



Cardiff Capital Region Employment & Skills Plan 2017



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FOREWORD

A key driver for the Employment and Skills Board of the Learning, Skills and Innovation Partnership (LSKIP) is to be responsive and create change driven by stakeholder engagement. Identifying employment and skills priorities over short, medium and longer term periods that align with economic drivers and indicators to support the South East Wales regional economy.

Developing the right skills is fundamental to increasing productivity and efficiency. It provides more opportunities for all ages, genders and abilities, helping to address social and physical exclusion by improving access to employment.

We need to accept that no one person or organisation can solve the employability and skills demands of the region and there is a need for us to break down the 'silos of self-interest' to deliver a strong baseline of education, training and skills for businesses to grow, confident that their workforce is equipped with the right skills to meet and respond to their sector needs.

There is a need to create economic partnerships, by continuing to build on growing relationships between industry, education providers and Welsh Government, to develop future skills that will ensure the South East Wales economy thrives and grows. Aligning delivery with the aspirations of the Cardiff Capital Region City Deal, Enterprise Zones, Valleys Taskforce, Welsh Government, local authorities, educators, the business community, the existing workforce and those about to enter it.

Central to the development of this cohesive Employment and Skills Plan for 2017 has been the recognition that skills and economic growth are intrinsically linked and LSKIP has over the last twelve months further established itself to respond to this.

To address the need to fully understand the changing economic landscape, we have over the last year enhanced our evidence base through research and increased our employer and stakeholder engagement. We have established sector cluster groups, each led by industry and connecting with representatives from the supply side. Cluster groups have identified strengths, weaknesses, opportunities and threats impacting their sectors, before agreeing a number of key priorities and recommendations.

During our extensive employer engagement and particularly across the five cluster groups, LSKIP has identified that there are a number of common themes emerging; employability and soft skills, engagement between schools and industry and digital competency. Throughout the Employment and Skills Plan we recognise that the world of work is evolving and changing at a demanding pace through digital developments across all sectors, creating increased demand for higher level skills in the workforce to meet these changing environments.

Business manages itself through the two Ps, Process and People, and with people being recognised as the greatest asset of any business organisation, it is therefore critical that we provide the right employability and skills provision to maximise the potential of the regional economy and its growth aspirations. As businesses we have a key role in working in partnership with LSKIP and through our sector groups to further inform business trends, and identify value chain opportunities and skills requirements to meet these opportunities.

I urge businesses of all sizes to take a leading role and get involved with LSKIP and support the sector groups. Your input and value will help shape a skills investment strategy that meets your needs,

delivers on innovation and enterprise and equips you with the workforce to meet the ever-changing landscape of business.

We need to unite as one and build upon the strengths of the region through positive partnership and collaboration to deliver a wide, knowledgeable, diversified and skilled workforce that allows us to grow and prosper.

A handwritten signature in black ink, appearing to read 'L. Hughes', is centered within a light gray rectangular box.

Leigh Hughes, Business Development & CSR Director, Bouygues UK
Chair of the South East Wales Employment and Skills Board
Learning, Skills and Innovation Partnership

EXECUTIVE SUMMARY

Our vision is to develop the social and economic potential of the Cardiff Capital Region, supporting people and businesses to deliver a high performing and prosperous region that stimulates and supports local and inward investment.

To achieve this the Cardiff Capital Region needs to develop a demand-led skills system that is driven by the needs of industry and which delivers employment and skills support in response to infrastructure and other investments to achieve growth within the regional economy.

Our Region

The Cardiff Capital Region (CCR) has a population of 1.53m, just under half the total for Wales. It generates more than half the total gross value added (GVA) in Wales and generates 80% of the UK average GVA per head. The region employs almost half of the workforce but there is a disparity between Cardiff and a more prosperous southern, coastal belt and areas in the Heads of the Valleys to the north.

Infrastructure and other investments through the £1.2bn Cardiff Capital Region City Deal, local authority and other sector's capital programmes, Enterprise Zones and others, are key drivers of economic growth. Creating employment and skills opportunities by investing in, for example, road and rail infrastructure, delivering the South Wales Metro and a UK Catapult for next generation compound semi-conductor applications to build an international cluster of supply chain companies in and around the region.

An analysis of the regional economy based on value by productivity (GVA), and size of the sector¹ has prioritised five sectors in the Cardiff Capital Region which are considered to have greatest demand for labour and skills in the next five years: advanced materials and manufacturing (AMM), construction (CON), financial, legal and professional services (FPS), digital (ICT/digital) and the human foundational economy including education, health and social Care (HFE).

Key Challenges

Raising GVA – the need to develop employment and skills in the regional labour market that support investment strategies and achieve economic growth. Infrastructure investment in the region (and competition from major infrastructure jobs within commuting distance) will have a substantial impact on demand for current employment and skills. For example, skills shortages are forecast in a range of construction trades and more senior roles.

Skills gaps and shortages – projected labour demands exceed the expected numbers of entrants to the labour market creating skills shortages whilst skills gaps increase as the demand for skills evolves in response to changing working methods, utilising new technology and introducing automation. The supply of labour to meet these demands is dependent on a number of factors including:

- i) appropriate training provision in the region for all ages, taking into account the need to train the trainers in current and changing skills needs;
- ii) retention of a workforce who may be lured away by higher salaries elsewhere in the UK and

¹ Welsh Government, Regional LMI Report, Table 2.3 & 3.7

- iii) provision for the upskilling of adults already in the workforce to meet the changing skills requirements of replacement jobs, particularly with the adoption of digital skills and Industry 4.0.²

Qualification levels – qualifications levels in the Cardiff Capital Region exceed Wales’ average but still do not meet forecast higher-level skills demand, which continues to increase. 54% of those in employment are forecast to hold qualifications at Level 4 or above by 2024, with an overall decline in those with no or low qualifications predicted. The exception is for caring, personal service and administrative occupations which predicts increases in demand for Level 2 and Level 3 qualifications, driven in part by mandatory requirements.

Apprenticeships – only 13% of employers utilise apprenticeships and just 1.5% of year 11 school children went directly into apprenticeships last year. Challenges remain regarding perceptions, including parity with academic routes, promotion and marketing of opportunities, increasing the number and range of apprenticeship opportunities, including higher and degree apprenticeships.

Careers advice and guidance – mismatch between subject areas chosen by learners and those occupations within the economy that offer the greatest prospect for employment, earnings and career development. Forecasts suggest significant numbers of local job vacancies across prioritised sectors, particularly amongst SMEs which employ a large percentage of the workforce. Certain skills subject areas are under-subscribed at all levels despite excellent long-term career opportunities. Forecast skills shortages may be reduced if careers advisors, teachers and industry representatives can collaborate to effectively market opportunities to parents and students.

Improving learner outcomes – limited measures of progression to education and employment due to poor destination data.

Unemployment and economic inactivity – high unemployment costs and projected skills shortages due to demographic trends, an ageing population and ageing workforce require pro-active plans to support the unemployed and economically inactive into work.

Brexit and European Union funding – consideration is needed of the significant impact the UK’s departure from the European Union (Brexit) could have on labour supply and skills availability if restrictions are placed on the free movement of labour from other European countries. Succession plans are needed for European Union funded programmes.

Regional Priorities for Employment and Skills

1. **Delivering employment and skills support for industry, infrastructure and other investments to enable growth** - creating tailored and flexible solutions through regional academies or centres of excellence that can respond to the needs identified and utilising social clauses to maximise the skills engagement and employment potential of any investment, including employment and skills support to build local supply chains/value chains and developing the capacity and capability within the education system to respond.
2. **Supporting industry through priority sectors to address skills gaps and shortages** –
 - a. **Digital skills** are in increasing demand in all sectors and include skills for advanced production such as compound semi-conductors, automation, Industry 4.0, artificial intelligence and robotics and for service support and information such as data analytics,

² Industry 4.0 is a name for the emerging trend of automation and data exchange in manufacturing technologies. It includes cyber-physical systems, the Internet of Things, cloud computing and cognitive computing.

cyber security, programming and software engineering. Increasing the supply of digitally skilled labour to meet rapidly growing demand is a priority for the region as there are currently half the number of technology specialists in the workforce as expected. Reversing the falling numbers taking science, technology, engineering and mathematics (STEM) and computer-related subjects at school is critical. Support for degree programmes and initiatives such as the National Cyber Security Academy and National Software Academy will improve numbers but retention will be an issue with higher salaries elsewhere. Introducing degree apprenticeships and other work based learning routes could both meet the demand for digital skills which tend to require higher levels of qualifications and address increasing skills gaps by keeping pace with rapid change.

- b. **Leadership and management** is needed in all sectors. High level strategic leadership and management skills will be required by managers to deliver transformation and succession plans.
 - c. **Train the trainer** programmes are needed to develop the capacity and capability of education providers to deliver specialist skills and/or ensure currency and relevance of learning, including digital competence. Initial training and continuous professional development for teachers, tutors and lecturers in schools, colleges and universities needs to develop and/or refresh skills to keep pace with changing demands within industry. Increasing collaboration between employers and education providers should provide opportunities to upskill trainers and enable the development of labour supply that that is aligned with demand.
 - d. **'People and personal skills'**, often described as soft skills, are a requirement for employability and should be integrated and feature within learning programmes as is the case for 'essential skills', (numeracy, literacy and ICT). 16% of employers reported having skills gaps, with 86% of skills gaps being related to people and personal skills and 96% being related to technical and practical skills.³
 - e. **Adult skills** programmes are needed to address skills gaps and shortages, developing the capacity of the existing workforce to meet labour demands, support progression and develop higher level skills.
3. **Developing higher level skills to future-proof the workforce** – increase the range of higher-level qualifications in technical subjects and to meet the demand for managers, professionals and associate professionals in ICT/digital, professional services and manufacturing at Level 4 and beyond. Innovate learning to encourage and support learner aspirations to achieve higher level skills, providing accelerated learning and pathways to encourage progression beyond levels 2 and 3. Improve learner attainment across the region to meet forecasted higher level skills demand.
 4. **Increasing the number and range of apprenticeships** – increase the number and range of apprenticeships offered and maximise the demand from employers in response to the Apprenticeship Levy. Extend the range of higher level apprenticeships and introduce degree apprenticeships as an alternative, and cost effective, route to higher level qualifications, with greater opportunity to progress into employment. Support shared apprenticeships in response to demand from industry and particularly SMEs.
 5. **Improving industry engagement with education and marketing of career opportunities and pathways** – develop sustained engagement by industry with schools and colleges to foster education/industry links. Support continuous professional development of teachers and tutors

³ Welsh Government Regional LMI Report Figure 6.3: People and personal skills that need improving and Employer Skills Survey 2015

in industry relevant skills. Improve information/intelligence and marketing of career options linked to employment opportunities, use industry engagement to challenge perceptions and promote parity between vocational pathways, apprenticeships and academic qualifications.

- 6. Improving destination data for better learner outcomes** – destination data needs to be improved. Quality data in higher education is able to demonstrate learner outcomes and the impact and value of skills investment; this needs to be extended across further education and work-based learning. Longer term measures could identify pathways to employment, relevance of learning and movement within and across different occupations to measure learner outcomes over time.
- 7. Developing a regional employability plan to get more people into work** – develop a regional plan to engage economically inactive and unemployed people, including ex-offenders and encourage them back into work with appropriate training and pre- and post-employment support. Utilise social clauses in contracts to create employment and placement opportunities for those seeking work.
- 8. Developing succession plans for European Union funded programmes post-Brexit** – risk assess and impact assess European Union funded support services offered through local and regional ESF operations. Determine priorities for succession plans post Brexit.

INTRODUCTION AND METHODOLOGY

The South East Wales Learning, Skills and Innovation Partnership (LSkIP) is one of three Regional Skills Partnerships (RSPs) across Wales, responsible for the production of an annual Employment and Skills Plan for Welsh Government which determines regional priorities and recommendations for skills investment.

LSkIP is led by the South East Wales Employment and Skills Board, whose membership is balanced between stakeholders representing demand, supply and those (catalysts) responsible for skills planning and funding. This includes Welsh Government, education, regeneration and industry, including the Cardiff Capital Region City Deal and Enterprise Zones. LSkIP and the Cardiff Capital Region are working in partnership to deliver the City Deal skills agenda and the LSkIP Employment and Skills Board acts in an advisory capacity.

The vision is to create a strategic partnership to develop the social and economic potential of the Cardiff Capital Region, supporting people and businesses to deliver a high performing and prosperous region that stimulates and supports local and inward investment. This employment and skills plan is a key component in delivering this aspiration and working towards a demand-led skills system, by identifying priorities to meet the needs of those sectors, infrastructure and other investments that are driving economic growth across the Cardiff Capital Region. Five priority sectors have been identified for the Employment and Skills Plan (2017) based on value by productivity (GVA) and size of the sector.⁴

Stakeholder engagement and in particular the involvement of industry is considered essential in shaping the development of this regional plan for employment and skills. LSkIP has developed industry engagement through its Board membership and partner organisations across the five prioritised sectors: advanced materials and manufacturing, construction, financial and professional services, human foundational economy (health, social care and education) and ICT/digital.

In addition to employer engagement across priority sector networks, cluster groups, workshops, meetings and consultation events, LSkIP has undertaken both a large and small companies research exercise and online survey to determine industry skills needs and key challenges.

This document therefore articulates the needs of employers from across the five identified sectors and their agreed priorities and recommendations for employment and skills investment and support. Each sector has adopted the three horizon rule, determining priorities and recommendations across the short, medium and long term which are considered essential for their development and growth.

Furthermore, sector priorities have been used to inform a number of confidential planning and funding recommendations, developed through regional meetings with further education principals/chief executives, work-based learning providers (through the National Training Federation for Wales) and at the LSkIP Employment and Skills Board. These recommendations are submitted for Welsh Government consideration and will contribute to the post-16 planning and funding process for skills.

Supporting data for the LSkIP Employment and Skills Plan can be referenced (in both Welsh and English) through the South East Wales Skills Observatory unless otherwise indicated.⁵ This includes

⁴ Welsh Government, Regional LMI Report Table 2.3 & 3.7

⁵ <http://sewso.infobasecymru.net/IAS/themes/databyregionalpriorities>

the Welsh Government Regional Labour Market Intelligence Data Report⁶ including data from the Employer Skills Survey and Working Futures.⁷

The employment and skills plan will be developed within the Welsh Government policy context and align with the Well-being of Future Generations (Wales) Act (2015)⁸ and the five ways of working in accordance with the sustainable development principle: long term, integration, involvement, collaboration and prevention.

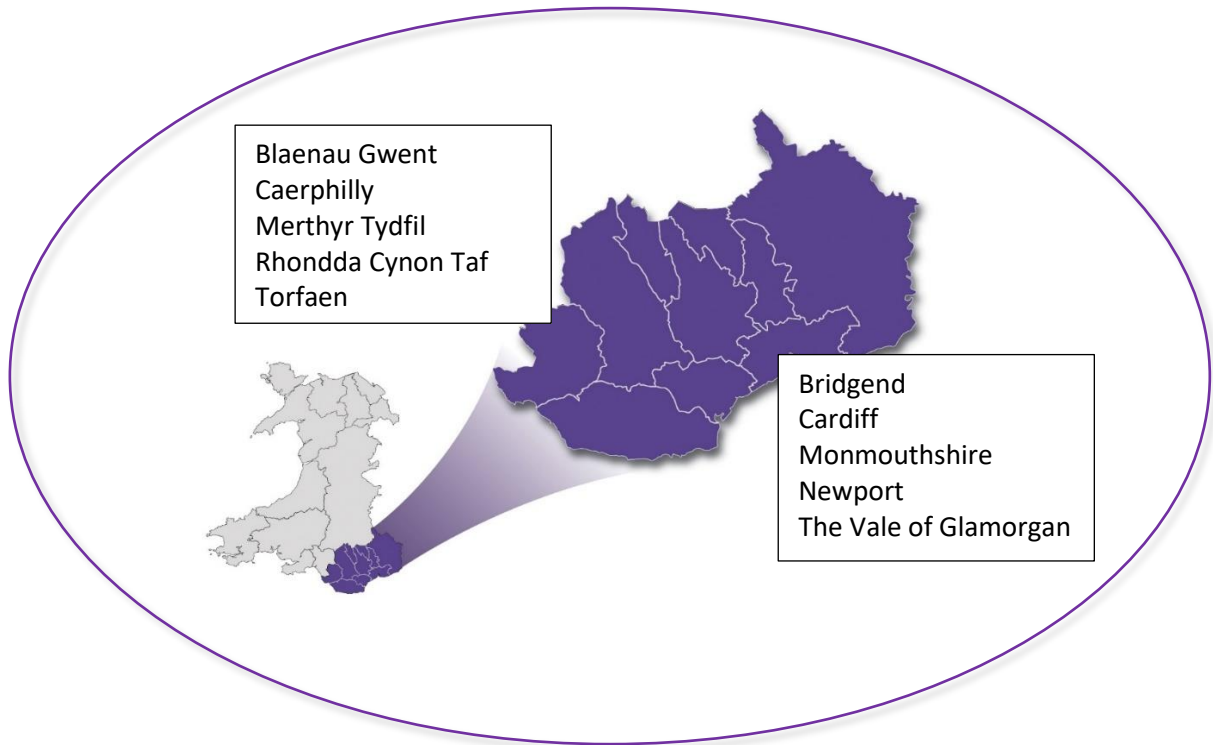
⁶ Welsh Government, Regional LMI Report

⁷ Working Futures data: 'As with all projections and forecasts, the results presented in Working Futures should be regarded as indicative of likely trends and orders of magnitude given a continuation of past behaviour and performance, rather than precise forecasts of the future.' Welsh Government, Regional LMI Report 7.2 *What is Working Futures?* pp72

⁸ <https://futuregenerations.wales/about-us/future-generations-act/>

SECTION 1 - REGIONAL OVERVIEW

The Cardiff Capital Region comprises ten local authorities in South East Wales with a population of 1.53m, just under half the total for Wales. Population growth is concentrated along the M4 corridor area and there are clear variances across the region from Cardiff and a more prosperous southern, coastal belt and the Heads of the Valleys to the north. There are three Enterprise Zones within Cardiff Capital Region where the Welsh Government is prioritising investment in business infrastructure.



INVESTMENT

Cardiff Capital Region City Deal

The Cardiff Capital Region has secured a £1.2bn City Deal with the UK and Welsh Governments. The City Deal includes the following elements:

- investment in the region's infrastructure, including delivery of the South East Wales Metro system of integrated bus and rail transport;
- support for innovation and improvement of the digital network;
- developing the skills of the workforce and tackling unemployment;
- supporting enterprise and business growth;
- housing development and regeneration.

Over its lifetime, the City Deal is expected to deliver up to 25,000 new jobs and leverage an additional £4bn of private sector investment. The nature of this investment, along with other sources (such as the replacement for European Union funding in the region) will help to shape the future economy of the region. In turn, this will influence the types of skills that will be required.

The Cardiff Capital Region Business Plan acknowledges that innovations such as artificial intelligence, drones, driverless vehicles, 3D printing, robotics and automation will radically change the future infrastructure and skills needed by the region to compete effectively. It states that, working together with partners in the business and other sectors, “We will therefore make sure our plans are flexible enough to cope with changes in the economic environment” with a system of governance that “allows, and fosters, innovation without trying to predict the future”.⁹

The four strategic objectives of the Cardiff Capital Region are to:

- have more and better jobs;
- help business climb the value-added chain at all levels;
- have a workforce equipped for the future;
- ensure the proceeds of growth are shared.

The Cardiff Capital Region Business Plan also sets out spatial priorities which will impact on where employment and skills are demanded in the region. The planned improvements in connectivity through the South Wales Metro will play a vital role in ensuring that places of labour demand are accessible to sources of labour supply, whilst investment in a UK Catapult for next generation compound semi-conductor applications will develop high level skills to build an international cluster of supply chain companies in and around the region. Cardiff Capital Region, through the City Deal, is investing £38m (on a commercial basis) towards a state-of-the-art, globally competitive manufacturing foundry.

In the same way, the education and skills sector needs to ensure that it is equipping people with the generic and specialist skills and abilities that will be needed in the jobs to be created. These will be a mixture of new jobs associated with emerging demands or innovation and jobs to replace those who leave their jobs or leave the labour market (e.g. move away or retire). The latter jobs are unlikely to be like-for-like replacements. They will be influenced by societal trends and technological developments.

Major Investment Demands

The largest single influence on labour force and skills demand in the Cardiff Capital Region economy is from substantial investments planned in the region and other commutable projects e.g. Hinkley Point C Nuclear Power Station. In future infrastructure investment will be co-ordinated by the National Infrastructure Commission for Wales,¹⁰ which it is hoped will address the need for effective intervention and early dissemination of labour demand information, key to forward planning of training delivery.

Skills support for infrastructure and other investments should include ‘train the trainer’, with continuing professional development for trainers/teachers needed to ensure there is both the capacity and capability to deliver new skills demanded by industry e.g. coded welding and inspection for nuclear construction.

Welsh Government forecast £5.5bn of public procurement per annum with £1.1bn of Mutual Investment Model (MIM) project funding contributing to an overall Wales Infrastructure Investment Programme (WIIP).¹¹ Procurement contracts have the potential to secure demand for a local labour

⁹ Report: Cardiff Capital Region – Powering the Welsh Economy

<http://gov.wales/docs/det/publications/150212-powering-the-welsh-economy-en.pdf>

¹⁰ <https://consultations.gov.wales/consultations/national-infrastructure-commission-wales>

¹¹ <http://gov.wales/funding/wales-infrastructure-investment-plan/mutual-investment-model/technical-documents/?lang=en>

force through effective use of social clauses, which can also increase industry engagement with education, to promote careers and support shared investment in training capacity and facilities.

The following publicly funded projects and programmes have been identified as having potential to create very local workforce skills demand. The Code of Practice for Ethical Supply and ‘Better Jobs Closer to Home’ will offer strong levers driving contractors to employ local people. Therefore training a local employment pool and raising qualification levels to meet forecast demand is a key regional priority. This should help to ensure that increases in gross value added (GVA) are, where possible, facilitated through the employment and training of a local workforce.

Local Authority Capital Programme

All local authorities wish to grow and retain skilled jobs and increase local prosperity (Table 1).

Table 1 South East Wales Local Authority - Capital Programme 2016/17-2019

South-East Wales £'000	2016/17	2017/18	2018/19
Blaenau Gwent	10,908	10,467	3,043
Bridgend	34,467	54,166	10,129
Caerphilly	55,690	50,870	52,062
Cardiff	98,014	136,859	113,670
Merthyr Tydfil	10,421	7,541	8,273
Monmouthshire	47,957	42,373	15,401
Newport	36,638	29,013	13,426
Rhondda Cynon Taf	116,164	68,842	37,358
Torfaen	27,709	15,612	40,635
Vale of Glamorgan	67,351	52,834	22,231
Cardiff Capital Region Total	505,319	468,577	316,228

Rail including the Metro

Transport for Wales (TfW)¹² is progressing procurement for the South Wales Metro and Wales and Borders Rail franchise (supported by an ethical procurement panel including the Wales Council for Voluntary Action). Initial skills needs are:

- rail engineering e.g. signalling, electrification, track and rolling stock engineers;
- ICT/digital systems and software engineers, data analysts and cyber security;
- project management skills – cost planning, risk analysts, managers;
- financial, commercial and procurement specialists;
- train operational staff, on-board, customer, station and planning staff.

Some existing staff can meet these demands; however, a paper produced for Transport for Wales indicates that an ageing workforce will result in 800-1,000 replacement staff being needed within the rail sector across South Wales, with about half in infrastructure and half in train operational staff.

Other transport infrastructure investment creating skills demand:

- South Wales M4 corridor relief road;¹³
- A465 dualling (see LSKIP’s 2016 Employment and Skills Plan)¹⁴ Heads of the Valleys to M50, M5 and Midlands;
- electrification of the railway from London, Swindon and Bristol.

¹² <http://gov.wales/topics/transport/transport-for-wales/?lang=en>

¹³ <http://gov.wales/topics/transport/roads/schemes/m4/corridor-around-newport/?lang=en>

¹⁴ http://www.lskip.wales/downloads/160731_LSKIP_EandS_Plan_with_cover_English.pdf

Social Housing and 21st Century Schools and Education Programme

The Welsh Government has committed to 20,000 new houses across Wales to meet social housing need. Skills training is needed for improved efficiencies, quality and accelerated delivery. The Government is looking at potential off-site construction and utilisation of Building Information Modelling (BIM).

