



Skills for Jobs

The National Strategic Skills Audit for Wales 2011 – Volume 2: Evidence Report

June 2011

Acknowledgements

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Foreword

Wales, along with the rest of the UK, has recently emerged from the longest recession on record. The Welsh Assembly Government responded to the challenges of the recession by publishing a holistic economic renewal strategy focused on creating the right environment for businesses to succeed and contribute to recovery.

Skills form a key part of the strategy. Having the right skills available is crucial if businesses are to pursue ambitious strategies that lead to higher productivity and profitability and individuals are to enter and progress in employment.

The remit of the UK Commission for Employment and Skills is to raise UK skills to help drive enterprise, jobs and growth. Within this remit we seek to provide outstanding labour market intelligence which helps businesses and people make the best choices for them. With this in mind Welsh ministers requested that the UK Commission include Wales within its ongoing work on strategic skills, leading to the production of this Audit.

This report is the first National Strategic Skills Audit for Wales. The Audit seeks to add value by drawing new and existing evidence together into a comprehensive and accessible form and by maximising the value of the UK Commission's extensive programme of research and labour market intelligence. It focuses on the sectors, occupations and skills that we need to prioritise to meet the changing needs of the economy and labour market.

The production of this document is only the first step in an ongoing process of improving Wales' evidence base on jobs and skills. A number of key sources of updated and enhanced data will become available in the coming months, including refreshed survey evidence on employers' skills needs and updated workforce projections. These will be incorporated into the next iteration of the Audit and we will seek to strengthen the evidence base in Wales and hence the insights we can draw from the analysis.

The analysis contained in the Audit is intended to be used to inform key decisions on jobs and skills by employers, individuals and their advisers, education and training providers, as well as policy-makers. To maximise impact and understanding, we are also publishing a further short document, summarising the key findings and messages, as well as this full evidence report. But this is only the beginning of the process. Following publication, it is important that work continues to actively share, translate and debate the findings widely amongst different players and action is taken to build on these initial foundations to improve the quality of labour market intelligence produced, disseminated and deployed in Wales.

The more well-informed that individuals and organisations are, the more effective their decisions about jobs and investment in skills are likely to be. This National Strategic Skills Audit has a valuable role to play, in helping to make sure that the right skills are developed to meet the demand for future jobs, to raise productivity and to achieve economic success.

Sir Adrian Webb

Chair of the Wales Employment and Skills Board and UKCES Commissioner

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1. Introduction

1.1. Introduction

Skills for Jobs is the first National Strategic Skills Audit for Wales produced by the UK Commission for Employment and Skills. The Audit provides key intelligence on Wales' existing and future skills. The information contained in this document will help to supply the analysis required to develop Wales' skills base so that it meets the immediate and longer-term needs of a fast changing economy.

In July 2010 the Welsh Minister for Children, Education & Lifelong Learning and the Deputy Minister for Science, Innovation & Skills requested that the UK Commission include Wales within its ongoing work on strategic skills and priority sectors. This follows the publication, in March 2010, of *Skills for Jobs: Today and Tomorrow: The National Strategic Skills Audit for England 2010*. Moreover, in its 2010 Annual Report (*Moving Forward: Foundations for Growth*) the Wales Employment and Skills Board called for a national skills audit to be produced for Wales and its regions, with outputs made available as early as possible to Wales' employers, providers, guidance services, and other stakeholders.

The aims of the Skills Audit are complementary to the wider policy context in Wales. Key policy documents emphasise the importance of skills. According to *Skills that Work for Wales: a skills and employment strategy*, skills are critical to the success of individuals, businesses and communities and are key to future economic growth and equality of opportunity. Individuals need appropriate skills in order to enter and then progress in employment. For business, a skilled workforce is a route for employers to achieve higher productivity. Skills also act as a potential source of competitive advantage and profitability in the private sector and enable the delivery of more efficient and effective public services.

A key feature of Welsh policy is the importance assigned to the role of intelligence in the operation of an informed market for skills. *Skills that Work for Wales* highlights the need to ensure that the right skills intelligence is available to support decision-making by government, public agencies, employers and individuals. Similarly, *Economic Renewal: A New Direction* (July 2010) notes that "the more well-informed that individuals, employers, and learning providers are, the more effective their decisions about jobs and investment in skills are likely to be".

In *Economic Renewal*, the Welsh Assembly Government set out a strategy for creating the right environment for businesses to succeed. Key priorities for skills include working with business to target investment on post-recession economic priorities, broadening and deepening the skills base and supporting young people to succeed in the world of work.

An important element of the new Welsh Government's targeted approach to addressing economic priorities continues to be a focus on six priority sectors. These sectors are:

- ICT;
- Energy and environment;
- Advanced materials and manufacturing;
- Creative industries;
- Life sciences; and
- Financial and professional services.

These sectors are viewed as being "strategically important to Wales", demonstrating above average growth at the UK level, projected to perform well in the future, and of significant importance to Wales in terms of employment. They are also important as enablers within the wider economy, for example in creating green jobs, driving resource efficiency and moving to a low carbon economy. However, the Government also recognises that job growth

and wealth creation lies outside these six sectors in areas such as business services, construction and tourism and supports “high performing, quality companies in all parts of the economy which can create employment, wealth and a sustainable Wales” (Labour Manifesto 2011).

The National Strategic Skills Audit for Wales supports the strategic approach to skills by identifying the nation’s existing and future skills needs, based on the latest available evidence. The Audit is, therefore, a synthesis of the currently available evidence on the existing and emerging demand for, and supply of, skills in Wales.

1.2. The aim of the Audit

The overarching aim of the National Strategic Skills Audit is to provide valuable insights to government, employers, education and training providers and individuals on Wales’ strategic skills needs. It is the logical next stage in the development of a labour market needs-led approach to skills development: one that not only ensures that current demand is effectively met by the skills system, but also future demands are identified, anticipated, shaped and stimulated.

The skills system will operate most effectively, in a way that maximises economic prosperity, if high quality information is used. This information needs to enable all parties – government, employers, individuals, universities, colleges and training providers – to make well-informed decisions about which areas of the economy are likely to provide opportunities in terms of high employment and high economic growth, and about areas of likely skills shortage and deficiencies now and in the future.

1.3. Objectives

The National Strategic Skills Audit draws on a wide range of sources from a number of organisations to provide a national overview, and an assessment of immediate and emerging priority skills needs in Wales. More specifically the Audit provides:

- A ‘big picture’ overview of strategic skills needs, assessing economic, social, technical drivers of change;
- An assessment of the likely futures and their implications for the labour market and skills;
- An assessment of the skills needs of industry sectors, including the key sectors identified in *Economic Renewal: a new direction* and sectors identified as being economically significant where skills deficiencies might constrain future employment and economic growth; and
- Assessment of key occupations and skill requirements by sector.

The requirement for labour market intelligence that enables informed decision making is particularly important in view of the current fiscal position. The pressure on the public finances in the foreseeable future will require policy makers at all levels to take difficult resourcing decisions, and there will be a greater emphasis on other stakeholders, including employers and stakeholders in funding training and qualifications. With the aim of a more informed system in mind, the National Strategic Skills Audit provides a comprehensive, solid and informative evidence base for:

- Policy-makers. Building on existing intelligence the Audit provides an authoritative, strategic overview that will help decision-makers to look at the longer term when prioritising future policy activity and when considering resource allocation. It will influence the development of future skills strategies;

- Individuals and advisory services (including Careers Wales). Enhancing the ability of learners to make well informed decisions from the best possible information about the types of training and qualifications they wish to undertake and the careers they wish to pursue;
- Colleges/providers. Enabling colleges and providers to assess provision against comprehensive labour market intelligence. This Audit is not a planning resource but it will be used to help inform skills strategies which in turn will also help to shape provision; and
- Employers and related groups/services (e.g. Chambers of Commerce, Sector Skills Councils). Providing intelligence that builds on that currently supplied by SSCs to raise demand, support strategic decision-making within businesses and the implementation of a system that reflects need.

1.4. Methodology

The National Strategic Skills Audit draws on the following five separate strands of work:

- **An initial national LMI assessment.** This uses a wide range of source materials including:
 - National Statistics for Wales;
 - The Annual Population Survey / Labour Force Survey;
 - Working Futures 2007-2017;
 - The UK Commission Employment and Skills Almanac 2009;
 - The UK Commission's Ambition 2020 report; and
 - The Future Skills Wales 2005 survey of employers and the DCELLS 2010 survey of employers.

A brief description of the national sources of data used is included in Appendix 1.

- **Sector skills assessment summary reports for Wales** produced by each of the Sector Skills Councils (SSCs) on the sectors they cover: These reports drew on a mix of national data supplemented by sectoral surveys and other information and qualitative interviews with key sectoral stakeholders.
- **Six additional skills assessment reports focusing on key 'emerging sectors'**, produced by SSCs working collaboratively in appropriate 'clusters'. These reports focused on:
 - Advanced manufacturing;
 - Professional and financial services;
 - Low carbon industries;
 - Digital economy; and
 - Life sciences and pharmaceuticals.

These reports were produced **at a UK-level** but they contain valuable intelligence on the needs of the six priority sectors identified in *Economic Renewal*.

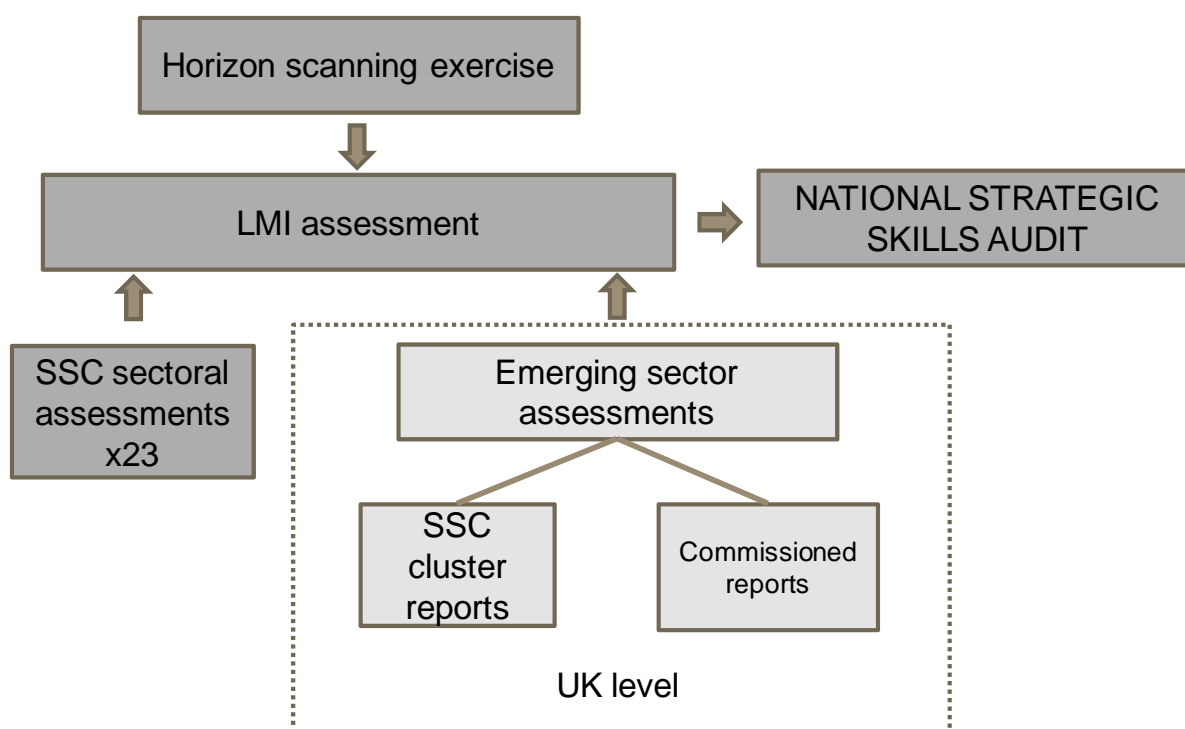
- **Three additional skills assessment reports on three of the emerging sectors** produced for the UK Commission by experts. These were:
 - A report on strategic skills needs in the bio-medical sector, focussing on medical technologies and pharmaceutical industries, produced by the Institute for Employment Research (IER) at Warwick University (Hogarth *et al*, 2010);

- A report on skills needs in the low carbon energy generations sector produced by PricewaterhouseCoopers (PwC) (PwC, 2010a); and
 - A report on the financial services sector produced by PwC (PwC, 2010b).
- **A horizon scanning and scenario development report** produced by the St Andrews Management Institute (SAMI) (SAMI, 2010): This report identifies key issues and changes taking place in Wales, the UK and globally which may impact on employment and skills in the period to 2020 using horizon scanning techniques informed through a stakeholder workshop and a series of expert interviews. SAMI developed a set of contextualised employment and skills drivers to overlay a set of existing scenarios to produce new scenarios for 2020.

