

December 2012

Editorial

Welcome to this edition of STEM Foresight. Each quarter, STEM Foresight will provide a summary of important developments in government policy, industry and education, highlighting funding opportunities and areas of skills shortage that will provide colleges with valuable information to inform and drive their development and curriculum planning. Colleges will be able to build a picture of key STEM industries and the skills needed at national and regional levels to promote growth. STEM Foresight can be used as a horizon scanning tool, raising awareness in leaders and teaching staff of important information on a regular basis.

In this edition we review the Green Deal and explain how colleges can use this initiative to build relationships with local authorities and businesses in their region. We also take a critical look at IT and the range and level of skills needed to support this high growth industry.

Our regional focus in this edition is Wales and the South West of England. This detailed report provides an analysis and interpretation of regional employment statistics that can be used to drive curriculum development and support funding bids. Finally, we give you the latest information on apprenticeship developments and how to exploit the potential of initiatives, thereby enabling linkages with industry in your region.

Each of our focus articles is accompanied by a set of key questions for college leaders that can be used to prompt management discussion and college activity, enabling you to continually review and enhance your offer



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News-in-Brief

Developing Business Resilience

Innovation and resilience was the centrepiece at a gathering that included former Prime Minister Tony Blair, Secretary of State for Education Michael Gove, the Chief Executive of UK Sports Baroness Sue Campbell, Lord John Reid Former Defence Secretary, Andy Haldane, Bank of England's Director of Financial Stability and our own CEO Professor Sa'ad Medhat amongst other senior politicians, academics and industry leaders. The debate focused on developing and sustaining business resilience in UK organisations.

Clearly, there is a symbiotic relationship between resilience and innovation. NEF believes strong resilience can be learnt and developed in any organisation (education, business or government) and almost in any person. Resilience is about the ability to act decisively and learn in a world of change. It is about allowing a healthier appetite for risk. Resilience requires active leadership that shapes cultures and strengthens capabilities. Resilience is about competitiveness and entrepreneurship and a greater capacity for healthy innovation.

Innovation is crucial in achieving competitive advantage and can be incremental. Frugal innovation involves the ability to innovate at low cost but at high quality. Frugal innovation is known to leaders but the value to organisations has to be fully understood. Using such mechanisms as NEF's Innovation Assured will enable organisations to open up an untapped potential at an individual, organisational or market level to shape their future.

Industrial Strategy, Innovation and Education

Industrial Strategy was the focus of this year's annual CaSE (Campaign for Science and Engineering) Annual Lecture delivered by Lord Heseltine. The lecture reinforced key themes in the Heseltine Report that highlight the need for a strategic approach to industrial development that includes significant investment in innovation, and the need for education providers to

address skills shortages in STEM-related areas that are currently inhibiting UK growth.

There is a serious shortage of skilled engineers in the UK and expertise in STEM subjects as a whole that prevents industry from exploiting opportunities to full potential. Lord Heseltine emphasised the fact that FE colleges have a major role to play in ensuring that appropriate training is available to meet the needs of regional employers. There is also a need for employers to be visible in colleges to inspire learners and provide a real world view of industry.

NEF believes that colleges also have a role to play in promoting innovation through training that releases creativity in individuals, and supports organisations in the developing a culture enabling innovation to be achieved in a sustainable manner. NEF's new Innovation Hubs are designed to be a focus for these interventions.

Richard Review of Apprenticeships

Summary

Within this review, Doug Richard¹ presents his vision for the future of apprenticeships to benefit the three key stakeholders (apprentices, employers and society). At the heart of the review is shifting the locus of responsibility for defining, assessing, validating and, to an extent, funding apprentices to employers. Richard believes that this will make the apprenticeship programme more fit for purpose and thereby facilitate employer engagement and wider demand from employers and learners.

There is recognition of the outstanding quality within FE colleges and that "our best colleges are world class leaders and are innovating in the delivery of apprenticeships", describing models which align with NEF's Intelligent College and Innovation Hubs. The key recommendations are summarised overleaf².

¹ http://en.wikipedia.org/wiki/Doug_Richard

² A full copy of the report can be found at www.schoolforstartups.co.uk/richardreview



Key Recommendations

1. **Clarity of purpose and outcome:** Apprenticeships should be redefined to target those either new to a job/role or who need sustained and substantial training. Apprenticeships are currently also used to certify those already competent and support entry into employment – these needs to be managed separately. Recognised industry standards should be the focus of apprenticeships, clearly setting out what they should be able to know and do at the end in a way which is meaningful and relevant to employers. These employer focussed standards should form a single national qualification for each occupation and link to professional registration where it exists.
2. **Design, delivery and assessment:** Government should run competitions where employers, individually or in partnership, are invited to design and deliver apprenticeship qualifications for their sector(s) for a minimum duration including mandatory off site learning, achievement of functionally delivered English & maths (level 2). The criteria should ensure that the qualification is stretching, delivers transferable skills and has significant employer buy in. The final test should ensure that the apprentice is fully competent and should directly involve employers with assessors who are wholly independent of the outcome and overseen by Government regulators.
3. **English & maths:** These should be achieved at level 2 and be functionally related to the apprenticeship.
4. **Diversity & innovation:** There should be minimal prescription and regulation to enable innovation and support the diversity of routes & pathways to gaining an apprenticeship.
5. **Funding:** Employers should control funding, including a Government contribution, in a manner which is accessible for smaller firms and at a price reflective of employer demand. Payment should be partly linked to success and delivered through the NI or tax system.

6. **Information & awareness:** Government should ensure that the information is relevant and accessible, including disseminating the benefits to schools, teachers and parents.

Uptake of Apprenticeships

This week, Matt Hancock MP the Parliamentary Under-Secretary of State for further education, skills and lifelong learning revealed provisional data for the number of 2011/2012 apprenticeships start.

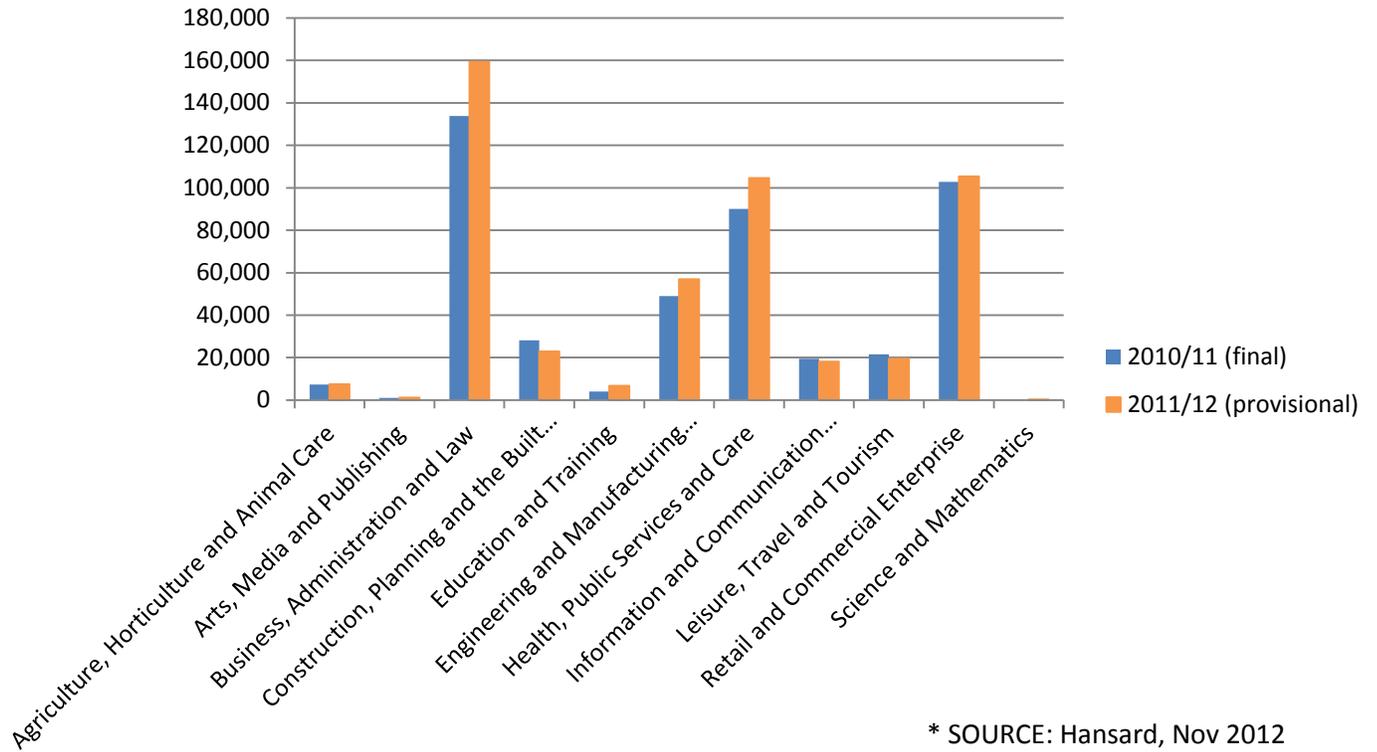
The data shows almost a 10% overall increase, from 457,200 to 502,500, the picture across STEM sectors is mixed. Construction, planning & the built environment dropped by 18% and ICT by 6%. Engineering & manufacturing technologies and health, public services & care both rose by 16%.