Valleys Taskforce¹⁵

Led by the Minister for Lifelong Learning and Welsh Language, the Taskforce remit is to maximise investment across valleys areas looking at improving delivery of public services and creating better jobs closer to home, to increase employment.

Cardiff-Newport Tidal Lagoon

The Swansea Bay Tidal Lagoon Power project is still awaiting a decision from Westminster, despite the favourable Hendry report.¹⁶ The initial impact is considered as limited for the Cardiff Capital Region. However, aspirations for a second project, if agreed, “With the potential to invest around £8bn of private capital... between the cities of Cardiff and Newport...” could offer opportunities for construction and supply chain jobs.¹⁷

Superfast Cymru - ICT/Digital

ICT/digital connectivity delivered through the Superfast Cymru broadband network has the potential to drive ICT, digital creativity and technology skills for the wider digital economy. These will have a cross-sector impact on skills demand, key to economic development.

Enterprise Zones¹⁸

Targeted investment to stimulate growth across three Enterprise Zones:

Cardiff Airport and St Athan Enterprise Zone focuses on aerospace, automotive, defence, engineering and manufacturing:

- Cardiff International Airport has a major British Airways presence;
- development of the former defence establishment of St Athan with Aston Martin is a high-profile inward investment;
- involvement of Cardiff and Vale College with an on-site campus offering bespoke training and support for apprenticeships;
- transport infrastructure is a priority.

Central Cardiff Enterprise Zone’s main driver is business and financial services (FPS) and digital:

- new office accommodation is being constructed for the BBC and financial, business and legal firms.
- Central Square has Cardiff Central Railway Station and Cardiff Bus Station (under construction).
- the Enterprise Zone has excellent broadband connectivity and is developing a skills base around fintech and digital services.

¹⁵ <http://gov.wales/topics/people-and-communities/communities/taskforce-for-the-valleys/?lang=en>

¹⁶ <https://hendryreview.wordpress.com/>

¹⁷ <http://www.tidallagoonpower.com/projects/cardiff/>

¹⁸ <https://businesswales.gov.wales/enterprisezones/zones>

Ebbw Vale Enterprise Zone is a centre for manufacturing and engineering enterprise:

- improving connections to the Midlands automotive industry by dualling the A465;
- a number of key supply chain automotive manufacturing organisations;
- strong life science presence in pharmaceutical manufacturing;
- local State-of-the-art further education college facilities and access to university research.

REGIONAL ECONOMIC PROFILE

The Cardiff Capital Region generates more than half the total gross value added (GVA) in Wales but it still lags behind the UK average, generating only 73% of UK average GVA per head. Although above the Welsh average, over the last 10 years productivity has fallen across all of the Cardiff Capital Region sub-regions with the exception of Merthyr Tydfil and Rhondda Cynon Taf. Latest figures from the Office for National Statistics (ONS) (pre-Brexit) indicate there is little difference between GVA in urban or rural locations, suggesting that economic growth potential exists across the region.

Table 2 Gross Value Added by Measure, Welsh Economic Region and Year¹⁹

NUTS3 areas within Cardiff Capital Region	Gross Value Added (GVA) (£ million)	Gross Value Added per head (£ million)	Gross Value Added Index (UK=100)
	2015	2015	2015
Central Valleys	4,578	15,429	60.9
Gwent Valleys	4,673	13,681	54.0
Monmouthshire and Newport	4,969	20,684	81.6
Cardiff and Vale of Glamorgan	11,044	22,783	89.9
Cardiff Capital Region ²⁰	25,264	18,532	73.1
Wales	55,788	18,002	71.0
UK	150,622	25,351	100.0

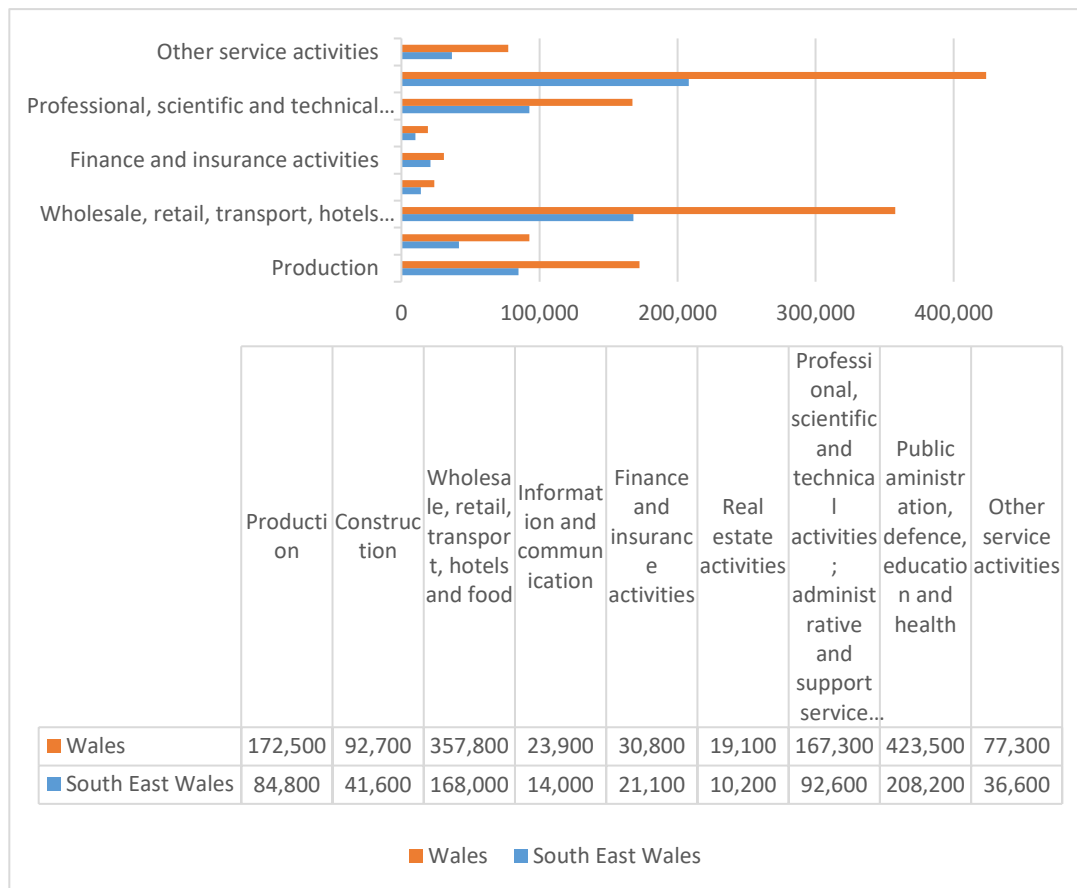
Data Source: Regional Accounts, Office for National Statistics Next update: December 2017

Gross value added (GVA) is a key target and measurement of growth for the Cardiff Capital Region; however, a drive for higher GVA alone does not guarantee an increase in employment, for example, real estate activity is the largest sector by GVA across the region but employs the least number of people. Similarly, construction and professional, scientific and technical activities are the second and third largest sectors by GVA in the Cardiff Capital Region, but public administration, defence, education and health and wholesale, retail, transport, hotels and food are the most significant in terms of numbers employed (Figure 1).

¹⁹ Welsh Government, Regional LMI Report Table 2.2

²⁰ The Cardiff Capital Region figure is an approximation and excludes Bridgend.

Figure 1 Cardiff Capital Region Workplace employment by Broad Industry 2015²¹



Therefore, to achieve growth, a balanced assessment is required of both the value and volume of labour demand, as well as associated skills gaps and shortages, to determine priority sectors for skills investment that secure the greatest economic return.

Large enterprises (250+ employees) are an important focus of demand for skills and training and often have high skills demands internally, although they may be less innovative than SMEs, which can tend to react more quickly to changes in the marketplace. Training may be delivered internally or by a range of suppliers at all levels, ranging from institutions to work-based learning and independent specialist providers.

Large companies with internal training may benefit from gaining formal recognition for in-house programmes that are not accredited. Equally, greater awareness is needed amongst employers of the range of existing learning that is already recognised through the Credit and Qualifications Framework for Wales (CQFW). There is also the potential to encourage large companies to collaborate and share training with others, including their supply chain. This would help to build the critical mass needed to develop and sustain provision and make it more accessible to micro and SME businesses.

Of the 140 large companies headquartered in Wales (n.b. excludes central and local government authorities), 30% are in manufacturing, 13% in wholesale, the retail trade and motor vehicles/cycles; 10% in education, 10% in health and social work and 8% in administrative and support services. Other sectors together represent the remaining 30% (individual sector numbers considered disclosive and suppressed).

²¹ Welsh Government, Regional LMI Report, Table 3.6: Workplace employment by Welsh local areas and broad industry

Table 3 Company Size Workforce and Value (November 2016)

Wales	Businesses	% All-Wales Businesses	Workforce	% All-Wales Workforce	£m CCR Turnover	£% Wales Turnover
All	105,690	42%	537,300	48%	50,846	43.5%
CCR	Businesses	% CCR Businesses	Workforce	% CCR Workforce	£m CCR Turnover	£% CCR Turnover
Micro 0–9	99,170	94%	160,700	30%	7,732	15%
Small 10–49	4,025	4%	74,500	14%	5,527	11%
Medium 50-249	1,215	1%	67,500	13%	6772	13%
Large 250+	1,280	1%	234,400	44%	30,815	61%

Micro and SME companies are key to future prosperity in the Cardiff Capital Region, comprising about 95% of companies and over 50% of the economy. SME lending in the Cardiff postcode (CF) area is reported to be £1.032 trillion and for Newport (NP) £0.526 trillion.²² The Federation of Small Businesses (FSB)²³ is a key contact point for small businesses through which skills opportunities can be promoted. The FSB identify the crucial importance of Wales’ digital infrastructure and the superfast broadband connectivity to its members, self-employed, micro and SME companies.

Investment in skills is low in micro companies and smaller SMEs. Cost is a significant factor for micro and smaller companies, but so too is time for workers off the shop floor or needing cover. Many companies run lean processes and are reluctant to take on more staff. An expectation that companies will automatically train if offered a subsidy or an apprentice can be misplaced.

Business models are changing for the self-employed (part of the gig economy) and micro companies. They are using digital connectivity in on-line collaboration, practicing as Virtual SMEs.²⁴ The Virtual SME is defined by an agile workforce operating online without a physical office and associated overheads. Best examples of the Virtual SME model are in the construction sector where complementary trades e.g. brickwork, plastering, electrics, plumbing skills are used to undertake small (local) shared contracts.

On average, over 20% of business births are in business administration and support, and transport and storage with around 16% in ICT and professional, scientific and technical. Many start-up/spin-out companies arise in universities, led by highly qualified individual entrepreneurs having identified an opportunity in the (local) supply chain. The rate in Wales of business births (12%) and deaths (10%) is above the South West of England²⁵ and Northern Ireland. Just over 40% of new companies remain in business over five years. Training and business support for entrepreneurs and new businesses is key to improving sustainability. Further research is needed into zero and micro companies as in 2015 recorded births are the largest number since 2000 (when records began).²⁶

²² British Banking Association SME lending <http://bit.ly/2mdpRaD> 2016

²³ <https://www.fsb.org.uk/regions/south-wales/branches/south-east-wales>

²⁴ Draws on CRESC research and the concept of precarity

²⁵ <https://www.slideshare.net/statisticsONS/business-demography-in-the-uk>

²⁶ Office for National Statistics Business Demography, 2015

<https://www.slideshare.net/statisticsONS/business-demography-in-the-uk>

LABOUR DEMAND INCLUDING GROWTH AND REPLACEMENT JOBS

The requirement for jobs in the region over the next ten years is forecast to be between 25,000 and 30,000 per annum – which exceeds the expected numbers of entrants to the labour market.

- 80% are expected to be ‘replacement’ jobs, with only 2,000 to 3,000 per annum being ‘new jobs’.
- It is also forecast that 54% of all jobs will be at Level 4+ by 2024.
- Significant increases in jobs for managers, professionals and associate professionals focused on ICT, professional services and manufacturing.
- A large increase in Level 2 and Level 3 qualifications is forecast for social care and other service roles in response to mandatory qualification and registration requirements.
- Significant growth in skills shortage vacancies is forecast in construction, human foundational economy, advanced materials and manufacturing and financial and professional services, many occurring in digital and technology skills.

Employment in the Cardiff Capital Region economy shows growth in employment in construction, health and social work, finance and insurance, ICT/digital, professional and support services. The manufacturing, engineering, media and education workforces are shrinking.

When replacement jobs are included (80%) there is a forecast demand for jobs in all sector occupations of 292,800 jobs to 2024,²⁷ a higher number than education leavers alone. The forecast net requirement for jobs over a ten year period between 25,000 and 30,000 jobs per annum across all sectors. 2,000-3,000 jobs per annum are forecast to be created through growth.²⁸

Table 4 Total Projected Employment Demand by Expansion and Replacement Jobs in the Cardiff Capital Region 2014-24²⁹

	2014	2024	Exp.	% Exp.	Rep.	Total
Food drink and tobacco	10,900	11,100	200	1.5	4,000	4,200
Engineering	9,300	6,700	-2,600	-27.6	2,900	400
Rest of manufacturing	52,400	47,400	-5,000	-9.5	17,200	12,200
Construction	43,200	46,900	3,700	8.6	15,300	19,000
Wholesale and retail trade	99,700	109,700	10,000	10.0	40,300	50,300
Transport and storage	22,400	23,100	700	2.9	8,800	9,400
Accommodation and food	36,700	41,000	4,300	11.8	15,900	20,200
Media	4,400	4,100	-300	-6.1	1,700	1,400
Information technology	9,500	10,500	1,000	10.8	3,500	4,500
Finance and insurance	19,500	23,400	3,800	19.6	7,900	11,700
Real estate	11,900	12,900	1,000	8.6	5,100	6,100
Professional services	34,500	39,400	4,900	14.2	14,400	19,400
Support services	48,900	53,300	4,500	9.1	19,600	24,100
Education	67,600	66,900	-800	-1.1	27,600	26,900
Health and social work	102,200	105,800	3,600	3.5	40,900	44,500
Arts and entertainment	15,100	16,100	1,000	6.8	6,300	7,300

²⁷ Office for National Statistics Business Demography: 2015

²⁸ Working Futures 2014-2024 Regional LMI report: Figure 7.1

<https://www.gov.uk/government/publications/uk-labour-market-projections-2014-to-2024>

²⁹ Working Futures Regional LMI Report Table 7.2 2014-24 <https://www.gov.uk/government/publications/uk-labour-market-projections-2014-to-2024>

Other services	20,200	20,700	500	2.5	8,500	9,000
All industries	671,700	701,000	29,300	4.4	263,400	292,800

Source: Working Futures 2014-2024 Notes: figures rounded to the nearest hundred, percentages are unrounded.

The term ‘replacement jobs’ can lead to the misconception that they are ‘skills neutral’ but the skills required for these ‘replacement’ jobs are evolving with the business and in response to digital technology. For perspective, 20 years ago cable/digital connectivity in the home was a year away (1998), wi-fi wasn’t available (2000) and nor were Facebook/social media (2007). Digital technology has created a rapid period of change over 20 years and Industry 4.0 will accelerate change for the next 20 years.

Older employees need new (digital) skills to work in a modern workplace. For an employee aged 45, formal education ended at least 20 years ago and the expectation is for a further 20 years of valuable work both for the benefit of the individual and gross value added (GVA) in the economy. Therefore, upskilling the adult workforce is a priority. Currently 10% of the workforce are aged over 65³⁰ (up 4% over ten years) and 5% of further education teaching staff are over 65.³¹

Cross Sector skills for Digital Futures

- Demand 3D printing, automation, robotics, automated vehicles, drones.
- Compound semi-conductor manufacture, nano technology, personalised medicine.
- Open data, LiDAR, building information modelling (BIM).
- Fintech, blockchain, legal technology, security.
- Digital analytics, NHS Wales Informatics Service patient information, online learning.
- Artificial intelligence, augmented reality (AR), virtual reality (VR), 5G, big data, Internet of Things, wearables.
- Prototyping, digital creatives, gaming, programming.

³⁰ Office for National Statistics May-June 2016

<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork>

<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork>

³¹ <http://www.ewc.wales/site/index.php/en/research-statistics/education-workforce-statistics>

<http://www.ewc.wales/site/index.php/cy/ymchwil-ac-ystadegau/ystadegau-r-gweithlu-addysg>

LABOUR SUPPLY

Skills Gaps and Shortages

Skills shortage vacancies (SSVs) in the labour market are problems employers encounter recruiting individuals with particular skills considered essential for a job. The range of skills is reflected in Table 5. This considers related figures in Wales but consideration should also be given to the impact of workforce skills demand in the West of England that runs along the Eastern edge of the region.

Table 5 Density of Skill Shortage Vacancies by Occupation and Region³²

	Wales %	North Wales %	Mid Wales %	South West Wales %	South East Wales %
Managers	15	-	-	-	(10)
Professionals	26	(25)	-	(32)	20
Associate professionals	24	(42)	(29)	(27)	15
Administrative/clerical	16	(17)	-	(7)	22
Skilled trades occupations	43	43	(66)	33	47
Caring, leisure and other services	30	(28)	-	(19)	34
Sales and customer services	15	(21)	-	(5)	19
Machine operatives	40	(20)	-	(56)	(36)

Nearly a quarter of all vacancies (density) reported in the Cardiff Capital Region were considered Skills shortage vacancies (SSVs), the same level as 2013.³³ The overall incidence of skills shortage vacancies (employers surveyed reporting SSVs) was 5% and has doubled over four years.³⁴ Vacancies and skill shortage vacancies by sector data indicates the highest levels of skills shortage vacancies are in manufacturing and construction.

In the context of UK figures the Cardiff Capital Region is likely to be pressured on retention of new recruits with increased importance training and upskilling the local workforce. UK figures rank demand for permanent jobs highest accounting/financial and IT and computing. Part-time demand is highest in hotel and catering, nursing/medical/care. In engineering, both full and part-time jobs are showing increased demand.³⁵ Availability of candidates is falling, starting salaries are increasing.

Skills Gaps represents skills deficiencies employers experience in their existing staff. A skills gap exists where an employee lacks full proficiency in their job role. The number of people with skills gaps is likely to expand rapidly with the introduction of digital technology and Industry 4.0. Skills gaps often disproportionately affect the adult/older workforce in businesses impacted by changes in technology.

Skills gaps affect more employers than skills shortage vacancies do, with 16% of employers in South East Wales experiencing skills gaps, compared to 6% with skills shortage vacancies. The highest

³²

<http://sewso.infobasecymru.net/IAS/themes/lmi/labourmarketintelligence/employerviewsonskillsandtraining-esssurvey/tabular?viewId=2026&geold=116&subsetId=128> (-) denotes that the base is under 25 and the figure has been suppressed. Figures in parenthesis are from a base between 25 and 49 and should be interpreted with care.

³³ <http://sewso.infobasecymru.net/IAS/themes/databyregionalpriorities/labourmarketintelligence/employerviewsonskillsandtraining-esssurvey/tabular?viewId=2024&geold=116&subsetId=128>

³⁴ <http://sewso.infobasecymru.net/IAS/dataviews/tabular?viewId=2025&geold=116&subsetId=128>

³⁵ IHS Markit Recruitment and Employment Confederation, July 2017

<https://www.markiteconomics.com/Survey/.../af7980eece364234a2b7900a9ff0a1d6>

incidence of skills gaps occurs in South East Wales, there were 28,100 staff, just under 5%, reported as having a skills gap in 2015 (Table 6).

Table 6 Incidence and Density of Skills Gaps by Region

	Establishments (incidence)				Staff with skills gaps (density)		
	Unweighted base, 2015	2011 %	2013 %	2015 %	2011 %	2013 %	2015 %
UK	91,210	17	15	14	5.5	5.2	5.0
Wales	6,027	16	16	14	4.6	5.8	4.5
South East Wales	2,395	18	17	16	4.5	5.3	4.9
North Wales	1,528	15	17	13	5.0	7.6	4.4
South West Wales	1,362	14	15	13	4.2	5.0	4.5

1% of employers in South East Wales required specific Welsh language qualifications³⁶ whilst 2% of students in Cardiff Capital Region universities are partially taught through the medium of Welsh.³⁷

³⁶ Welsh Government, Regional LMI Report, section 5.5 qualifications and training via the medium of Welsh

³⁷ Cardiff University 2.6%, Cardiff Metropolitan University 1.75%, University of South Wales 1.4% of all enrolments (compared to Bangor University at 10%)

Qualifications levels

Skills shortage vacancies and skills gaps may be accounted for, in part, by a lack of higher level qualifications, particularly in technical subjects. Working Futures project that 54% of those in employment will hold qualifications at level 4 or above by 2024 with increases in jobs for managers, professionals and associate professionals focussed on ICT, professional services and manufacturing.³⁸ Large declines are forecast for those with low or no qualifications although a large increase in Level 2 and Level 3 qualifications are forecast for caring personal service and administrative occupations (25,000) where, for example, mandatory qualification and registration requirements in social care will have a significant impact on demand.

Currently:

- 11% of working age adults have no qualifications - above the Welsh average;³⁹
- 57% of working age adults hold a Level 3+ qualification (36% Level 4+ qualification);
- 19% fewer further education enrolments in the Cardiff Capital Region between 2012/13 and 2014/15;⁴⁰
- 3% reduction in student numbers in Welsh higher education institutions in the same period.

Working population qualification levels vary markedly between authorities in the region:

- 13.6% highly qualified to Levels 7-8 in Cardiff compared to the Welsh average of 8.5%;
- 64% qualified to Level 2+ in Blaenau Gwent - over 80% in Cardiff, Monmouthshire and the Vale of Glamorgan;
- 20% across Blaenau Gwent have no qualifications, whilst Cardiff, Monmouthshire and the Vale of Glamorgan experience less than 10% with none;
- essential skills remain a challenge with up to one third lacking skills across the region;
- people and personal skills, 'soft skills', are considered lacking across all sectors.

Overall, qualifications levels in the Cardiff Capital Region exceed Wales' average but still do not meet forecast skills level demand. There is a challenge to improve qualification levels achieved by students across the region to address a marked difference in attainment between local authorities.

Raising Levels of Qualifications in Further Education

There were 129,550 learners enrolled at further education institutions in 2015/16, a 13.8% decrease on 2014/15 evenly spread across every local authority.⁴¹ Whilst there is recognition of the need to develop higher level skills, there are also concerns amongst providers in further education institutions and across the third sector, that reducing numbers for those accessing lower levels of qualifications is removing the opportunity for learners to progress from entry level on a vocational pathway. New approaches are needed to ensure individuals can access provision from entry level through pathways that grow aspirations and accelerate progress towards higher qualifications. If successful, a pilot by further education colleges (2016-17) to accelerate progression and shorten timeframes, from Level 1-2 and Level 2-3 for students may provide one such solution.

³⁸ Welsh Government, Regional LMI Report, Figure 7.2: Projections of employment by qualification level 2004-2024, South East Wales pp78

³⁹ Office for National Statistics Annual Population Survey ILM report, <https://www.ons.gov.uk/search?q=annual+population+survey+march+2017>

⁴⁰ Numbers fell in every local authority – by less in Merthyr Tydfil

⁴¹ Welsh Government, Regional LMI Report Section 4.2 (May2017)

Further education institutions' retention of young vocational learners is low in some subject areas e.g. construction. Many are leaving early to undertake an apprenticeship but often exit with low level qualifications and little opportunity to progress. Although all apprenticeships initially offer an employed job, not all employers retain apprentices once they have completed and can command a higher rate of pay. Support is needed to retain or re-engage and support learners into suitable progression pathways.

Apprenticeships

- Apprenticeship completion rates are 80% compared to 67% in England.
- 47% of all apprenticeships⁴² are forecast for the Cardiff Capital Region.
- Apprenticeships at Levels 2 and 3 have seen a decline in take-up in subjects other than management and professional and business administration.
- Conversely, higher level apprenticeships doubled to 4,000 since 2012/13, with further increases forecast in demand for higher-level and degree apprenticeship opportunities.
- Over twice as many women were engaged in a higher apprenticeship than men in 2014/15.
- Apprenticeships generate around £1.1bn to the Welsh economy.⁴³
- The average framework costs between £4,000 and £16,000, compared with a minimum of £27,000 for an undergraduate degree.
- Frameworks in Wales are being retained where possible and new frameworks developed where necessary.⁴⁴

Welsh Government is committed to 'at least' 100,000 apprenticeship starts in this Assembly term,⁴⁵ but indicators suggest that a greater aspiration can be achieved. The National Training Federation for Wales (NTfW) reports a total of 116,150 apprenticeships over the past five years.⁴⁶ Whilst the Apprenticeship Levy is driving greater interest from large companies including organisations such as the National Health Service, local government and wider public services, this suggests a higher demand for apprenticeships and the potential to exceed the original target; however key challenges remain and will need to be addressed if the region is to increase participation in apprenticeships:

- Apprenticeships are perceived by some school students and adults including parents and teachers as of less value than an 'A' level progression to university. Despite economic arguments supporting apprenticeships, just 1.5% of year 11 school children went directly into apprenticeships last year – 488 in Wales and just 5% of year 11 school children even considered an apprenticeship.
- Increasing apprentices in SMEs is more challenging for the employer. Some are put off by perceived administrative and employment issues. A resolution may be to increase shared apprenticeships where administrative burdens can be covered centrally and placements with different employers may offer a wider range of skills.