The input reports can be accessed at: <http://www.ukces.org.uk/>

The diagram set out in Figure 1.1 shows how the different strands were used as 'inputs' to the final Audit:

Figure 1.1: Elements of the National Strategic Skills Audit for Wales



1.5. Methodological issues

The England Audit (UKCES, 2010a) sets out the key issues relating to defining and measuring skills, timescale and data availability. A brief outline of these, and how they have been tackled is presented here.

1.5.1. Defining skills and types of skills deficits

Skills can be difficult to define and measure at an aggregate level. In practical terms, skills can often be measured in terms of either the qualifications people hold, or the jobs they do (i.e. their occupation).

In addition, it is important to recognise that measures of employer demand for skills can take a number of different forms. Four types are commonly identified in the relevant literature:

- Hard-to-fill vacancies;
- Skill shortages;
- Known skill gaps; and
- Latent skill gaps.

Some skills needs are caused by factors other than a shortage of labour with the appropriate blend of capabilities, knowledge and experience. Such 'hard-to-fill' vacancies may be associated with poor pay or unattractive working conditions.

Skill shortages are marked by the absence of sufficient, appropriately qualified and experienced people to undertake particular roles when employers seek them, even if other factors such as recruitment methods and rates of pay are appropriate.

Known skill gaps occur within an existing workforce where individual employees lack the requisite skills to undertake the full range of duties in their job.

Latent skill gaps are unrecognised skills needs within an existing workforce which inhibit the capacity of the individuals and/or organisation to reach their full potential.

To this we might add a fifth type of skills for jobs which do not yet exist. These **emergent skills needs** may require relatively minor adaptations to existing skill sets, or they may require whole new sets of skills. This Audit explores all of these types of skills deficit, where data allows.

1.5.2. Measuring skills deficits – demand and supply indicators

Skills deficits take a range of forms, and there is no single perfect measure available to assess them. The following indicators of skills needs are commonly used, all of which have advantages and disadvantages:

1. **Skills demand measured through change in, or predictions of, occupational and employment change across sectors:** i.e. through surveys of individuals, and by assessing trends in employers' reports of the volumes of staff employed in different occupations. While this measure is able to drill down to identify changes within sectors and industries, there can be difficulty in capturing occupational change at the desired level, and there may be very limited data available for new and emerging occupations. This measure is also dependent upon skills mapping neatly onto 'whole' jobs, and less readily captures changes in skills needs within occupations. This instead requires more detailed questioning of employers (or individuals) about changes in job content.
2. **Skills demand measured through employers' direct and subjective opinions on current and future skills demand:** This is a direct method of assessing skills shortages relying on the judgement of managers who are in a position to comment. It often reveals shortages of generic skills. There is UK evidence, however, which shows some ambiguity in how employers understand and define a number of generic skills such as communication, team working and customer service, which are commonly identified as being in short supply. It is important, therefore, to recognise that these terms may be understood differently by different employers.
3. **Skills demand measured through wage returns to qualifications/occupations:** Possession of skills or qualifications which generate higher wage returns to the individual

can be an indication of employer demand. Wage premia for particular kinds of skills and occupations may develop because of a short-term increase in employer demand, a need to provide an incentive to individuals to develop particular kinds of skills or a simple reflection of the market distribution of rare skills, i.e. a reward for scarce skills which are not easily learned.

4. **Skills supply measured through possession of qualifications:** This approach has the advantage that qualifications are easy to count, and data are readily available. Some skills which are often sought by employers are not easily amenable to measurement, however (e.g. 'soft skills' such as problem solving, team working) and even when individuals hold qualifications, employers may be sceptical of the value of some qualifications. Unless they are technically specific and directly related to a particular occupation, qualifications may also act as proxies for a general level of ability. There is also no automatic 'read across' from possessing a qualification to actual usage in the job. This is dependent upon the way in which work is organised and how employers choose to make use of the skills of their staff.
5. **Skills supply measured through the provision of training required to do a job:** On the face of it, participation in training is relatively easy to measure. The difficulty with this approach is in deciding which activities constitute training, whether it must be delivered 'on-the-job' or 'off-the-job,' and whether it must be accredited. In addition there are questions about whether participation in training actually raises skill levels (or for example certifies existing levels of competence), and how well it meets individuals' and employers' needs.

Much analysis shows that measurement of skills needs requires the use of multiple measures to attain a sufficient degree of accuracy. Ideally, skills needs should be measured using sophisticated predictive econometric models which integrate analyses of both future demand and future supply, combined with an assessment of changes in demand and supply drivers. These are often robust, well tested and suited to capturing long-term trends without being affected by marginal changes or 'noise' within employer surveys. However, the models rely on extrapolating future demand based on historical and long-term trends. This means they are poorly suited to capturing the impact of exogenous (external) shocks which produce discontinuous change. So, for example, the effects of the current global financial crisis are not accommodated within these forecasts.

This means that use of data such as that from *Working Futures* within this report must be subject to judgement about how any changes in relevant labour market, economic and regulatory conditions may affect the credibility of the predictions.

1.5.3. Data availability

A key methodological issue encountered in producing the Audit was the lack of up to date employer skills survey data. The most recent comprehensive dataset is the Future Skills 2005 survey of employers. We have sought to address this gap by using more recent time series data for England (National Employer Skills Survey) as a basis for extrapolating likely change in the level and nature of skills deficiencies in Wales since 2005.

It is anticipated that this gap will be addressed in 2011 by a UK-wide skills survey, which will provide up to date data on skills deficiencies, on a consistent basis, across all four nations.

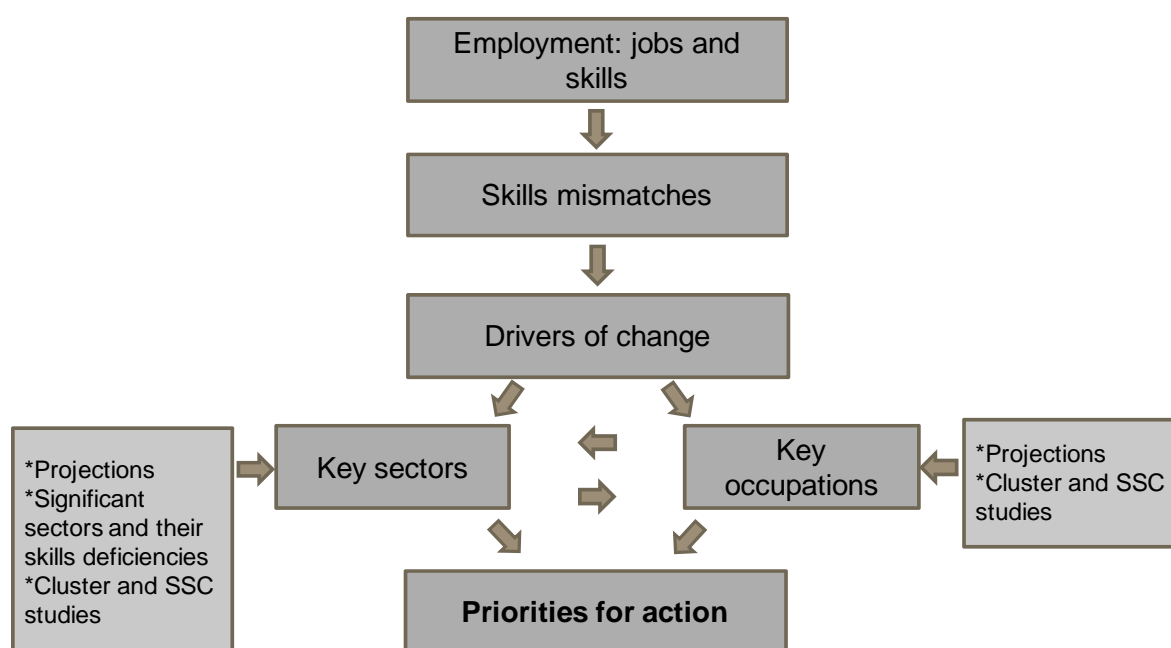
However, two particular issues are more long-lasting, and as they will affect any future Audits and they are worth noting here:

- Availability of data for Wales: a number of key official datasets are only available at UK level whilst the usefulness of others at the level of Wales is constrained by data quality issues arising out of small sample sizes. This also affects forecasting models which rely on official statistics for their underlying basis; and
- Categorisation of data: For obvious reasons of consistency and comparability, data are structured around a series of conventions, for example standard categorisations for sector, occupation, location, etc. However, as the economy and labour market change, these conventions can constrain the examination of emerging or new areas of work, and therefore skills.

1.6. The structure of the Audit

The rest of the Audit is set out as follows (Figure 1.2):

Figure 1.2: The National Strategic Skills Audit in outline



The coverage of the remaining chapters of the Audit is as follows:

- Chapter two sets out the **labour market, skills and economic foundation** for the Audit, focusing on employment and skills in Wales. It covers the overall economic position, recent employment trends, the current structure of employment by sector and occupation, and the impact of the recession on the labour market;
- Chapter three examines **the extent of 'current skills mismatch'** using a framework that enables the identification of the key skills issues in the labour market in a coherent and systematic way;
- Chapter four examines the main **forces that will shape the economy** over the next ten years and therefore affect the demand for (and supply of) skills and employment in the future;
- Chapter five identifies **key sectors** that are expected to be the major sources of economic growth and employment and significant skills deficit over the next ten years;
- Chapter six examines, at a finer level of detail, **occupational skill needs** within and across sectors; and

- Chapter seven summarises the **key messages** and identifies areas where **action is needed** and timeframes for addressing them, using a risk-based approach and considering the degree of certainty attached to each skills need.

In addition to this main report a separate shorter volume of key findings (Volume 1) is also available.

2. Jobs and skills: the labour market in Wales

2.1. Introduction

This chapter of the report sets out the major characteristics of existing employment and skill levels, together with a brief economic context. It briefly reviews:

- The overall national and sub-national economic position;
- Recent employment trends;
- The current structure of employment by sector and occupation;
- The sectors of the economy which have grown fastest in recent years; and
- The impact of the recession on the labour market.