The biggest winner however was science and mathematics which saw an increase from 10 (all male) to 360, 42% of whom were female.

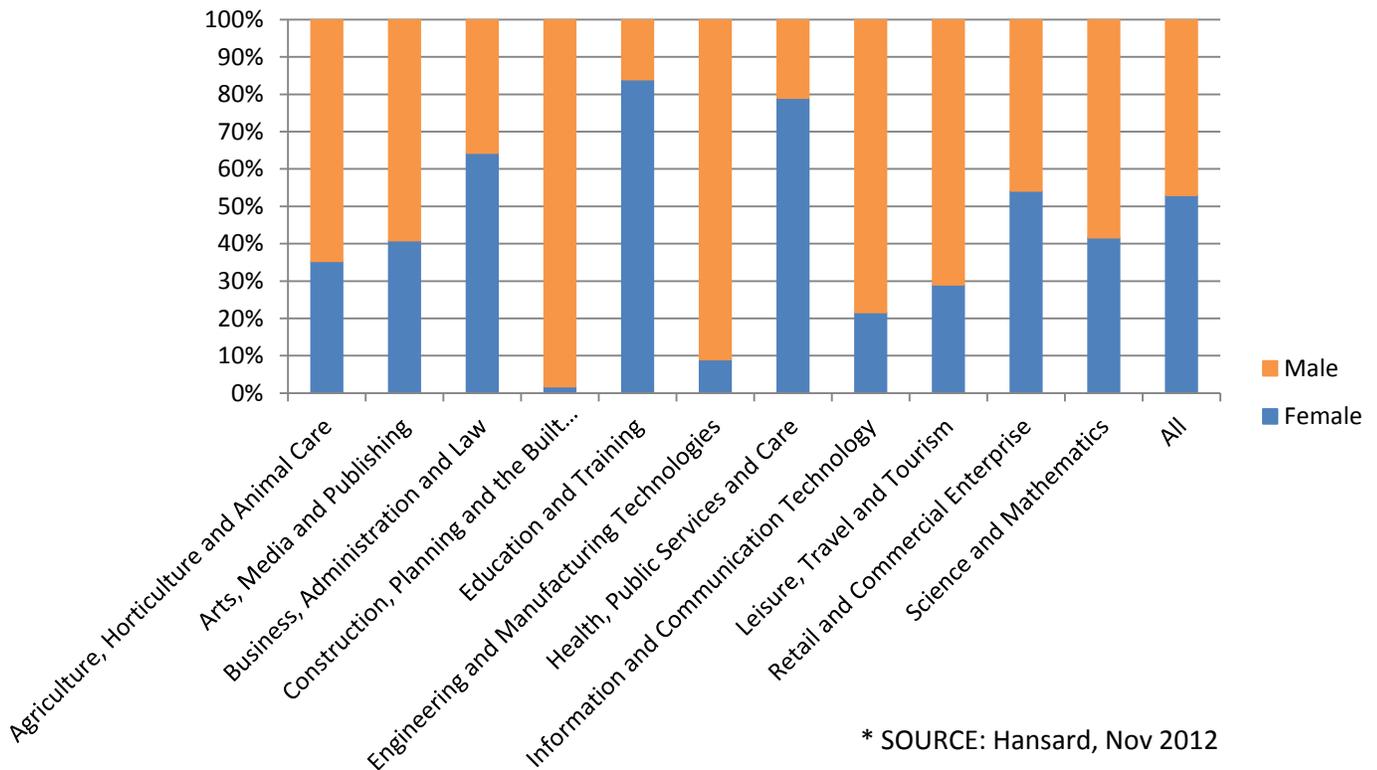
The gender balance of apprenticeships across the subject sector areas is shown in figure 2 below. Other than the dramatic shift for science and mathematics, this provisional data shows little change from confirmed data for 2010/2011. The 2011/2012 data should be confirmed in January 2013 by DBIS (Department for Business, Innovation and Skills) which should enable colleges to benchmark their provision and learner diversity profile.



Apprenticeship Starts Across Subject Sector Areas*



Apprenticeship Starts Gender Balance 2011/2012*



The Green Deal

Policy

The Green Deal is a government scheme that lets businesses and residents pay for energy-saving improvements over time through their electricity bill. Although the scheme was officially launched on 12 October, customers may only sign up to Green Deal financing from 28 January next year.



As over 40% of the UK's emissions come from the existing building stock, the Green Deal will play a vital role in helping the UK achieve its emissions targets. The scheme aims to catalyse billions of pounds of investment and create thousands of jobs. It has been

designed to ensure that customer repayments, which are linked to their energy bills, are lower than the resultant savings

The Green Deal will empower consumers by giving them new ways of funding home improvements, and empower businesses by enabling them to compete for energy efficiency opportunities in new and innovative ways.



The government will hand over up to £200m of incentives to encourage uptake of the scheme and seven cities across UK have already been selected to act as pilots: Birmingham, Bristol, Leeds, Manchester, Newcastle, Nottingham and Sheffield. For local communities, there will be opportunities for companies selling, marketing, and installing a broad range of measures under the Green Deal and for emerging technologies to come to market.

Only qualified **Green Deal Advisors** will be able to undertake this work and provide customers with access to funding. They will identify and promote how householders can reduce their energy usage through changes to their property and behaviour.

Local Businesses can get involved by becoming a Green Deal provider or installer, subcontracting for large providers, providing the full Green Deal service and by manufacturing and selling energy-saving products that can be installed at customers' properties. In order to get started businesses must be authorised to act as a **Green Deal assessor, provider or installer**. Businesses can use their existing skills or may require training on specific areas of the Green Deal. Training, provided by local colleges, trade bodies and sector skills councils.

Networks between local authorities, contractors, SMEs and colleges are being developed to build a skilled regional delivery ahead of The Green Deal. Skills for staff in direct contact with customers and those carrying out field roles including fitters, repair and maintenance and meter installation are established by the Competence Framework for Green Deal. There are three levels of competences based on stages of engagement and depth of knowledge and skills required. Each level covers adoption of energy efficiency measures, energy use behaviours, Green Deal and other energy efficiency initiatives as well as energy efficiency products, communication and interaction with customers.

Not only is the Green Deal a great offer for customers; it is also a great opportunity for firms to compete in a new market. The DECC (Department of Energy and Climate Change) has indicated that the Green Deal will drive billions of pounds of investment in energy efficiency measures over the next decade.

Colleges have the opportunity to create partnerships with local authorities and business to help meet the demands from the Green Deal. Latest techniques, using energy efficient products and materials are being taught to up-skill tradesmen. Partnership opportunities and the correct training are key to up-skilling the workforce, training new learners and the overall success of the Green deal.



Case Study

The Genesis Project^{10,11} initiated by Somerset College in Taunton, provides a good example of how colleges can exploit funding and resources aimed at expanding regional (and national) skills in emerging green technologies.

The Genesis Centre is a state-of-the-art, £2.5 million educational resource funded by the South West Regional Development Agency (SWRDA) and the Learning and Skills Council. The Centre was built to showcase a variety of new materials and sustainable building techniques and to promote new methods for recycling, energy and water saving, and heat production to the construction industry and the public. It brings together sustainable technologies in a single location in such a way as to allow comparison and evaluation of performance and viability. This provides a valuable source of information and expertise that supports and influences mainstream construction within the region and beyond.