⁴² Based on 2012-14/15 figures

⁴³ National Training Federation for Wales figures <https://www.ntfw.org/apprenticeships-wales/>

⁴⁴ <https://businesswales.gov.wales/skillsgateway/>

⁴⁵ Welsh Government Apprenticeship Policy 2016-2022
<http://gov.wales/topics/educationandskills/skillsandtraining/apprenticeships/apprenticeships-skills-policy-plan/?lang=en>

⁴⁶ <https://www.ntfw.org/apprenticeships-wales/>

- Greater promotion and marketing of apprenticeships is needed to increase the number and range of apprenticeship places offered. There is a need to engage existing employers in exploring new and different apprenticeship options such as higher level and degree apprenticeships and introduce new employers to the benefits of apprenticeships to raise participation above the current figure of 13%.
- Pre-apprenticeship programmes might offer a useful introduction to vocational learning and progression through to full apprenticeship programmes.

Careers Mismatch

There is a continued mismatch between the subjects that learners choose and those occupations within the regional economy that offer the greatest opportunities for employment, earnings and career development. There are fewer school children taking science, technology, engineering and mathematics (STEM) subjects than needed to satisfy demand and a low take up of STEM-related subjects in further education, where sciences, mathematics and computer studies have a low take-up. The number of apprenticeships from 2014/15 to 2015/16 fell in construction, engineering, manufacturing, healthcare and public services and ICT. Forecasts suggest significant numbers of job vacancies across priority sectors, however some key subject areas are under-subscribed despite excellent long-term career opportunities.

The largest increases in job opportunities of over 60,000 are forecast in health and social care sectors with 25,000 education professionals. Over 35,000 jobs are anticipated as being needed in STEM-related and skilled trades, from software programming to welding. There is a serious gender imbalance in construction, engineering and ICT with many more males taking up options than females.

Labour market information, advice and guidance is needed to inform learner choice, with teachers, parents, careers advisors and other influencers made aware of modern career opportunities and the full range of pathways available, vocational and academic. Building sustainable relationships between education and industry can assist in raising awareness of the nature and range of opportunities available, challenging perceptions (including gender stereotypes) and promoting parity of esteem between different pathways.

The lack of routine careers advice and support for all learners creates a significant gap which exacerbates the mismatch between learner choice and employment opportunity. Equally, careers information, advice and guidance needs to keep pace with changing skills demands, career pathways and job roles. For example, half of teachers did not discuss or provide any information to young people about construction with the outcome that more than 50% thought it was mainly manual labour and less than 20% considered it a good option. Nearly half of young people were told by teachers that studying for a university degree would be better for their career in the long term than undertaking an apprenticeship.

Learner outcomes

Understanding an individual learner's outcomes (of any age) is key to recognising the impact and value of skills investment. Collection of relevant data is a priority, with the take-up and completion of courses and qualifications offering two valuable measures to understand the direction of travel for learners across the skills and training landscape. However, it is destination data that gives a true picture of the outcomes for students and it is hoped that the Welsh Government consultation in summer 2017⁴⁷ will result in improvements to the collection and availability of destination data and that regional skills partnerships will be included amongst recipients of this data.

A key challenge is working collectively to also measure detailed longer-term (12+ months) outcomes. This needs to go beyond looking at whether, at 6 months, an individual is in continuing education or employment and consider pathways, type of employment, the relevance and transferability of the training/qualification achieved, numbers leaving their specialisation or returning to it and numbers leaving or returning after specified time periods.

Expanding the collection of quality destination data, such as that collected by the Higher Education Statistics Agency (HESA) for higher education, across further education, work-based learning (including apprenticeships), third sector interventions and European Union funded initiatives will aid planning and funding decisions, develop understanding of skills gaps and shortages, identify success/best-practice and allow for a 360 review of skills investment, delivery and outcomes.

Higher Education Destination Data and Retention of Welsh Domiciled Students

Higher education destination data demonstrates that investment in Welsh domiciled students for Welsh universities is paying dividends. 85% of Welsh domiciled leavers who went to university in South East Wales institutions (2014/15)⁴⁸ remained in Wales to work with the highest retention rates in subjects allied to medicine and education at over 90%. Retention rates for social studies, law, business and administration were all over 85%. Lowest retention rates were for mass communications and documentation (61%) and mathematics (71%). 67% of Welsh domiciled students who went to UK universities returned to Wales to work. Again, subjects allied to medicine and education had the highest return rate at over 75%.

Close working relationships between employers and universities support progression into employment, delivering positive learner outcomes and potentially competitive advantage. Destination data is a useful measure of outcomes, highlighting those programmes and institutions securing high levels of progression to employment, for example, 65%-75% of all who studied 'medicine and dentistry'; 'subjects allied to medicine' and 'education' reported working in a related area. Social studies and engineering and technology retention rates for Wales domiciled were about 10% higher than for all students. 59% of business and administrative leavers reported working in sectors other than financial and professional services and administration.⁴⁹

⁴⁷ <https://consultations.gov.wales/>

⁴⁸ Welsh Domiciled Leavers of Higher Education Who Stated that their Qualification was Useful, by Location of Employment, Subject Studied and Economic Activity Welsh Government stats 2014/15. Data source HESA StatsWales Welsh Government research

⁴⁹ Annex for Destination Data for Welsh Domiciled Students in Cardiff Capital Region Higher Education Institutions Data source HESA StatsWales Welsh Government research

Unemployment and Economic Inactivity

Unemployment costs South East Wales £4bn in welfare annually. Bringing this figure down is central to the Cardiff Capital Region economic strategy. The Welsh Government has identified an additional concern which is “the growing issue of in-work poverty.”⁵⁰ Welsh Government sees improving the levels of qualifications held by the working age population as the key to driving up pay and driving down unemployment.

Wales has the second highest unemployment figures (4.9%) and second lowest employment rate at 71% in the UK with a high percentage of people who are economically inactive. Those people who are economically inactive in the local population negatively impact on the local economy as they cannot contribute to productivity.

Welsh Government has committed to an Employability Plan for Wales “To reshape employability support for job-ready individuals, and those furthest from the labour market, to acquire the skills and experience to gain and maintain sustainable employment.”⁵¹ The Cardiff Capital Region City Deal is equally committed to a delivering an employability plan, engaging partners in a collaborative approach to tackle regional unemployment and economic inactivity.

The unemployment level in Cardiff (Table 7 below) is amongst the lowest in the region. So too is the employment level. The difference indicates levels of economically inactive people. There are marked differences in employment rates across all local authorities in the Cardiff Capital Region. Training those who are either unemployed or economically inactive is part of the equation necessary to balance the forecast difference between replacement and jobs growth demand and the market under-supply of those leaving education and training to fulfil it. With forecasts indicating shortages in workforce numbers, there is an opportunity to drive training for those people who are unemployed and economically inactive to fulfil valuable job roles. Training a significant percentage of this combined group back into the workforce will be essential.

Table 7 Unemployment Levels

			Year ending 30 Sep 2016	
	Employment level	Employment rate	Unemployment level	Unemployment rate
United Kingdom	30,211,000	73.7	1,628,700	5.1
Wales	1,356,900	71.1	69,700	4.9
South East Wales	663,900	70.0	36,800	5.2
Bridgend	62,100	71.7	4,000	6.0
Vale of Glamorgan	56,200	73.7	3,400	5.8
Cardiff	163,800	67.9	7,800	4.6
Rhondda Cynon Taf	102,100	68.9	6,500	6.0
Merthyr Tydfil	25,000	66.9	1,900	6.9
Caerphilly	80,600	71.4	4,700	5.5
Blaenau Gwent	27,700	64.0	2,700	8.8
Torfaen	42,100	74.3	1,400	3.2
Monmouthshire	41,600	76.9	1,300	2.9
Newport	62,600	68.2	3,200	4.8

Source: Annual Population Survey, Office for National Statistics

(a) Regional area level data are approximations

Next update: March 2017

⁵⁰ <https://www.cardiff.ac.uk/news/view/758111-record-levels-of-in-work-poverty>

⁵¹ <http://gov.wales/topics/educationandskills/skillsandtraining/employability-plan-for-wales/?lang=en>

Much of the projected employment demand in replacement and growth jobs (Table 4) are in areas where unemployment is low. To rebalance the workforce, it may be necessary to incentivise businesses to locate, or remain, in areas with high unemployment and economic inactivity rates linked to a programme of skills and training support.

Unemployment affects the young disproportionately in Wales with 12.7% of 16-24 year olds compared to 3.6% of 25-49 year olds and 3.0% of 50-64 year olds.⁵² Less women are unemployed (3.9%) than men (5.5%).

One in five of 19-24 year olds are registered as not in education, employment or training (NEET) and are economically inactive. The Cardiff Capital Region has 29,800 (16-24 year olds) NEETs, 54% of 56,100 people in Wales.⁵³ All Wales statistics⁵⁴ reflect a significant opportunity to attract young people under 25 into work.

Table 8 Not in Education, Employment or Training

Age	% Not in education employment or training	Age	% Not in education employment or training
16	3.8	20	19.1
17	8.2	21	19.5
18	13.9	22	20.6
19	14.9	23	19.0
		24	19.1

Brexit and European Union Funding⁵⁵

The ‘Implications for Wales of leaving the European Union’ review of skills⁵⁶ reflects on the importance of Europe and the need for succession planning to consider:

- the status of non-UK European Union nationals, students and academics currently studying in Wales;
- support for work-based learning and skills development research and investment;
- participation in European Union mobility and research programmes e.g. Horizon 2020, ERASMUS+;
- continuing existing schemes for mutual European Union recognition of educational qualifications by the Credit & Qualifications Framework Wales (CQFW) link to European Qualifications Framework (EQF);
- ensure a framework for professional qualifications is maintained ensuring transferability; framework for trades, professions and low skilled employment (potential for shortages);
- recognition of European Union health professionals’ qualifications to work across European Union health care systems;

⁵² <https://assemblyinbrief.files.wordpress.com/2017/05/unemployment-may-eng-01.png>

⁵³ <http://bit.ly/2mtMOWT>

⁵⁴ Numbers are not available for South East Wales due to small sample sizes.

⁵⁵ <https://beta.gov.wales/brexit>

⁵⁶ <http://www.assembly.wales/laid%20documents/cr-ld10912/cr-ld10912-e.pdf> External Affairs and Additional Legislation Committee, January 2017

- impact on European Union nationals working in health and social care, particularly non-registered.⁵⁷

The immigrant workforce brings many benefits to communities, including employment in job roles that experience skills shortages and are hard to fill.⁵⁸ Any reduction on the freedom of movement from continental Europe is also likely to exacerbate shortages in labour supply, and the city of Cardiff in particular may face challenges over the next period, with an estimated population of 11,000 European and 20,000 non- European Union nationals.

Welsh Government research suggests that, despite low levels of migrants, certain sectors of the Cardiff Capital Region economy are dependent on the skills of migrants from the European Union⁵⁹ and elsewhere. Wales has just 2% of the non-British European Union population in the UK, and 2.2% of non-European Union residents. However, since 2005 migrant worker numbers have doubled to 9.2%, around 82,600.

- Human foundational economy - health and social care sector, around 1,140 European Union nationals were employed in the National Health Service Wales, with 6% of doctors (whose nationality was known) trained in other parts of the European Union.
- The construction sector is dependent on migrant workers, with skills shortages anticipated by the UK National Infrastructure Delivery Plan (September 2015) with an additional 100,000 UK workers needed by 2020. Wages may be inflated and the workforce depleted in Wales.
- 1,360 academic staff in Welsh universities came from European Union countries (December 2014) with concerns about Wales' access to academic talent and cross-border research collaboration.⁶⁰
- The Welsh food and drink sector employs over 25% of the labour force that is non-UK.
- The life sciences and the pharmaceutical industry employs significant numbers of European Union citizens.
- The tourism industry in Wales employs around 11% of migrant workers; 50% are from European Union.
- Reductions in migrants in England may create shortages, drawing employment from Wales.

European Union Funding

A plethora of national, regional and sub-regional European Union funded initiatives operate across the region as part of the 2014-2020 European Union programming period. These range from large scale revenue projects aimed at supporting people back into employment to capital schemes to assist small and medium-sized business to become more innovative. The following provides a snapshot of some of the support currently provided by European Union funding across the Region:

- apprenticeships: a Welsh Government-led national operation providing increased opportunities for those of working age to acquire further skills (European Social Fund (ESF));
- traineeships: a Welsh Government-led national operation providing vocational-based learning for 16-18 year olds who are not in employment, education or training (ESF);

⁵⁷ <http://wmp.infobasemru.net/IAS/> .

⁵⁸ <http://www.wmp.org.uk/InformationCentre.asp?path=/documents/wsmp/News%20and%20Events/Migration%20Briefings> – Research by Swansea University using data from 2013

⁵⁹ https://beta.gov.wales/sites/default/files/2017-02/31139SecuringWalesFuture_Version%202_WEB.pdf

⁶⁰ https://beta.gov.wales/sites/default/files/2017-02/31139%20Securing%20Wales%20B9%20Future_Version%202_WEB.pdf

- innovation, entrepreneurship, SME start-up and expansion support: a number of national initiatives led by Welsh Government (Business Wales) and Finance Wales (European Regional Development Fund (ERDF));
- Bridges2Work: a local government-led sub-regional programme of support for the economically inactive and long-term unemployed to help them back into work (ESF);
- Inspire 2 Achieve: a local government-led regional programme of support for young people aged 11-24 to increase their self-esteem, develop soft skills and gain qualifications to enable them to enter further learning, training and/or employment (ESF);
- Inspire 2 Work: a local government-led regional programme of tailored support for young people aged 16-24 who are not in employment, education or training to address and overcome their barriers, increase their self-esteem, develop employability skills and move closer to the labour market (ESF);
- Upskilling@Work: a further education-led regional programme of support providing a strategic approach to the delivery of workforce development opportunities for those in employment to further develop their skills (ESF);
- Leading Business Growth East Wales: a higher education-led programme of support for higher level vocational and professional skills in order to increase the number of people in the workforce with technical and job specific skills at an intermediate and higher level (ESF);
- the Institute for Compound Semiconductors: higher education-led supporting research and development activities in relation to the commercialisation of compound semiconductor technologies (ERDF).

The South East Regional Engagement Team (RET) supports the delivery of European Union funded interventions across the region and plays a key role in coordinating opportunities, ensuring lack of duplication and overlaps and ensuring that the region maximises all the opportunities from the programmes. It supports, facilitates and brokers discussions between all key partners, stakeholders, project leads and beneficiaries across all sectors. Specifically, it facilitates ESF Priority Networks across the region, bringing lead partners together with key organisations, relevant Welsh Government Departments and the Welsh European Funding Office (WEFO) to ensure the smooth delivery of all operations and projects. Some key challenges include:

- avoiding duplication in the support provided by national, regional and sub-regional interventions to specific groups under ESF-funded activity in the region;
- encouraging ERDF projects to consider the skills opportunities of their interventions. Highlighting the potential for the skills requirements of a number of ERDF-funded capital projects to be considered together in order to maximise the skills opportunities of large scale ERDF interventions within the region. This is something that both the RET and LSKIP can support within the region, together with ensuring that WEFO and lead beneficiaries also address this via project review meetings, etc;
- lack of access to meaningful performance data from WEFO is currently preventing the RET from measuring and communicating the regional performance of the programmes against key regional strategies and to plan for an effective exit strategy from ESF to domestic funding streams post-Brexit. This is something that the RET is working with their counterparts across Wales to ensure that such data is made available by WEFO as more projects start to claim and report outputs and targets.

Other priorities for the coming period as follows:

- work with all key partners and stakeholders as the Welsh Government reconfigures its existing ESF-funded employability programmes as it moves towards delivering new employability

programmes from April 2019 and establish how regional and sub-regional interventions might also need to change as a result, in particular as the Valleys has been identified as a test bed to inform the new delivery approach for employability programmes;

- lobby for future domestic funding to replace ESF post-Brexit, both at a UK and Welsh Government level, to ensure the region continues to benefit from key funding opportunities of vital importance to individuals, communities and businesses throughout the region.

PRIORITY SECTORS FOR EMPLOYMENT AND SKILLS INVESTMENT

An analysis of the regional economy has resulted in the prioritisation of five sectors in the Cardiff Capital Region which are considered to have greatest demand for labour and skills in the next five years: advanced materials and manufacturing (AMM), construction (CON), financial, legal and professional services (FPS), digital (ICT/digital including digital creativity) and human foundational economy including education, health and social care (HFE). The advanced materials and manufacturing sector includes the specialist areas of food and pharmaceutical manufacture.⁶¹

Table 9 Cardiff Capital Region by Priority Sector – GVA

Cardiff Capital Region by Priority Sector (UKCES 2016)	GVA Cardiff Capital Region Industry £bn	By GVA	Business Units
All Industry	29.3		41,540
Advanced materials and manufacturing ⁶²	5.0	2	2,435
Construction	1.8	4	4,755
Financial and professional	4.8	3	2,210
Human foundational economy	5.1	1	2,545
[Education £2.2bn, health and care £2.9bn]			
ICT sector including creative industries	1.2	5	2,210
Energy and environment	1.1		225
Tourism	0.6		1,970
Food and farming	.2		1,455

Table 10 Cardiff Capital Region by Priority Sector – Skills Shortage Vacancies

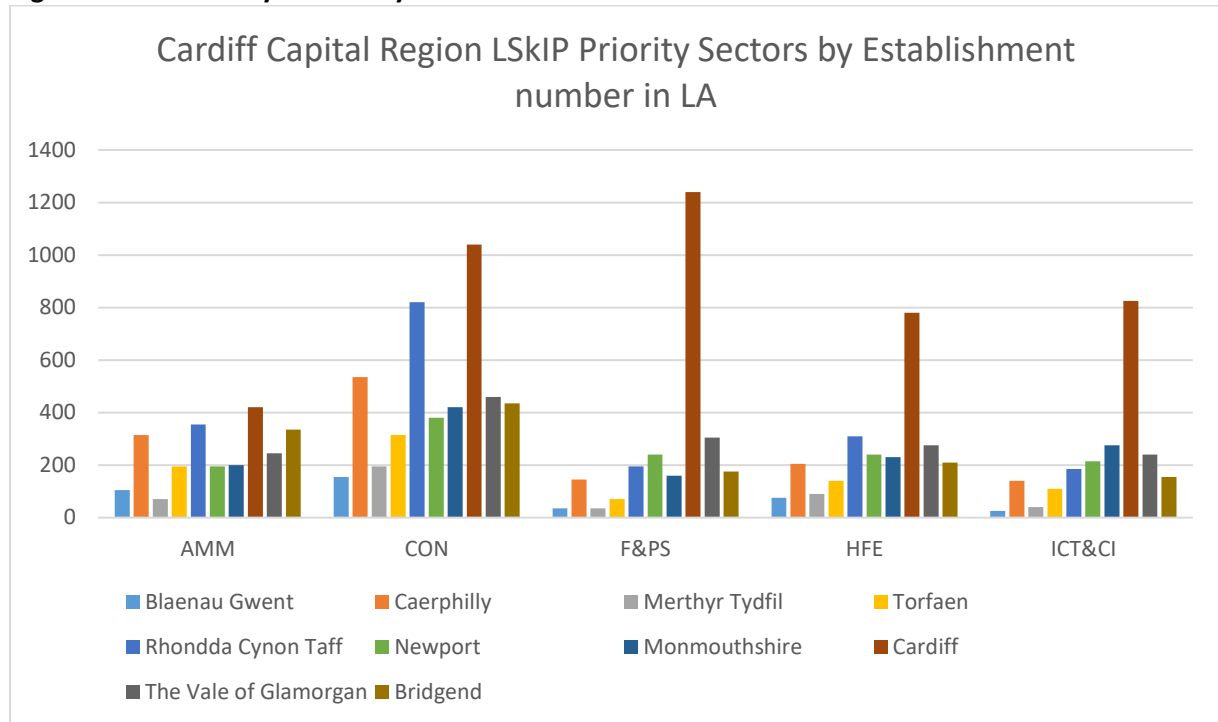
Cardiff Capital Region by Priority Sector (UKCES 2016)	SSVs in CCR by SOC employee	Base companies with vacancies	2013 % companies SSVs	2015 % companies SSVs	Increase/decrease
All Industry					
Advanced materials and manufacturing	600	177	25%	31%	+
Construction	800	123	21%	40%	+
Financial and professional	1600	722	30%	22%	-
Human foundational economy	1000	425	14%	22%	+
[Education £2.2bn, health & care £2.9bn]					
ICT Sector including creative industries	700	407	n/a	n/a	
Energy and environment	100	28	7%	16%	-
Tourism	1000	614	21%	22%	+
Food & farming	100	31	n/a	18%	

⁶¹ A further review of the sectors currently prioritised by LSKIP will take place in Autumn 2017.

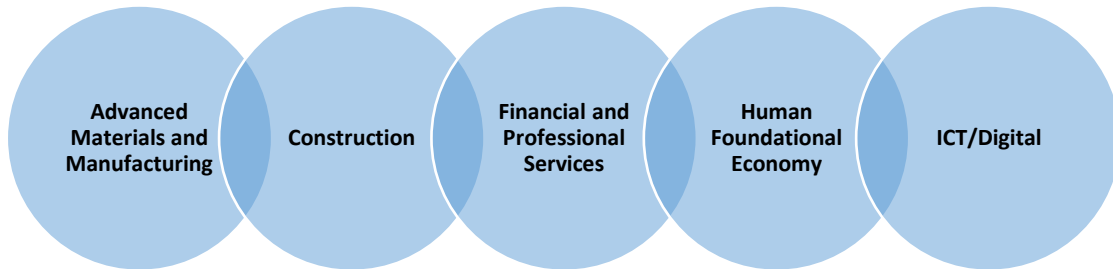
⁶² Includes pharmaceutical manufacturing and food manufacturing.

Workforce skills demand is found across all local authorities in the Cardiff Capital Region. Although Cardiff has the largest number of businesses in every sector (with the exception of food and farming) there are significant numbers of employers in all areas. Consideration needs to be given to those areas with high concentrations of businesses in certain sectors to ensure there is associated training delivery through institutions and work-based learning providers e.g. advanced materials and manufacturing and construction in Bridgend, Caerphilly and Rhondda Cynon Taf.

Figure 2 LSKIP Priority Sectors by Establishment number in Local Authorities



SECTION 2: PRIORITY SECTOR ANALYSIS



The following sections offer a more detailed regional analysis of five sectors prioritised for employment and skills support.