2.2. Growing, globalised economy

The UK, before the recession, enjoyed a sustained period of long-term growth. Between 1995 and 2008 the UK economy grew, in real GDP terms, by an average of almost three per cent per annum, a higher rate than that seen across the Euro area and the OECD (OECD, 2010). However, the economy contracted sharply, by 4.7 per cent, in 2009 and is forecast to see limited growth in 2010 (+1.3 per cent) before regaining momentum in 2011 (+2.5 per cent).

Wales accounts for around four per cent of the UK economy in terms of workplace based gross value added (GVA). The data suggest that Wales has failed to keep pace with past growth in the UK economy. Gross value added (GVA) per head in Wales in 2009 was £14,842 or 74.3 per cent of the UK average (although it rises to 85 per cent when London and the South East of England are excluded), giving Wales the lowest GVA per head of all the devolved countries and English regions. It has been the lowest since 1998 and relative to the UK has fallen each year since 2001, except for 2004/5 and 2008/9 (ONS, 2010e).

GVA per head fell by 2.5 per cent in Wales between 2008 and 2009, as a result of the recession, slightly less than the UK average fall. Some areas of the UK saw a smaller fall than Wales, most notably Scotland and North West England, whilst others were more badly affected, such as the East of England and South East of England.

The two factors chiefly responsible for Wales' low relative Gross Value Added (GVA) per capita are a low employment rate and low average wages, reflecting low average productivity (Welsh Assembly Government, 2010b).

Wales, like the UK, depends heavily on international trade. Whilst the value of exports of goods in Wales is small relative to the UK, accounting for only four per cent of the UK total, as a proportion of Wales GVA the value of exports in Wales, at more than 20 per cent, actually exceeds the UK average (around 18 per cent) and is higher than any of the devolved countries and English regions, except the North East and South East of England (Department for Business, Innovation and Skills, 2010)¹.

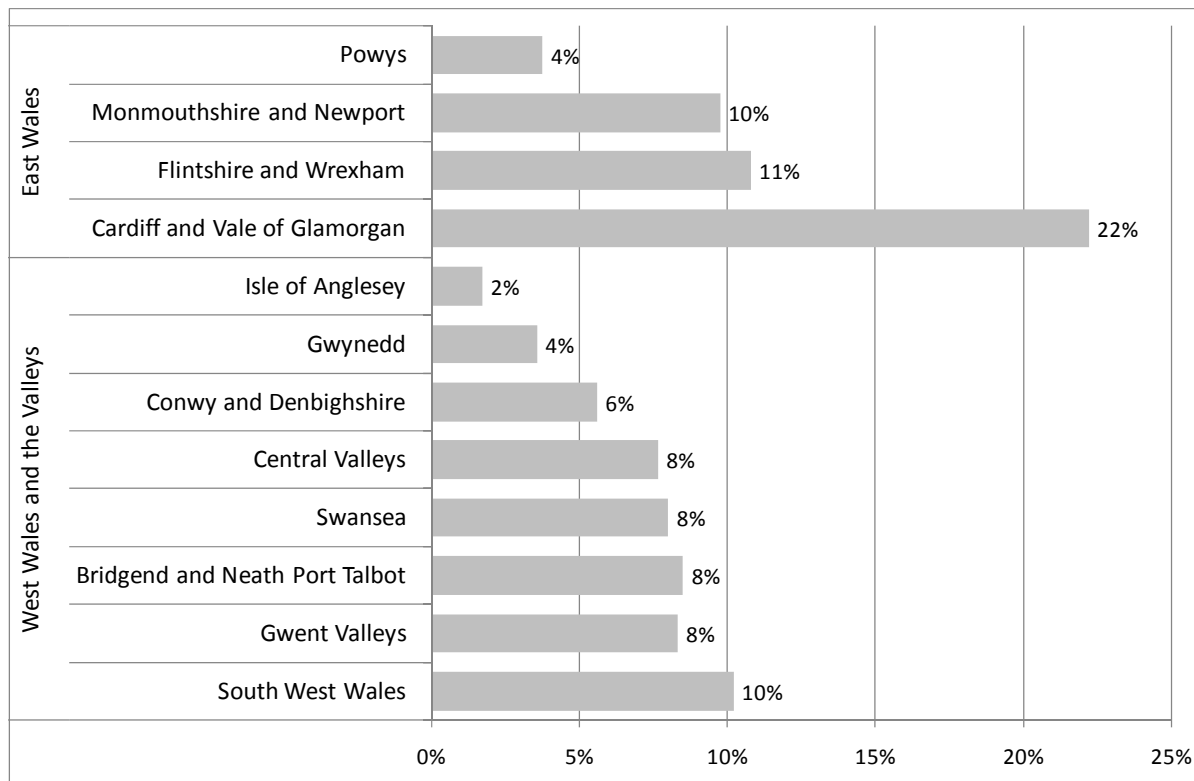
2.3. Sub-national concentration

In terms of the value of economic output, the Welsh economy is almost evenly split between West Wales and the Valleys (54 per cent of the total) and East Wales (46 per cent). This split has remained stable over recent years. Cardiff and the Vale of Glamorgan is the most

¹ It should be noted that these figures show exports of goods as a percentage of headline GVA which also includes services and therefore is likely to underestimate the export performance of some regions with a large share of service industries.

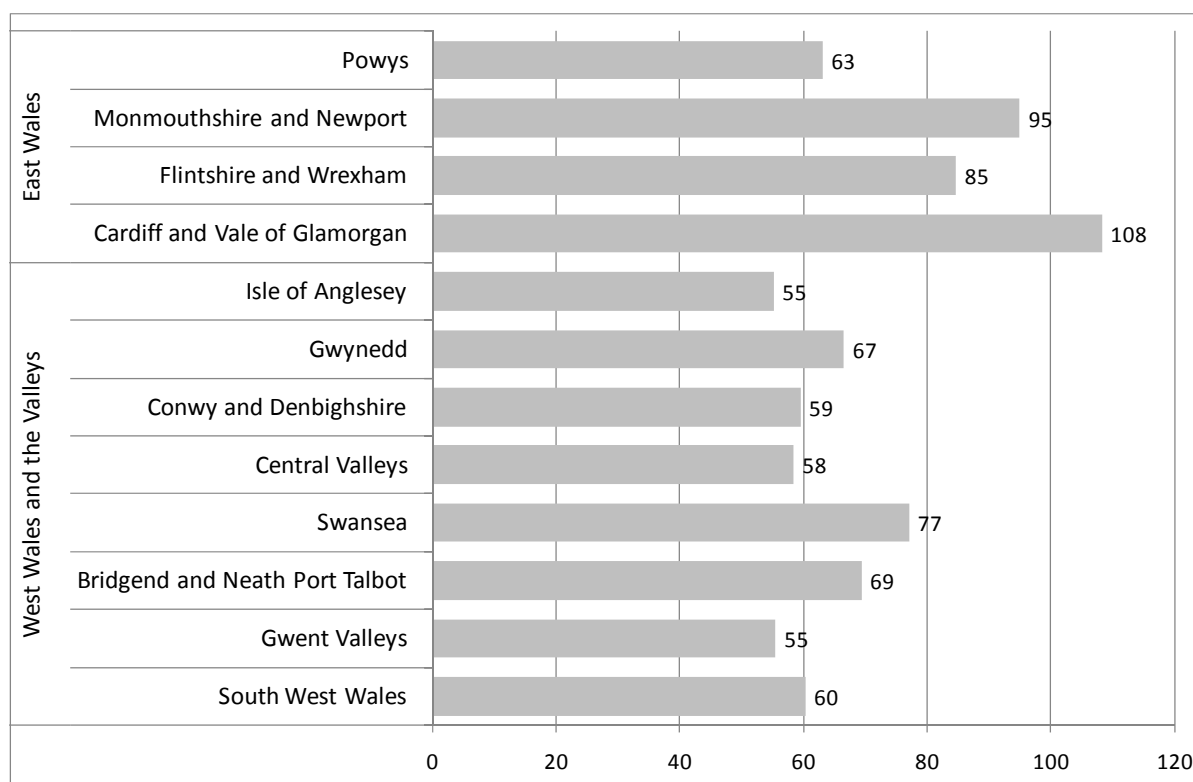
significant locality by far, in terms of its contribution, accounting for more than a fifth of total output in Wales (see Figure 2.1).

Figure 2.1: Sub-national share of workplace-based GVA at basic prices by NUTS Level 3 areas in Wales, 2008



Source: ONS (2010e) *Regional, sub-regional and local gross value added, 2009*

There are also major differences in GVA per head within Wales. In 2008 West Wales and the Valleys had the lowest GVA per head of all NUTS2 regions in the UK at 63 per cent of the UK average, whilst East Wales' figure was 94 per cent of the UK average (ONS, 2010e).

Figure 2.2: Sub-national GVA per head index comparison with UK average, 2008 (UK=100)

Source: ONS (2010e) *Regional, sub-regional and local gross value added, 2009*

With the exception of Cardiff and the Vale of Glamorgan, all localities in Wales have GVA per head that is below the UK average (see above figure). Analysis by Welsh Government indicates that there are a range of reasons for sub-national differences in GVA per head in Wales, which vary in their relative importance by locality. These include variations in the level of GVA per job, differences in the ratio of people employed relative to people of working age, variations in the ratio of people of working age to the overall population and also variations in the impact of the commuting effect.

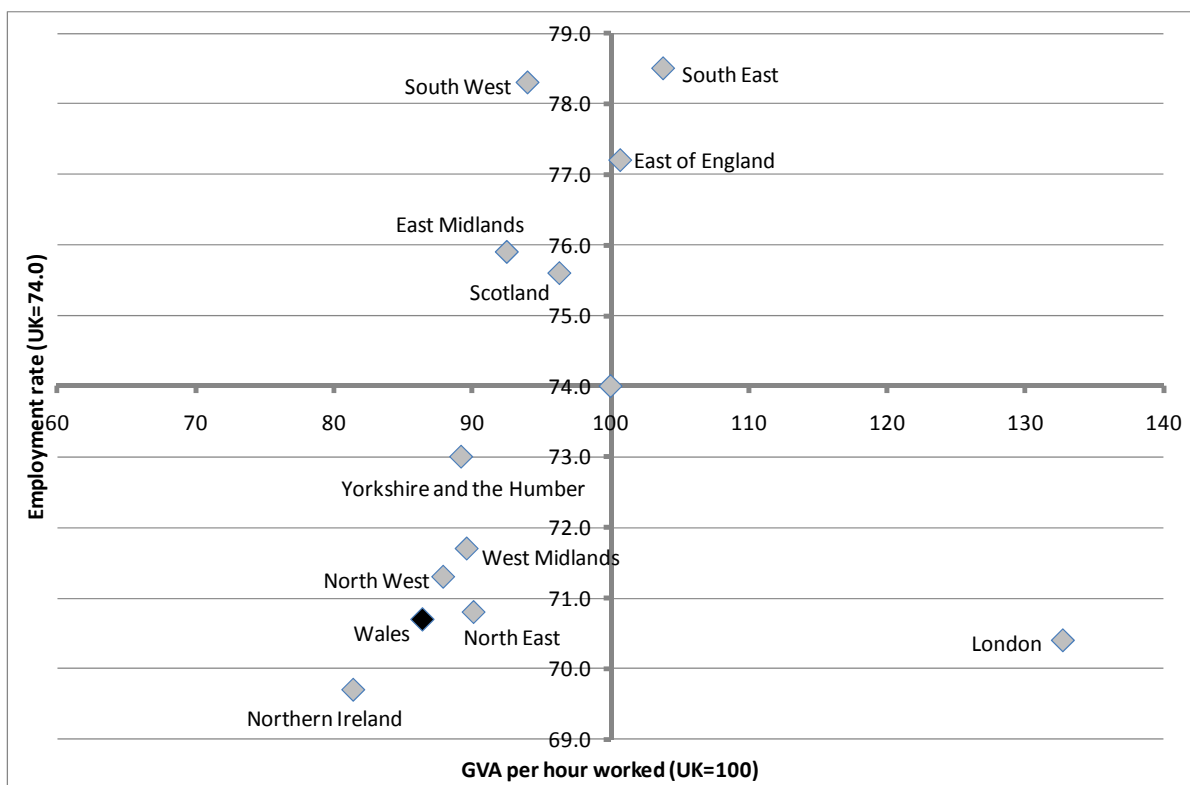
2.4. Productivity

Wales has one of the lowest levels of productivity of any area in the UK, with output per hour worked that is 85 per cent of the UK average², ranking lower than any of the English regions or Devolved Countries, with the exception of Northern Ireland (ONS, 2010f).