The Centre also provides a learning base that services the needs of individuals and industry through vocational qualifications and CPD training. It reaches out to primary and secondary schools, and further and higher education institutions. It also engages with professionals from the construction industry as well as individuals involved in restoration and self build.

In response to the Green Deal, Somerset College now offers a Diploma in Green Deal Advice through the Genesis Centre, as well as a variety of other courses that build much needed skills and knowledge relating to photovoltaics, solar thermal hot water systems, water harvesting, and other environmental technologies.

As governments across the world continue to press for carbon-reduction and better environmental management, the need for new technologies and skills to support the emerging technologies will continue to grow. Colleges may want to review the extent to which their curriculum meets the skills needs of this growing industry and exploit the business opportunities that initiatives such as the Green Deal have to offer.



The Wider Picture

The Green Deal is an example of how environmental policy has influenced industry and forced a change in employment and skills requirements. The impact of the move towards a green or low-carbon economy will be felt most in the energy, logistics, construction, and manufacturing sectors.

In the short term, climate change will lead to more unpredictable and extreme weather conditions that affect food supply and water availability¹. Sustained population and economic growth, will produce environmental degradation and pollution requiring skilled staff to operate new technologies for food production, water delivery and treatment.

Demand for energy will grow by more than half by 2035 but climate change coupled with the need to reduce carbon emissions is driving the need to diversify energy sources and develop technologies for generating renewable energy².

The balance of skill demands between existing skills to new technologies in existing jobs; existing skills to new technologies in new jobs; and new skills for new occupations is unclear and unrecognised by employing organisations. It is clear that in all cases this will require delivering a significantly higher volume of STEM skills at all levels³.



Distinctions can be made between low carbon energy generation and more efficient use of energy in the sectors that produce goods and services⁴:

- In the **energy** sector, wind, marine, micro generation, nuclear, and carbon capture and storage, comprise the low carbon energy generation sector, all of which, except nuclear, are in the early stages of development and implementation. The forecast decline in employment in traditional carbon-based energy generation and the nuclear industry can be more than off-set by growth in low carbon energy sources. Research and development, and engineering activities are most prominent, characterised by a dependence on high level STEM skills (levels 4 and 5).
 - The most immediate prospect for renewable energy lies with wind, (currently with 4,000 jobs and a potential to create up to 40,000 by 2020). Skill needs include project managers, electrical engineers, turbine technicians, geologists, and aeronautical engineers⁵.
 - The UK's potential marine energy resource represents 50 per cent of Europe's wave energy capacity and 35 per cent of its tidal resources. The marine sub sector is highly reliant on STEM skills at a high level, including civil engineers, electrical engineers, mechanical engineers and structural engineers^{5,6}.
 - The UK also has the potential to store hundreds of years' of CO₂ from fossil fuel stations creating thousands of new jobs.
 - Approximately 24,000 jobs are provided directly by the nuclear industry^{5,6} with around a further 20,000 provided by the supply chain. Overall employment levels are expected to fall but 70 per cent of the current workforce is expected to retire by 2025 and will need replacing. In general, the workforce is skilled to levels 3 or 4 in professional and technical roles (engineering, project management, and safety). The industry is currently lacking one-third of the workforce it requires at levels 2 and 3 but has a surplus at level 1⁷.
- Micro generation is the generation of low carbon heat and electricity at the point of demand. The design, installation and maintenance is currently undertaken within the construction sector through electrical trades, plumbing, heating, ventilation and air conditioning skills
- The concentration of population in city regions will support economic growth and recovery, enable technological innovation, and provide pools of skilled workers. Carbon emissions can be reduced by concentrating urban development in forms accessible by public transport and through the use of more fuel-efficient ways of driving in the **logistics** sector⁸.
- Decarbonising buildings will involve addressing how we heat, cool and power buildings, the materials, and methods used. In the **building services engineering and construction** sector, traditional skills can be easily adapted to energy efficiency but the renewables sector would benefit greatly from a general up-skilling. More specific training is needed for architects and planners on the impact of new materials on sustainability. The Green Deal alone could see the numbers of people employed in insulation grow from 27,000 now to 100,000 in 2015 and 250,000 by 2025. New skills are needed, eg: ecosystem services design and management; designing and managing multi-functional spaces; life cycle assessment/costing; carbon and water footprinting⁹.
- Decarbonising the **manufacturing and process industry** supply chains³ will involve adopting eco-efficient processes such as: using scientific and technical skills to design and evaluate new materials from renewable sources (particularly for aviation), extraction of recyclates for reuse and recovery, the application of lean manufacturing methods, use of cogeneration methods thus enabling operations at a higher temperature whilst burning less fuel, energy minimisation by integrating waste recycling to energy⁵.



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Responding to the challenges: key questions

- Should the Green Deal Assessor and related programmes incorporate other accredited training such MCS?
- Colleges should have a strategic approach to resource planning including structured risk assessment. Will you tackle resource planning for green technologies differently and how will you assess potential overall impact?
- What should colleges do to drive the uptake of green and sustainable technologies?
- What civic role should colleges play to influence and shape the green agenda at community level?

Industry Focus: Information and Communications Technology

This article provides an overview of the current state of the UK ICT industry from the viewpoint of employers and current employees. It reviews national employment statistics relating to IT and telecoms and highlights factors that colleges and training providers may wish to take into account when developing qualifications and short courses that aim to service current and future skills requirements for this sector.

It is important to note the extent to which IT is now embedded in almost every sector of industry and society and the pervasive and diverse nature of its applications. IT has a vital role to play in the development of many other industry sectors, and is therefore crucial to national growth and difficult to evaluate in isolation.

Application areas extend from control systems in manufacturing to business intelligence software, data warehousing and enterprise search techniques in the analysis of so-called "big data". Big data is a term applied to the huge unstructured data sets regularly captured using mobile devices, remote sensors and other technologies. It was recently estimated¹ that 2.5 quintillion (2.5×10^{18}) bytes of data are captured daily, and this figure is growing. Such advances drive a continual requirement for new techniques to manage and manipulate data. Innovation is a defining characteristic of this industry and growth depends on a workforce that adapts and develops at a comparable rate to the technology.

Current skills needs relate to areas such as sensor technologies & embedded systems, mobile networking, cloud technologies, software design, mobile apps, information security, games and simulation.

It is possible to define further current areas but less realistic to speculate on the nature of skills that will be required in 5 years' time.



Industry Sector Statistics

According to a number of sources²⁻⁸, the IT and telecoms industry alone contributes 9% (£81 billion) to the total UK GVA. More widely, it is estimated that 55 per cent of UK GVA comes from technology-intensive sectors in the economy. Overall, it has been found that growth in technology occupations has been twice the average for the whole economy over the last 10 years.

Across the UK, the IT & telecoms workforce consists of approximately 1.5 million people. Of this, 863,000 people work in IT companies where the primary business is IT and the remaining 674,000 IT



professionals work in other sectors. Annually, the sector needs to recruit 179,800 people. 22% of companies report difficulties in attracting the appropriate skills, with shortages in programming, software engineering, networking, IT & telecoms management, systems design & development.

While employment in the UK workforce as a whole is forecast to increase at 0.45% per annum for the coming decade, the IT industry will grow at 2.19%. Growth in IT & telecommunications professionals is anticipated to be 1.42% per year between 2010 and 2019, manifesting itself mainly at senior level roles i.e. ICT managers, IT strategy & planning and software professional roles.

Due to the fast moving nature of the sector it is vitally important to provide support for SMEs through up-skilling of the workforce in new and emerging technologies. This presents a continual demand for CPD training and short courses². Key drivers for change include greater exploitation of IT, convergence of technologies (multi-functionality of devices) and the emergence of green IT.

The challenge for education and training providers is to balance the immediate need for specific skills to

support current technologies with the needs of learners to develop a deep understanding of core principles and the ability to apply & extend themselves to exploit emerging technologies whilst generating innovative ideas to drive future development. In providing this, it is important to consider the level of qualifications that may be required.