- 1. Advanced Materials and Manufacturing (AMM)**
- 2. Construction (CON)**
- 3. Financial, Legal and Professional Services (FPS)**
 - a. Financial Services
 - b. Legal Services
 - c. Business Services
- 4. Digital (ICT/Digital) is considered a cross-sector**
- 5. Human Foundational Economy (HFE)**
 - a. Education
 - b. Health
 - c. Social Care

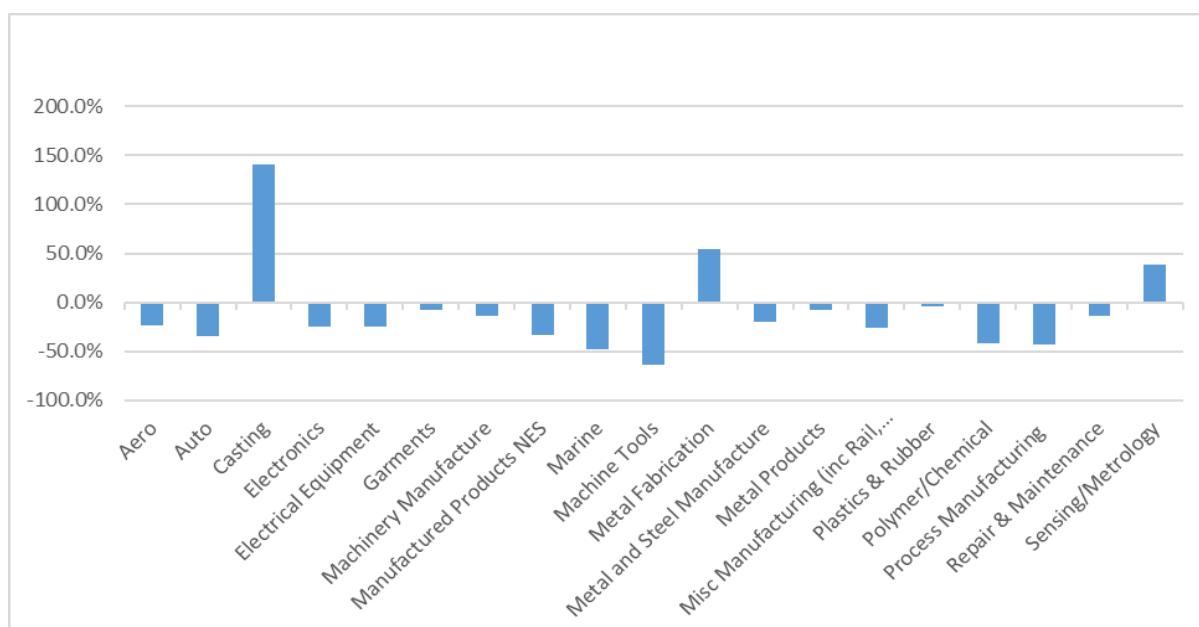
ADVANCED MATERIALS AND MANUFACTURING

Advanced Materials and Manufacturing Overview

Advanced materials and manufacturing (AMM) is a key sector in Wales with 40% of total enterprise turnover. Over 50% of Welsh AMM companies (2,435) are in the Cardiff Capital Region with half located in Cardiff, Bridgend, Rhondda Cynon Taf and the Vale of Glamorgan. The sector includes established industries, Anchor and Regionally Important Companies, large employers (250+) and SMEs which offer key opportunities in the supply chain.

As a sector gross value added (GVA) compares poorly with the UK, indicating a need for improved leadership and management skills, efficiencies through project management, technology and research.⁶³ Two of the largest employers in South Wales (1,000-2,000 workforce) are in steel manufacturing.

Figure 3 Wales GVA compared to UK by Advanced Materials and Manufacturing Sub-sector 2014



Summary of Major Advanced Materials and Manufacturing Projects

The advanced materials and manufacturing sector will be impacted by infrastructure projects and inward investment:

- Hinkley Point C Nuclear Power Station in North Somerset (South Wales travel-to-work area);
- Wales's only UK catapult centre is the Compound Semiconductor Applications Catapult;
- The Aston Martin project in St Athans will create hundreds of manufacturing/assembly jobs;
- The TVR project in Ebbw Vale will create 150 manufacturing jobs;
- high-quality furniture manufacturing for international export;⁶⁴
- Ebbw Vale Enterprise Zone – skills needed to target automotive companies in the Midlands;
- off-site manufacturing facility for construction industry e.g. Heathrow Hub.

Advanced Materials and Manufacturing SWOT

⁶³ <http://gov.wales/newsroom/finance1/2017/59001732/?lang=en>

<https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/support-measure/score-cymru>

⁶⁴ Orangebox Ltd, Treforest was recently approved as a Regionally Important Company by Welsh Government.

<p>Strengths</p> <ul style="list-style-type: none"> • There 49 Anchor and Regionally Important Companies in the Cardiff Capital Region. • 35% of the workforce is employed by large companies. • Advanced materials and manufacturing (AMM) contributes over 20% gross value added (GVA) to the Cardiff Capital Region. • 25% of companies are registered as engineering.⁶⁵ • The number of engineering enterprises is growing by 8.4% year-on-year in Wales. • 78% of mathematics teachers have been trained in the subject in Wales. • High-level research e.g. Cardiff University Innovation Centre; PDR located within Cardiff Metropolitan University.⁶⁶ 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Productivity weakest in UK - focus on leadership, management and innovation. • 44% of physics teachers in Wales are specialist teachers (56% are not) with numbers falling. • Engineering manufacture: 9% report retention difficulties in comparison to 5% of all. • Average earnings for engineers in Wales are the lowest in the UK.⁶⁷
<p>Opportunities</p> <ul style="list-style-type: none"> • Focus on new technologies and growth opportunities forecast for the next 5-10 years. • To focus on high-growth high profile opportunities for future specialist employment. • The Ministry of Defence Sustainable Procurement Charter offers opportunity to local companies to develop their skills base. • Range of training across further education institutions and higher education institutions to 'develop the leaders' - degree apprenticeships. • 80% of companies are micro/SMEs. • Over 26% of qualified engineers and technicians work for non-engineering enterprises. • Replacement jobs create strong demand for 12,600 jobs annual recruitment requirements (ARR) despite falling numbers. 	<p>Threats</p> <ul style="list-style-type: none"> • Lack of a skilled workforce to deliver targeted training to meet skills gaps and shortages. • Limited development of apprenticeship frameworks and the UK apprenticeship levy. • Failure to market career opportunities in the sector. • Falling workforce numbers (manufacturing -5,000, engineering -2,600). • 31% of general science teachers are known to be trained in the subject (69% are not) in Wales. • Engineering workforce ratio male to female is 8:1. The graduates ratio male to female is 5:1.

There is a balance needed across training and skills for high-profile, high-growth, new technology manufacturing e.g. compound semi-conductor technology, advanced food manufacturing technology and pharmaceutical manufacture and the new skills required to maintain employment and replacement jobs. This innovative group currently has a relatively small, specialist workforce. Large advanced materials and manufacturing companies have replacement demand for large numbers and despite being traditional also have major skills challenges to meet long term skills needs for technical innovation. e.g. Ford at Bridgend.

⁶⁵ <http://www.engineeringuk.com/Account/ReturnReport> State of Engineering (log-in required)

⁶⁶ www.pdronline.co.uk

⁶⁷ £23,304, £1,500 less than the North East of England and over £3,000 less than Scotland.

New entrants and apprentices are part of the solution for Level 4+ qualifications together with demand for upskilling all those aged 25 and above who are currently employed.

Advanced Materials and Manufacturing Demand and Supply by Sub-sectors

Aerospace and Defence

There are over 60 large companies in Wales, 10 of which are in the Cardiff Capital Region:⁶⁸ British Airways Avionics Engineering (BAAE); British Airways Maintenance Cardiff (BAMC); GE Aircraft Engine Services Ltd; General Dynamics UK Ltd (Blackwood and Merthyr Tydfil); Nordam Europe Ltd; Qioptiq; TES Aviation Group; Sony UK Technology Centre and Zodiac Seats UK. Two of the largest employers (1,000-2,000 workforce) are in the aerospace sector. Most of these companies are recognised as Tier One for procurement which increases opportunities to develop skills locally.

The Ministry of Defence Sustainable Procurement Charter⁶⁹ may offer an opportunity for local companies to develop their skills base and broaden their supply chain. The charter includes mentoring of SMEs, open competition, collaboration, SME targets and fee incentives to promote the socio-economic agenda. The involvement of the Cardiff Airport and St Athan Enterprise Zone is promoting opportunity.

Automotive Engineering

Wales has about 8% of the UK's automotive manufacturing.⁷⁰ Over half of automotive manufacturers in Wales are in the supply chain producing components; over a quarter manufactures products for the aftermarket. The Ebbw Vale Enterprise Zone offers a significant opportunity to develop vocational and management skills to meet inward investment and expand engineering in the Heads of the Valleys with the A465 dualling linking to the M4 and Ireland and the M50/M5. Automotive business in the West Midlands account for over 30% of the UK's automotive business (£17.6bn). The Cardiff Airport and St Athan Enterprise Zone has attracted the prestigious Aston Martin investment.

Compound Semi-Conductor Cluster – Manufacture, Research and Development

The Compound Semiconductor Applications Catapult is a joint venture, including IQE Europe Ltd, the Cardiff Capital Region and Cardiff University. This 'for profit' venture will develop high-level skills to build an international cluster of supply chain companies in and around the region. The Compound Semiconductor Applications Catapult centre will encourage a Mittelstand approach, collaborating with the University of Bristol, the University of Exeter and Bangor University, attracting interest through Europe, the Americas and Asia. The Cardiff Capital Region, through the City Deal, is investing £38m (on a commercial basis) towards a state-of-the-art, globally competitive manufacturing foundry.

Food and Drink Manufacturing

There are 22,100 people working in the food manufacturing sector,⁷¹ 10% of the Welsh food and drink workforce. It has a turnover of £4.8bn, 555 business units of which 85% are micro (less than 10 employees), e.g. fewer than 85 larger companies. In addition to existing production clusters (Wales has 7 protected names), NutriWales is a 'high impact business and export' cluster. Four out of five of the largest companies in the region are food or beverage-related manufacturers.

The Food and Drink Wales Industry Board has set a target of 30% growth or £7bn in sales by 2020. A large part of this will arise from food manufacturers in the Cardiff Capital Region using and developing

⁶⁸ Manufacturing Centre of Excellence - Aerospace Wales data

<http://www.aerospacewalesforum.com/welcome-to-aerospace-wales-forum>

⁶⁹ Presentation at Procurex 2016 by Ministry of Defence Commercial Director Steven Morgan

⁷⁰ Wales Automotive Forum: <http://www.automotivecouncil.co.uk/wp-content/uploads/2016/02/REPORT-UK-Automotive-Industry-Jobs-and-Skills-Report-February-20162.pdf>

⁷¹ Welsh Government 2015 - <https://businesswales.gov.wales/foodanddrink/key-facts>

advanced manufacturing techniques supported by a range of skills being developed at further and higher education levels. Cardiff Metropolitan University's specialist Food Industry Centre has attracted significant investment (£11.9m) for research. Higher education institutions are being encouraged to work collaboratively with local further education institutions to expand their food and pharmaceutical courses.

Pharmaceutical Manufacturing

Life sciences is a high-profile sector in Wales employing around 11,000 people based at more than 350 companies with a turnover of £2bn per year. Pharmaceutical manufacture is a key sector for the Cardiff Capital Region recognised by Welsh Government through nominated Anchor and Regionally Important Companies. Life science companies work with academic institutions and health boards on medical research including biopharmaceuticals, regenerative medicine, diagnostics, e-health and biotechnology. There is a risk from the UK's exit from the European Union of losing important European Union regulatory agencies such as the European Medicines Agency.

Cardiff University, the University of South Wales, the Open University in Wales and Swansea University can collaborate to ensure a skilled workforce is available. This will help meet demand from life science companies across the Cardiff Capital Region including Bridgend and Cardiff and the Heads of the Valleys. Specialist skills required are exemplified by Bridgend College - the first training provider to deliver the new Higher Apprenticeship in Life Science and Related Science Industries in Wales.⁷²

Advanced Materials and Manufacturing Specialist Nuclear Skills Annual Recruitment Requirements by Occupation

Nuclear sector manufacturing is highly regulated with around 250 companies holding existing nuclear contracts out of a potential 700 businesses with requisite skills. Latest estimates suggest high-growth demand with an annual recruitment requirement of over 6,000 new jobs by 2021, growing to 8,500 by 2025 for off-site mechanical and off-site control, electrical and instrumentation manufacture. This workforce is in addition to the new build construction workforce dealt with in the construction section. Nuclear industry skills have not been a priority, with no nuclear facility in South Wales. However, this may change if further education institutions and higher education can develop transferable skills to meet the demand of Hinkley Point C Nuclear Power Station, which has designated South Wales as in its travel-to-work area.

⁷² <http://gov.wales/newsroom/educationandskills/2016/161017-minister-visits-the-first-provider-to-deliver-the-new-higher-apprenticeship/?lang=en>

Table 11 NESAs – Nuclear Energy Skills Alliance⁷³

	Forecast Annual Recruitment Requirements (ARR) to 2021 Operation, Decommissioning, Engineering Construction and Defence			
	Number per year		Annually as a % of total	
	Technical per year	Professional per year	Technical per year	Professional per year
All Resource Codes	3000	3500	8%	13%
Control and Instrumentation	260	360	10%	19%
Engineering	1050	1800	10%	16%
Project Management	130	600	5%	13%
Quality Assurance	45	145	5%	13%
Safety Case	10	50	3%	9%
Health Physics	15	30	1%	8%
Security and Safeguards	30	20	9%	5%

The table above, which includes Hinkley Point C Nuclear Power Station, Oldbury Nuclear Power Station and Wylfa Nuclear Power Station, illustrates workforce growth from 70,000 in 2014/15 to 98,000 in 2021 over 5 years. The new-build workforce is forecast to grow by 28,000 full-time equivalent (FTE) to 2021. Professional skills demand in engineering, control and instrumentation, and project management – skills which for nuclear will take a minimum of 3-5 years training – are forecast to be up by a fifth. Fifty businesses in Wales will benefit from a £450k fund for a Fit for Nuclear (F4N) programme from the 2017 Welsh Government fund.

Hinkley Point C Nuclear Power Station includes both Swansea and Cardiff in its travel-to-work area. There is likely to be increased demand for skills locally to backfill those who choose to travel to work in North Somerset. Gross value added (GVA) will accrue to the individual’s home authority under one measure although it may accrue to the location of the business under another. Nuclear skills will be required in succession for Wylfa Nuclear Power Station from 2019 and Oldbury Nuclear Power Station from 2023. Research into the opportunity arising from intensive training programmes (further education institutions and higher education) may clarify the opportunity.

The ripple effect of infrastructure investment is already being felt with Spanish company Construcciones y Auxiliar de Ferrocarriles (CAF) receiving Welsh Government support to open a £30m rail construction centre in Autumn 2018.

Advanced Materials and Manufacturing Skills Needs, Gaps and Shortages

Employers have the highest incidence of (verifiable) skills shortages by sector of 10%. The highest density of skills shortage vacancies in advanced materials and manufacturing in South East Wales is for machine operatives at 36% and professionals at 35%, although this is across all sectors. The most common skills shortages were specialist skills or knowledge needed to perform the role (which were the cause, at least in part, of 70% of skills shortage vacancies in South East Wales).

Advanced materials and manufacturing is a complex skills sector with a very different skill set needed in each subsector (engineering, aerospace, automotive, food and drink, furniture and pharmaceutical manufacturing). Higher-level employer engagement with discrete sectors offers a valuable granular reflection of skills needs and forecasts of shortages. Identification of skills needs (particularly large companies, and Anchor and Regionally Important Companies) to identify high risk and best practice is required to reverse decline and to take account of the introduction of digital technology and automation/robotics/Industry 4.0.

⁷³ The Nuclear Energy Skills Alliance is informed by the Construction Industry Training Board (CITB), Cogent, the UK Government, the Engineering Construction Industry Training Board (ECITB), the Science, Engineering and Manufacturing Technologies Alliance (SEMTA), the National Skills Academy (Nuclear), the University of Manchester and Welsh Government.

High-level skills training is most in demand in the sector:

- 25% of companies are confident about accessing high-level skills currently (75% are not);
- 51% of companies are confident about accessing intermediate skills (49% are not);
- 74% of companies are confident about accessing low-skilled employees (26% are not).

Skills needs common to all advanced materials and manufacturing sectors have been identified as:

- advanced materials and technology;
- leadership and management with particular reference to technology change management and succession planning;
- robotics and automation and mechatronics across all manufacturing sectors;
- machine management, software engineering, programming and maintenance;
- digital and information and communications technology skills;
- engineering, control and instrumentation (nuclear industry);
- toolmaking and production engineering;
- fabrication and welding.

Advanced manufacturing skills are required to meet the demands of the compound semiconductors foundry in Newport which is forecast to create 2,000 jobs, creating a global centre of compound semiconductor expertise. Companies are anticipating skills requirements in:

- manufacturing and applications;
- wireless;
- smart phones;
- power stations;
- imaging devices;
- automotive technology;
- driverless cars.

Automotive and aerospace manufacturing skills needs and shortages are in:

- battery technology and research;
- composites (the nearest centre for skills is in Bristol);
- seating design and construction (including materials cutting and (hand) finishing);
- driver-assisted and autonomous vehicle design;
- quality engineers;
- electric and hybrid research and design (engine manufacture change management).

Pharmaceutical and food manufacturing skills needs are for:

- quality assurance at all stages and all levels (work-based learning and industry entry requirements);
- laboratory skills for testing from Level 3+;
- high containment and clean manufacture;
- live cell research and gene technology;
- food technologist at all levels including continuing professional development.

Industry 4.0 for Sectors⁷⁴

The impact of Industry 4.0 across the economy in the long term will improve gross value added (GVA) but in the short term will accelerate skills shortages for those needing to use new technology to compete in the international marketplace. The challenge is to seamlessly integrate Industry 4.0 into businesses.

Skills Supply Engineering Manufacturing - Qualifications in Wales⁷⁵

There are 458 engineering and 147 manufacturing qualifications in Wales of which 24 are available in Welsh and English. Twenty-eight qualifications are available between Level 4-Level 7 (Higher National Certificate, Higher National Diploma, the Diploma, Business and Technology Education Council Qualification, National Vocational Qualification).

Apprenticeships

Manufacturing and engineering is under-represented, a strong subject area reflecting proportionately high-level qualifications.

- 18,000 apprentices achieved the full framework, 4,000 (22%) of which were engineering related.⁷⁶
- 42% were at Level 3 with the remaining 58% at Level 2.
- Over 80% attained the full framework across all engineering apprenticeships:
 - engineering and manufacturing technologies;
 - construction, planning and the built environment;
 - information and communication technology.
- ICT numbers at Level 2 and Level 3 in 2014/15 totalled 445 in Wales.
- Numbers need to be increased and the balance between Level 2 and Level 3 reversed.

Apprenticeship work-based learning provision identified through StatsWales 2015/16 are

- engineering manufacture;
- engineering manufacture - higher apprenticeship;
- improving operational performance (engineering direct entry);
- operations and quality improvement;
- rail engineering track;
- vehicle body and paint operations;
- vehicle fitting;
- vehicle maintenance and repair;
- vehicle parts.

Food and Drink:

- improving operational performance;
- other sector frameworks - manufacturing.

Available but with no take-up:

- advanced engineering construction;
- engineering;
- extractives and mineral processing operations.

⁷⁴ The Farmer Review of the UK Construction Model – Modernise or Die

<http://www.constructionleadershipcouncil.co.uk/wp-content/uploads/2016/10/Farmer-Review.pdf>

⁷⁵ <https://www.qiw.wales/qualifications/search?lang=en>

⁷⁶ Welsh Government, Regional LMI Report, Table 4.7: Learning programmes for Foundation Apprenticeships, Apprenticeships and Higher Apprenticeships

Advanced Materials and Manufacturing Priorities and Recommendations

	Priorities	Recommendations	Short (1-3)	Med (3-5)	Long (5-10)
1	To Improve the brand of the sector to young people, new recruits, parents and teachers by showing the modern face of manufacturing, ensuring those with an interest in the sector are supported to study to meet their full potential.	<ul style="list-style-type: none"> Review current offerings to young people to ensure that employers are aware of the support available. Encourage Anchor and Regionally Important Companies to continue to hold events for young people as well as ensuring that suppliers and customers are also involved in promoted a career in the sector. Ensure teachers are aware of the many career opportunities in the sector for students. Promote the inward investment and infrastructure projects to young people to ensure that they (and parents) understand the exciting opportunities within the sector. Promote the diversity of a career in the sector to encourage more females to apply for positions. Review the apprentice-matching service i.e. how Anchor and Regionally Important Company applicants can be signposted to other employers if they have been unsuccessful with their Anchor and Regionally Important Company application. Examine data to match the number of vacancies to the number of school leavers. Look at the ASPIRE model in Ebbw Vale as an exemplar on school Industry liaison. 	✓	✓	
2	To improve productivity and automation in the sector to ensure higher salaries and sustainable employment.	<ul style="list-style-type: none"> Work with managers and Welsh Government to implement projects to raise productivity and salaries through: <ul style="list-style-type: none"> Benchmarking against best in sector to futureproof their business; improved process practice; automation/digitisation investments; upskilling technical skills to support each employer’s needs but typically, welding, CNC, CAD/CAM, robotics, pneumatics, hydraulics, digital skills, coding; trainers/ lecturers receiving staff development to deliver cutting edge programmes or support to sector employees; ensure cutting edge development is available from the most appropriate source for the employer. 	✓	✓	
3	To Improve strategic leadership and management in the sector that instills: <ul style="list-style-type: none"> ambition; innovation; efficiency (improved productivity); vision; succession planning. 	<ul style="list-style-type: none"> Review the current offering of government support for leadership and management programmes for suitability. Provide a list of management and leadership development programmes applicable for manufacturers. Develop/source new management and leadership development programmes where there are gaps in provision. Promote case studies where companies have successfully improved strategic management. Promote/signpost where companies can get support. Investigate support from Innovate UK. Develop potential young leaders using new higher apprenticeship frameworks, including Taskforce for the Valleys, across the region. Enhance apprenticeship frameworks to include an understanding of strategic management that promotes this priority. 	✓	✓	✓

Construction Overview

Construction has 5,125 business units registered in the region with a construction workforce of 45,000 in employment (2014), forecast to grow to 46,900 in 2024 with a replacement job requirement of 15,300.⁷⁷ The annual rise in construction output forecast for 2017-21 in Wales (6.2%)⁷⁸ is twice that of the South-West of England. The annual rise in employment at 2.7% is also highest in the UK.

Government (public) investment in construction is important in the Cardiff Capital Region creating local opportunity for a wide variety of skills. In 2016 there was a higher percentage (27%) of output in 2016 from Wales Infrastructure Investment Plan (WIIP) projects in the public non-housing sector (13%) in Wales than the UK (15% and 7%). Housing repair and maintenance is high in both the UK and Wales (equal 18%).

However, future forecasts for the region cannot simply look at past performance to predict the future. Forecasts need to take account of uncertainties in the economic and investment landscape arising in part due to the UK's forthcoming exit from the European Union.

Public projects can use procurement rules to increase locally skilled employment opportunities. Skilled jobs are forecast to increase by an average of 4% while less skilled jobs are forecast to see net job losses. One of the main challenges facing the sector is that it needs to increase its productivity to deliver higher gross value added (GVA) in the region. This means helping to support innovation and ensuring the industry becomes more efficient.

In responding to the challenges identified within construction, some key themes have been identified:

1. qualifications reform to deliver higher-level skills to employers and promote economic growth;
2. improve careers information, advice and guidance to highlight construction sector opportunities;
3. professional and organisational development to improve competency in the workforce;
4. building capability and capacity within the provider network;
5. adoption of new technology and innovation e.g building information management (BIM).

In 2015 the Construction Industry Training Board (CITB) announced an investment of £6.5m to establish an innovative construction training facility in Wales. A consortium led by the University of Wales Trinity Saint David was formed with pan-Wales organisations comprising four further education colleges including Coleg y Cymoedd plus the Building Research Establishment (BRE) and Tidal Lagoon Swansea Bay. This innovative partnership is working together to develop consistent, seamless provision throughout Wales of specialist and bespoke construction-related training from Levels 1-7. The partnership has established the Construction Wales Innovation Centre (CWIC), a hub and spoke model. The CWIC aims to make a significant contribution to economic growth and job creation by responding to the current demand for skills in the construction industry and allied industries, as well as those arising from several large construction projects planned for Wales including the Metro, new nuclear build and energy projects. The CWIC will help deliver specialist training to over 1,100 people per annum. A new 'off-site manufacturing and training facility' in Wales may offer an opportunity to drive numbers at all levels and all ages to gain 'off-site' and specialist skills training locally. Collaboration is encouraged between training providers to enable a sub-regional hub and spoke

⁷⁷ Working Futures 2014-2024 <https://www.gov.uk/government/publications/uk-labour-market-projections-2014-to-2024>

⁷⁸ Construction Industry Training Board/Office for National Statistics
<https://www.citb.co.uk/documents/research/csn%202017-2021/csn-wales.pdf>

arrangement to emerge that increases employer engagement and extends delivery across multiple locations.

Summary of Major Construction Projects

Infrastructure, Transport Projects Specialisation and a Centre of Excellence⁷⁹

Local transport infrastructure projects include ongoing dualling work on the A465 and the new M4 relief road. These projects have a contractual commitment to a 50 mile travel-to-work area which has the potential to protect jobs in the region. This radius includes Mid and West Wales and the West of England. Electrification and the Metro project will create demand for high-level construction, engineering, manufacturing, building and maintenance skills.

