also created a visual mapping system which can show a wide variety of variables in different levels of local detail. This visual system will be available for the West of England Combined Authority online (password-protected) for one year but can be extended[110] for further time if required.

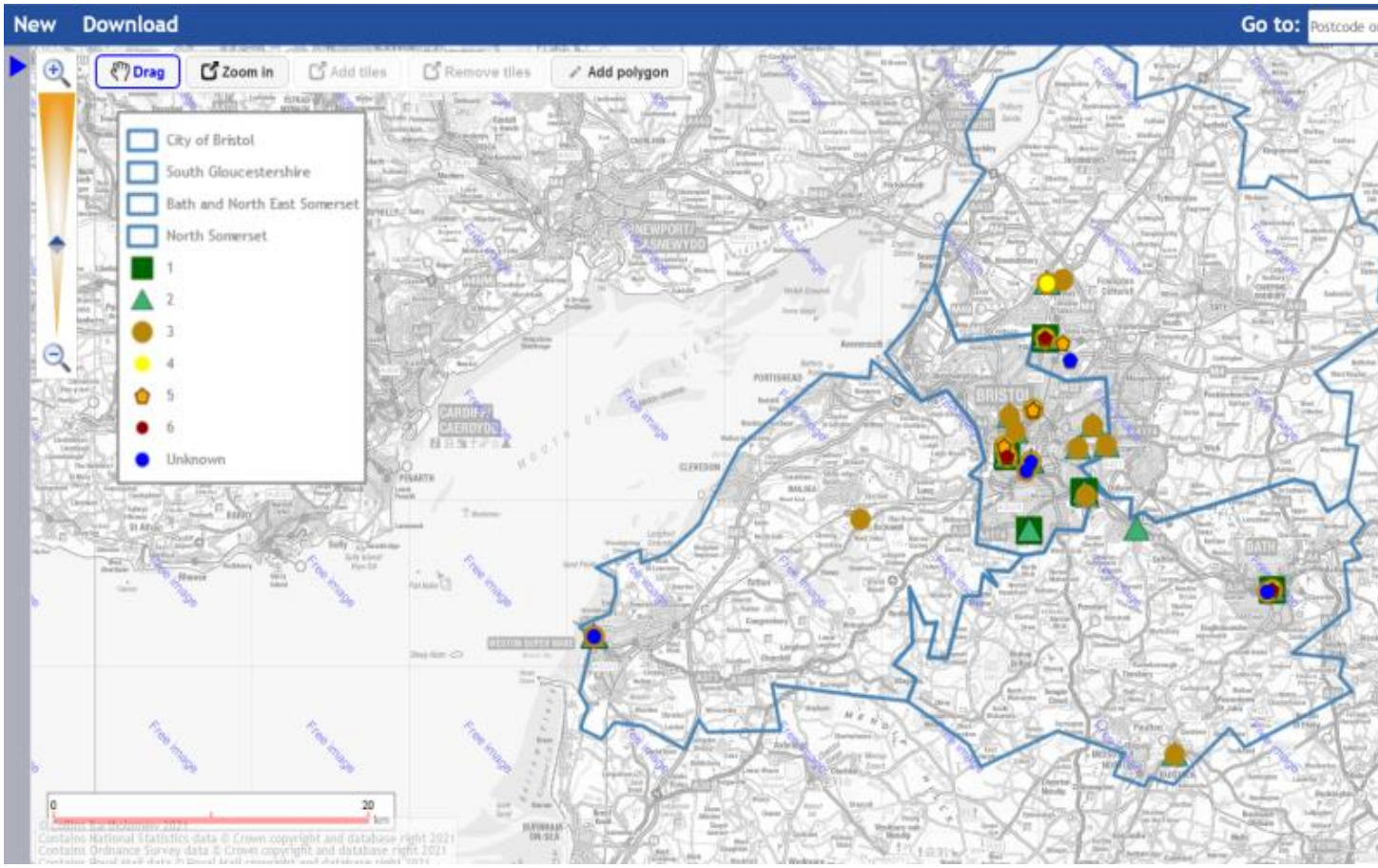
The examples below use the Business & Professional Services sector to show firstly the distribution of all courses at levels 1 to 6 in Bristol and then the same sector and all courses for the West of England.

[110] For a small fee.

Example Maps



Notes: the key shows course levels from 1 - 6


New
Download
Go to:
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Add tiles
Remove tiles
Add polygon
City of Bristol
South Gloucestershire
Bath and North East Somerset
North Somerset
1
2
3
4
5
6
Unknown
BRISTOL
CARDIFF / CAERDYDD
NEWPORT / CASNEWYDD
BATH
0
20

Appendix 2: Forecasting analysis - Cambridge Econometrics

Defining the Key Sectors of Interest

Forty-five sector definitions were aggregated to provide summary analysis for the six sectors of interest. How these have been treated in this paper is detailed below.