Currently 36% per cent of development needs for IT user skills is at level 3 or above. In three years' time it is anticipated that this figure will rise to 53%. In addition to this there will also be a need to enhance skills development at lower levels for people who do not currently use IT at work and provide essential skills for all learners who now need these to function effectively in almost any work situation.

What IT Professionals are Saying

A recent survey of 1200 IT professionals⁹ provides an employee perspective on the industry. Participants included software engineers, web designers and managers as well as business analysts and help desk workers. Despite the variety of roles, some interesting characteristics and aspirations of employees engaged in this industry come through in the results.

Workers are extremely aware of the speed of change in technology and the need to continually up-skill in order to keep their knowledge current. In an industry with a high turnover of staff and a shortage of expertise, jobs are relatively easy to find. 54% of those surveyed expected to stay in their current position for less than 1 year, before moving on to progress their career. They expect their employer to provide CPD and training courses to extend existing knowledge and develop new skills on an on-going basis, viewing as an incentive to join or remain with a company. Colleges have an opportunity to exploit this through greater engagement with IT organisations in their regions.

Innovation and entrepreneurship are high on the agenda. Over two thirds of participants reported that they were allocated time to develop innovative ideas. There is a clear correlation between the amount of time allowed for these activities and the length of time employees plan to stay with a company.



Just over 50% had been involved in start-up companies and highlighted the need for training in non-technical areas such as leadership and marketing to support business function. Training and support for business, entrepreneurship and innovation are therefore key areas of focus to promote growth in this sector.

Women are hugely under-represented in the IT industry, with figures indicating that only 10-15% of employees are female. Education has a crucial role to play in changing perceptions of the IT industry and reducing the barriers that inhibit a culture of inclusion. More role models and mentors are advocated to champion the “women in tech” cause and act as ambassadors to encourage new entrants.

Summary

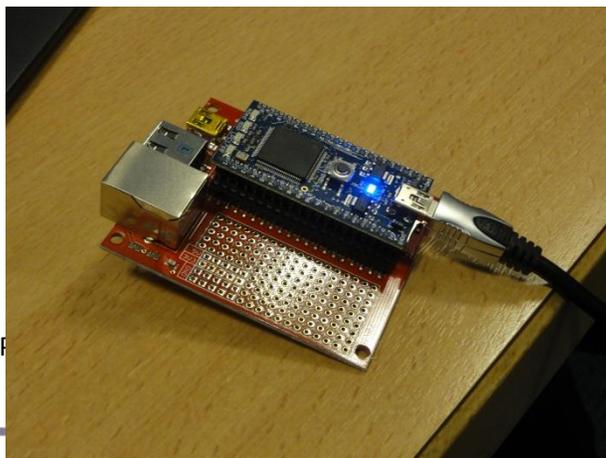
The UK IT industry cannot be considered in isolation from the rest of the world. More than any other industry, IT is inherently global, and today’s mobile communication technologies, social media and apps make it possible to control and manipulate data through computer systems anywhere in the world, at any time. The industry needs technically skilled and rounded individuals capable of problem solving and adapting to continual change as a matter of routine. Education and training provision is required across all levels, but with an increasing requirement for higher level skills and short courses that offer CPD to update skills and develop knowledge of new technologies.

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Responding to the challenges: key questions

- What workforce development programmes do you have on offer for IT professionals?
- How do you raise awareness of the offer with the sector?
- How aligned are your qualifications to the needs of the IT industry?
- Do you offer leadership and management programmes for IT specialists? How can you package and deliver other non-technical training and development programmes in a manner which meets the needs of IT specialists? How do you identify a similar market for other specialists?
- What steps are you willing to take to influence the gender imbalance in the IT industry?



Regional Labour Market Foresight: Focus on Wales and the South West

In each edition of STEM Foresight, this section reviews the latest available information about the current status and likely future of the labour market in two or more of the UK countries or regions.

The objective is to help colleges, universities & businesses to match the profile and levels of labour supply & demand. We would ideally explore both sides of the market; understanding the characteristics of residents and the needs of local industry, then assessing where shortages and gaps occur both now and in the future so that we can identify actions to better match the two. This is problematic since at any one time we can only record the current equilibrium but we must recognise that this will mask the presence of skill shortages and unemployment, skill gaps and under-employment.

Key Indicators

There are FOUR key indicators within a regional economy through which we understand the labour market. The **first key indicator** is the wealth of the regional economy: productivity is measured on a workplace basis by the Gross Value Added (GVA) (or, better, by the GVA per worker or per hour worked)³ and broken down by industrial sector. The Gross Disposable Household Income (GDHI) is a good measure of the wealth of the resident population since it derives from all sources both inside and outside the region⁴.

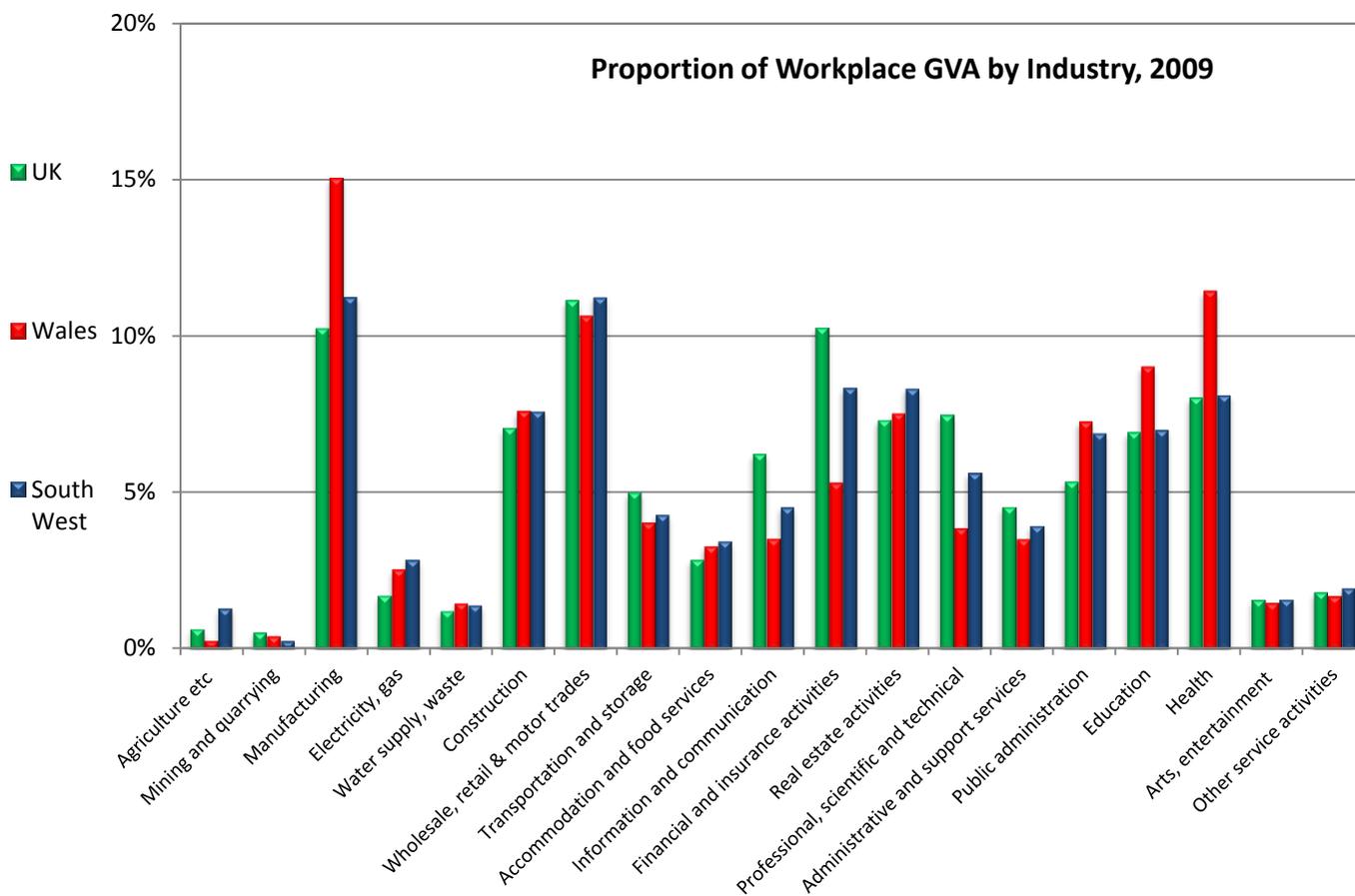
Productivity and Wealth	Date	Wales	South West	UK
Gross Value Added (million) [Workplace at current prices]	2005	£40,408	£85,297	£1,116,882
	2010	£45,120	£97,508	£1,301,118
Nominal GVA per hour worked, indexed	2005	85.3	93.5	100
	2010	83.9	92.0	100
Nominal GVA per filled job, indexed [NB jobs may be full or part-time]	2005	83.3	92.5	100
	2010	80.6	90.3	100
GVA per head [NB This relates workforce output to the residential population]	2005	£13,697	£16,773	£18,542
	2010	£15,008	£18,489	£20,849
GVA per head, indexed	2005	75.2	92.1	100
	2010	73.3	90.3	100
GDHI per head	2005	£11,955	£13,467	£13,535
	2010	£13,740	£15,655	£15,727
GDHI per head, indexed	2005	88.4	99.6	100
	2010	87.5	99.6	100