The establishment of a centre of excellence or an infrastructure academy in the Cardiff Capital Region may be a valuable means of focussing on specialist skills e.g. steel fixing and concrete work. Coleg y Cymoedd is investing significantly in a specialist training centre to meet future demand of the Metro and for the electrification of the Great Western Railway linked to the Construction Wales Innovation Centre.

Specialist transport skills in construction and engineering are needed to fulfil long-term forecast demand with a significant tail of on-going operation and maintenance and spin-off opportunities:

- early contractor involvement (ECI) design and construction on the Metro⁸⁰ - Transport for Wales (TfW) contractor framework;
- rail electrification, track, civil works - Welsh Government reorganisation/transfer of functions;
- Metro Phase 2 and new rail franchise procurement - £700m of capital investment for 2019-2023;
- A465 dualling sections 5 and 6: procurement in 2017, construction in 2018 and delivery in 2021;
- A4226 – improvements to Five Mile Lane through Welsh Government and Vale of Glamorgan Council partnership;
- M4 relief road, Brynglas Tunnels refurbishment and the River Usk bridge strengthening contract with Costain;⁸¹
- M4 J28 improvement (Basseleg – Tredegar Park);
- M4 corridor around Newport contract with Costain and Vinci Construction joint venture (public local inquiry).

Other Major Projects

Constructing Excellence in Wales (CEW) has worked with the Welsh Local Government Association (WLGA) and Welsh Government on the Capital Programme 2016/17-2019/20 in the Cardiff Capital Region:⁸²

- procurement for the Wales Infrastructure Investment Plan (WIIP) (availability at end of July 2017);
- £500m for the Band B 21st Century Schools and Education Programme and £200m for the Velindre Cancer Centre in Cardiff through the Welsh Government Mutual Investment Model (MIM);

⁷⁹ Andy Falleyn, Deputy Director Transport DEST Welsh Government gave a presentation at Procurex 2016

⁸⁰ Transport for Wales TfW not for dividend organisation to advise Welsh Government

⁸¹ 92% local workforce from 50 mile radius includes Cardiff and Swansea AND Gloucester, Taunton and Worcester.

⁸² <http://www.cewales.org.uk/files/9414/8949/3412/3 - Welsh Local Authorities Capital Profiles 2016-17 - 2019-20 - Published Mar 2017.pdf pp 28-46> Glenigan offers further current construction project analysis

- housing repair and maintenance, estate and stock;
- construction (private, commercial and public);
- social housing construction spread of 20,000 houses (geographic breakdown);
- Power industry – nuclear: Hinkley Point C Nuclear Power Station, Oldbury Nuclear Power Station (decommissioning) and Wylfa Nuclear Power Station;
- Tidal Lagoon technology (Swansea, Cardiff, Newport and Conwy) informed by the South West & Mid Wales Regional Learning and Skills Partnership.

Construction skills should not be looked at in isolation. The energy and environment (EE) sector is the sixth largest priority sector in the Cardiff Capital Region. It includes electricity, gas, steam and air-conditioning supply (£630m) and water supply, sewerage and waste management (£510m). Renewable energy projects (and nuclear) will impact on jobs with demands on civil engineering contractors.

Nuclear Construction (cross-over with Advanced Materials and Manufacturing)

Hinkley Point C Nuclear Power Station (North Somerset) will have a long-term impact on construction (steel fabrication), advanced materials and manufacturing (coded welding), and energy and environment sector skills demand.⁸³ Cardiff and Swansea are inside the travel-to-work area for Hinkley Point C.

The nuclear workforce for new build is forecast to grow by just under 30,000 between 2016 and 2023, falling back to existing levels (70,000) by 2030. Forecasts suggest strong demand from the South Wales workforce to 2021. Salary inflation of 10%-12% or more is indicated with a migration e.g. formwork carpenters, steel fixers from South Wales, driving local increase in salaries.

Further understanding of occupations that sit outside the construction footprint but are still key to the process is required. There is engagement from local higher and further education institutions e.g. Cardiff and Vale College has a local campus engaging with Hinkley Point C Nuclear Power Station. The shortage of trainers may need to be sourced from outside of Wales.

Staff attrition rates in the new build workforce are forecast to be 5% per annum (circa 3,000) excluding issues around mobility of skilled workforce between sites. Nuclear construction has an ageing workforce with over 50% of the workforce aged 40-plus and under 10% of new entrants under the age of 25. The Welsh Government Economy Secretary has recently announced a second tranche of funding to support businesses in Wales to take advantage of the multi-billion pound opportunities in the nuclear industry. The £450,000 funding will secure support for a cohort of 50 companies on the Fit for Nuclear (F4N) programme, a unique service to help UK manufacturers prepare to bid for work in the civil nuclear supply chain.⁸⁴

Swansea Bay Tidal Lagoon Power and Cardiff-Newport Tidal Lagoon Power

The Hendry Review (January 2017)⁸⁵ offered a broadly favourable 'economic' review to progressing the Swansea Bay Tidal Lagoon Power pathfinder project. If it is built there will be new demands for local training for marine power, engineering and construction for a Cardiff-Newport Lagoon.

⁸³ It will also affect future nuclear projects at Oldbury and Wylfa Newydd in Anglesey.

⁸⁴ <http://gov.wales/newsroom/businessandconomy/2017/170718-450000-funding-boost-to-back-Welsh-businesses-wishing-to-target-the-multi-billion-pound-nuclear-sector/?lang=en>

⁸⁵ <https://hendryreview.files.wordpress.com/2016/08/summary-of-recommendations.pdf>

Construction SWOT

<p>Strengths</p> <ul style="list-style-type: none"> • Engagement with a wide range of research and an active construction sector cluster group. • Local Wales offices for UK institutes and organisations e.g. the Institution of Civil Engineers (ICE), the Royal Institution of Chartered Surveyors (RICS), the Confederation of British Industry (CBI) and the Civil Engineering Contractors Association (CECA). • Engagement with the Construction Industry Training Board (CITB) (access to CSN-Experian) and CITB Labour Forecasting Tool.⁸⁶ • Access to Constructing Excellence in Wales (CEW) Welsh Government data and Wales Infrastructure Investment Plan (WIIP). • Construction industry careers information, advice and guidance engagement research (CIAG). • Investment in 21st Century Schools and Education Capital Programme and hospital construction (Cwmbran). 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Lack of interest from young people in construction career roles and apprenticeships.⁸⁷ • Poor careers advice; under 20% of children (1,000 sample) and parents consider construction a 'good option'. • Parents are crucial to children's career choices as over 50% never considered a career in construction. • 50% construction not discussed by a teacher or information made available in literature. • Lack of knowledge: over 50% of young people said construction work was mainly manual labour. • High numbers of low-level construction qualifications with few progression routes from further education institutions. • Reduction in take-up of apprenticeships.
<p>Opportunities</p> <ul style="list-style-type: none"> • The South Wales Metro is creating high demand for local jobs e.g. construction/manufacturing. • Housing projects e.g. the urban village at the Ely Paper Mill site. • The Housing Supply Pact between Welsh Government and Community Housing Cymru will deliver 20,000 affordable homes (£1.5bn). Off-site construction innovative building methods promoted by Welsh Government.⁸⁸ • Reducing tolls on the Severn crossing will impact on house prices in Monmouthshire and the M4 corridor.⁸⁹ • Employers to actively engage schools and colleges to market career paths and opportunities. 	<p>Threats</p> <ul style="list-style-type: none"> • Drain on skilled workforce from cross-border demand e.g. Heathrow, HS2, Hinkley Point C Nuclear Power Station. • 700,000 replacement jobs plus 120,000 growth jobs to meet UK government construction targets.⁹⁰ • Over-confidence generated by over-optimistic reporting of skilled workforce demand. • Uncertainty about projects/timings eg. M4, Wylfa Nuclear Power Station and Swansea Bay Tidal Lagoon Power. Recognition of skills shortages. • Regional infrastructure strategic planning e.g. civil engineering. • Removal of Construction Related Occupation (CRO) card.⁹¹

⁸⁶ This will be available for the 2018 plan.

⁸⁷ <https://www.constructionnews.co.uk/best-practice/skills/constructions-image-problem-laid-bare-in-new-poll/10017923.article?blocktitle=Latest&contentID=14651> Research conducted by Redrow North Wales

⁸⁸ <http://gov.wales/newsroom/housing-and-regeneration/2016/30-million-and-new-housing-supply-pact-to-deliver-20000-homes/?lang=en>

⁸⁹ Tolls are currently £30+ for a weekly tariff for cars and £67-£100 for a weekly tariff for commercial vehicles.

⁹⁰ The Farmer Review of the UK Construction Labour Model 2016 (Arcadis, 'People and Money', 2015) <http://www.constructionleadershipcouncil.co.uk/wp-content/uploads/2016/10/Farmer-Review.pdf>

⁹¹ <http://www.cscs.uk.com/cro>

- | | |
|--|---|
| <ul style="list-style-type: none"> • Further education institutions addressing retention from existing courses to strengthen pipeline for higher qualifications. • Commercial sector projects e.g. Wales International Convention Centre | <ul style="list-style-type: none"> • Failure to adopt new technology and innovation in construction. |
|--|---|

Construction Skills Needs, Gaps and Shortages

Construction growth forecast in Wales is one of the highest compared to other locations in the UK, driven by significant projects and programmes of work, particularly relating to infrastructure. All projects will draw on the same labour pool creating further gaps and shortages in key occupations. The Employer Skills Survey 2015 already indicates incidence of skills shortage vacancies of 8% (second after manufacturing) and 16% skills gaps in the Cardiff Capital Region.⁹²

The All Wales Construction Annual Recruitment Requirement (ARR) by Occupation (All Wales) report forecasts 3,890 jobs requirement per annum by occupation (2017-21).⁹³ Wales traditionally suffers from high net outflows of its construction workforce to other areas of the UK, in particular to the South West and North West of England, and thus tends to have a high relative annual recruitment requirement. The highest numbers in the annual recruitment requirement are for non-construction professional, technical and IT which, if involving ICT, are likely to be skills shortages.

Highest demand in construction is for:

- wood trades;
- bricklayers;
- painters and decorators;
- labourers (50% annual recruitment requirement);
- electrical trades and installation (25% annual recruitment requirement);
- heating, ventilation and air conditioning (HVAC) trades;
- other construction trades and technical.⁹⁴

Associated training for nuclear Level 2 and Level 3 forecast requirements of 3,000 per annum is linked at professional level to Level 4 and Level 5 and graduate training, forecast at 3,500 per annum. Training for Hinkley Point C Nuclear Power Station should be carefully considered as it may be subject to different funding and qualifications. The Hinkley Point C Nuclear Power Station is forecasting major shortages in steel fixing, concrete works and scaffolding within the next 3 years so making provision in this area should be considered.

The building services and engineering sector in Wales reports an ageing workforce and a potential future labour shortage (few managers are under 30). Heating, ventilation and air conditioning (HVAC) skills are an issue – there are few operatives at Level 3 (very few are under age 22). Steel fixers, welders and ground-workers are showing shortages. Construction safety had the highest fines ever

⁹² Welsh Government, Regional LMI Report Table 6.3: Incidence of skill shortage vacancies by sector and region

⁹³ Construction Skills Network (CSN) and Experian: the annual recruitment requirements are “employment requirements and not necessarily training requirements” and do not factor in workforce mobility and “skilled migrants’ transferable skills.” <https://www.citb.co.uk/documents/research/csn%202017-2021/csn-wales.pdf>

⁹⁴ The Construction Skills Network annual recruitment requirements do not indicate training needs as it ignores transferable, mobile or migrant labour skills.

(£14m) for safety offences in 2016. Long-term training for industry specialists need to be considered such as civil engineers or architects.

Off-site Construction Skills and Building Information Modelling⁹⁵

The Farmer Review of the UK Construction Labour Model followed reports of government savings of over £0.8bn on projects,⁹⁶ a significant contribution of which was building information modelling (BIM). In the rest of the UK, building information modelling is mandatory for all construction projects over £3m.⁹⁷ Construction companies understand the opportunities and necessity of having a workforce with building information modelling skills for contracts outside Wales.

A Construction Industry Training Board (CITB) report indicates 42% of employers (with workforces over 100) expect to use off-site methods in five years.⁹⁸ 100% expect to use precast concrete and 92% expect precast concrete frame usage to increase. This is despite off-site currently accounting for just 10% of construction.

This is an excellent opportunity for the region to offer an off-site construction manufacturing facility in Wales. It requires a very large facility and access for transport. There is strong potential in

“the housing and commercial sectors, where mass customisation, can create buildings more quickly and to higher standards”.⁹⁹

The Welsh Government view is

“as construction transforms itself into a modern digitally enabled industry, it will need fewer quantity surveyors and bricklayers and more people with production, logistics, supply chain management, collaborative systems and data analysis skills. Training in building information modelling is essential for Welsh workforce.”¹⁰⁰

Welsh Government has made funding available for strategic management support which is time limited (Construction Industry Training Board and Cardiff Metropolitan University).¹⁰¹

This ‘new’ approach to social housing construction is part of the vision for 20,000 new affordable homes by 2020 and the ‘Better Jobs Closer to Home’ policy.¹⁰² The Cardiff Capital Region has had an opportunity to bid for a large ‘off-site’ construction facility to manufacture building units for housing and commercial use e.g. the new Heathrow Hub (Terminal 5). Other opportunities to exploit include the 21st Century Schools and Education Programme, workers’ accommodation, Wylfa Nuclear Power Station and social housing construction.

Although there are currently few building information modelling qualified/certified employees available in Wales, there is some experience and training. Swansea University Bay Campus was prefabricated and transported to the site; University Hospital Llandough had a new wing. A new

⁹⁵ <http://www.bim4real.co.uk/Downloads/e1/BIM4Real%20Summary%20v1.0.pdf> - a ‘smart’ Industry 4; prefabrication; off-site modular assembly on-site; integrated electrics and digital intelligence; heating, ventilation and air conditioning.

⁹⁶ <http://www.constructionleadershipcouncil.co.uk/wp-content/uploads/2016/10/Farmer-Review.pdf>

⁹⁷ <http://www.cewales.org.uk/current-programme/bim/>

⁹⁸ <https://www.citb.co.uk/documents/research/csn%202017-2021/csn-wales.pdf>

⁹⁹ <http://www.citb.co.uk/news-events/uk/2017/new-skills-are-key-to-success-of-offsite-construction/>

¹⁰⁰ <http://digital-built-britain.com/DigitalBuiltBritainLevel3BuildingInformationModellingStrategicPlan.pdf>

¹⁰¹ <https://businesswales.gov.wales/constructionfutureswales/news/wales%E2%80%99-future-construction-leaders-celebrated-graduation-ceremony>

¹⁰² <https://www.betterjobswales.org/>

project commencing in 2017 is the Specialist and Critical Care Centre in Cwmbran, a £350m 'super' hospital using building information modelling Level 2 - Design for Manufacture and Assembly Approach.

Higher education (the University of South Wales) offers a building information modelling course and some construction engineering. Graduate employment opportunities are also likely to arise from large-scale infrastructure projects e.g. Hinkley Point C Nuclear Power Station is "already using offsite techniques". Building information modelling training is currently being offered by companies to staff on an ad hoc, non-standard basis which may create future problems with transferability. A standard transferable industry qualification is a priority.

A cost-benefit analysis by Construction Excellence in Wales¹⁰³ identified the following benefits:

- built off-site in clean environment – reduced on-site labour costs;
- embedded knowledge of building – power, plumbing, heating, standards;
- digital smart control – green power saving, future maintenance standardised;
- central data of building layout e.g. critical to blue light services, life-saving.

Skills Supply in Construction

Qualifications in Wales¹⁰⁴

There are 501 available 'construction' qualifications in Wales of which 19 are available in Welsh and English. 25 qualifications are available at Level 4 - Level 7 (Higher National Certificate, Higher National Diploma, Diploma, Business and Technology Education Council Qualification, National Vocational Qualification).

Full-time Further Education Construction Courses (050)

All courses are in need of review for currency of skills and relevant progression routes/opportunities:

- Construction level 1,2,3;
- Construction & Built Environment Level E;
- Brickwork Level 1,2,3;
- Carpentry & Joinery Level 1,2,3;
- Painting and Decorating Level 1,2,3;
- Trowel Trades Level 1,2,3;
- Plumbing Level 1,2,3;
- Gas Installation and Maintenance Level 2,3;
- Wall and Floor Tiling Level 1,2,3;
- Plant Maintenance Level 1,2,3;
- Electrical Installation Level 1, 2;
- Electrical Installation Level 3.

Part time Further Education Construction Courses (050)

Architecture; Building and Construction; Urban, Rural and Regional Planning.

Apprenticeships

Work-based learning framework provision for apprenticeships (StatsWales 2015/16) indicates there are 1,800 vocational apprentices in the region, of which 1,000 are at Level 3 undertaking:

- construction (building - excluding specialist);
- construction (specialist);

¹⁰³ <http://www.cewales.org.uk/current-programme/exemplar/> (BIM)

¹⁰⁴ <https://www.qiw.wales/qualifications/search?lang=en> where construction is in the title.

- construction (civil engineering);
- foundation apprenticeship direct entry;
- construction (technical and professional);
- electro-technical;
- heating and ventilation;
- housing;
- plumbing and heating.

N.b. fencing and construction (civil engineering) apprenticeships are not delivered.

The construction industry is well represented through trade bodies and member organisations in the delivery of apprenticeships through a network of approved training providers and is making these opportunities visible through signposting on the 'GoConstruct' website¹⁰⁵ and in collaboration with further education institutions in South East Wales. Careers Wales also offer a similar service. Companies believe in the apprentice opportunity to fill skills gaps. Ability to offer work, suitability of candidates and cost and uncertainty about government apprenticeship policy are concerns, particularly for SMEs. 74% of electrical contractor companies forecast a shortfall in recruitment of apprentices and trainees.

The Chartered Institute of Builders' (CIOB)¹⁰⁶ focus is on higher level qualifications for site supervisor, site management and production manager. They are launching a 'Higher Apprenticeship' in September 2018. The University of South Wales is applying for the Chartered Institute of Builders accreditation. Bridgend College is an approved Chartered Institute of Builders centre (one of three in Wales) offering apprenticeships across South Wales. The Chartered Institute of Builders is working with the Construction Wales Innovation College to develop a programme to provide the soft skills that further education colleges currently do not cover.

Gender and Age

Action needs to be taken to address the gender balance and age profile of apprentices.

Table 12 Apprenticeships by Age and Level across Construction

Age	Level	Number	Level	Number	Gender
16	2	45	3	25	All male
17	2	140	3	60	All male
18	2	195	3	145	All male
19	2	135	3	140	5 females at Level 2
20-24:	2	270	3	470	20 females, 10 each at Level 2 and Level 3
25-39:	2	45	3	125	15 females at Level 3
40-64:	2	5	3	10	All male

¹⁰⁵ <https://www.goconstruct.org/>

¹⁰⁶ The Chartered Institute of Builders (CIOB) has 1,500 members in Wales out of 45,000 in the UK. <http://www.ciob.org/near-you> provided by CIOB Development Manager

Construction Priorities and Recommendations

Priorities	Recommendations	Short (1-3)	Med (3-5)	Long (5-10)
Qualifications: The number of projects currently planned in Wales makes the need for effective apprenticeship provision even more pressing.	<ul style="list-style-type: none"> • New and existing apprenticeship provision to expand beyond current trades into technical and professional roles to meet employer needs in the region and travel-to-work areas including architects, civil engineering, quantity surveyors, mechanical engineering, building services, and sustainability and multi-trade apprenticeships. • Deliver a pilot apprenticeship delivery model 'on site' linked to infrastructure projects in steel fixing, concrete and formwork. 	✓	✓	
	<ul style="list-style-type: none"> • Simplify the transferability of funding of full-time learners to apprenticeship programmes across all sectors. 	✓		
	<ul style="list-style-type: none"> • Encourage the advertisement of construction apprenticeship vacancies. 	✓		
Expand the current options in higher apprenticeships and degree apprenticeships in Wales.	<ul style="list-style-type: none"> • Roll out existing higher apprenticeship provision and further develop degree apprenticeship programme to enable progression to an honours degree both for new entrants and upskilling existing workforce. 	✓	✓	
Work with Qualifications Wales to better understand potential gaps in qualifications linked to major projects/employment opportunities.	<ul style="list-style-type: none"> • Develop qualifications where none exist and ensure existing qualifications meet employer needs. • Building information modelling/off-site and modular construction/concrete/steel fixing/dry lining. • Provision of employability/soft-skills including: <ul style="list-style-type: none"> • communication; • work ethic and team working; • effective working relationships; • information sharing; • digital skills, online security. 		✓	✓
	<ul style="list-style-type: none"> • Investigate the lack of higher education provision for building services and work with higher education to find a solution. 	✓		
Understand usage of construction and built environment Welsh Baccalaureate challenges at all key stages.	<ul style="list-style-type: none"> • Develop a co-ordinated approach to support schools and further education colleges to deliver construction and built environment challenges. 		✓	
Careers information and advice: Change public perception of apprenticeships	<ul style="list-style-type: none"> • Promotion of better understanding of construction opportunities to encourage higher level aspirations/entry to parents/teachers and careers advisors. 		✓	

Priorities	Recommendations	Short (1-3)	Med (3-5)	Long (5-10)
[47% of young people in Wales were told by their school that studying for a university degree would be better for their career in the long term than taking an apprenticeship.]	<ul style="list-style-type: none"> Support potential career changers and a focus on the development of career resources and career transition pathways, recognising transferrable skills. 		✓	
	<ul style="list-style-type: none"> Develop and deliver a targeted campaign towards those under-represented in the sector, particularly females. 		✓	
	<ul style="list-style-type: none"> Investigate the potential for a structured and co-ordinated regional work experience programme which results in the attainment of basic employability skills. 	✓		
<p>Organisation, professional development and succession: Consider the existing workforce and the resources available; significant numbers of workers are set to retire, and the mobile nature of the workforce.</p>	<ul style="list-style-type: none"> Develop management and leadership skills across the sector with consideration of succession planning within companies and upskilling/reskilling opportunities for existing workers. 	✓		
<p>Capability and capacity: Work with advisory cluster to assess the supply side/provider network to identify gaps.</p>	<ul style="list-style-type: none"> Develop a train-the-trainer programme to meet existing and emerging skills needs. 	✓		
	<ul style="list-style-type: none"> Consider the establishment of further education centres of excellence focusing on specialist areas to widen current provision offer. 		✓	
Investigate an industry/academia/government placement programme.	<ul style="list-style-type: none"> Develop a programme of exchange experience between industry and academia as part of a recognised continuing professional development programme. 			✓

FINANCIAL AND PROFESSIONAL SERVICES

Financial and Professional Services Overview

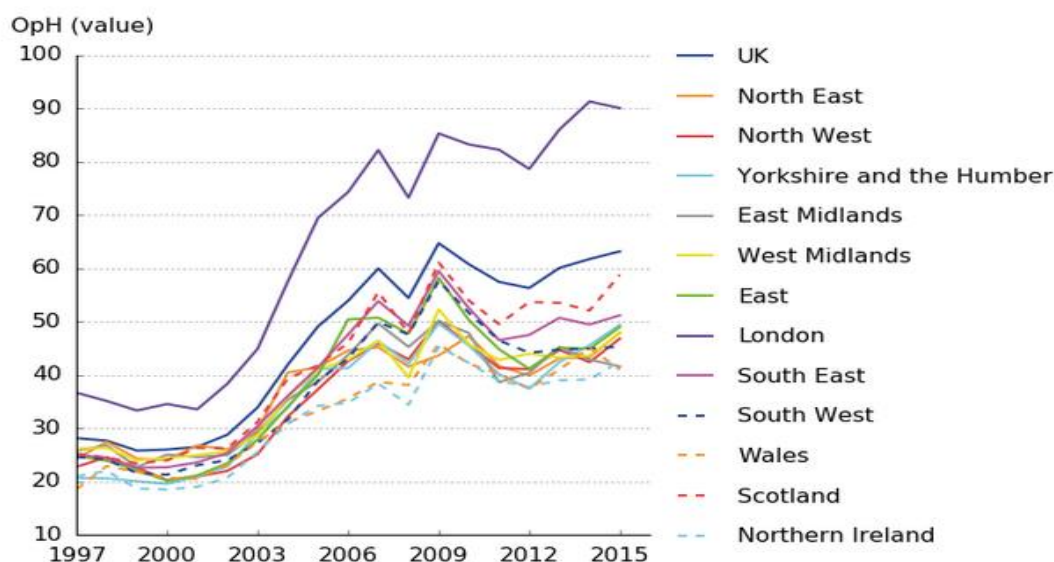
Finance and insurance, real estate and professional services have a workforce of 66,000 and over 110,000 work in support services, public administration and defence, and other services. There is an increase in the employment forecast of over 10,000 and replacement jobs of over 50,000 by 2024. Growth estimates in each of the sub-sector ranges from 2.5% to 20% (finance and insurance) with the highest finance and insurance forecast to grow by 19.6%. Gross value added (GVA) is an issue to be addressed.