Table 42: Allocation of forty-five 2007 Standard Industrial Classification sector definitions to six sectors of interest

Advanced Engineering and Aerospace Chemicals (20) Pharmaceuticals (21) Non-metallic mineral products (22-23) Metals & metal products (24-25) Electronics (26) Electrical equipment (27) Machinery (28) Motor vehicles (29) Other transport equipment (30)	**Tourism, Culture and Hospitality** Accommodation (55) Food & beverage services (56) Recreational services (93)	**Creative and Digital** Media (58-60) IT services (61-63) Architectural & engineering services (71) Arts (90-91)
Health Health (86) Residential & social (87-88)	**Professional Services** Financial & insurance (64-66) Real estate (68) Legal & accounting (69) Head offices & management consultancies (70) Other professional services (72-75) Business support services (77-82)	**Construction** Construction (41-43)

Table 43 details historic changes in employment by each key sector, and projected changes. Apart from Advanced Engineering and Aerospace, all key sectors have experienced much higher annual rates of jobs growth between 1996 and 2019 than the average for all sectors (1.2%). This is likely

to result from the advancement of technology and automation in this sector which has made it more efficient and requiring fewer jobs.[111]

Looking forward, Tourism, Culture and Hospitality, Creative and Digital, Health, Construction and Professional Services all have annual rates of jobs growth equal to or above the West of England average for all industries (0.5%).

[111] West of England Combined Authority (2019) Advanced Engineering and Aerospace: West of England Local Sector Skills Statement 2019

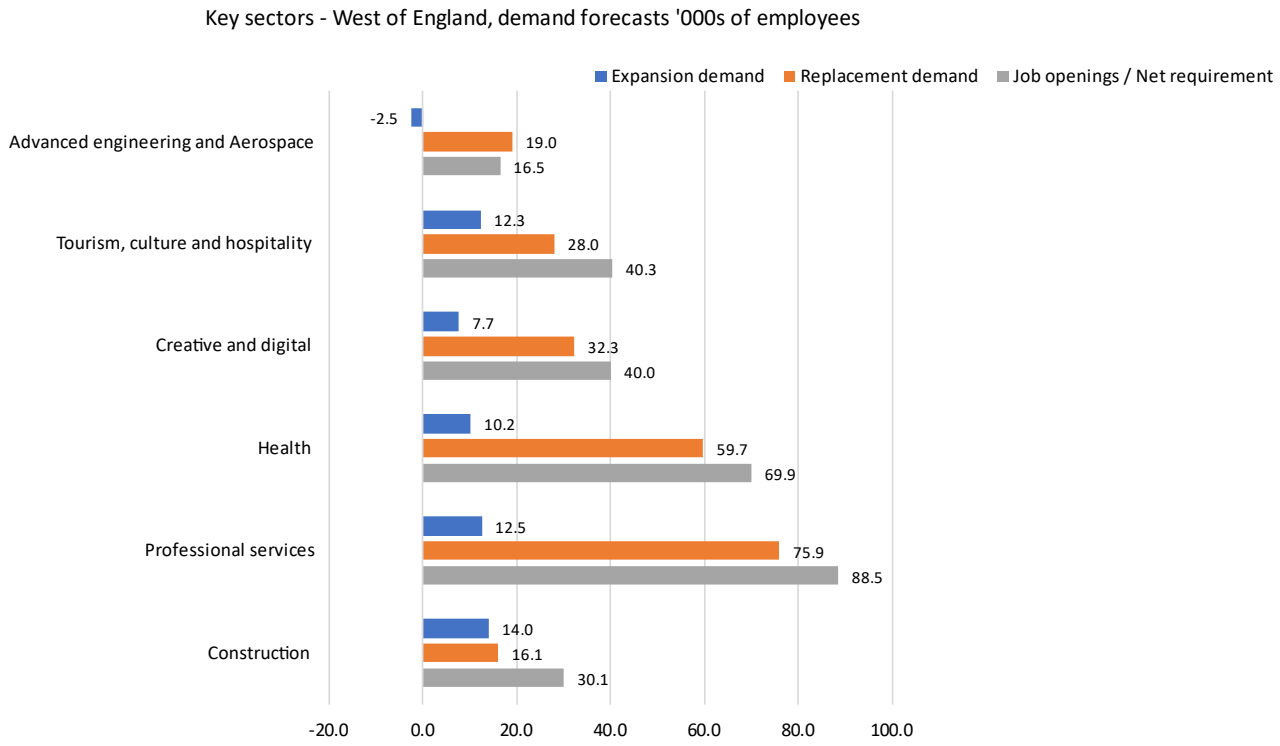
Table 43: Employment by sectors of interest in the West of England Combined Authority & North Somerset and the UK