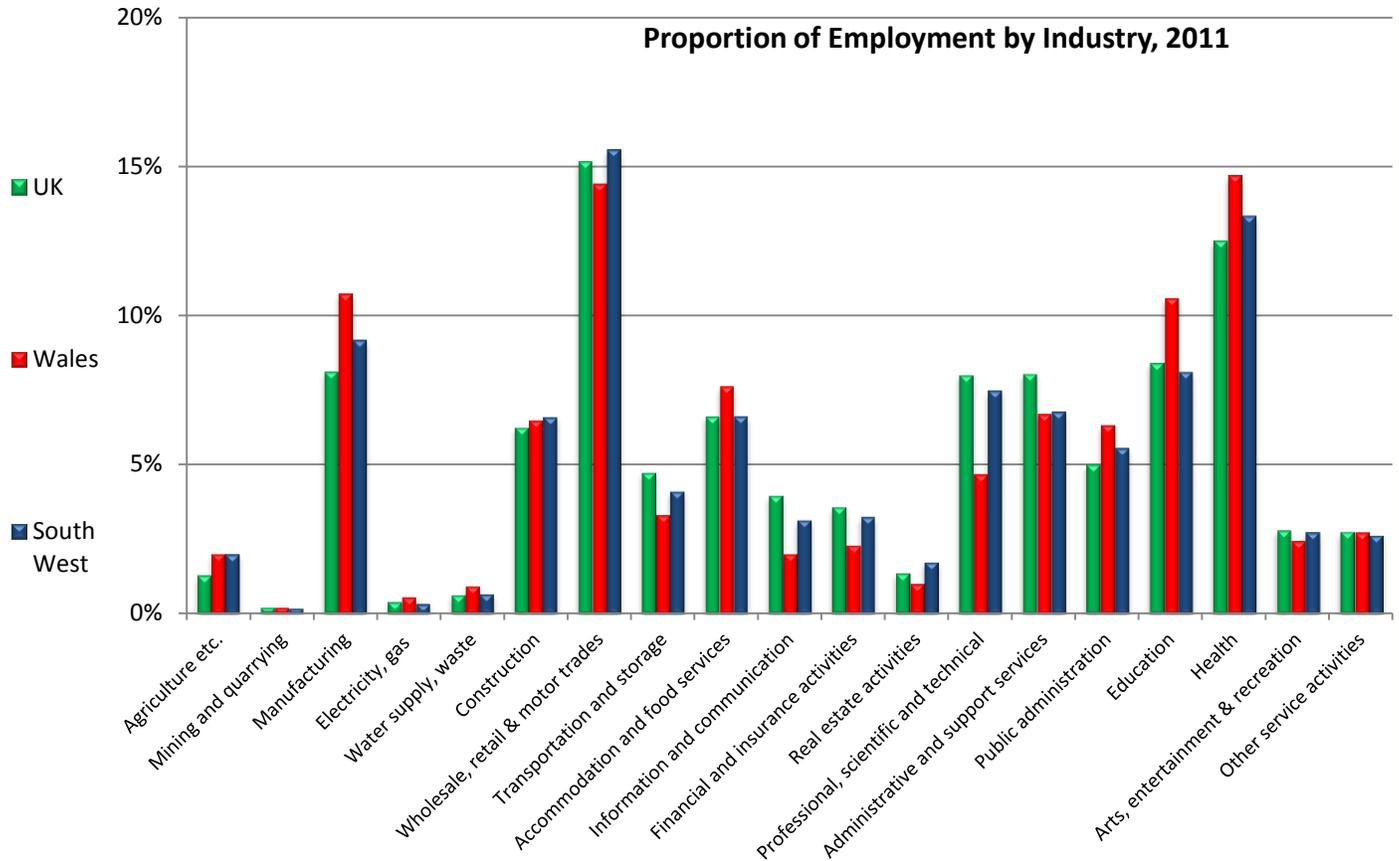


The most effective measure of productivity is the GVA per hour worked. The productivity of the Wales is 16% less than that of the UK as a whole and that of the South West is 8% less. These differences represent “Output Gaps” worth £8,600million (Wales) and £8,100million (South West). These gaps can be explained by a combination of factors; a lower working age population, lower employment rate, lower hours worked, the industrial and occupational structures, or lower regional prices. All except the last factor provide a focus for changing the operation of the labour market to improve its productivity.

The proportion of businesses employing less than 5 people in 2011 was 67% (Wales) and 68% (South West), compared with a UK average of 76%⁵. These are the SMEs where employment growth takes place. In 2010, the business birth rate was 8.5% (Wales), 8.8% (South West) and 10.2% for the UK, with the business death rate higher at 12.5% Wales, 11.6% (South West) and 12.9% for the UK³.



The **second key indicator** is the industrial structure and levels of employment in each industry⁶. The structure of the regional economy can be seen both from the industrial composition of GVA and in the proportion of employment in each industrial sector. A comparison of the two reveals the different levels of productivity between the manufacturing sector (high productivity) and the education, health and public administration sectors (lower productivity). The main difference between the structure in Wales and that of the UK is the much higher employment in manufacturing and the public sectors and less employment in financial activities, and professional and scientific services. The economy of the South West differs far less from the UK average.



Demand for labour in Wales and the South West may be compared with the UK⁷ using the ratio of jobs to the population of working age. The difficulty in separating supply and demand is illustrated by comparing job density with the activity rate in the following table and trying to determine which causes which.

	Date	Wales	South West	UK
Number of jobs	2010	1,337,000	2,706,000	31,093,000
Job density (number of jobs per resident 16-64)	2010	0.70	0.82	0.77

The characteristics of labour supply are summarised by the following data relating to the residential population:

Population:	Date	Wales	South West	UK
Economically active population 16 and over	2012 Q3	1,479,000	2,692,000	32,090,000
Population in employment 16 and over		1,358,000	2,536,000	29,576,000
Percentage economically active (16-64)		75.3%	79.1%	76.5%
Percentage in employment (16-64)		69.0%	74.4%	70.2%
Unemployment rate		8.2%	5.8%	7.8%

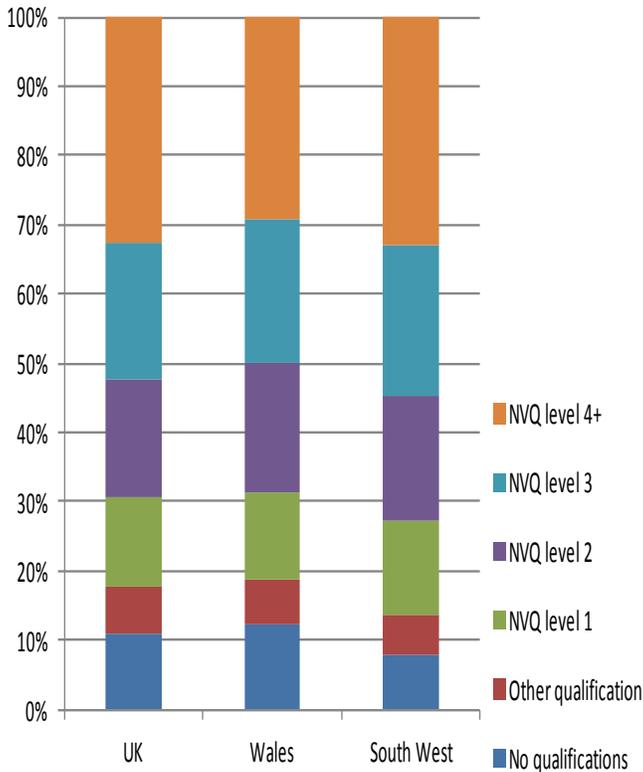
The **third key indicator** is the occupational structure of the workforce. Variations in productivity between industries in different regions and nations may be explained by different occupational profiles; improving the occupational structure may improve the productivity of a region without changing its industrial structure.