A UK hot-spot for financial and professional services skills is located on the M4 corridor with Welsh head offices for Arthur J Gallagher & Co, Admiral Group, BT, Geldards, Hugh James, Creditsafe, Cunningham Lindsey, Deloitte, Legal & General, Principality Building Society and the Target Group. Wales is a centre for internet comparison sites. GoCompare is based in Newport, Creditsafe and Confused.com (part of the Admiral Group) in Cardiff.

Financial and professional services combined is high growth with the highest gross value added (GVA) of any sector. However, despite its high profile, when broken down into sub-sectors there are eight times as many people working in business services as in any other financial and professional sub-sector. Gross value added (GVA) varies widely by sub-sector.

Figure 4 Output per hour Values 1997-2015¹⁰⁷

Figure 8: Output per hour values, financial and insurance activities (K), NUTS1 regions, 1997 to 2015



Source: Office for National Statistics

Financial and professional services is a key sector group for the local economy. However, it is currently underperforming with 3% of UK jobs (estimated target is 6%). Earnings at 75% of the UK average are rising more slowly in Wales (see Figure 4). The financial and professional services aggregated gross

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<https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/articles/introducinindustrybyregionlabourmetricsandproductivity/jantomar2017>

valued added (GVA) figure is 88% of the UK average, rising at 17.7%, one third of the UK rate. The sector is doing well in Wales but has the potential to grow and generally has good links with the education sector at all levels – these could be enhanced and leveraged to support growth.

Key challenges and opportunities for the sector over the next 5-10 years are:

- leadership and change management;
- the changing expectations of employees, customers and clients;
- the pace of change;
- the impact of technology;
- marketing the sector in relation to attracting and retaining talent;
- the perception of the Welsh sector outside of Wales;
- the need for the diversity of talent;
- soft skills - people and personal skills.

Building on the success of the relatively high gross valued added (GVA) there is an opportunity for further improved growth and productivity in the sector. Finance and accountancy performs relatively poorly in comparison with the UK – GVA in Wales for some financial and professional services sub-sectors is currently 20% below UK average. Legal and business services sectors within financial and professional services are performing above average for the UK. As an overarching theme there is a need to support the collation of good practice case studies and exemplars of growing productivity.

In response to growth potential and the challenges and opportunities posed by UK and international competition, the region will need to pay attention to specialist training to improve the performance of the finance and accountancy requirements. Training and development to meet the demands of new technologies such as fintech and blockchain will help the Cardiff Capital Region position itself as a financial centre outside London for existing UK and potential inward investors. Essential skills (numeracy and literacy) are a continuing priority.

There is a strong pipeline of students from within the Cardiff Capital Region universities. Local universities have around 10,000 business students with a growing number of courses and apprenticeships being developed through further education and training providers. Retention rates are being addressed with a number of opportunities to engage with work-related schemes.

The financial and professional services sector in London has 191,400 European Union nationals in the workforce,¹⁰⁸ which may put pressure on UK nationals in the sector in the Cardiff Capital Region if they should become difficult to recruit and/or retain.

Financial and Professional Services – UK and Welsh Government

Welsh Government is investing in a skills ‘dashboard’ to map employment and skills need within UK government departments across Wales. The figure for UK civil servants based in Wales is expected to be high. Key parts of UK Government, including HM Revenue & Customs, are moving staff out of London to regional centres as part of the strategic Government Hubs Programme. This may generate demand for around 2,000 jobs in addition to those relocating to Wales.

The Land Transaction Tax and Anti-avoidance of Devolved Taxes (Wales) Act 2017 will lead to the development of a specialist Welsh Government office to collect taxes. The new HM Revenue & Customs regional office is due to be established in Cardiff and a new Welsh Revenue Authority (WRA) office within South Wales.¹⁰⁹ HM Revenue & Customs will collect income tax in Wales when it partially devolves from 2019. There is also the prospect of jobs growth at HM Land Registry - Swansea office

¹⁰⁸ <https://www.markiteconomics.com/Survey/.../af7980eece364234a2b7900a9ff0a1d6> produced by IHS Markit on behalf of the Recruitment & Employment Confederation

¹⁰⁹ <http://gov.wales/funding/fiscal-reform/welsh-revenue-authority/?lang=en>

and in the newly developed Welsh Revenue Authority. The Welsh Revenue Authority will be a new public body responsible for collecting new taxes devolved to Wales to replace UK Stamp Duty Land Tax and Landfill Tax from April 2018. This is a new government authority starting from the ground up. The Tax Collection and Management (Wales) Act 2016 provides powers to establish devolved tax arrangements.

Initial employment in the Welsh Revenue Authority is anticipated to grow from about fifteen (graduate level) staff with specialist skills and knowledge to around 40 staff. LSKIP is fully engaged through its skills delivery and innovation strand. Employment growth around the Government Hub in Cardiff and HM Land Registry in Swansea as well as any powers and responsibilities coming to Wales after the UK's exit from the European Union sees the need for higher education, further education and training providers to engage on the emerging skills requirements and staff roles. The UK Government in Wales is a growing sector with a range of skill and resource requirements.

Financial and Professional Services SWOT

<p>Strengths</p> <ul style="list-style-type: none"> • Concentration of sector businesses with head offices in Cardiff and M4 corridor. • Highest GVA of any sector. • Internet price comparison sites based locally. • FTSE 100 company headquartered in region. • Strong pipeline of students studying business. 	<p>Weaknesses</p> <ul style="list-style-type: none"> • GVA underperforming in comparison to the UK average. • Perception of and recognition for the sector outside Wales. • Some sub-sectors performing 20% below UK average. • Earnings in Wales 25% below average sector earnings in the UK.
<p>Opportunities</p> <ul style="list-style-type: none"> • Growth and replacement jobs forecast is 60,000. • UK Government regionalisation of HM Revenue & Customs and other services from London. • Lower earnings in Wales growing more slowly may be attractive to London-based companies. • Changing expectations of customers and clients. 	<p>Threats</p> <ul style="list-style-type: none"> • Impact of technology. • Significant differences in GVA between sub-sectors. • Failure to change and improve in productivity. • Retention of university leavers in the area. • Impact of the UK's exit from the European Union with large numbers of European Union nationals leaving London, drawing workforce from Wales.

Financial and Professional Services Skills Needs, Gaps and Shortages

The Employer Skills Survey 2015 indicates an incidence of 6% in skills shortage vacancies and 13% in skills gaps in the business service sector in the Cardiff Capital Region, which contrasts with the financial services showing a decline of 4% skills shortage vacancies and a 23% decline in skills gaps.¹¹⁰ Projected changes in employment by the UK Commission for Employment and Skills Working Futures report¹¹¹ in the finance and insurance sector suggest an expansion of 3,800 new growth jobs in the ten-year period to 2024. In the context of a workforce of under 20,000 there is a total additional forecast demand for jobs of 11,700 over the ten-year period, when replacement jobs are included. Customer services, project management, governance, risk analysis, compliance and strategic planning are all higher-level skills currently reflecting skills shortages.

¹¹⁰ Welsh Government, Regional LMI Report, Table 6.3: Incidence of skill shortage vacancies by sector and region

¹¹¹ Regional LMI Report, Table 7.2: Working Futures 2014-2024

<https://www.gov.uk/government/publications/uk-labour-market-projections-2014-to-2024>

Technology is forecast to have a significant impact on working practices in the sector. The use of artificial intelligence and automation may reduce workforce numbers, particularly around call centre staff and standard legal work e.g. insurance claims and renewals. Understanding the digital revolution and its impact on skills will be a key part of the training paradigm as further education seeks to enter the higher-level financial and professional services qualifications space in competition with higher education. There is increased pressure on core employability and personal security skills, digital competency, software engineering, information and communication technology, people and personal skills, social media analytics and cyber security skills.

In the long term, external factors are likely to impact operationally when the impact of disruptive technology hits e.g. insurance for driverless/assisted vehicles or overhead and fee-cutting technology linked to assisted flexible agile working. The legal sector may be at high risk e.g. current charging practices being challenged by new entrants to the market.

Consideration should be given not only to skills gaps and shortages but also to significant numbers in the workforce whose skills may become redundant if they are not retrained as technology replaces job roles. Further education colleges and universities should consider how it can better leverage value for the region from the range and type of placements, projects, Internships and research that can be offered to the sector. Companies across the sector should review their potential to increase such offers to the education and training sector with a view to retaining more graduates in the region. Adult upskilling and the upskilling of those in work requires better definition in this sector.

Increasing Skills Levels for SMEs Linked to Financial Support

There has been a shortfall in funding for SMEs despite government intervention with the banks. Professor Dylan Jones-Evans' Five Principles of Public Funding for SMEs has been accepted by Welsh Government financial and professional services sector panel.¹¹² This includes a 'must be' principal to take an integrated approach to skills "... that business and skills support is offered alongside financial support to businesses in Wales, rather than as separate elements".¹¹³

Skills Supply Business Administration/ Management and Professional Qualifications in Wales¹¹⁴

There are 460 'Business', 62 'Financial' and 560 'Management' qualifications entered in the Qualifications in Wales database. At Levels 4-8 there are 63 'Business', 7 'Financial' and 282 'Management' awards. There are 25 management awards at Level 7.

Financial and Professional Services Apprenticeships

There are a range of work-based learning frameworks available in Wales:¹¹⁵

- facilities management;
- learning and development;
- management;
- management - higher apprenticeships;
- accounting;
- business and administration;
- contact centre operations;

¹¹² <http://gov.wales/topics/businessandconomy/our-priority-sectors/financial-and-professional-services/financial-and-professional-services-sector-panel/?lang=en>

¹¹³ <http://eprints.uwe.ac.uk/25608/1/access%20to%20finance%20stage%20%20review.pdf>

¹¹⁴ <https://www.qiw.wales/qualifications/search?lang=en>

¹¹⁵ StatsWales 2015/16 <https://statswales.gov.wales/Catalogue/Education-and-Skills/Post-16-Education-and-Training/Further-Education-and-Work-Based-Learning/Learners/Work-Based-Learning/learningactivitiesworkbasedlearning>

- IT users;
- IT, software, web and telecoms professionals;
- project management;
- providing financial services;
- supporting teaching and learning in schools;
- other sector frameworks, ie, business administration.

Access to the Professions

There is a need to engage with companies and providers to develop a mixture of routes and entry levels into the professions in this sector. A degree will remain important for some but is no longer a pre-requisite entry qualification in law, accountancy or finance. Further education is seeking to offer apprenticeship entry at Level 2/Level 3 delivered in collaboration with employers, e.g. Deloitte. Independent and in-house legal training supported by employers increasingly offers a flexible approach to legal training via full-time, part-time or on-line. The Chartered Institute of Legal Executives (CILEx) offers various training pathways into the legal sector alone or in partnership with further and higher education. Legal secretaries can enter the profession with a GCSE to a Level 6 Higher Diploma. A range of relevant qualifications can now be taken flexibly/part-time through Coleg Gwent, Cardiff & Vale College, Brightlink Learning and Pitman Training as an alternative to a full-time course.

Further consideration is required of the demand and type of higher level and degree apprenticeships and graduate training programmes required in the region. Employers may find it useful to produce and promote a 'pathways to the profession' approach demonstrating the range and level of routes in and associated progression and employment pathways. This could be helpful in promoting the full range of roles and opportunities in the sector to schools and colleges.

From 2020 there will be changes to training for solicitors (the new Solicitors Qualifying Examination) and this will provide further opportunities for the sector to work with the professional body and training providers to collaborate on the curriculum and qualifying work experience element (which will replace a training contract).

Financial and Professional Services Specialist Skills Providers

Buzz Wales

The Welsh Financial Services Graduate Programme is an industry-led scheme for graduates supported with European funding. The course content is co-designed by industry and academics to ensure that it is current and relevant for the marketplace. Companies involved are Admiral Group, Atradius, Composite Legal Expenses, Finance Wales, GM Financial, Julian Hodge Bank, Lexis Nexis, Optimum Credit, Principality Building Society and V12 Retail Finance and is led by the Wales Contact Centre Forum.

Higher Education

Cardiff University, Cardiff Metropolitan University, The Open University in Wales and the University of South Wales all offer a range of specialist financial and professional services qualifications.

Further Education

CILEx awards are widely available through further education provision from Level 2 upwards. Cardiff and Vale College has the National Skills Academy for Financial Services LTC4 award. Coleg Gwent has CILEx Certificate in Law and Practice Level 3.

Work-based Learning

National Training Federation for Wales members offer a range of training opportunities through internal academies and training providers. Business in the Community (BITC) offers a long-term opportunity to engage with schools and careers.¹¹⁶

Promoting Global Recognition and Digital Competence

LTC4 Legal Technology Core Competencies Certification Coalition

'LTC4™ Core Competencies has established legal technology core competencies and certification that all law firms can use to measure ongoing efficiency improvements.¹¹⁷ LSKIP has been instrumental in introducing LTC4 delivery to South East Wales through the LSKIP skills delivery and innovation workstream.

The Legal Technology Core Competencies Certification Coalition (LTC4) is a non-profit organisation that has established legal technology core competencies and certification that all law firms can use to measure ongoing efficiency improvements.¹¹⁸ Their purpose is to maintain a set of legal technology core competencies and certification that are workflow-based:

- sufficiently flexible for firms to use in the way which suits them (incorporating best practices);
- allows for any training or testing method;
- two target audiences: attorneys and support staff. The attorney core competencies and certification have been developed to provide the skills necessary to address their professional responsibility to the firm and clients to create/oversee quality work product, avoid risk and maintain confidentiality and compliance;
- the staff core competencies and certification have been developed to provide the skills necessary to support firm attorneys and clients to create efficient quality work product.

Both Cardiff and Vale College and the University of South Wales are working with LTC4 and are able to support competency delivery in the region for existing employers, inward investors and local students.

On-line and Technology-related Delivery

Across the region it is important for those in employment to be able to access support for upskilling and engage with education for continued professional development, however a limited range of provision is available. A focus might be needed on delivering accredited bite-size provision that sits with award frameworks where employees need part of an award and which can be delivered around existing job roles and responsibilities. The Open University in Wales offers several on-line part-time courses linked to financial and professional services by sub-sector to achieve a degree.

There are changes to training for solicitors from 2020 in the form of new Solicitors Qualifying Examinations. These will bring opportunities for the sector to work with the professional body and training providers to collaborate on the curriculum and qualifying work experience element. This will replace a training contract.

¹¹⁶ www.bitc.org.uk/wales

¹¹⁷ <http://www.ltc4.org/about-us/>

¹¹⁸ www.ltc4.org/

Financial and Professional Services Priorities and Recommendations

	Priorities	Recommendations	Short (1-3)	Med (3-5)	Long (5-10)
1	<ul style="list-style-type: none"> • Digital futures and automation: identify opportunities to grow understanding of artificial intelligence and upskilling of new and existing workforce in digital skills, programming, operation and analysis. • Support SME supply chain to engage with further and higher education delivery on skills. 	<ul style="list-style-type: none"> • Engage further and higher education with businesses (SMEs) at different levels to inform progression routes into fintech opportunities. e.g. Blockchain, ICT cluster engagement. • Work with further and higher education to address skills shortages in programming, operation and analysis. SME supply chain – sector groups and supply side. • Support engagement with schools in these areas, e.g. First Campus. 	✓		
2	<ul style="list-style-type: none"> • Digital analytics, documentation and security – legal, financial and business. • Work with locally-based and headquartered companies 	<ul style="list-style-type: none"> • Support embedding of LTC4 in the region and encourage business engagement. • On the supply side further education is tasked to develop new courses as identified. Skills Priorities Programme in full to help identifying potential outside Qualifications in Wales. • Further and higher education, work-based learning and CILEx to come together to identify opportunities to support pathways in the private sector and for UK Government in Wales. The Welsh Government department of Skills, Higher Education and Lifelong Learning (SHELL) and the Higher Education Funding Council for Wales (HEFCW) are to consider this area for higher and degree apprenticeships. • Higher education to develop and promote a joined up approach by the National Cyber Security Academy at the University of South Wales, the Centre of Excellence in Cyber Security Analytics and the National Software Academy in Newport from Cardiff University, and industry in the region and beyond. Promote these two assets as regional strengths and consider hosting a financial and professional services event and showcase at these to support engagement and connectivity. 	✓		
3	<p>Developing a portfolio of new and existing offers that delivers on 4 core strands, supports regional upskilling and promotes the Cardiff Capital Region as a destination for inward investment- showcasing good practice.</p> <ul style="list-style-type: none"> i) Legal, business, financial and digital. ii) High-level apprenticeships and degree apprenticeship programmes for all ages. 	<ul style="list-style-type: none"> i) Increase further education/work-based learning availability of training to certification e.g. the Association of Accounting Technicians (AAT), the Institute of Chartered Accountants in England and Wales (ICAEW) and the Association of Chartered Certified Accountants (ACCA) to promote the full range of routes into these professions. ii) Further and higher education to promote a range of demand-led cyber security awards including work with the Open University and Tech Partnership on apprenticeships and high-level work-based learning degree programmes. Worldwide recognition of certification looking to innovation in flexible awards, online delivery, higher apprenticeships through ICT/digital and links to the 	✓	✓	

	Priorities	Recommendations	Short (1-3)	Med (3-5)	Long (5-10)
	iii) Graduate master degree programme – expand industry-led opportunity to roll-out similar programmes at different levels across sub-sectors.	National Cyber Security Academy and National Software Academy. Several providers but a regionally coherent offer. iii) Support transition from European funded support of local graduates for the financial sector to placements in local businesses across legal, financial and business supported by higher education teaching staff to gain academic awards. Course content informed by business – to be explored with higher education and the Welsh Government department of Skills, Higher Education and Lifelong Learning (SHELL) and the Higher Education Funding Council for Wales (HEFCW). Level 6/7 apprenticeships with a flexible validation document offering work-based and higher-level learning bespoke to regional needs.			
4	Training current and future leaders: <ul style="list-style-type: none"> • technical and subject matter expertise; • an increasing need for both traditional and emerging non-technical skills, including specific business, interpersonal and leadership and management skills; • growing importance on the need for values and trust; • digital and ICT skills; • basic and higher-level numeracy and literacy skills (not just among entry level employees). 	Delivery <ul style="list-style-type: none"> • Traditional further and higher education courses. • Tailored technical and non-technical training, including from the private sector. • Experiential learning. • Partnerships, collaboration and broad networks. • Higher apprenticeships (and to some extent entry-level apprenticeships). • Coaching. • Online training/e-learning/other digital solutions. 			
5	Growing the employment pool - careers engagement between companies and delivery (schools and higher education) and peer-to-peer to identify and develop opportunities for school programmes with apprenticeship pathways at entry level for large companies, including online marketing price comparison sites and insurance companies - ensure these map to future progression. ¹¹⁹	i) Apprenticeships, higher apprenticeships and high-level Welsh Baccalaureate degree programmes should map routes in and progression. Programmes of learning are required around digital documentation and security. Companies need to engage in long-term planning to train/future proof against redundancy of call centre staff (automation). ii) Funders and curriculum design to emphasise sector footprint – mapping and next steps for work/study. iii) Government to consider bespoke work-based learning strategy that sits within award frameworks but that support ‘bite-size’, just-in-time learning for employees and not just whole awards.			

¹¹⁹ With regards to the challenges of encouraging young people to develop skills in procurement and supply management, the Chartered Institute of Procurement and Supply’s (CIPS) ‘Be a Buyer’ resources may be useful to schools and colleges in the region: <https://www.beabuyer.org/>

ICT/Digital Overview

Welsh Government estimates the sector comprises 600 enterprises employing 30,000 people. Using a broad UK government definition for information and communication technology (ICT)¹²⁰ which includes digital creativity, intellectual property and innovation. There are 2,210 employers in the Cardiff Capital Region (equal with financial and professional services). Over half of Wales' fastest growing fifty companies last year were ICT-related with the majority based in South Wales.

A wider definition of ICT/digital companies may be helpful when considering economic and employment opportunities. Understanding this rapidly changing cross-cutting sector is challenging and will need full engagement with the supply side. This should not hide the need to train a diverse, highly-skilled and adaptable local workforce. In Cardiff, of 1,765 creative businesses, over half are in software and digital online businesses (590), or architecture and design businesses (248).¹²¹ A wide variety of digital skills are required to maximise the commercial opportunity. In the UK, e-commerce makes up 19% of business turnover (£533bn), of which 40% arise from website sales.

ICT is both a horizontal 'service' as well as a sector with diverse skills needs at all levels which cut across sectors and every sort of business activity. Our economy is increasingly digital: finance, accountancy, banking and legal services are rapidly changing to use digital skills. Manufacture and production can look to Industry 4.0, smart supply chains, automation and robotics. Smart ICT offers cheap, universal, connectivity for sales and marketing reaching through social media and across international boundaries; it offers a revolution in every sector.

Projected changes in employment¹²² in the Cardiff Capital Region suggest an expansion of 1,000 new growth jobs in the information technology sector. In the context of replacement jobs and a workforce of under 10,000 there is an additional forecast for 4,500 jobs over the ten-year period. These figures may be very much larger if digital creative and cross-sector demand is considered.

The Newport Knowledge Quarter currently being developed is planned to include a new campus for Coleg Gwent beside the University of South Wales City Campus and Cyber Security Academy on the waterfront. The Cardiff University National Software Academy is located in the city.

¹²⁰ Nesta innovation and the creative digital economy in the UK <http://www.nesta.org.uk/>

¹²¹ 17% of creative media businesses are in film, television and radio (294)
https://www.nesta.org.uk/sites/default/files/the_geography_of_creativity_in_the_uk.pdf

¹²² Working Futures 2014-2024 Regional LMI Report Table 7.2: Total projected employment demand by expansion and replacement jobs Cardiff Capital Region <https://www.gov.uk/government/publications/uk-labour-market-projections-2014-to-2024>

ICT/Digital SWOT Analysis

<p>Strengths</p> <ul style="list-style-type: none"> • The importance of the ICT sector is recognised by the Welsh Government as a ‘priority sector’. • GVA in the Cardiff Capital Region is at £1.2bn, 4% of the total and fifth largest of the priority sectors. • ICT/digital is a highly entrepreneurial sector with 16% of business births in the past year.¹²³ • 64% of workforce have a degree – compared to 32% of the creative economy. • Introduction of national academies for software and cyber security to meet skills demand • The National Cyber Security Academy (NCSA) has engaged with Cisco to deliver enhanced skills. • National Software Academy is expanding to accommodate increased specialist skills demand. 	<p>Weakness</p> <ul style="list-style-type: none"> • Despite 9% growth in 2015 the sector is in the bottom three regions in the UK. • The density of the ICT/digital specialist workforce is about 2%, less than half the expected. • Gender split: 23% of workforce is female (compared to 36% of creative and 47% of the UK economy).¹²⁴ • Lack of skilled trainers in analytics, programming and software engineering. • Numbers taking computing-related subjects for GCSE and A-level are still falling, especially as the older ICT qualifications expire. • Universities have been slow to respond to the demand created by rapidly developing digital technology.
<p>Opportunity</p> <ul style="list-style-type: none"> • Digital competency as an essential skill to be delivered as part of the national curriculum. • Three times as many businesses concentrated in Cardiff as any other local authority. • Growing the sector to meet opportunity as in Newport’s development of a Knowledge Quarter. • Expanding the National Cyber Security and Software Academies together to support the sector. • Every sector needs ICT/digital innovation e.g. job opportunities in contract and service employment. • 60% of the ICT workforce is taken up by the sector and 40% by non-specialist employers. 	<p>Threat</p> <ul style="list-style-type: none"> • Workforce/skills retention with the rise in skilled ICT wage levels along the M4 and in London. • ICT job densities for Bristol and the South East are much higher than in the Cardiff Capital Region. • The new Digital Competence Framework was made available to schools in September 2016 and will be one of the three cross-curricular curriculum priorities (with literacy and numeracy) from 2021. • The largest employer of tech-specialists in the UK are supermarket chains.