There is some debate about the root causes of Wales' productivity deficit. Important factors appear to be an adverse skills mix, which is associated with low average wages and productivity, plus the relative absence of "agglomeration" economies in Wales. These economies are associated with the presence of a large conurbation and derived from efficiently functioning labour markets and competitive costs arising from proximity to suppliers and business services (Boddy, 2010).

² Regional output per hour worked is the ratio of Regional Accounts Place of Work Gross Value Added estimates and regional Total Workforce Hours Worked.

Figure 2.3: Productivity and employment rates in the devolved countries and English regions



Source: ONS (2010c) Productivity Statistical Bulletin; ONS (2010) Annual Population Survey, January to December 2009

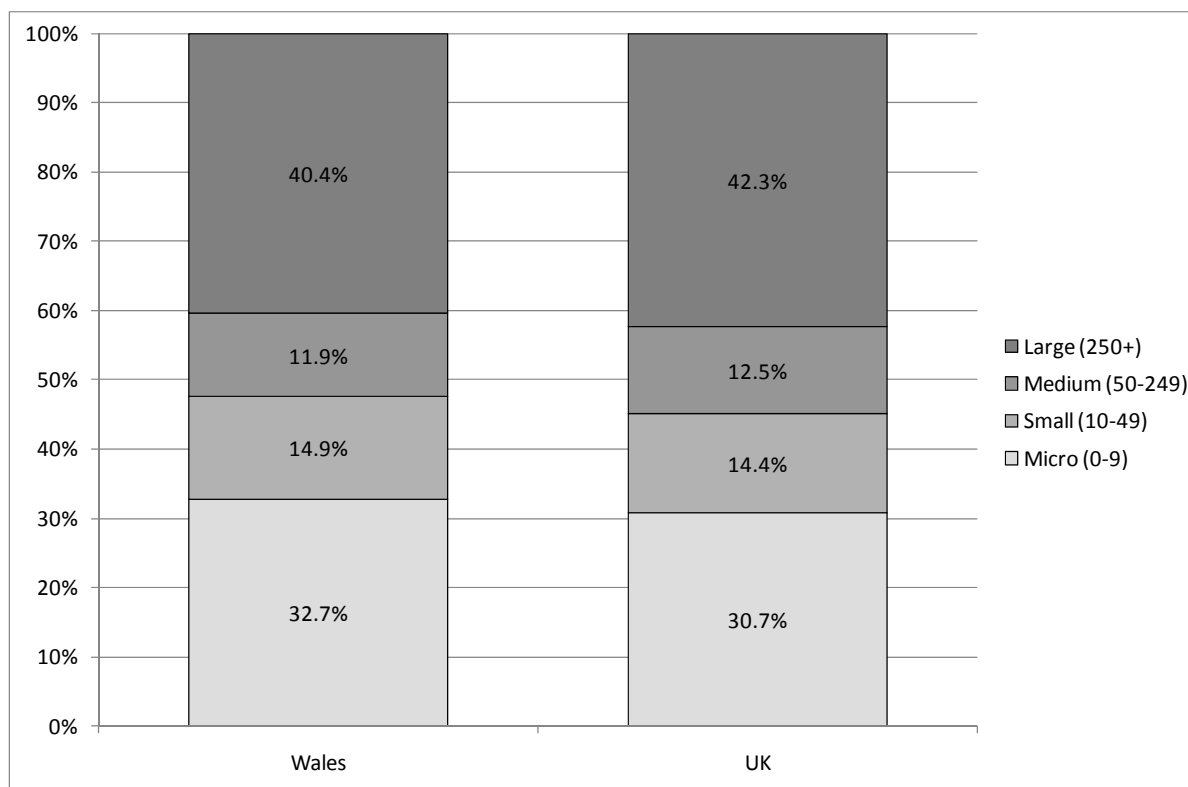
2.5. Size analysis of Welsh businesses

Analysis by the previous Welsh Assembly Government (Welsh Assembly Government, 2010c) shows that although micro businesses account for 94 per cent of the count of private sector enterprises active in Wales, they account for less than a third of total employment. Medium-size (5–249 employees) and large enterprises (250+ employees), meanwhile, together account for less than two per cent of the count of enterprises but more than half of total employment.

This overall picture conceals significant variation between industry sectors, with employment in agriculture almost entirely amongst micro businesses (91 per cent) and employment in production industries concentrated in the large size-band (53 per cent).

The profile of employment by size band in Wales is broadly similar to that seen across the wider UK (see figure below).

Figure 2.4: Employment shares by employee size-band, 2010



Source: Welsh Assembly Government

Note: relates to employment in private sector enterprises only; local and central government organisations are excluded.

2.6. Commuting flows

According to the Annual Population Survey, Wales had a net commuting outflow of 39,800 workers in 2009. This comprised 86,900 Welsh residents working outside Wales, offset by 47,100 people resident outside Wales coming into Wales to work. The inflow of workers into Wales is equivalent to around four per cent of the total number of people working in Wales. This proportion rises to more than 10 per cent for the border districts of Flintshire and Monmouthshire. Wales' net outflow of workers grew, from 29,400 in 2008, as the number of workers commuting out of Wales remained steady while the number coming into Wales fell sharply (Welsh Assembly Government, 2010d).

These commuting patterns are important because the inflow of workers from England helps to address demand for skilled labour in Welsh workplaces. It is notable that the proportion of people working in Wales who are resident outside Wales is highest for skills-intensive occupations i.e. managers, professionals and associate professionals. Fluctuations in the level of inward and outward commuting flows, linked at least in part to changing economic circumstances, have the potential to open up skills mismatches in Welsh workplaces.

71 per cent of working residents in Wales work within the local authority area within which they live. The largest net commuting flows within Wales are in the South East, with the biggest commuting inflows into Cardiff and Newport and the biggest out-commuting flows from the Vale of Glamorgan and Blaenau Gwent (Welsh Assembly Government, 2010d).

2.7. Growing and contracting sectors

Which sectors have seen the most growth since the early years of the century? Table 2.1 sets out the fastest / slowest growing sectors in Wales between 2002 and 2007 on the basis of the following key metrics:

- Output growth;
- Employment growth;
- Productivity growth; and
- Enterprise growth.

The **fastest growing** sectors across the four metrics are:

- **Financial services;**
- **Business services;**
- **Transport equipment;**
- **Health and social care; and**
- **Transport and storage.**

The contracting or slow growth sectors mainly comprise parts of manufacturing, including “other” manufacturing, wood / paper and publishing, textiles and clothing and metal manufacture.

Table 2.1: Growing and contract sectors in Wales 2002 to 2007³

Output	Employment	Productivity	Enterprises	Overall
<i>Fastest growing</i>				
Business services	Professional services	Financial services	Health and social care	Financial services
Financial services	Business services	Textiles and clothing	Professional services	Business services
Computing	Computing	Machinery manufacture	Transport equipment	Transport equipment
Transport equipment	Construction	Transport and storage	Construction	Health and social care
Transport and storage	Transport equipment	Post and telecommunications	Post and telecommunications	Transport and storage
<i>Slowest growing</i>				
Machinery manufacture	Metals and metal goods	Construction	Wholesale	Mining, quarrying and utilities
Mining, quarrying and utilities	Wood, paper and publishing	Mining, quarrying and utilities	Agriculture	Metals and metal goods
Other manufacturing	Other manufacturing	Education	Computing	Textiles and clothing
Wood, paper and publishing	Machinery manufacture	Wood, paper and publishing	Retailing	Wood, paper and publishing
Textiles and clothing	Textiles and clothing	Professional services	Other manufacturing	Other manufacturing

Source: UKCES calculations based on Working Futures and Inter Departmental Business Register

³ Due to the need to keep the data consistent, the analysis is restricted to the years 2002 to 2007 (2005 to 2007 in the case of the number of active enterprises), which therefore precedes the recession. Sectors are ranked according to the rate of change in the appropriate indicators. A sector with the highest rate of change achieves the highest ranking and the one with the lowest rate of change is in bottom place. The sectors are also ordered on a scale, from 0 to 1; the lowest is given the score of 0 and the highest is given the score of 1, with the remaining sectors positioned proportionately on this scale. The individual scores for each indicator are then aggregated to give a composite score.

Sectors differ also in the level of “added value” generated per person employed. This is shown in Table 2.2. Mining / utilities and banking, finance and insurance are the highest performing sectors on this measure, while manufacturing and transport and communications are also strong contributors. When we look at employment, however, we can see that some of the sectors with the largest levels of employment including distribution, hotels and restaurants, and public administration, education and health, are modest performers in terms of gross value added (GVA) per person. In sum, **some sectors primarily contribute to economic growth via high levels / growth of employment, others by high levels / growth of productivity.**

Table 2.2: Gross value added (GVA) per person employed in Wales by sector, 2007 (residence-based)

Industry group	GVA per worker per sector 2007 (£)
A-B: Agriculture and fishing	7,400
C,E: Mining and quarrying; energy and water	83,200
D: Manufacturing	45,500
F: Construction	26,500
G-H: Distribution, hotels and restaurant	25,900
I: Transport and communications	36,100
J-K: Banking, finance and insurance, etc	68,900
L-N: Public administration, education and health	17,600
O-Q: Other Services	32,100