The **fourth key indicator**, the qualifications and skills held by the labour force, may similarly explain weaknesses or strengths in the occupational structure. However, there is some concern that the supply of labour may become increasingly over-qualified for the structure of demand.

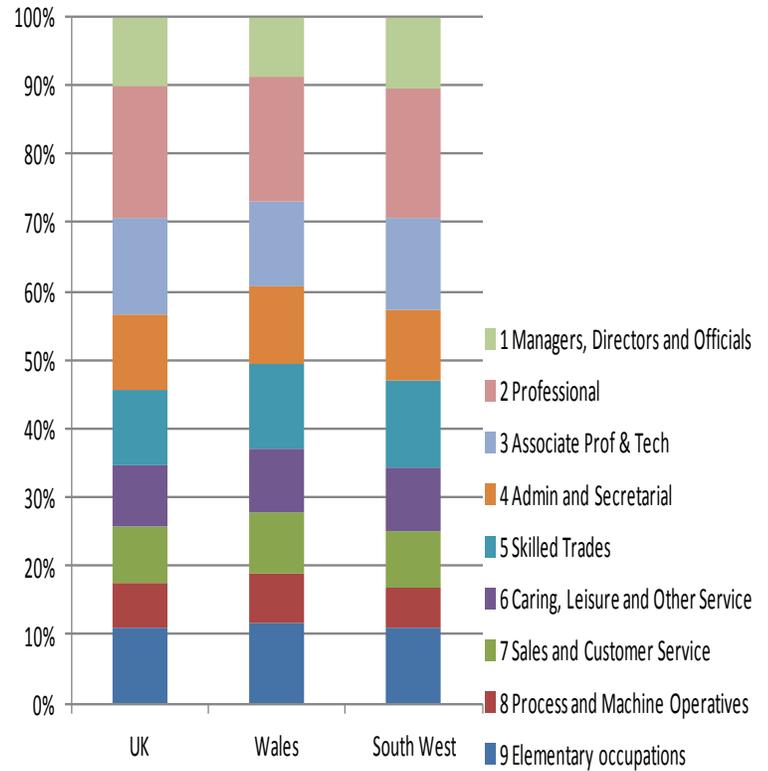




Qualifications Structure 2011



Occupational Structure 2011/12



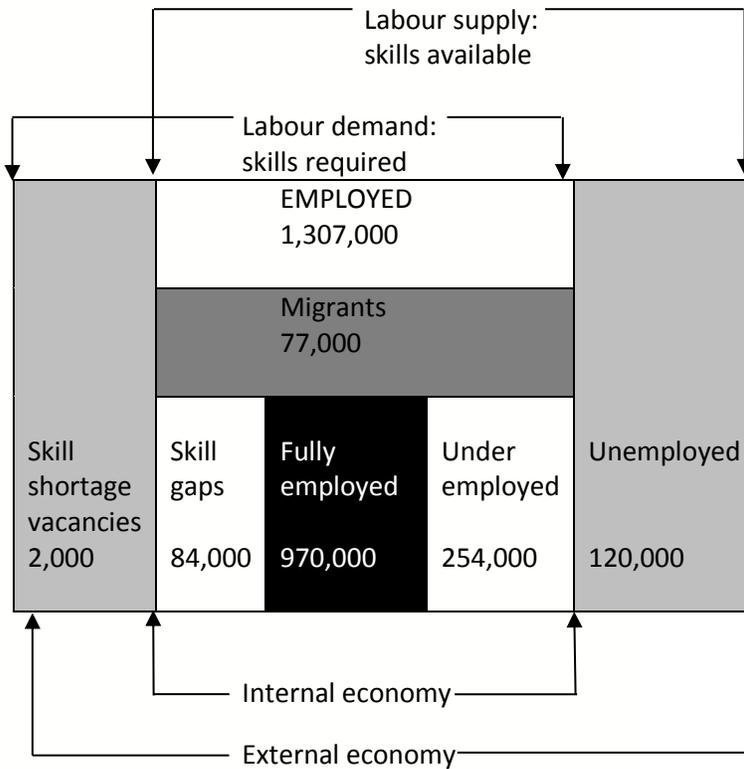
Wales has a lower proportion of its workforce qualified at Level 4 but the same proportion qualified at Level 2 or above. Similarly, its occupational structure has a lesser proportion of the workforce engaged in the highest level jobs (Groups 1-3) but only slightly more engaged in the lowest level jobs (Groups 7-9) than in the UK as a whole. The South West has workforce with a greater proportion qualified at level 2 or above than the UK but nevertheless displays a very similar occupational structure to the UK.

The local labour market is continually attempting to balance the four key variables, above. Changing patterns of demand for goods and services result in a shifting demand for labour. The changing aspirations of the economically active resident population and their access to qualifications leads to a dynamic pattern of labour supply. Any imbalances between either the total supply and demand or their profiles results in either increasing commuting flows between the region and other labour markets or a reduction in the level of economic activity in the regional population, ie unemployment or withdrawal from the labour force. In both cases, the cost to the labour force is increased and the wealth accruing to the region is diminished.

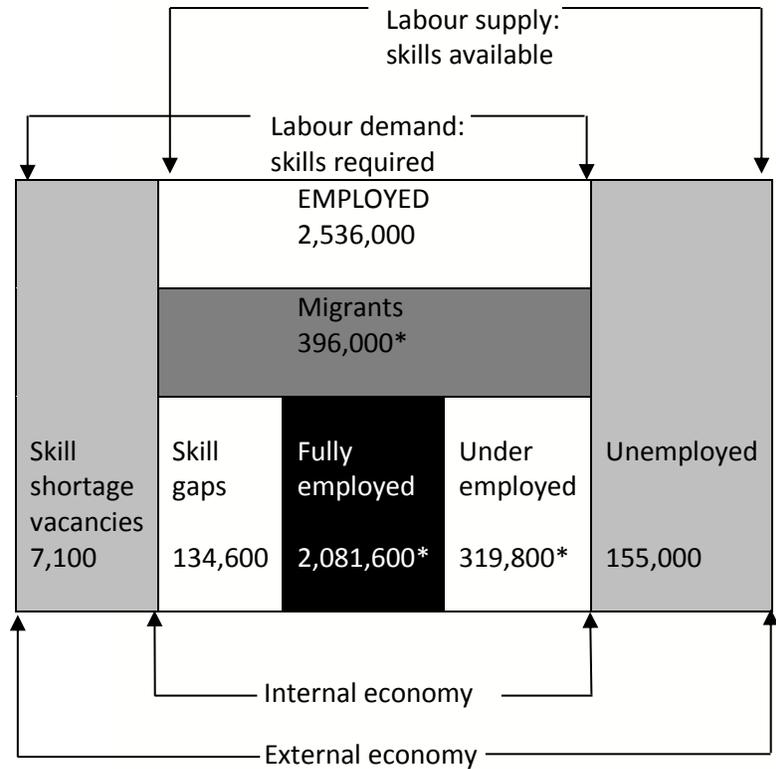


The current (2011) structure of skills and employment for Wales and the South West may be analysed as follows (*figures are estimates using UK percentages):

WALES



SOUTH WEST



It is increasingly being recognised that the supply of skills exceeds demand at all levels (except at the 'no qualifications' level), i.e. there is a considerable excess of jobs for people with no qualifications. Although the balance between demand and supply fluctuates due to a number of short-term factors, there is currently a fall in the excess supply of labour with Level 3 qualifications and an increase in the excess supply of those with Level 4 qualifications and above. The difference, nationally, between the supply and demand for degree-holders is now well over one million, i.e. the supply of graduates is outpacing the growth of jobs that require them.