West of England	Change	1996-2019	Employment 2019	Change	2019-2020	Projected change	2020-2036
Sector of interest (aggregated from 45 sectors)	**'000s**	**% pa**	**'000s**	**'000s**	**% pa**	**'000s**	**% pa**
Advanced engineering and Aerospace	-9.4	-1.30%	25.7	-0.6	-2.50%	-2.5	-0.70%
Construction	21.4	2.60%	47.7	-0.9	-2.00%	14	1.60%
Creative and digital	29.9	2.70%	65.6	-4.1	-6.30%	7.7	0.70%
Health	25.5	2.10%	68.2	-2.6	-3.80%	10.2	0.90%
Professional services	54.2	2.00%	148.3	-0.9	-0.60%	12.5	0.50%
Tourism, culture and hospitality	24.3	2.80%	51.8	-2.7	-5.30%	12.3	1.40%
All sectors/industries	**150**	**1.20%**	**607.8**	**-7.7**	**-1.30%**	**53.9**	**0.50%**
UK							
Advanced engineering and Aerospace	-866.7	-2.00%	1,482.70	-87.3	-5.90%	-183.5	-0.90%
Construction	495.8	1.10%	2,238.20	-40	-1.80%	309.9	0.80%
Creative and digital	1,160.00	2.30%	2,846.30	-14.6	-0.50%	405	0.80%
Health	1,316.30	2.00%	3,550.10	-0.6	0.00%	636.6	1.00%
Professional services	2,827.20	2.30%	5,906.80	-36	-0.60%	708.7	0.70%
Tourism, culture and hospitality	958.2	1.90%	2,699.90	-149.5	-5.50%	545.1	1.20%
All sectors/industries	6,332.20	1.00%	30,492.70	-532	-1.70%	2,743.00	0.50%

Source: LEFM (March 2021), Cambridge Econometrics

Together, all the key sectors (see Figure 11) have a net requirement for 297,700 job openings between 2020 and 2036 – 72% of the West of England total.

Figure 11: Demand forecasts for key sectors in the West of England 2020-2036



Source: LEFM (March 2021), Cambridge Econometrics

Job Openings by Occupation

Analysis of jobs openings has also been undertaken by occupation at sub-major group level using SOC2010.

Figure 12 shows expansion demand, replacement demand and the number of job openings forecast for occupations in the West of England, including North Somerset.[112]

[112] Demand projections are not available for the UK from the Local Economy Forecasting Model.

Figure 12: Job openings ('000s) by occupation in the West of England Combined Authority & North Somerset area, 2020-2036 (000s, FTE)

	2020-2036 '000s		
Occupation (sub-major group)	Expansion demand	Replacement demand	Job openings / Net requirement
Caring personal service occupations	14.7	36.3	51
Business, media and public service professionals	4.9	39.2	44.1
Business and public service associate professionals	8.7	34.1	42.8
Science, research, engineering and technology professionals	7.9	28.5	36.5
Elementary administration and service occupations	4.4	25.9	30.3
Health professionals	6	21.1	27.1
Sales occupations	0.3	24.6	24.8
Corporate managers and directors	10.3	12.3	22.6
Skilled construction and building trades	3.1	17.9	21
Teaching and educational professionals	7.3	12.8	20.1
Other managers and proprietors	4.4	13.8	18.2
Administrative occupations	-9.6	27.1	17.5
Transport and mobile machine drivers and operatives	-0.4	14.8	14.5
Culture, media and sports occupations	0.4	12.2	12.6
Leisure, travel and related personal service occupations	2.7	9.2	11.9
Customer service occupations	4.1	6.5	10.6
Skilled metal, electrical and electronic trades	-3	9.9	6.9
Science, engineering and technology associate professionals	0.5	5	5.6
Skilled agricultural and related trades	-0.1	4	4
Textiles, printing and other skilled trades	-3.7	5.7	2
Protective service occupations	-0.2	2	1.8

Health and social care associate professionals	1.9	-2.7	-0.8
Process, plant and machine operatives	-4.1	2.8	-1.3
Secretarial and related occupations	-7.8	6.3	-1.5
Elementary trades and related occupations	1.2	-9.2	-8
Total	**53.9**	**360.2**	**414.2**

Source: LEFM (March 2021), Cambridge Econometrics.