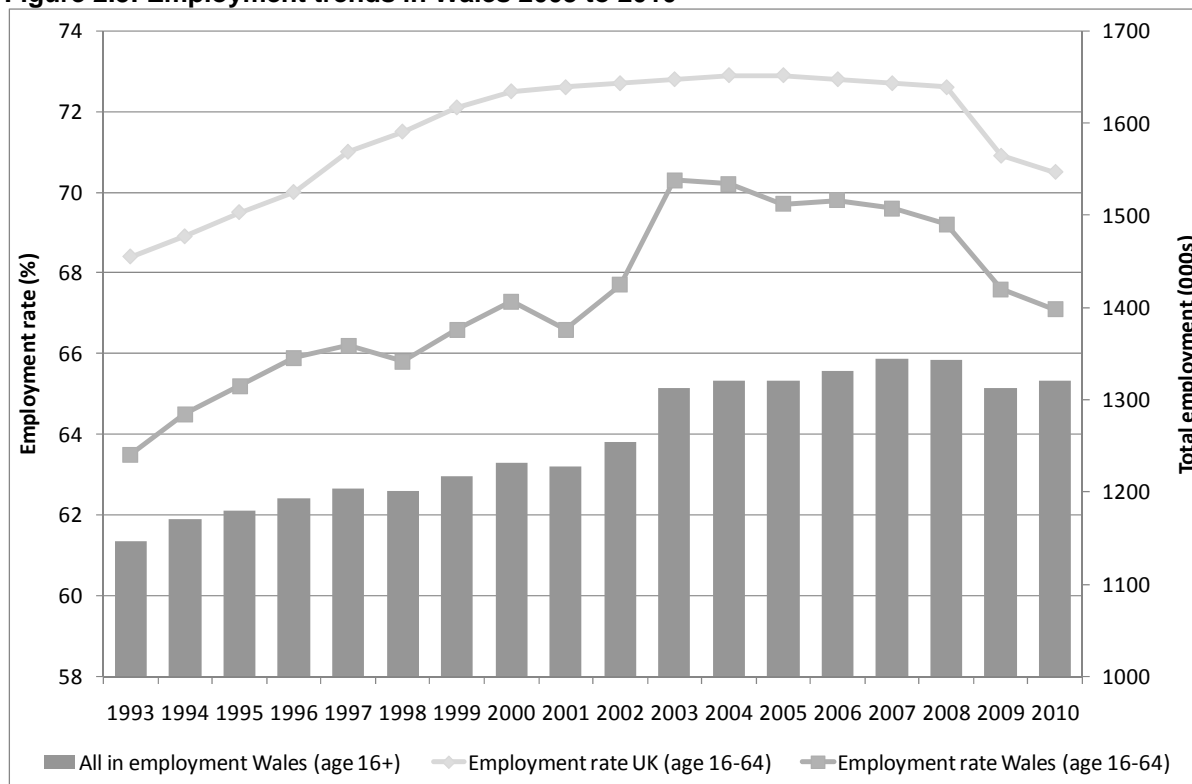
Source: UKCES (2010) UK Employment and Skills Almanac 2010

2.8. A trend towards rising employment

1.3 million people are in employment in Welsh workplaces. Although employment levels have fallen since the onset of the financial crisis, **there are still more than 150,000 additional people in employment compared with 15 years ago.** The demand for labour, as measured by the number of jobs being made available and filled, has therefore increased by almost 15 per cent over the period.

The employment rate (the proportion of the working age population who have a job) has also risen and stood at 67.6 per cent as of the fourth quarter of 2010 (source: Labour Force Survey, seasonally adjusted figure). The employment rate has plateaued since 2003 and has fallen from 70.1 per cent in 2008; there is, however, evidence of a convergence of Wales’ employment rate with that of the UK over the period as a whole (see Figure 2.5).

Figure 2.5: Employment trends in Wales 2003 to 2010



Source: Office for National Statistics: Labour Force Survey

2.9. The characteristics of the employed workforce

More men than women are in employment. 52 per cent of the employed labour force are male (see Table 2.5 for the gender balance by sector and occupation) but this is lower than the 54 per cent of 10 years ago.

More than three-quarters of those in work in Welsh workplaces are aged between 25 and 59 (see Table 2.3). However, different sectors have different age profiles. For example, those employed in the distribution / hospitality and other services sectors are relatively young, while public administration, transport and manufacturing have relatively old age profiles. Sectors with an ageing workforce could face a disproportionate level of “replacement” demand for labour as older people retire, although the trend towards longer working lifetimes may mitigate this effect to some extent.

Table 2.3: People in employment in Welsh workplaces by age and sector (%)

Age band (yrs)	Agriculture and fishing	Mining and utilities	Manufacturing	Construction	Distribution and hospitality	Transport and communications	Business services and finance	Public administration, education and health	Other services	All
16-24	(!) 8	(!!) 11	9	14	30	(!) 5	12	7	22	14
25-34	(!) 11	29	20	19	17	18	24	20	19	19
35-44	20	25	28	25	20	27	26	26	23	25
45-59	31	29	36	32	25	38	30	39	26	33
60-64	12	(!!) 5	5	8	5	9	6	6	7	6
65 and over	18	*	(!) 1	(!!) 2	3	(!) 3	3	2	4	3
Total	100	100	100	100	100	100	100	100	100	100

Source: ONS (2010) Annual Population Survey, January to December 2009

Note: industry sector relates to main job of respondent.

Key: >25% above average >25% below average

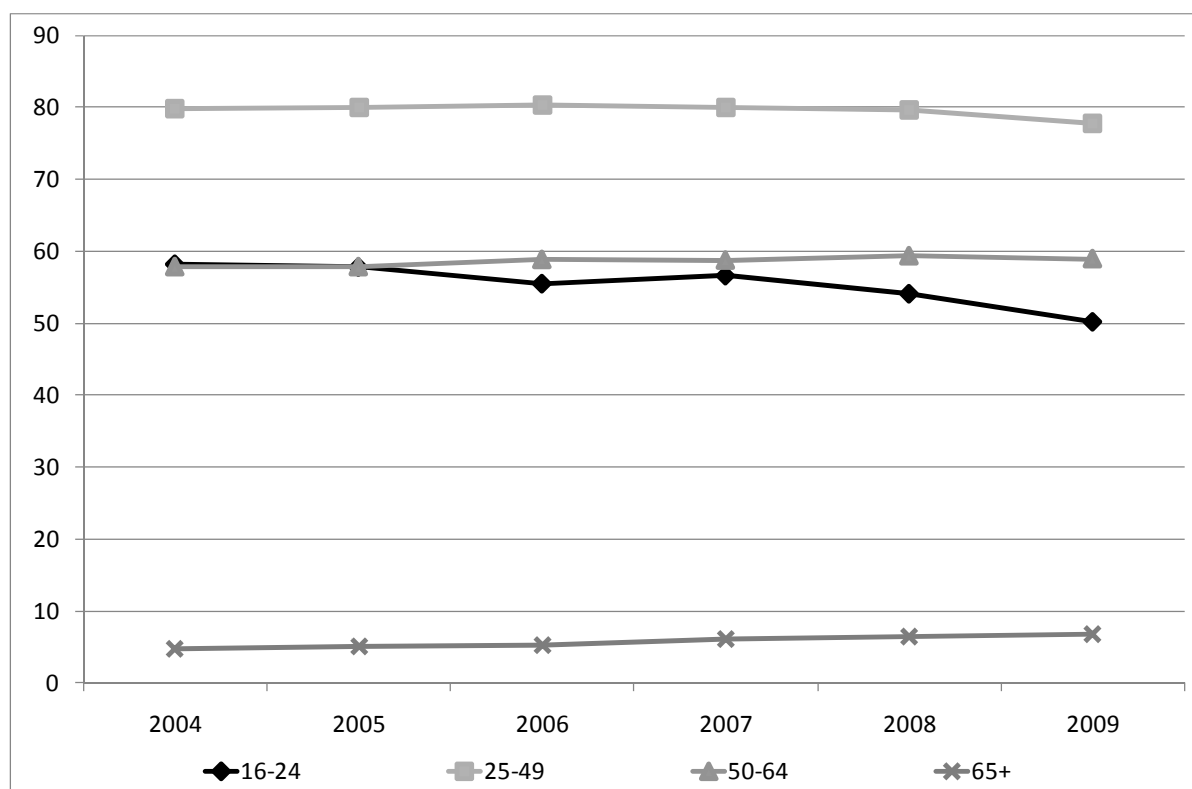
(!) 25 and 40 responses to the survey – limited quality

(!!) 10 and 25 responses to the survey - low quality

* Disclosive or not sufficiently robust for publication

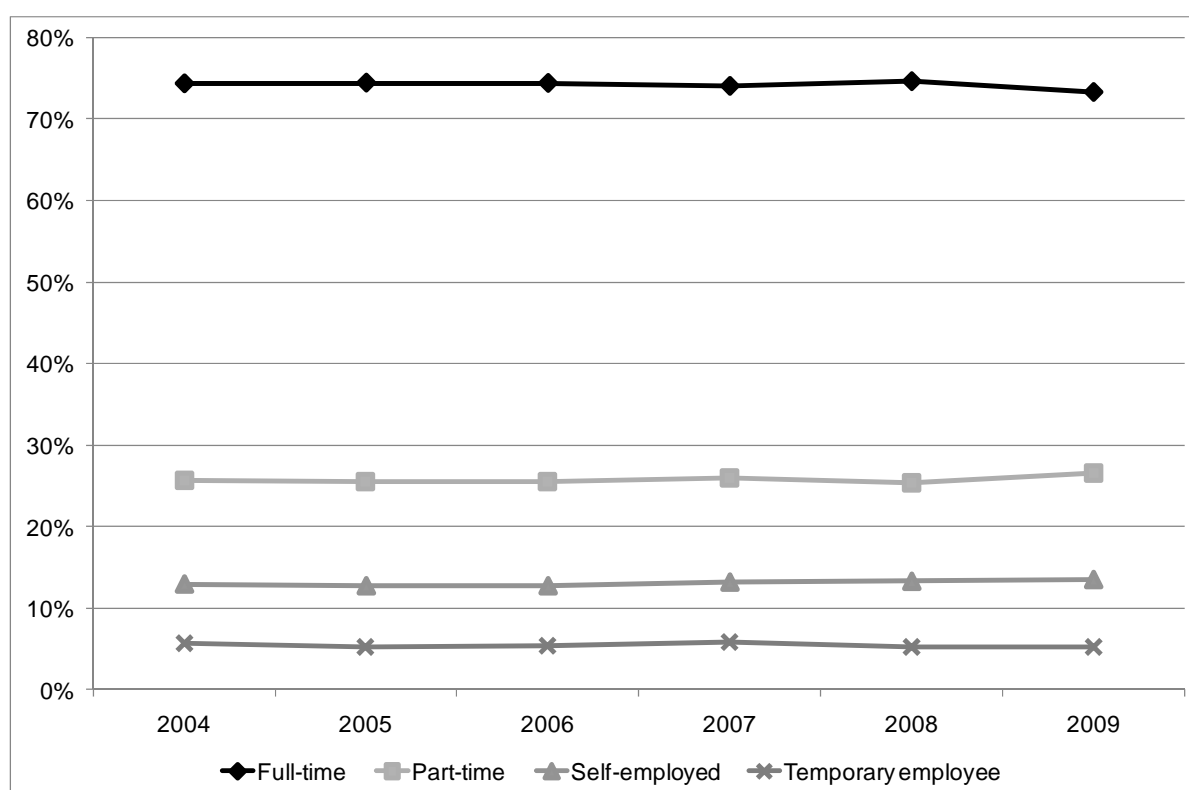
In recent years, the employment rate among older workers has risen significantly, albeit from a low base (see Figure 2.6). In 2009, 38,000 people over the age of 65 were in employment, almost 60 per cent more than in 2004, although this group still only accounts for a small proportion of the overall employed workforce (three per cent). The employment rate for those over retirement age has increased more rapidly than the UK in Wales in recent years although the rate remains slightly lower than the UK average.

Figure 2.6: Trends in employment rates by age in Wales



Source: Annual Population Survey

The employment rate for younger people has remained fairly static. Indeed, in the case of 16-24 year olds the rate of employment fell from 2008 onwards, reflecting the broad pattern for the UK.

Figure 2.7: Trend in employment status of people working in Welsh workplaces: 2004 to 2009

Source: Annual Population Survey

In terms of employment status 72 per cent of people in employment work full-time, with the remaining 28 per cent working part-time. 13 per cent are self-employed; whilst one in 20 have a temporary contract. The proportions in each of these categories remained broadly stable between 2004 and 2009.

Employment status differs markedly by gender. 44 per cent of women in employment work part-time compared with only 13 per cent of men. Moreover, only eight per cent of women in employment are self-employed, less than half the rate for men of 19 per cent.