Labour Market Forecasts^{8,9,10}

Between 2010 and 2020, the GVA of **Wales** grew more slowly than any other region or country of the UK than the West Midlands. For the period to 2020, the annual average rate of GVA growth is forecast to be more than twice as that of 2010-2020 but still low (equal to that of the North East and Scotland). In terms of employment, the annual average rate of growth was nearly twice that for the UK during 2000-2010 but growth is projected to slow during 2010-2020 and achieve only the overall UK rate.

In the **South West**, GVA growth for the period 2000 and 2010, and for the forecast period to 2020, is projected to be the same as the UK average. Employment grew slightly faster than the UK average between 2000 and 2010 and this is expected to continue.



The pattern of change by sector for 2000-2010 and projected change for 2010-2020 is shown in the table.

REGIONAL ECONOMY	Primary and Utilities		Manufacturing		Construct-ion		Trade, Accom & Transport		Business and other services		Non-market services		All	
	201	200	201	200	201	200	201	200	201	200	201	200	201	201
	2000	0-	0-	0-	0-	0-	0-	0-	0-	0-	0-	0-	0-	0-
	-	202	201	202	201	202	201	202	201	202	201	202	201	202
	2010	0	0	0	0	0	0	0	0	0	0	0	0	0
GVA % growth pa														
Wales	-6.9	0.8	-1.3	2.6	-0.5	2.2	2.2	2.5	2.5	3.4	1.5	0.7	0.9	2.2
South West	0.2	1.2	-0.9	2.5	1.1	2.8	1.9	3.2	3	3.9	1.3	0.8	1.5	2.7
United Kingdom	-1.9	0.5	-1.2	2.4	1.4	2.4	1.6	3	2.9	3.8	1.6	0.7	1.5	2.7
Employment % growth pa														
Wales	-1.6	0.7	-4.3	-0.4	1	1.4	1.7	0.8	1.5	1.1	1.6	-0.1	0.7	0.5
South West	4.1	0	-3.2	-1.1	0.3	1.9	-0.2	0.8	2.1	1.9	1.6	-0.2	0.7	0.7
United Kingdom	0.3	-0.3	-4.5	-0.7	0.8	1.1	0	0.5	1.3	1.3	2	-0.1	0.4	0.5

The industrial sectors identified by the Welsh Assembly as priority for the economy¹⁴ are:

- ICT, including the creative media sector;
- energy and environment, including the low carbon sector;
- advanced materials and manufacturing;
- life sciences;
- financial and professional services.

The industrial sectors important for future economic and job growth in the South West⁹ are:

- low carbon wave/tidal power¹¹
- advanced manufacturing, particularly aerospace and clusters of R&D activity attracting foreign investment¹²
- care sector: older people's services will concentrate in regions with an ageing population
- retail sector: opportunities to develop the retail economy where demographic patterns demand face-to-face interactions, ie regions of which have an older population
- tourism, hospitality and leisure¹³

Summary statistics on labour supply and demand are shown in the table below. All indicators are residence-based except for workplace employment (jobs). The decline in the **economic activity rate** (defined as the labour force expressed as a percentage of the population aged 16 years and over) from 2010 to 2020 reflects the increasing share of



the population in retirement. **Workplace employment** (or labour demand) measures the total number of jobs located within a region. This is projected to increase slightly slower than the number of employed residents.

WALES	Total Pop.	16+ Pop.	Working age Pop.	Labour Force	Economic activity rate	Employed residents	Workplace employment
LABOUR MARKET SUMMARY							
2010 (000s)	3,003	2,456	1,797	1,423	57.9%	1,304	1,333
2020 (000s)	3,091	2,533	1,843	1,429	56.4%	1,313	1,404
SOUTH WEST	Total Pop.	16+ Pop.	Working age Pop.	Labour Force	Economic activity rate	Employed residents	Workplace employment
LABOUR MARKET SUMMARY							
2010 (000s)	5,259	4,338	3,122	2,687	61.9%	2,522	2,616
2020 (000s)	5,672	4,658	3,386	2,835	60.9%	2,685	2,808

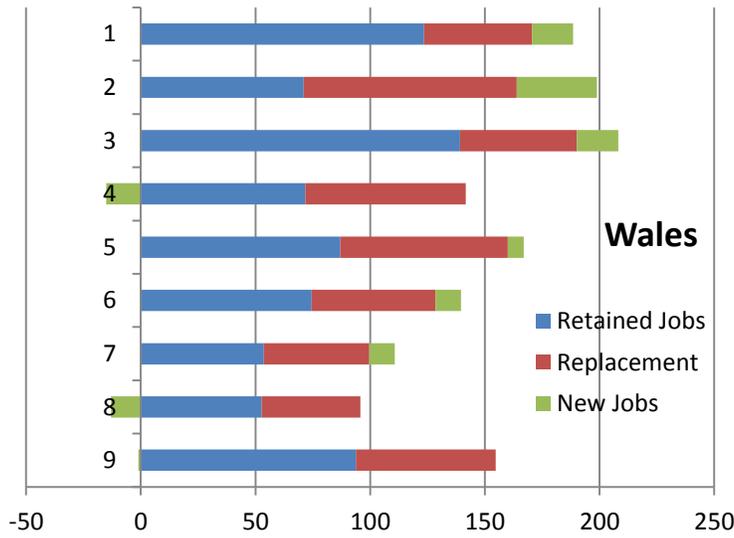
The **labour force** (measured as the **employed residents** plus unemployed) indicates the total potential supply of labour. The difference between this and the available workplace employment reflects the marginal stress in the market resulting from a failure to match the amount and profile of supply and demand. Part of this mis-match derives from the jobs or occupations required by employers compared with those accessible to the labour force. Expected changes in the occupational structure of employment are shown in the charts below.

In both Wales and the South West, the proportion of the workforce engaged as **managers, directors and senior officials, professionals and associate professionals** are expected to increase between 2010 and 2020 and the proportion of **elementary occupations** is expected to remain approximately the same, reflecting the increasing importance of the business and other services sector.

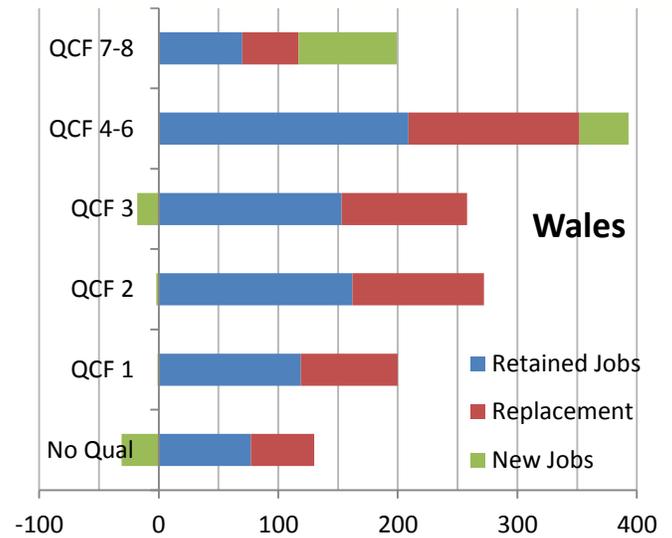
The greatest losses will occur in **administrative, clerical and secretarial occupations**, exacerbated by cost-savings in private sector organisations and cut-backs in public sector administration, followed by **skilled trades occupations** and **process, plant and machine operatives**. These groups are currently over represented in the workforce in Wales but the changes expected during between 2010 and 2020 will align the occupational structure more closely with that of the UK by the end of the period. The structure in the South West is already close to that of the UK as a whole and changes are expected to follow the national pattern.