Cardiff University reports 52% of companies in the Cardiff Capital Region are ‘innovation active’, 20% being product innovators and just 10% process innovators.¹²⁵ The remaining identified innovators are engaged in ‘non-technological innovation’, mostly around new business practices through computer hardware and software. Just 12% are engaging with training for innovative activities. It is a priority

¹²³ <https://www.slideshare.net/statisticsONS/business-demography-in-the-uk> ICT and professional, scientific and technical company births comprise about a third of the total.

¹²⁴ <https://www.thetechpartnership.com/Resources/factsheets/#workforce>

¹²⁵ Cardiff Capital Region – State of the City Region, February 2017, ONS, UK Innovation Survey 2015

to overcome this threat by building on current low levels of innovation activity focussing on leadership training and entrepreneurship.

Superfast Business Wales

Welsh Government offers advice for companies by sector on how to utilise superfast connectivity to benefit the company. There are over 40 valuable online skills guides for companies to upskill and 'harness the power of superfast broadband'.¹²⁶ Currently there is no section for health, education or care services. Every local authority, except Cardiff (30.2Mbit/s), is falling below the UK average (28.9Mbit/s).¹²⁷ Merthyr Tydfil is worst with 13.04Mbit/s (less than 50%). In Monmouthshire, less than 40% of businesses have superfast access despite having the second largest concentration of ICT businesses (275) in the Cardiff Capital Region. Premises in Cardiff, Newport and Blaenau Gwent are best served.

Superfast delivery may encourage cross-sector demand for skills and for the supply side to 'train the trainers' for schools, further and higher education institutions and work-based learning training provision in new advances e.g. cloud technology. Over 56% of technology teachers currently have not been trained in the subject.¹²⁸ Superfast broadband connectivity to institutions and the technology to use it would seem a prerequisite.

NHS Wales Informatics Service (NWIS)

Best practice identified and being piloted as health informatics is fundamental to the safe delivery of patient care with a development of a Level 4 higher apprenticeship to support the professionalism agenda.¹²⁹

ICT/Digital Skills Needs, Gaps and Shortages¹³⁰

In the Cardiff Capital Region, Cardiff and the Vale of Glamorgan have a higher than average creative and high-tech economy by density compared to the UK average. The UK government has agreed to include the creative industries in the digital economy. This re-alignment has support from the digital sector. Over the past five years there has been a 64% increase in demand for IT specialists, higher only than the North East of England. However, despite Cardiff and the Vale of Glamorgan, there is less than 50% density of digital enterprises in Wales than may be expected.¹³¹ Pay rates in Wales lag in the UK at 77% of UK average (£37,600). Digital (creative) economy workers are highly qualified.

Table 13 ICT/Digital Sector Skills

Sector skills	Those with degrees	Subsector as percentage of creative economy
ICT workforce	64%	32%
Advertising and marketing	59%	18%
Film, TV, video, radio and photography	56%	17%
Publishing workforce	62%	9%
Architecture	69%	5%

¹²⁶ <https://businesswales.gov.wales/superfastbusinesswales/superfast-business-guides>

¹²⁷ UK broadband performance <http://maps.thinkbroadband.com/#!lat=51.73437881401027&lng=-3.2402790302734297&zoom=10&type=terrain&speed-cluster&cable-coverage>

¹²⁸ <http://www.ewc.wales/site/index.php/en/research-statistics/education-workforce-statistics>
<http://www.ewc.wales/site/index.php/cy/ymchwil-ac-ystadegau/ystadegau-r-gweithlu-addysg>

¹²⁹ <http://www.wales.nhs.uk/sitesplus/863/page/83808>

¹³⁰ ICT/Digital skills shortage vacancies are not recorded in Employer Skills Survey (2015) as disclosive suppressed using current SIC codes. <https://www.gov.uk/government/publications/ukces-employer-skills-survey-2015-wales-toolkit>

¹³¹ www.thetechpartnership.com/recruit-and-train

Recruitment analysis shows top IT/computing skills shortages in audio/visual, CAD (computer-aided design) designers, CNC (computer numerically controlled) programmers, cyber security, developers, digital, IT and gaming. Within these areas the skills most in demand are agile software development (twice any other demand), project management, analytical skills, scrum technology and business intelligence.¹³² The 'tools' (specific applications, platforms, languages etc.) most often called for over the past year were Cisco, Windows, Linux and Check Point.

The most commonly advertised cyber security positions in the UK during the past year were security analysts (19%), security consultants (18%), security engineers (14%), security managers (12%) and security architects (11%). The process/methodological skills most often needed for cyber security positions are those relating to information security, firewalls and network security. A requirement for certifications is much more common amongst advertisements for cyber security jobs than for other digital positions. The most commonly referenced over the past year were CISSP (Certified Information Systems Security Professional) and ISO/IEC 27001 (International Organization for Standardization and the International Electrotechnical Commission).¹³³

Special consideration is needed for the approach taken to training in a very fast-paced sector where 99.8% of companies in the UK are SMEs with training issues. Support for the National Software and Cyber Security Academies are a strategic regional response to the sector skills needs. However, the following detailed deficiencies remain and need to be addressed:

- the advanced materials and manufacturing sector noted “persistent gaps in [underpinning] technical expertise with introduction of new products/technology and levels of automation”,¹³⁴
- in construction, building information modelling (BIM) skills are in demand with integrated smart technology and increased levels of off-site construction and logistics planning;
- in financial and professional services, fintech and data security are threatening productivity. Gaps in specialist delivery e.g. CILEx and LTC4 Legal Technology Core Competencies Certification Coalition;
- software engineering and data skills (e.g. data science and big data analytics) and management in the human foundational economy e.g. online training and communication;
- online fraud is now the most commonly experienced crime in England and Wales, but has been overlooked by government, law enforcement and industry. Creative industries deliver/publish primarily through digital media in the ICT and digital sector. As creative is key to the digital economy, skills e.g. programming and design, should be fully integrated.

The digital creative and cultural industries are an essential part of Wales and potentially have economic impact on people’s perceptions of Wales as a place to visit or to live with a high quality of life.

There is high demand for ICT/digital skills across the infrastructure and services foundational economy with much of the hotel, leisure and retail industries and commercial businesses using online systems. Customer/visitor access to broadband/wi-fi is now considered an essential offer. Many Welsh tourist attractions are in remote locations. However, this will no longer be a restriction as Superfast Cymru has promised connectivity and digital skills support to 100% of businesses by 2021 and delivery of

¹³² ‘Demand for Digital Specialists’, July 2016 <https://www.thetechpartnership.com/Resources/factsheets/>

¹³³ <https://www.itgovernance.co.uk/iso27001>

¹³⁴ Large Employers Survey (2016), University of South Wales and Cardiff and Vale College

enhanced broadband to 95% of Welsh businesses by the end of 2017. Targeted, flexible, ICT training for professionals may benefit marketing, advertising, on-line booking and local services.¹³⁵

Virtual SMEs¹³⁶

Regional online networks of businesses will be able to collaborate commercially, in real time, sharing skills and services using the enhanced band-width. The virtual SME (in any sector) will be able to deliver a stronger, joined-up, complete commercial offer – in effect shortening the supply chain. This is a rapidly developing opportunity for the young, networked, ‘digital native’ offering a competitive approach to meet demand. Skills shortages are otherwise delivered e.g. technical skills offered by other digitally linked, flexible and commercial partners.

Skills Supply

Apprenticeships

Tech Partnership research reports “96% of employers with apprentices say their business has benefitted as a result”.¹³⁷ However, in the Cardiff Capital Region, work-based learning provision shows apprenticeships as having few opportunities for progression. Qualifications currently being delivered/available in South East Wales through colleges, universities and National Training Federation for Wales (NTfW) members cover business administration, IT Users, IT practitioners, IT, software, web and telecoms professionals at differing levels. The National Software Academy offers a vocational approach to digital skills.

There is a significant opportunity to develop higher and degree apprenticeships in Wales across computing, software, digital and data areas. The Open University offers a Digital and Technology Solutions Professional Degree Apprenticeship for existing employees who wish to upskill or transfer to digital and technology roles but this is yet to be recognised within Wales. Trailblazers in England address UK Government digital, data and technology job roles in six discrete skills clusters. These are data, IT operations, product and delivery, quality assurance and testing (QAT), technical and user centred design.

National Cyber Security Academy and National Software Academy

The National Cyber Security Academy and National Software Academy based in Newport have the potential to deliver the skills which are necessary to meet shortages and gaps in the Cardiff Capital Region. Cyber security and computer software skills are a growth area for skills across the UK which offers potential for skills delivery as the workplace location can be independent of the services supplied.

There were 7,000 cyber security positions advertised across the UK in 2016 with roles for security analysts (19%), security consultants (18%), security engineers (14%), security managers (12%) and security architects (11%). Remuneration averaged over £55,000 per annum and around £480 per day for contract work. Of those cyber security jobs advertised, just over 60% (4,200) were in London and the South East of England and approximately 1% (50-100) were in South Wales.

Skills needed for cyber security positions are for those related to information security, firewalls and network security. Tools called for included Cisco, Windows, Linux and Check Point. Certification is often an essential requirement, e.g. through Certified Information Systems Security Professional (CISSP) and the International Organization for Standardization and the International Electrotechnical

¹³⁵ <https://businesswales.gov.wales/superfastbusinesswales/superfast-business-benefits-tourism-and-leisure-sector>

¹³⁶ A CREW/ foundational economy.com report, June 2017, ‘What Wales Can Do: Asset Based Policies and the Foundational Economy’
<http://www.regenwales.org/upload/pdf/062517091442What%20Wales%20Can%20Do%2022%20June%202017%20FINAL%20V2.pdf>

¹³⁷ <https://www.thetechpartnership.com/Resources/factsheets/#apprenticeships>

Commission (ISO/IEC27001). A broad range of transferable software engineering skills are being addressed in the National Skills Academy.

Technocamps and Computing at School (CAS)

Technocamps (led by Swansea University) has primarily served West Wales and the Valleys convergence area with European funding, but has had wider national reach and impact through other sources of funding. Computing at School (CAS), supported by BCS, The Chartered Institute for IT is largely based in South Wales but with a number of regional “hubs”. Technocamps and Computing at School have worked in partnership over the past five years to support computer science education, programming and teach professional development through a variety of initiatives and activities.

Computing activities are designed to counter “the poor reputation amongst pupils, parents and industry” of traditional ICT teaching.¹³⁸ Technocamps are transformative. In the Cardiff Annual Technocamps Robotics Competition, open to all Welsh Schools, all of the 43 teams travelled in from a convergence area. Technocamps are a successful intervention.¹³⁹

Schools and pupils in East Wales (non-convergence) are disadvantaged because of a lack of support, especially through previous projects funded by the European Social Fund.

“The lack of confidence and isolation felt by the teacher community in Wales means that computing clubs have only arisen... through direct engagement with Technocamps.”¹⁴⁰

Professor Faron Moller, Swansea University

It is a priority to support a broad, shared, national computing initiative to grow skills in schools and teachers now and post Brexit. Higher education can have a valuable role to play in teacher and trainer support.

BCS, The Chartered Institute for IT

A new BCS Certificate in Computer Science Teaching which would help to meet local training priorities has been designed to be accessible for all teachers. It is for teachers to develop skills as a computing teacher, recognition of competence and commitment to professional development. While it has been targeted at the new computing curriculum in England, the skills and competencies are relevant for all teachers of ICT/computing.

A New Curriculum for Wales and the Digital Competence Framework¹⁴¹

A deficit in teaching for ICT/digital technology and poor gender split over last five years is widely recognised.¹⁴² Together with Qualifications Wales there is an urgent need to prioritise action, especially a review of the ICT qualifications portfolio. Teaching skills (and confidence) are patchy. In computer studies, of 786 GCSE entries in 2014/15 just under 50% gained an A-C grade. Three schools got less than 10% of pupils through GCSE while seven schools achieved a pass rate of over 85% at A-C. The high pass rates in some schools suggest that the problem may lie with the fact that over half of staff teaching computer studies have not been trained in the subject.

¹³⁸ http://issep2016.ens-cachan.fr/ISSEP_2016_Proceedings.pdf pp.2

¹³⁹ http://issep2016.ens-cachan.fr/ISSEP_2016_Proceedings.pdf pp.5

¹⁴⁰ <http://www.technocamps.com/en>

¹⁴¹ <http://gov.wales/newsroom/educationandskills/2017/education-secretary-praises-newport-schools-role-in-developing-wales-digital-curriculum/?lang=en>

¹⁴² N. C. C. Brown, S. Sentance, T. Crick, and S. Humphreys, “Restart: The Resurgence of Computer Science in UK Schools,” *ACM Transactions on Computer Science Education*, 14(2), 1–22, 2014
<http://dx.doi.org/10.1145/2602484>

At A-Level, just 151 students taking computing (2015-16) gained an A-C grade, of whom only 18 were female. As part of the wider curriculum review, the Welsh Government identified a new Digital Competence Framework as a priority and has fast-tracked it to make it currently available to schools from September 2016.¹⁴³ A number of schools are already using it, but there is uncertainty about the timeline for adoption in all schools by 2021.

Digital competence is one of three cross-cutting themes running across all areas of the new Welsh curriculum with numeracy and literacy. The new Welsh curriculum has four core purposes in that learners should become ambitious, capable learners; enterprising, creative contributors; ethical, informed citizens; and healthy, confident individuals. It is to be based around six Areas of Learning and Experience (AoLE):

- expressive arts;
- health and well-being;
- humanities;
- languages, literacy and communication (including Welsh);
- mathematics and numeracy;
- science and technology.

The new Welsh curriculum is to be less prescriptive, experiential and encourage development of life skills like problem-solving and collaboration. It is being developed by teachers from Pioneer Schools alongside experts and key stakeholders like Estyn.¹⁴⁴ They expect to present outline frameworks for consideration in June 2017. Qualifications Wales is planning to deliver outcomes by the end of 2017. Two National Networks for Excellence have been funded by the Welsh Government to support key Areas of Learning and Experience (AoLEs): one in Mathematics and Numeracy (NNEM),¹⁴⁵ the other in Science and Technology (NNEST),¹⁴⁶ focusing on research-informed practice, theory and professional development of practitioners.

The Welsh Schools ICT Curriculum content has been only slightly amended to allow the existing framework to be continued to 2021, following a review in 2013.¹⁴⁷ A group of science and technology curriculum pioneers will be developing how computer science will sit in this new Area of Learning and Experience (AoLE), with advice from the National Network for Excellence in Science and Technology. England has already implemented changes to the curriculum with the introduction of a new computing curriculum from September 2014, with a clear focus on algorithms, computational thinking and programming.

Research from learners by Qualifications Wales¹⁴⁸ has revealed (not unexpectedly) that some educators did not have sufficient industry skills/knowledge; computer equipment in educational establishments can be out of date, teaching software applications can be out of date and/or not suitable for age and there is little engagement with the wider ICT/digital sector.

¹⁴³ <http://learning.gov.wales/resources/browse-all/digital-competence-framework/?lang=en>

¹⁴⁴ <http://www.erw.wales/professional-learning/pioneer-schools/>

¹⁴⁵ <http://gov.wales/newsroom/educationandskills/2016/new-national-network-of-excellence-for-mathematics-to-be-created/?lang=en>

¹⁴⁶ <http://gov.wales/newsroom/educationandskills/2017/new-national-network-of-excellence-for-science-and-technology-to-be-established/?lang=en>

¹⁴⁷ <http://learning.gov.wales/docs/learningwales/publications/131003-ict-steering-group-report-en.pdf>

¹⁴⁸ Qualifications Wales presentation by Jon Luton and Lu Thomas, 25 April 2017

ICT/Digital Economy Priorities and Recommendations

	Priorities	Recommendations	Short (1-3)	Med (3-5)	Long (5-10)
1	<p>Workforce for a digital economy:</p> <ul style="list-style-type: none"> recognising the importance of the ICT/digital sector to the future prosperity of the region; a focus on doubling the digitally skilled workforce in the Cardiff Capital Region. 	<ul style="list-style-type: none"> Working to ensure access to all for technology across the Cardiff Capital Region. Expand offer of training courses from entry level to specialist skills (with various progression routes, but not specialising too early). Offer for all sectors e.g. data science/analytics, programming, cyber security, robotics/automation, mobile application technology, digital media/creativity in publishing, ICT and digital workflows. Specific initiatives to address gender, diversity and age barriers. 	<p>✓</p> <p>✓</p> <p>✓</p>	<p>✓</p> <p>✓</p> <p>✓</p>	<p>✓</p>
2	<p>Schools, further education, higher education and work-based learning talent pipeline:</p> <ul style="list-style-type: none"> improve take-up of ICT/digital related courses in reversing decline with enhanced/flexible use of technology. 	<ul style="list-style-type: none"> Early intervention to build on Digital Competence Framework (including primary school initiatives) and new science and technology Area of Learning and Experience (AOLE), emphasising applied approach and positive role models in industry. Identify core/baseline skills as for entry to digital jobs across a range of sectors. <ul style="list-style-type: none"> Key examples: degree apprenticeships (inc. shared models), work-based learning and massive open online courses (MOOCs). 	<p>✓</p> <p>✓</p>	<p>✓</p>	
3	<p>Marketing – the pitch:</p> <ul style="list-style-type: none"> ICT/digital technology and innovation strategy using employers, skills and education; aggregate/share/enhance. 	<ul style="list-style-type: none"> Sector focus on accessibility. A shared pan-sector strategy linking industry, higher education, further education, schools, Digital Tuesday, ColInnovate, Digital 2017, ESTNet, Open Innovation, Tramshed, gaming clubs, Technocamps, Computing at School, BCS, The Chartered Institute for IT, etc. Strategy to change the wider public perception of digital/tech/computing careers/skills. The Cardiff Capital Region to fund an initiative to highlight and promote “10 Great Digital Roles” across all priority sectors in Wales? 	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	<p>✓</p> <p>✓</p>	
4	<p>Training the trainer:</p> <ul style="list-style-type: none"> keeping abreast of (broad) skills for all teachers and delivery: <ul style="list-style-type: none"> cross-curricular digital competency; subject specific computing. Work with BCS, The Chartered Institute for IT, Computing at Schools and Technocamps. 	<ul style="list-style-type: none"> Urgent need for (on-line) innovation in training/teaching/future potential for jobs/careers in the Cardiff Capital Region (including qualifications for teachers) through engagement with employers and digital specialists. Technocamps, continuing professional development programmes, Computing at School/BCS, The Chartered Institute for IT and Certificate in Computer Science Teaching accessible for all teachers to develop skills as a Computing teacher. Recognition of competence. 	<p>✓</p> <p>✓</p> <p>✓</p>		
5	<p>Future proofing:</p> <ul style="list-style-type: none"> high-level digital specialist specific skills e.g. artificial intelligence, building information 	<ul style="list-style-type: none"> Use innovation examples to help to promote the relevance of high-level skills/training offered by higher education, the National Software Academy (Cardiff University), the National Cyber Security Academy (the University of South Wales). 	<p>✓</p>	<p>✓</p>	<p>✓</p>

	Priorities	Recommendations	Short (1-3)	Med (3-5)	Long (5-10)
	modelling, fintech, voice recognition security.	<ul style="list-style-type: none"> Drive further education institution core progression skills. 			
6	Definition of ICT essential skills: <ul style="list-style-type: none"> minimum requirement for up-skilling, cross-sector, whole workforce, with access to skills delivery including teacher training. 	<ul style="list-style-type: none"> Support work with Qualifications Wales to develop a baseline framework for schools: <ul style="list-style-type: none"> entry level and Level 1-Level 3 progression; applicable as core transferable skills for all including apprenticeships, unemployed and disadvantaged. Challenge the ongoing review of the vocational ICT portfolio for further education, higher education and apprentices. 	✓	✓	✓
7	Superfast Business Cymru: <ul style="list-style-type: none"> skills utilisation and company uptake; business case – engagement with skills/training delivery? includes building information modelling. 	<ul style="list-style-type: none"> Market Superfast Business Cymru opportunity http://bit.ly/2msWSQM Expand 'Sector Business Benefits' training support to include health education and care. Consider technology and online delivery to improve training and education access for all. Address issues of uptake where Superfast Cymru exists – market opportunity. 	✓ ✓ ✓	✓ ✓	
8	<ul style="list-style-type: none"> Improve training to increase number of innovation active companies (using technology to innovate their business in addition to efficiency). Share skills best practice across supply chains. 	<ul style="list-style-type: none"> Promote skills in SMEs to support entrepreneurs and innovators, supporting the wider ecosystem in South East Wales. Understand and improve range of skills and support availability of part-time/online. Push to improve on the 12% of companies currently training in innovation skills. Increase innovation active companies from 25% in the Cardiff Capital Region. Wider message: digital Wales, open data, open innovation ... 	✓ ✓	✓ ✓	✓ ✓ ✓

Human Foundational Economy Overview

The foundational economy workforce in the Cardiff Capital Region is over 300,000 of which about half are employed in the human foundational economy, with 100,000 employed in health and social services and 50,000 in Education. The health and social care sector is similar in size to the financial and professional services sector. The human foundational economy sector is the largest of the sectors identified by LSKIP.

In Wales there is spending of £3.6bn every year on services from public agencies within health, education, social care and criminal justice because of ‘high levels of poverty in Wales’.¹⁴⁹ There are 36,600 health professionals and 13,100 associate health and care professionals in the Cardiff Capital Region with over 50,000 people in caring personal service occupations including nurses.

Health Service

The National Health Service (NHS) employs 74,000 staff in all organisations in Wales (2015) and has three major offices in the Cardiff Capital Region, with the head office in Cardiff and smaller offices in Pencoed and Pontypool. The NHS is working hard to attract and retain jobs across Wales offering strong work and benefits packages.

Table 14 Health Service Workforce in Wales

Workforce - Wales	2010	2015	%
Medical and dental staff	5,726	6,120	8
Nursing, midwifery and health visiting staff	28,157	28,684	39
Administration and estates staff	15,472	15,724	21
Scientific, therapeutic and technical staff	11,507	11,972	16
Health care assistants and support workers	10,033	9,753	13
Ambulance staff	1,427	1,597.9	2
Other non-medical staff	166	108	
Total	72,488	73,958	

The sector is a major employer in Wales with 56,500 workers in social care-commissioned services, including the independent and voluntary/third sector, across 1,414 services. The businesses are primarily SMEs with only 7% employing more than 100 staff. There are a further 24,000 staff employed by public social services including early years’ workforce.

Education (Further Education, Higher Education and Work-based Learning)

There are 6,358 further education teachers registered on the Education Workforce Council (EWC). Their profile reflects an aging workforce with 60% over the age of 45 and 28% over the age of 55. Five percent of teachers in further education are over 65. In the academic year 2014/2015 there were 9,079 staff employed in higher education in the region either as an academic or member of support staff.

Table 15 Higher Education Academic/Support Staff Ratios

Organisation	Full Time Equivalent	Percentage Split
Cardiff University	5,618	62%
Cardiff Metropolitan University	1,172	13%
University of South Wales	2,289	25%
Total headcount	9,079	100.00%

¹⁴⁹ The Joseph Rowntree Foundation, ‘Prosperity without Poverty: a Framework for Action in Wales’ <https://www.jrf.org.uk/report/prosperity-without-poverty>

It is estimated that the work-based learning workforce employs up to 2,000 training delivery personnel in Wales with a further 1,500 employed as managers and support staff. The demographics of the sector vary across the workforce which employs on average 25% male and 75% female. The average age of the sector is 40-45 with nearly 10% of employees due to retire within the next 5 years. Over 25% of the workforce are aged 50 plus.

Third Sector

There are 9,770 third sector organisations in Wales,¹⁵⁰ with over 930,000 volunteers. Key areas requiring skills support include:

- leadership skills for charities and their support managers;
- skills to access loan finance through the Wales Council for Voluntary Action (WCVA);
- social investment and administration of resources;¹⁵¹
- community housing project skills from construction to administration;
- management support e.g. the WCVA is administering the 'Active Inclusion' fund.

Welsh Language

Delivery of Welsh provision across education is a key objective of the Well-being of Future Generations (Wales) Act (2015). Welsh Government has set a target of one million Welsh speakers by 2050 serving the cultural and language needs of the population. Strategic support for the Welsh language in the Cardiff Capital Region should be targeted to meet demand and be responsive to need. The culture and language is important in Cardiff as Wales' capital city both for its own population and as it affects the way Wales is viewed internationally.

- In Wales 562,000 people or 19% of the population can speak Welsh.
- In the Cardiff Capital Region 10% speak Welsh, close to half the national average.
- By population Cardiff has more Welsh speakers (36,700) than other local authorities in the region.