In terms of ethnicity, some 96 per cent of Wales' employed workforce is white, a proportion that has fallen slightly since 2004 and is significantly higher than the UK average of 91 per cent. The proportion of people in employment in Wales who were born outside the UK has risen over this period from four per cent to six per cent but is markedly lower than the UK average of 13 per cent. Whilst more than 60 per cent of this group in Wales were born outside the European Economic Area, the growth in numbers is accounted for largely by migration within the EEA, with a sharp rise in the numbers coming from the EU accession countries, particularly Poland.

2.10. The jobs people do and the things they make: the structure of employment

The overall structure of employment in Wales by sector and occupation is shown in Table 2.4. We can see that the sectors which employ the largest numbers of people in Wales are public administration and education and health (which account for more than one third of all jobs), distribution, hotels and restaurants (19%) and business services and finance (12%). Manufacturing now accounts for one job in 10 and construction accounts for one job in 12.

Compared with the UK employment in Wales is strongly represented in public administration (34 per cent share of employment in Wales, 30 per cent in the UK) and “under-represented” in business services and finance (12 per cent versus 16 per cent) and transport and communications (five per cent versus nine per cent).

The occupations that employ the largest number of people are higher skilled: managers account for 13 per cent of employment and associate professional / technical 14 per cent. However, elementary occupations, covering lower skilled roles, also account for 13 per cent of employment in Wales, compared with an average of 11 per cent for the UK.

Taken together, high level occupations (managers, professionals and associate professionals) account for a substantial proportion of employment in Wales: 39 per cent of the total. However, this is somewhat lower than the 44 per cent share that these occupations hold at UK level.

12 per cent of total employment is in skilled trades, 10 per cent in personal services whilst sales / customer service and operative occupations each contribute around one in 12 of people employed.

The sectoral and occupational distribution of employment is highly gendered, as shown in Table 2.5.

Table 2.4: People in employment in Welsh workplaces by occupation and sector (000s)

	Agriculture, forestry and fishing	Energy and water	Manufacturing	Construction	Distribution, hotels and restaurants	Transport and communication	Business services and finance	Public admin, education and health	Other services	Total	% of employment
Managers and Senior Officials	3	(!) 4	19	12	42	6	29	34	8	158	13%
Professional occupations	*	(!!) 2	12	7	4	(!!) 2	27	91	8	152	12%
Associate Professional and Technical	*	(!) 3	14	5	11	4	30	95	15	177	14%
Administrative and Secretarial	1	(!!) 2	8	6	14	6	28	63	9	137	11%
Skilled Trades Occupations	21	(!) 3	32	50	29	(!) 4	4	7	4	154	12%
Personal Service Occupations	*	*	*	*	(!!) 2	(!) 3	(!!) 2	95	17	119	10%
Sales and Customer Service Occupations	*	(!!) 2	(!!) 2	(!!) 1	75	(!!) 1	11	4	(!!) 2	99	8%
Process, Plant and Machine Operatives	*	(!) 3	36	10	11	23	(!) 3	5	4	93	7%
Elementary Occupations	7	*	13	9	57	10	18	31	12	157	13%
Total	33	18	137	101	244	58	151	424	80	1,246	100%
% of employment	3%	1%	11%	8%	20%	5%	12%	34%	6%	100%	

Source: ONS (2010) Annual Population Survey, January to December 2009

Note: occupation and industry sector relate to main job of respondent.

(!) 25 and 40 responses to the survey – limited quality

(!!) 10 and 25 responses to the survey - low quality

* Disclosive or not sufficiently robust for publication

Table 2.5: Employment in Welsh workplaces by occupation and sector (women as % of total employment)

	Agriculture, forestry and fishing	Energy and water	Manufacturing	Construction	Distribution, hotels and restaurants	Transport and communication	Business services and finance	Public admin, education and health	Other services	Total
Managers and Senior Officials	(!!)22%	*	20%	(!!)10%	42%	(!!)24%	34%	52%	47%	36%
Professional occupations	*	*	(!!)16%	*	(!!)34%	*	18%	58%	(!)41%	43%
Associate Professional and Technical	*	*	28%	(!!)27%	52%	(!!)40%	41%	68%	48%	55%
Administrative and Secretarial	*	(!!)80%	69%	80%	76%	55%	72%	79%	79%	76%
Skilled Trades Occupations	(!)12%	*	(!!)6%	*	22%	*	*	54%	(!!)20%	10%
Personal Service Occupations	*	*	*	*	(!!)76%	(!!)47%	(!!)55%	85%	77%	83%
Sales and Customer Service Occupations	*	*	(!!)53%	*	68%	*	64%	(!)69%	(!!)66%	67%
Process, Plant and Machine Operatives	*	*	24%	*	(!!)11%	(!!)4%	*	(!!)23%	*	13%
Elementary Occupations	(!)44%	*	25%	*	56%	(!!)15%	49%	76%	42%	49%
Total	22%	25%	22%	10%	52%	19%	42%	70%	53%	48%

Source: ONS (2010) Annual Population Survey, January to December 2009

Note: occupation and industry sector relate to main job of respondent.

(!) 25 and 40 responses to the survey – limited quality

(!!) 10 and 25 responses to the survey - low quality

* Disclosive or not sufficiently robust for publication

Females account for a majority of employment in administrative / secretarial and personal service occupations (three quarters of jobs in the former case and more than four-fifths in the latter) and also in the broad industry sector of public administration, health and education. Men account for 60 per cent of employment in the two highest skilled occupational groups of managers and professionals, as well as the vast bulk of employment in skilled trades and operative roles (around nine out of 10 in each case). In sectoral terms male employment dominates in agriculture, energy, manufacturing, construction and transport.

Analysis at a more detailed level reveals that around a third of jobs are concentrated in just 20 occupations, many of which are characterised by high levels of part-time employment (see Table 2.6). The most common occupation is that of shop assistant, with almost 60,000 jobs, followed by care assistants with 40,000 jobs. A further 36,000 within the Top 20, are teaching jobs, either working with primary school children and early years or in secondary schools.

Table 2.6: The 20 biggest occupations in Wales by number of jobs, 2009

Occupation category	Number 000s	% of jobs held by women
Sales and retail assistants	57	72%
Care assistants and home carers	44	80%
Cleaners, domestics	35	78%
Nurses	33	89%
General office assistants or clerks	26	77%
Kitchen and catering assistants	22	75%
Educational assistants	21	94%
Accounts wages clerks, bookkeepers	20	79%
Primary and nursery teachers	19	84%
Retail and wholesale managers	18	40%
Chefs, cooks	16	51%
Farmers	16	(!)14%
Secondary education teachers	16	59%
Bar staff	15	48%
Customer care occupations	15	65%
Marketing and sales managers	15	(!)20%
Production works and maintenance managers	14	(!!)12%
Retail cashiers/check-out operators	14	76%
Civil service administrative officers and assistants	14	69%
Nursing auxiliaries and assistants	13	87%

Note: Workplace basis. Includes main jobs and second jobs.

Data are taken from the Annual Population Survey January to December 2009 and refer to occupations categorised at the "four digit" level. Residual categories (i.e. "other" occupations in a category not elsewhere specified) are excluded.

(!) 25 and 40 responses to the survey – limited quality

(!!) 10 and 25 responses to the survey - low quality

* Disclosive or not sufficiently robust for publication

Source: ONS (2010) Annual Population Survey

This analysis also shows that women hold a majority of the jobs in most of these occupations. This will be a particular issue where occupations with high levels of gender segregation have significant existing and / or future skill deficits because of the needs of men and women often differ.

2.11. Where have the new jobs come from?

Since 2000, employment in Wales has increased by more than 90,000, or around seven per cent; but which jobs have experienced the greatest increase, and which have seen the greatest decline?

Annual Population Survey data show that there has been considerable occupational change between 2004 and 2009. Overall the bulk of employment growth has been in personal services (+21,000), professional occupations (+16,000) and associate professional occupations (+12,000). On the other hand, operative occupations saw a decline in employment of 28,000, whilst employment in administrative / secretarial and sales / customer service fell by around 15,000 and 7,000 respectively. It should be noted that these declines are partly due to the impact of the recession in 2008/09 (see 2.13, below).

Employment growth in the three high level occupations (managers, professionals, associate professionals) was higher in Wales than across the UK as a whole during this period (eight per cent versus six per cent) and was also much higher for personal services (21 per cent versus 13 per cent). Conversely, employment contracted much more rapidly in Wales in operative roles (a decline of 23 per cent in Wales versus a 13 per cent reduction in England). In spite of faster growth since 2004, employment in the high level occupations still accounts for a smaller proportion of total employment in Wales than across the UK, whilst operative employment is still over-represented.

Table 2.7 shows the 10 fastest growing occupations between 2004 and 2009, ranked in terms of percentage growth. These cover a wide range of jobs. Prominent areas include ICT-related roles, at management and technician level; and personal service and hospitality roles, including occupations related to childcare, hairdressing and food preparation. It is important to note that half of the 10 fastest growing occupations have a dominant qualification level of level 4 and above.

Table 2.7: The 10 fastest growing occupations in Wales 2004 to 2009

Occupation	2004	2009	Change	% change	Predominant qualification level*
Information and communication technology professionals	7,000	11,800	4,800	69%	Level 4
Quality and customer care managers	3,600	5,800	2,200	60%	Level 3 and above
Health professionals	11,000	17,400	6,400	58%	Level 4
Childcare and related personal services	25,600	38,700	13,100	51%	Level 3 and above
Public service professionals (e.g. social workers)	7,600	11,300	3,600	48%	Level 4
IT service delivery occupations (e.g. IT operations technicians)	5,100	6,900	1,800	36%	Level 4
Customer service occupations	15,600	20,900	5,300	34%	Level 2 and below
Business and finance associate professionals (e.g. financial analysts and advisers)	13,200	17,700	4,500	34%	Level 4
Food preparation trades	16,800	20,800	4,000	24%	Level 2 and below
Hairdressers and related occupations	8,200	10,000	1,800	22%	Level 2 and below

Note: Workplace basis. Includes main jobs and second jobs.

Data are taken from the Annual Population Survey and refer to occupations categorised at the 'three digit' level. A minimum cell size of 40 unweighted cases in 2004 has been applied. Categories that have seen year-on-year growth in fewer than three out of five years are excluded. Figures rounded to nearest 100.

*i.e. more than 50 per cent of the people in this occupational group are qualified to this level (based on UK data).

Source: Annual Population Survey

By contrast, there are a number of occupations which have experienced significant declines over recent years in percentage terms (see Table 2.8). Operative occupations are prominent, including routine assembly, machine operative and process operative roles, together with low-level elementary storage and plant occupations, such as packers and labourers. In addition, several occupations in the administrative / secretarial group have been adversely affected.

It is notable that a majority of the fastest declining occupations are male-dominated. Men hold a large majority of the jobs in all of the top six occupations, although women account for the bulk of jobs in the secretarial, administrative and retail occupations that are highlighted. This is in contrast to the list of fastest growing occupations, which is split between male and female-dominated occupations as well as occupations in which the gender split is roughly equal.

This picture of occupational change largely reflects what we would expect to see, based on longer term historic trends for the UK and also reflects projected future trends as set out in chapter 6. It should be stressed that for a number of these occupations much of the decline in employment has occurred between 2008 and 2009 (i.e. since the start of the recession) and in some cases may not be solely attributable to longer run trends. The impact of the recession is explored further in section 2.13.

It is important to note that nine out of 10 occupations identified by this analysis have a dominant qualification level of Level 2 and below.