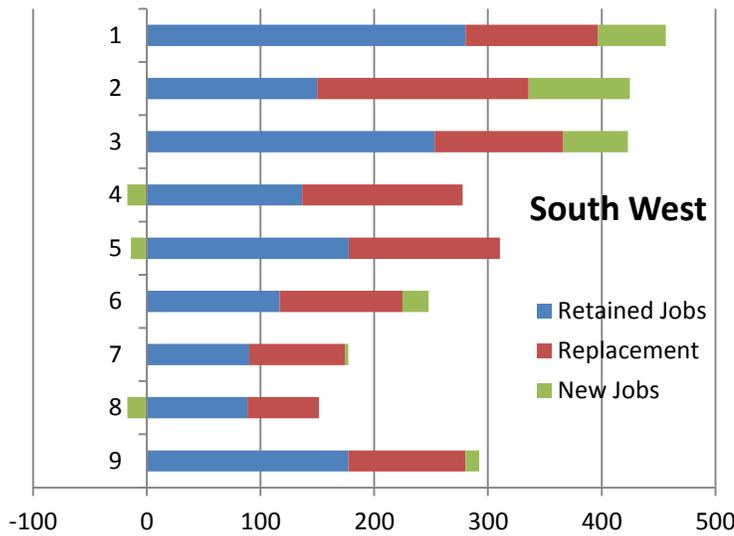
Employment Change 2010-2020 by Occupation



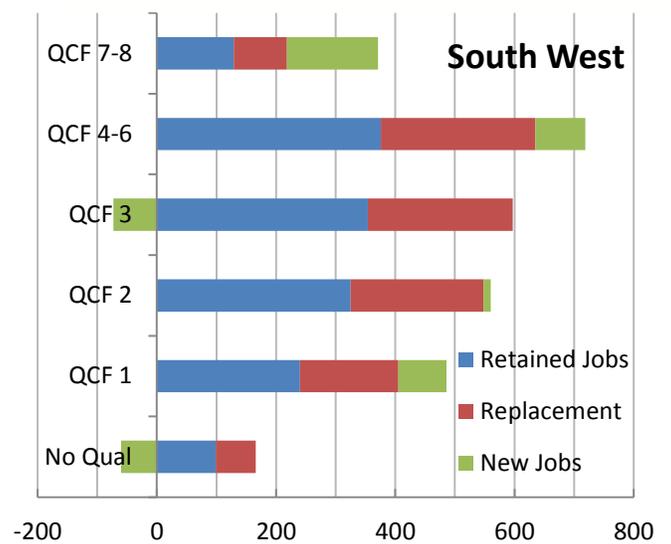
Employment change 2010-2020 by Qualification



South West



South West



KEY:

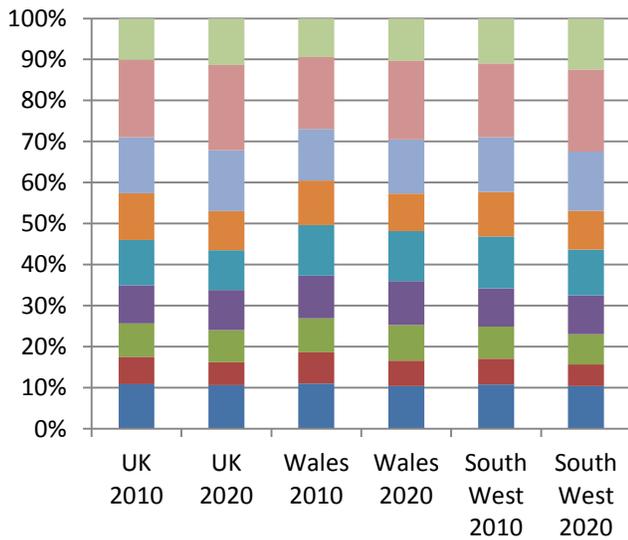
- 1 Managers, directors and officials
- 2 Professional occupations
- 3 Associate professional and technical
- 4 Administrative and secretarial
- 5 Skilled trades occupations

- 6 Caring, leisure and other service
- 7 Sales and customer service
- 8 Process, plant and machine operatives
- 9 Elementary occupations

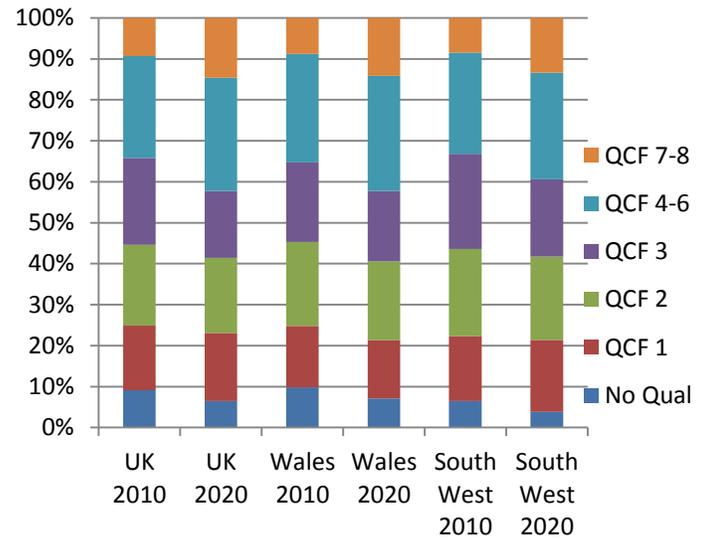
Source: Working Futures 2010-2020, Warwick Institute for Employment Research/Cambridge Econometrics, UKCES, Revised August 2012



Proportion of Employment by Occupation



Proportion of Employment by Qualification



Source: Working Futures 2010-2020, Warwick Institute for Employment Research/Cambridge Econometrics, UKCES, Revised August 2012

The charts above show the overall requirement for labour in each occupation as the sum of expansion demand, ie new jobs, and replacement demand, ie the effect of retirements, mobility between occupations and other factors. The relative importance of these two factors varies between industries and occupations, depending upon the age structure of different industrial sectors and occupational groups. In terms of qualifications, both new and replacement demand at each level may be met by people moving upwards to higher qualifications. It is therefore extremely difficult to identify where the real gaps will occur in relation to the qualification needed by those entering the labour market.

Patterns of employment by qualification vary considerably across the different parts of the UK. These patterns have been changing rapidly and are projected to continue to do so over the next decade. This is primarily driven by differences in the industrial and occupational employment structures. The data above are based on the assumption that qualification patterns are similar for resident and those working in a geographical area. For most parts of the country the difference between the two is probably not very significant but becomes more significant with local labour markets. Both Wales and the South West are expected to see rising employment for those qualified at QCF levels 4+ and declines for those with no, or low qualifications. Growth in labour demand only accounts for part of new opportunities and, as previously noted, the supply of those qualified at Level 4 may already exceed this increased demand.

Education and training provided by the FE sector is key to preparing new entrants to the workforce with the qualifications necessary to access the current occupational structure. Colleges are also central to up-skilling existing jobs and re-skilling displaced workers. Colleges can provide a capable workforce, aiding Local Enterprise Partnerships to attract inward investment and influence changes in local industrial structure, generating more productive local economy. But product market strategies drive skill use. It therefore follows that to increase skills used in the workplace, there is a need to drive companies up the product market value chain².

Businesses need to improve the market position of the existing regional industrial structure in order to provide opportunities for the increasingly higher skills profile of the workforce. Colleges have a key role to inform local businesses of the opportunities for change and provide the services that will enable them to do so.



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Responding to the challenges: key questions

- Given the output gaps indicated by labour productivity, action needs to be taken to shift the local economy towards higher levels of GVA by manipulating any or all of the other key indicators, ie industrial structure, occupational structure or qualifications profile. What steps can you take to have an impact on this?
- The predicted growth in demand for managers, professional and associate professional occupations is considerable over the current decade, with overall decline predicated for administrative and skilled occupations. How will your current strategies address this imbalance of growth and decline?
- The supply of qualifications is thought to exceed demand, particularly at higher levels. However, growth in new jobs requiring Level 7 and above qualifications is likely to continue along with growth at Level 1. Jobs requiring no qualifications and those at level 3 are likely to decline overall. Given this likely mixed pattern of change, how are you balancing your policies between encouraging progression up the qualifications ladder and ensuring that qualifications lead directly to employment?
- One solution to the over-supply of qualified job-seekers is to raise the level of demand by improving the product market positioning of businesses in the region. How will you support such growth in your region?

Forthcoming Events

NEF Masterclasses

- | | |
|--------|---|
| 6 Dec | The Green Deal
Genesis Centre, Somerset |
| 13 Dec | Food Security & Testing
Chester University
Hands-on workshop for scientists, food engineers, catering lecturers |
| 17 Jan | Transport Engineering with TfL
London Transport Museum
Includes ideas to promote STEM to schools |