Across public service the mandatory requirements for the Welsh language are clear. However, across the private sector in South East Wales there is unsurprisingly less demand. When asked about impact on the bottom line 1% said very significant; 3% fairly significant; 13% minor impact.¹⁵²

Human Foundational Economy Sector Priorities

The National Health Service and Social Care Wales are responsible for staff training. There is clear understanding for the need to share information around services, particularly an older population in hospital and care. This information sharing is creating a demand for ICT skills, particularly digital competency, programming and software engineering, data analytics and cyber security.

There may be increased pressure on the workforce following the UK's exit from the European Union. The Royal College of Nursing Labour Market Review 2015 (UK) shows the proportion of nursing staff joining the workforce from the European Union rose from 2% in 2010/11 to 8.8% in 2013/14 but has dropped back sharply since the referendum.¹⁵³ For social care, research by Independent Age indicates that nearly 1 in 5 care workers were born outside the UK (266,000).¹⁵⁴ Non-European Union migrants accounted for around 1 in 7 (228,000 European Union, 38,000 non-European Union). The situation

¹⁵⁰ 2017 report: 40,800 paid jobs, circa 50,000 volunteers worth £2.37 billion to Welsh Economy.

<https://wales.coop/news/social-business-sector-in-wales-worth-2-37bn-to-the-welsh-economy/>

¹⁵¹ <http://www.wcva.org.uk/funding/wcva-funding/social-investment>

¹⁵² Welsh Government, Regional LMI Report, section 5.5 Qualifications and training via the medium of Welsh

¹⁵³ Royal College of Nursing, *A workforce in crisis? The UK nursing labour market review 2015*, October 2015.

<https://www.rcn.org.uk/professional-development/publications/pub-005348>

¹⁵⁴ Independent Age, UK, *Moved to care: the impact of migration on the adult social care workforce*, Nov 2015

should be monitored to ensure training is at appropriate levels. Foreign nationals working in the education sector will be subject to government policy.

There is a recognised need for continuing professional development and higher level skills for staff and new entrants to the health sector, particularly to take advantage of efficiencies available through new technology and ICT. At the same time, there is an understanding that change in such a large public organisation is likely to be evolutionary rather than revolutionary.

Skills delivery plans are required to meet Social Care Wales' vision of a workforce trained to use life-changing electronic assistive technology. This initiative was launched in 2014 but still has some way to go.¹⁵⁵ There are significant issues around further education and higher-level provision for the care sector, by level and whether course content is fit for purpose, which need to be examined in detail.¹⁵⁶ New teaching standards are being introduced in all schools in Wales including Welsh-medium schools. They will apply to all serving teachers in Wales (from September 2018) and to initial teacher training programmes from September 2019. They will require extensive levels of continuing professional development over the next 18 months.

The standards will call on considerable training resources for ICT/digital skills to meet the new Digital Competence Framework which will be mandatory by 2021. Implementation of the Digital Competence framework will be first with other challenges as Qualifications Wales re-examines the curriculum. It is urgently recommended that teachers are upskilled for the digital competency framework targets for 2021.

In core subjects across Wales there are significant deficiencies in training with little improvement since 2014.¹⁵⁷ With a focus on the Programme for International Student Assessment (PISA) scores it is challenging to see that nearly a fifth of mathematics teachers teaching in secondary school are not trained in the subject.

¹⁵⁵ <http://www.ccwales.org.uk/technology-to-care/>

¹⁵⁶ Care Council for Wales - Analysis of Full Time Vocational Programme Delivery for the Welsh Government by Jacky Drysdale, Workforce Development Manager, Care Council for Wales, September 2015

¹⁵⁷ <http://www.ewc.wales/site/index.php/en/research-statistics/education-workforce-statistics>
<http://www.ewc.wales/site/index.php/cy/ymchwil-ac-ystadegau/ystadegau-r-gweithlu-addysg>

Human Foundational Economy SWOT

<p>Strengths</p> <ul style="list-style-type: none"> • Well-being of Future Generations (Wales) Act (2015). • Large part of the foundational economy with a local focus on employers, employees, clients. • High-quality provision of education, research and training. • Investment in high-level education, health and social care resources (capital and training). • Deployment of informatics and data analysis to manage demand. 	<p>Weaknesses</p> <ul style="list-style-type: none"> • High numbers of economically inactive (and unemployed) currently excluded. • Ageing workforce and marketing careers opportunities in the sector. • Large numbers of staff with low-level qualifications. • Complex skills to service areas of persistent multiple deprivation in social care, health and education. • Welsh language to service customer needs and in education.
<p>Opportunities</p> <ul style="list-style-type: none"> • The Well-being of Future Generations (Wales) Act (2015) five pillars of sustainable development. • Apprenticeships at all levels. • Large numbers of staff requiring training. • Flexible approach to skills delivery – innovative ‘train the trainer’ programme. • Broaden the range of sector skills delivery to meet new demand. 	<p>Threats</p> <ul style="list-style-type: none"> • Leadership to manage large numbers of underqualified staff requiring training (mandatory in part). • Changing demands on the workforce – technology, legislation, qualifications. • Employment and retention of workforce, movement of people affected by the UK’s exit from the European Union. • End of European Union social funding support to address high levels of poverty and social deprivation. • Meeting nearly 70,000 (skilled) jobs requirement forecast 2014/24.

Human Foundational Economy Demand and Supply

Social Care

The UK Commission for Employment and Skills (UKCES) Working Futures report predicts an increase in demand for health and social care associate professionals which are forecast to grow by 15.6% and a total of 6,800 at Level 4+ by 2024,¹⁵⁸ with caring personal service occupations at Levels 2/3, qualifications by 12.3% and a total of 32,900 for by 2024.¹⁵⁹ Current qualifications delivered by further education need to be checked with Social Care Wales for rigour.

53% of those employed by local authorities have the required or recommended qualifications, leaving 47%, or 29,945 individuals, to become qualified. Most of these workers require a Level 2 health and social care qualification (Qualifications and Credit Framework (QCF) Diploma). The numbers of Level 2 further education provision (most of which do not meet industry requirements) and apprenticeships falls short of the industry need.¹⁶⁰

¹⁵⁸ <https://www.gov.uk/government/publications/uk-labour-market-projections-2014-to-2024>

¹⁵⁹ Welsh Government’s Regional LMI report, Table 7.3: Projected employment change in South East Wales, by occupation, 2014-2024

¹⁶⁰ <http://www.ccwales.org.uk/profiles-of-the-registered-workforce/>

Welsh Medium

Of 36,951 teachers registered with the Education Workforce Council (EWC) in Wales, 21,684, or 59%, identify as Welsh. Welsh speaking teachers make up one third (12,292), of which just over 10,000 are registered to teach through the medium of Welsh. Of 1,004 Welsh language teachers 232 (23%) are not trained in the subject. Demand for Welsh-speaking teachers is increasing with growth in Welsh-medium education. City of Cardiff Council plans to increase pupils enrolled in Welsh-medium education from 6,000-8,000 by 2019/20.¹⁶¹ Welsh Government support will be needed to underpin low demand for work-based learning programmes delivered through Welsh and increase courses, e.g. Agored Cymru to consolidate growth in the Cardiff Capital Region.¹⁶²

Qualifications and Accreditation

Key to developing skills priorities for the human foundational economy sector is understanding delivery and ensuring it is fit for purpose, keeping pace with changing workforce demands.

The Qualifications in Wales sector-based library of awards designed to plug gaps in existing and future provision with a focus on specialist skills, delivered flexibly, offers potential to deliver and attract employer interest. In the Qualifications in Wales database there are:

- 161 entries listed with social care, 333 entries with health, 256 with teaching and/or education.
- 30 social care awards, 41 health and 13 teaching and/or Education awards are at Level 4+ (11%)
- 24 social care awards, 70 health and 72 teaching awards are at entry level or Level 1 (22%)

Education

Teaching is challenging as keeping pace with technology is increasingly demanding. In the classroom, young people from the ages of 16 to 20 are working with smart phones, social media and YouTube, accessing vocational and academic instruction on a universal basis. Developing new teaching strategies for teachers, as part of continuing professional development, is likely to be critical. Vocational subjects will increase the proportion of learning outside the classroom demonstrated by junior apprenticeships.

Growing the number of work placements and work-based learning is challenging as reflected by just 13% of employers in Wales taking on an apprentice last year. Driving up engagement must be a priority to improve both student and employer outcomes. Employers need to be encouraged to play their part in skills development.

There is support for extending the skills priorities programme or introducing a similar initiative to support new specialist continuing professional development for all teaching staff. The Skills Priorities Programme includes one strand as a driver to support continuing professional development of those teaching in the further education sector and more broadly supports new and innovative responses to employer need. The programme will enable the further education sector to align delivery to regional demands, including the need for technical and job specific higher level skills identified in the regional Employment and Skills Plan.

Higher Education, including higher-level and Degree Apprenticeships in Wales

There is a growing demand for higher-level and degree apprenticeships across the Human Foundational Economy sector, in part stimulated by the apprenticeship levy. There is a lack of clarity

¹⁶¹ <https://www.cardiff.gov.uk/ENG/Your-Council/Strategies-plans-and-policies/Documents/Welsh%20in%20Education%20Strategic%20Plan.pdf>

¹⁶² Initiatives since 2010 are detailed in an evaluation of the Welsh-Medium education strategy. <http://gov.wales/statistics-and-research/welsh-medium-education-strategy/?lang=en>

on the planning and funding mechanism for the delivery of degree apprenticeships and an appetite by employers and providers to progress development of programmes in response to industry need.

The Open University is developing a range of apprenticeships¹⁶³ and a number of these¹⁶⁴ are available in sectors where there is significant demand in the Cardiff Capital Region including ICT/digital, healthcare and Chartered Management Institute, however these are not currently supported in Wales. The potential exists to move swiftly to introduce degree apprenticeships in Wales by building upon successful practice elsewhere.

In addition, there are large numbers of part-time places in higher education being taken up by those employed in the human foundational economy, including full courses being delivered by the Open University in Wales. Innovative course design with longer timeframes can offer a financially acceptable alternative for universities, an example would be the part-time nursing qualification being introduced this year, which was developed in response to an identification of need in last year's Employment and Skills Plan, the University of South Wales has now commissioned 31 part-time places for 2017-18.

Human Foundational Economy Skills Needs, Gaps and Shortages

The Employer Skills survey (2015) indicates an incidence of 5% in skills shortage vacancies in health and social work sectors and 2% in the education sector across South East Wales (which seems low).¹⁶⁵ Forecasts suggest an expansion of 2,800 new growth jobs in the human foundational economy sector and when replacement jobs are considered, 68,500 jobs in total over the ten-year period.¹⁶⁶ The social care sector has the largest replacement demand at around 25,000 from 44,500 health and social care jobs. Some are likely to be at more senior levels which will need to be found within the existing service creating associated skills and training demand through continuing professional development, top-up apprenticeships and in-house planning.

There is a need to significantly increase student numbers in science, technology, engineering and mathematics (STEM) subjects and this will require investment, both in capital equipment and staff training to meet changing digital and technological demands. Certainty about student numbers and increasing take-up on courses in STEM subjects is challenging.

Education – Training the Trainers

Significant numbers of vacancies in the wider workforce reflect a positive economic outlook. However, there is a major challenge for training providers to deliver new skills such as those in the high-tech, high-growth and specialist industries. There is a significant and growing knowledge gap amongst the trainers delivering the skills in colleges, universities and amongst training providers. This is further exacerbated by the push for apprenticeships (often from non-Welsh employers and/or inward investors) in skills areas where Wales has little experience e.g. nuclear or marine tidal power. To overcome training skills gaps employers may be encouraged to share the skills of specialists to 'train the trainers', building teaching expertise and accelerating response to demand. Clarity about inward investment or infrastructure projects is needed to identify levels of resource required e.g. marine construction on off-shore wind farms and shared skills with tidal lagoon power. An alternative is to mobilise skills, 'train the trainer', Technocamps for school pupils, upskilling teachers in computer

¹⁶³ <http://www.open.ac.uk/business/professional-learning-development/apprenticeships>

¹⁶⁴ <http://www.open.ac.uk/business/professional-learning-development/apprenticeships/degree-and-higher>

¹⁶⁵ Welsh Government, Regional LMI Report Table 6.3: Incidence of skill shortage vacancies by sector and region

¹⁶⁶ Working Futures 2014-2024 Regional LMI Report Table 7.2: Total projected employment demand by Expansion and Replacement jobs Cardiff Region <https://www.gov.uk/government/publications/uk-labour-market-projections-2014-to-2024>

programming or 'Lab in a Lorry' sponsored by Institute of Physics and Welsh Government to promote an innovative approach to science, technology, engineering and mathematics (STEM) teaching best practices.¹⁶⁷

Apprenticeships (2015-16)

There were 21,900 apprenticeships undertaken in the Cardiff Capital Region of which over a third were in the healthcare and public services sector.

Teaching Assistants

There is currently no formal pathway for support staff in schools to become teachers. There are apprenticeships for teaching assistants but very low take-up. A Higher Level Teaching Assistant (HLTA) award which demonstrates knowledge of professional standards and may serve as a progression route to teaching has seen 1,800 assistants gaining HLTA status.¹⁶⁸

Apprenticeship Opportunities for Human Foundational Economy Cross-over Skills

The National Health Service is one of the largest employers in every region with a very significant estate and a workforce cutting across all skills areas in the service sector. The following apprenticeship skills are indicated by the National Health Service as 'relevant' to the workforce and in demand within the sector.¹⁶⁹

- administration and human resources;
- management;
- financial services;
- security and cybersecurity;
- construction;
- electrical and engineering;
- property;
- repair and maintenance;
- hospitality and catering;
- IT, data analytics, software engineering, communications and marketing;
- public services (includes clinical support, dental nursing, pharmacy, health & social care).

Postgraduate Certificate in Education (PGCE) - Teacher Training and Skills Shortages

In education projected changes in employment by the UK Commission for Employment and Skills (UKCES) Working Futures report suggests a contraction of 800 in jobs.¹⁷⁰ However, In the context of a Cardiff Capital Region workforce of over 65,000 there is a forecast demand for 26,900 jobs over the ten-year period, when replacement jobs are considered. These jobs are likely to have much higher digital skills associated with them and a changed curriculum to consider.

Welsh Government has recently completed its consultation period on new professional standards for teaching and leadership in schools.¹⁷¹ Pupil benefit arising from high quality teaching is recognised as the equivalent of an additional year's teaching. There are significant skills shortages.

¹⁶⁷ www.labinalorry.org.uk/

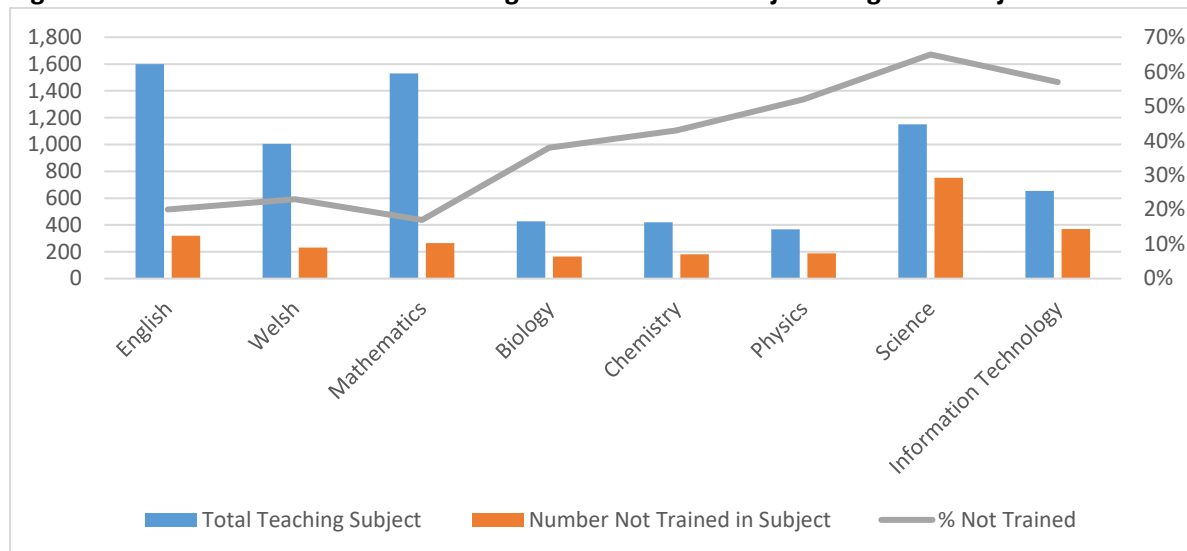
¹⁶⁸ <http://learning.gov.wales/yourcareer/school-support-staff/higher-level-teaching-assistant/?lang=en>

¹⁶⁹ Arising from discussions at the human foundational economy sector group

¹⁷⁰ Regional LMI Report Table 7.2: Total projected employment demand by Expansion and Replacement jobs
<https://www.gov.uk/government/publications/uk-labour-market-projections-2014-to-2024>

¹⁷¹ May 2017 & <http://learning.gov.wales/resources/collections/professional-standards?lang=en>

Figure 5 Education Workforce Council Registered Teachers Subject Taught -v- Subject Trained¹⁷²



Current Teaching Shortages and Gaps

There is a significant shortage of teachers trained in the core subject which they are delivering.¹⁷³ Teaching a non-specialist subject, is particularly problematic in science, technology, engineering and mathematics (STEM), e.g. computer programming. Training in alternative approaches to academic delivery, flexible teaching, engaging sector specialists in business, online delivery methods, teacher continuing professional development and digital competency across subject areas is required.

Figure 6 Core Education Subjects¹⁷⁴

	CORE Subjects & Religious Education															
	March 2015				March 2016				March 2017							
	Percentage (%) trained in subject	Percentage (%) not trained in subject	Percentage (%) Subject trained is unknown	Percentage (%)	Percentage (%) trained in subject	Percentage (%) not trained in subject	Percentage (%) Subject trained is unknown	Percentage (%)	Number trained in subject	Percentage (%)	Number not trained in subject	Percentage (%)	Subject trained is unknown	Percentage (%) Subject trained is unknown	Total teaching subject	Percentage (%)
Biology	56.6	39.7	3.7	100%	58.5	38.4	3.0	100%	247	58.5	168	39.8	7	1.7	422	100%
Chemistry	51.6	44.5	3.9	100%	52.7	43.2	4.1	100%	211	51.5	190	46.3	9	2.2	410	100%
English	73.1	19.4	7.5	100%	73.7	19.9	6.3	100%	1,148	75.4	297	19.5	78	5.1	1,523	100%
Mathematics	77.9	16.0	6.0	100%	77.6	17.3	5.0	100%	1,183	78.8	251	16.7	67	4.5	1,501	100%
Physics	45.3	51.7	2.9	100%	44.1	51.5	4.4	100%	165	46.2	182	51.0	10	2.8	357	100%
Religious Education	65.8	25.9	8.3	100%	66.1	27.1	6.8	100%	385	67.4	153	26.8	33	5.8	571	100%
Science	31.6	63.1	5.3	100%	30.6	65.3	4.1	100%	354	31.7	725	65.0	36	3.2	1,115	100%
Welsh	70.6	22.1	7.2	100%	71.4	23.1	5.5	100%	725	74.7	203	20.9	43	4.4	971	100%

The data in this section is based on registered teachers whose route to Qualified Teacher Status (QTS) was through a course of initial teacher training at a teacher training institution and not through any other route

¹⁷² <http://www.ewc.wales/site/index.php/en/research-statistics/education-workforce-statistics>

¹⁷³ <http://www.ewc.wales/site/index.php/en/research-statistics/education-workforce-statistics>
<http://www.ewc.wales/site/index.php/cy/ymchwil-ac-ystadegau/ystadegau-r-gweithlu-addysg>

¹⁷⁴ <http://www.ewc.wales/site/index.php/en/research-statistics/education-workforce-statistics>

Human Foundational Economy Priorities and Recommendations

	Priorities	Recommendations	Short (1-3)	Med (3-5)	Long (5-10)
1	Skills gaps in education/training workforce require continuing professional development support across all levels to enable the recruitment and development of a qualified, occupationally competent and highly-skilled workforce.	<ul style="list-style-type: none"> • Provide funding /support for continuing professional development (train the trainer) for all teachers, trainers and assessors across schools, further education institutions, higher education institutions, work-based learning and specialist provision. • Maintain and extend the Skills Priorities Programme or an equivalent to further develop occupational competence for all and meet increasing demand for higher and specialist level skills. 		✓	
		<ul style="list-style-type: none"> • Improve 'occupational competence' of teachers and assessors by developing sustained engagement and relationships between education and industry, including training and events. • Engage industry to grow curriculum and upskill teachers. • Encourage training placements with industry for teachers. 			✓
		<ul style="list-style-type: none"> • Develop initial teacher training and continuing professional development for existing staff in ICT. • Use new entrants and the digitally competent as mentors in ICT for other teachers. 		✓	
		<ul style="list-style-type: none"> • Assess training needs of support staff in schools and develop a training strategy and skills pathways including a pathway into teaching. 			✓
		<ul style="list-style-type: none"> • Recruit and develop existing staff to meet increasing demand for Welsh language skills within the education workforce. 			✓
2	Meet new and different future skills needs driven by transformation, service changes, policy, technology and other drivers across the human foundational economy sector.	<ul style="list-style-type: none"> • Assess future skills needs of the human foundational economy sector, including consolidation of existing research/reports/action plans and the impact of key drivers including the Well-being of Future Generations Act (Wales) 2015. • Produce clear recommendations of future skill needs. 			✓
		<ul style="list-style-type: none"> • Increase science, technology, engineering and mathematics (STEM) tutors and teacher-training student numbers to meet growing demand for high-tech and specialist provision. 		✓	
		<ul style="list-style-type: none"> • Encourage sponsored degrees and internships in science, technology, engineering and mathematics (STEM) areas. 		✓	
		<ul style="list-style-type: none"> • Review and develop a plan for skills needs in response to the new professional standards and new curriculum for the education workforce. 			✓
3	Increase take up of apprenticeships across the human foundational economy sector; need to	<ul style="list-style-type: none"> • Market and promote the value of apprenticeships to employers across the human foundational economy sector, particularly the health sector. 		✓	

	Priorities	Recommendations	Short (1-3)	Med (3-5)	Long (5-10)
	improve the number of Welsh employers employing apprentices to 20% as a minimum in three years.	<ul style="list-style-type: none"> • Increase nature and range of public service apprenticeship options, including degree apprenticeships where appropriate, to meet higher-level skills needs. 		✓	
		<ul style="list-style-type: none"> • Explore potential for a teaching apprenticeship. 		✓	
		<ul style="list-style-type: none"> • Ensure access to all-age Level 2 provision across health and social care in response to mandatory qualification and registration requirements, which in part drives demand. 	✓		
4	Address skills shortages across health and social care, which have been exacerbated by the UK's exit from the European Union.	<ul style="list-style-type: none"> • Consider new models of delivery and/or linking Level 2 to an aspiration to achieve Level 3, to maintain entry level pathways to tackle skills shortages. 		✓	
		<ul style="list-style-type: none"> • Research and address portability and transferability of qualifications across health and social care, with a focus on progression from health to social care. • Encourage recognition of prior learning and develop the skills/structures within education to enable recognition of prior learning. 		✓	
		<ul style="list-style-type: none"> • Targeted action to promote career pathways and attract potential recruits into health and social care including action to increase the diversity of the workforce. 			✓
5	Address cross-cutting/common skills gaps and shortages identified across the wider human foundational economy sector.	<ul style="list-style-type: none"> • Implement a plan for ICT/digital skills needs, including both generic and specialist skills such as data analysis and cyber security. 		✓	
		<ul style="list-style-type: none"> • Improve leadership and management skills at all levels - leadership skills from supervisor upwards are hugely important including digital competencies. 		✓	
		<ul style="list-style-type: none"> • Provide regional co-ordination of careers support and education/industry links and encourage parental engagement. • The human foundational economy cluster to engage with schools/careers workstream to develop and promote career pathways for school leavers into the human foundational economy. 			✓
		<ul style="list-style-type: none"> • Review the health services future transformation programmes and plan for workforce skill needs. 			✓
6	Address uncertainty, and any confusion caused by the Apprenticeship Levy, on what employment and training support is available to human foundational economy employers in Wales.	<ul style="list-style-type: none"> • Improve information around access to funding and support for human foundational economy employers and clarify areas that require employer investment. 		✓	