Table 2.8: The 10 fastest declining occupations in Wales 2004 to 2009

Occupation	2004	2009	Change	% change	Predominant qualification level*
Assemblers and routine operatives	27,600	15,300	-12,400	-45%	Level 2 and below
Process operatives	24,700	14,600	-10,200	-41%	Below Level 2
Elementary goods storage occupations	17,500	10,900	-6,700	-38%	Below Level 2
Plant and machine operatives	13,800	9,300	-4,600	-33%	Level 2 and below
Elementary process plant occupations (e.g. labourers, packers)	15,600	11,600	-4,000	-25%	Below Level 2
Managers and proprietors in other service industries (e.g. shopkeepers)	24,700	18,700	-6,000	-24%	Level 3 and above
Secretarial and related occupations	35,000	29,400	-5,600	-16%	Level 2 and below
Vehicle trades	13,600	11,500	-2,100	-15%	Level 2 and below
Administrative occupations: finance	33,000	28,900	-4,100	-13%	Level 2 and below
Sales assistants and retail cashiers	83,600	73,200	-10,300	-12%	Level 2 and below

Note: Workplace basis. Includes main jobs and second jobs.

Data are taken from the Annual Population Survey and refer to occupations categorised at the 'three digit' level. A minimum cell size of 40 unweighted cases in 2009 has been applied. Categories that have seen year-on-year decline in fewer than three out of five years are excluded. Figures rounded to nearest 100.

*i.e. more than 50 per cent of the people in this occupational group are qualified to this level (based on UK data).

Source: ONS (2010) Annual Population Survey

2.12. Employment in the regions

How does the pattern of employment by sector and occupation vary across the economic regions of Wales?

Table 2.9 sets out the sectoral profile of the four economic regions. The key points are:

- Agriculture is of particular importance to the economies of Mid Wales and South West Wales, relative to the other regions;
- Manufacturing is of above average importance to North Wales; and
- Business services and finance are strongly represented in South East Wales.

Table 2.9: People in employment in Welsh workplaces by sector and economic region

	North Wales	Mid Wales	South West Wales	South East Wales	Total
Agriculture, forestry and fishing	2.7%	8.9%	3.6%	0.4%	2.2%
Energy and water	2.1%	*	(!) 1.4%	2.5%	2.1%
Manufacturing	13.8%	6.7%	9.8%	10.1%	10.7%
Construction	8.6%	9.1%	8.8%	7.8%	8.3%
Distribution, hotels and restaurants	20.1%	20.4%	19.9%	18.8%	19.5%
Transport and communications	4.7%	(!) 4.2%	6.0%	6.2%	5.7%
Business services and finance	10.1%	9.7%	10.9%	13.4%	11.8%
Public admin, education and health	32.8%	32.5%	34.5%	35.1%	34.2%
Other services	5.1%	6.4%	5.1%	5.8%	5.5%

Source: ONS (2010) Annual Population Survey, January to December 2009

Note: Column percentages. Industry sector and place of work relate to main job of respondent. Percentages may not sum to 100 due to rounding.

Relatively important sector to the region in providing employment

(!) based on 25 and 40 responses to the survey – limited quality

(!!) based on between 10 and 25 responses to the survey - low quality

* Disclosive or not sufficiently robust for publication

Table 2.10 looks at the occupational profile of employment by region. This shows that South East Wales has a relatively high representation of employment in the higher level management, professional and associate professional occupations but a relatively low proportion of employment in skilled trades. Skilled trades are a relatively important occupation in the economies of North Wales, Mid Wales and South West Wales. Mid Wales also has a relatively high concentration of employment in elementary occupations.

Table 2.10: People in employment in Welsh workplaces by occupation and economic region

	North Wales	Mid Wales	South East Wales	South West Wales	Total
Managers and Senior Officials	12.6%	12.2%	13.6%	11.0%	12.7%
Professional occupations	11.4%	10.8%	12.9%	11.8%	12.2%
Associate Professional and Technical	13.8%	12.3%	15.0%	13.4%	14.2%
Administrative and Secretarial	10.9%	11.4%	10.6%	11.7%	11.0%
Skilled Trades Occupations	14.7%	17.4%	9.7%	14.1%	12.4%
Personal Service Occupations	10.0%	9.2%	9.6%	9.0%	9.5%
Sales and Customer Service Occupations	6.7%	6.4%	8.5%	8.4%	7.9%
Process, Plant and Machine Operatives	8.0%	5.7%	7.5%	7.5%	7.5%
Elementary Occupations	11.8%	14.6%	12.5%	13.2%	12.6%

Source: ONS (2010) Annual Population Survey, January to December 2009

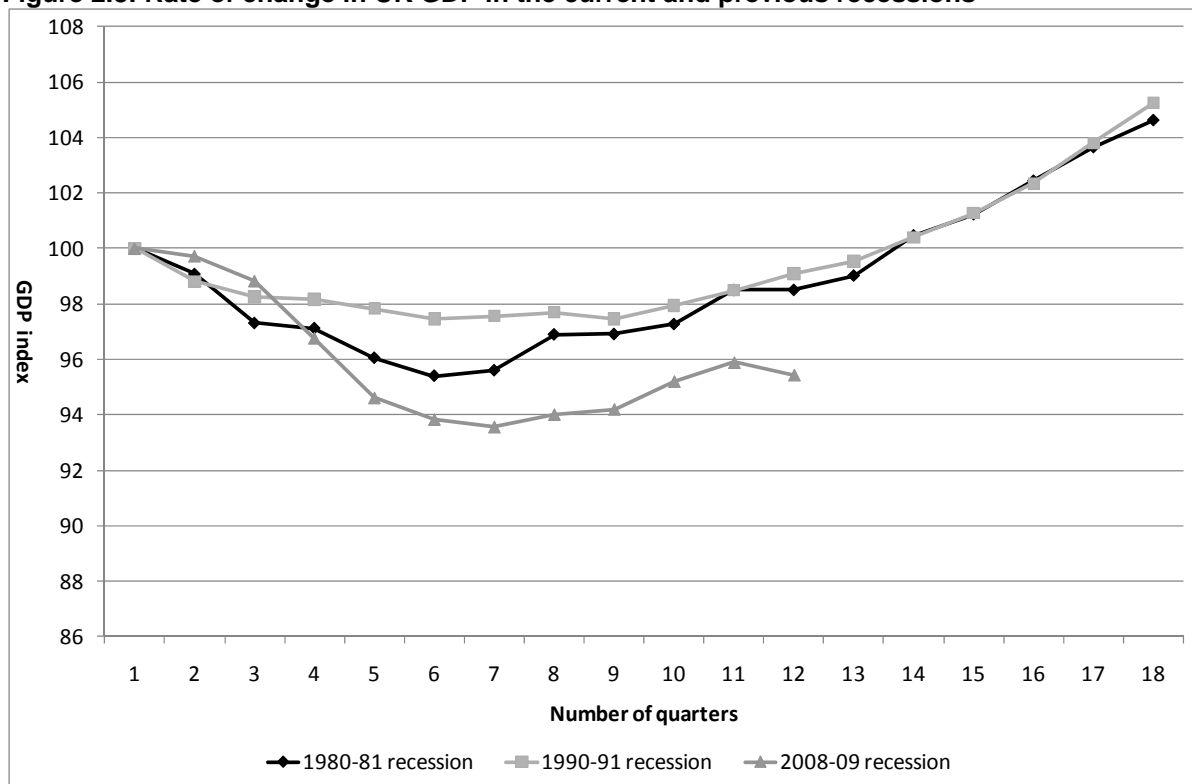
Note: Occupation and place of work relate to main job of respondent. Column percentages may not sum to 100 due to rounding.

Relatively important occupation to the region in providing employment

2.13. The recession

The recent recession began in the second quarter of 2008 and has been more severe than both the two most recent previous recessions, in terms of the rate of decline in GDP at UK level. Figure 2.8 shows the rate of change in GDP in the UK indexed to the start of the recession in 2008, and for comparison, the 1980/81 and 1990/91 recessions. This sharp contraction came to an end, initially, in the last quarter of 2009, with GDP stabilising and then starting to grow, before seeing a further decline in the final quarter of 2010. The severity of the 2008-09 contraction means that the economy is still in a relatively worse position currently compared with the equivalent points in time in both previous recessions. UK GDP has so far recovered about half of the output lost during the recession. In the past two recessions it took just over three years for output to reach the pre-recession level.

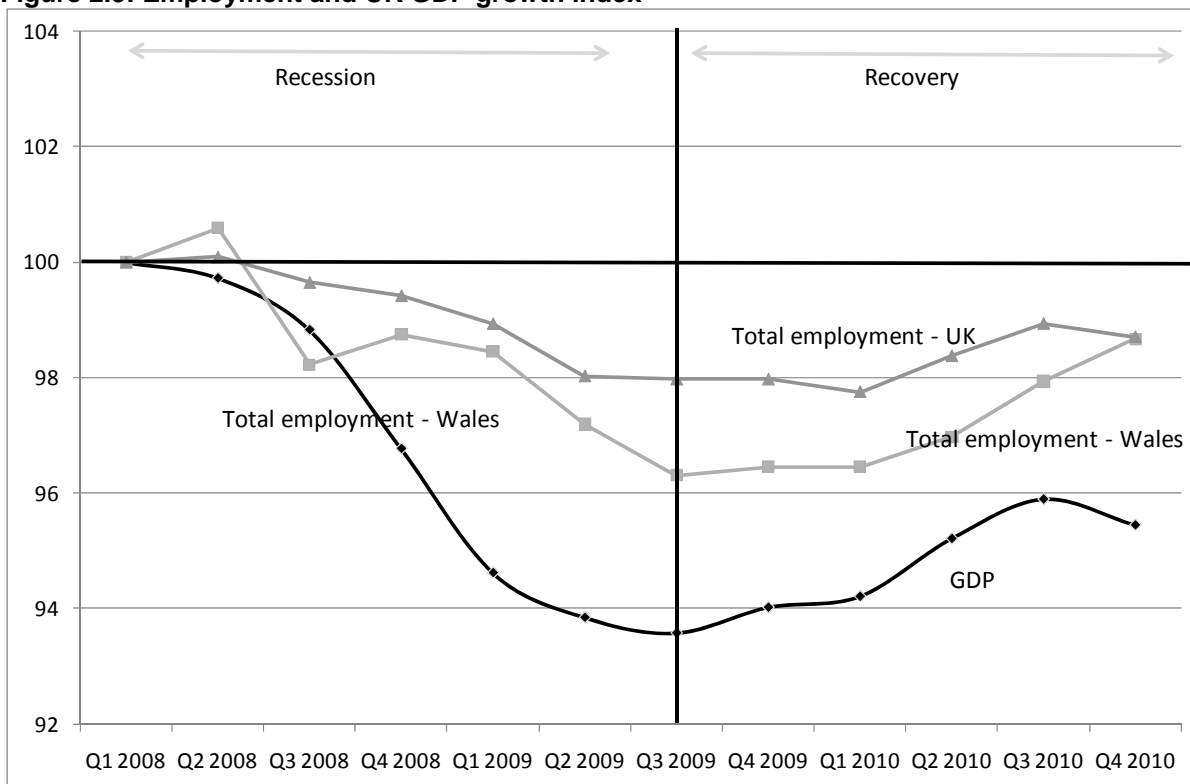
Figure 2.8: Rate of change in UK GDP in the current and previous recessions



Source: ONS Gross Domestic Product (ABMI): chained volume measures, seasonally adjusted

The contraction in employment brought on by the recession has been more pronounced in Wales than at UK level and Wales has not yet fully regained this ground. From its peak in quarter two 2008 to its low point in quarter three of 2009, employment in Wales fell by four per cent compared with a figure of two per cent for the UK as a whole. Nonetheless, employment levels in Wales grew by 10,000 in quarter four 2010 and employment was 30,000 higher at the end of 2010 compared with a year earlier (see Figure 2.9). However this masks differing situations between types of workers (as at UK level), with much of the growth being driven by part-time and temporary workers.

Figure 2.9: Employment and UK GDP growth index

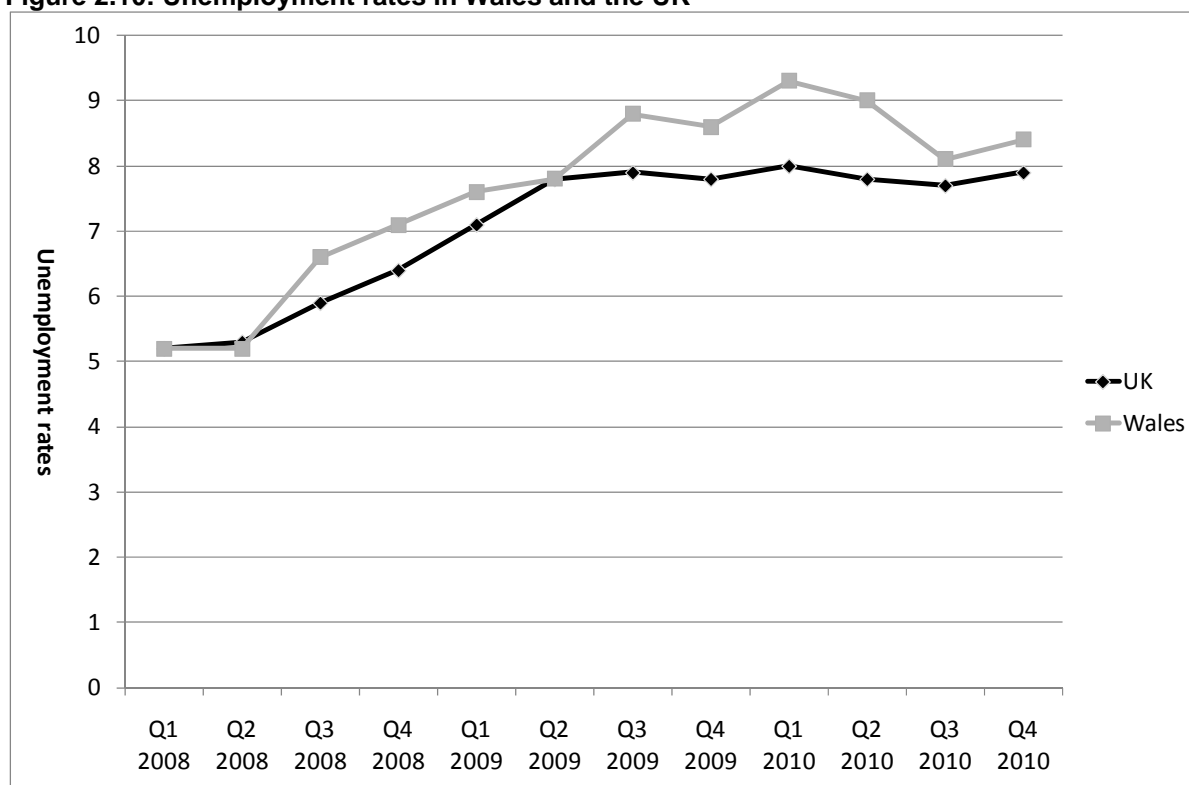


Note: Index: 2008 Q1=100

Source: ONS Gross Domestic Product (ABMI): chained volume measures, seasonally adjusted; Total employment level: Labour Force Survey, all those aged 16 and over, seasonally adjusted

In recessions, increases in unemployment tend to continue for some time after GDP starts to grow again as people continue to lose their jobs, move onto the unemployment register and take longer to find a new job and flow off again. Since the 2008-09 recession the rate of increase in unemployment has been less marked than in previous recessions, as employers appear to be retaining labour to ensure they have the skills to capitalise on in the economic recovery.

The (ILO measured) unemployment rate at quarter 4 2010 was 8.4 per cent in Wales, compared with an average of 7.9 per cent for the UK. With the onset of recession unemployment grew at a faster rate in Wales but there are signs of convergence with the UK rate since then.

Figure 2.10: Unemployment rates in Wales and the UK

Source: Labour Force Survey, all those aged 16 and over, seasonally adjusted

Table 2.11 shows the 10 fastest declining occupations during the recession. Unlike the analysis in section 2.11 these are ranked in **absolute terms** rather than percentage terms, in order to minimise potential statistical anomalies arising out of a comparison at such a detailed level using only two years worth of data.

Table 2.11: The 10 occupations seeing the greatest decline in Wales during the recession

Occupation	2008	2009	Change	% change
Process operatives	21,300	14,600	-6,800	-32%
Construction trades	44,000	38,500	-5,500	-13%
Metal machining, fitting and instrument making trades	21,300	16,600	-4,800	-22%
Elementary goods storage occupations	15,600	10,900	-4,700	-30%
Assemblers and routine operatives	19,500	15,300	-4,200	-22%
Sales assistants and retail cashiers	77,300	73,200	-4,100	-5%
Teaching professionals	65,700	62,200	-3,500	-5%
Mobile machine drivers and operatives	10,600	7,200	-3,400	-32%
Managers and proprietors in other service industries (e.g. shopkeepers)	22,000	18,700	-3,200	-15%
Elementary construction occupations	15,200	12,200	-3,000	-20%

Note: Workplace basis. Includes main jobs and second jobs.

Data are taken from the Annual Population Survey and refer to occupations categorised at the 'three digit' level. A minimum cell size of 40 unweighted cases in 2009 has been applied. Figures rounded to nearest 100.

Source: ONS (2010) Annual Population Survey

Routine operative and low-skilled elementary roles are strongly represented among the worst-affected occupations. The analysis also seems to reflect the impact of the recession on the construction sector in terms of both skilled trades and labouring roles.

Some of the occupations, such as teachers and retail assistants, have seen relatively minor declines in percentage terms but still feature in the list because of their large overall size in employment terms.

Looking at the impact of the recession at a broader level the occupational major group that felt the greatest negative impact on jobs, in percentage terms, between 2008 and 2009 was process, plant and machine operatives, which experienced a rate of decline that was four times greater than the overall average rate for Wales and twice the UK average rate of decline for operatives. It is notable, however, that management occupations also saw a rate of decline that was twice the overall average for Wales.

Even in the recession, some occupations have actually grown (see Table 2.12), particularly roles related to personal services such as bar staff, childcare workers and hairdressers, for example. Other areas of growth include health associate professionals (including nurses) and customer service roles (including call centre agents). At a broad level there appears to have been slight growth in the numbers employed in associate professional / technical roles and in personal service roles. It is notable that many of the jobs that have seen the greatest short-term growth require a relatively low level of skills and qualifications; this runs somewhat counter to expected longer-term trends.

Table 2.12: The 10 occupations seeing the greatest growth in Wales during the recession

Occupation	2008	2009	Change	% change
Health associate professionals (e.g. nurses)	37,100	43,000	5,900	16%
Childcare and related personal services	33,800	38,700	4,800	14%
Customer service occupations	17,600	20,900	3,300	19%
Elementary personal services occupations	50,000	53,000	3,000	6%
Sports and fitness occupations	5,500	8,500	3,000	54%
Elementary cleaning occupations	38,200	40,500	2,400	6%
Food preparation trades (e.g. chefs)	18,500	20,800	2,300	12%
Transport drivers and operatives	38,400	40,500	2,100	5%
Hairdressers and related occupations	8,000	10,000	1,900	24%
Elementary sales occupations (e.g. shelf fillers)	9,700	11,600	1,900	19%

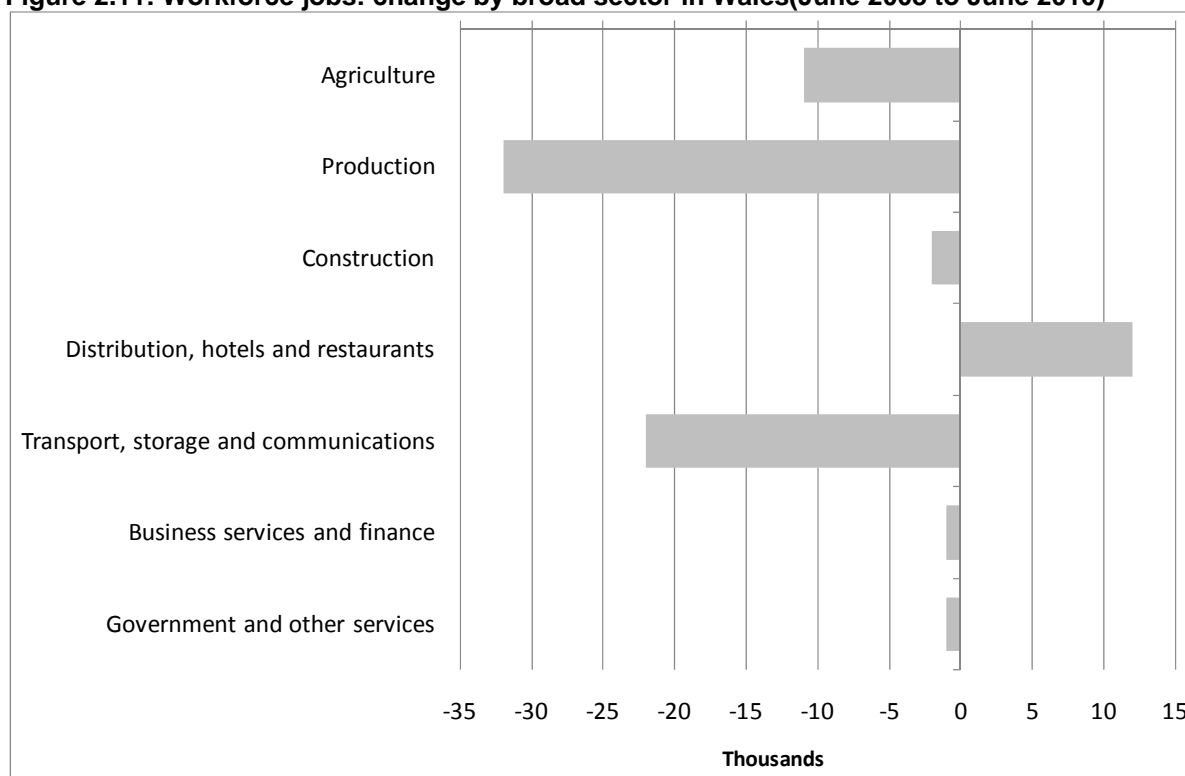
Note: Workplace basis. Includes main jobs and second jobs.

Data are taken from the Annual Population Survey and refer to occupations categorised at the 'three digit' level. A minimum cell size of 40 unweighted cases in 2008 has been applied. Figures rounded to nearest 100.

Source: ONS (2010) Annual Population Survey

In sectoral terms, the biggest decline in workforce jobs in absolute terms has been seen in the production sector, primarily manufacturing, down by 30,000 or 18 per cent between June 2008 and June 2010. Transport, storage and communications and agriculture have also experienced significant declines of more than 20,000 and over 10,000 respectively, equivalent to 28 per cent and 26 per cent respectively in proportionate terms. The declines seen in all of these sectors are all in excess of the UK average, with UK production jobs contracting by nine per cent over the same period, while transport fell by five per cent.

In the services component of the economy financial services employment fell by 21 per cent and information / communication services by almost two-fifths. Construction employment has proven relatively resilient so far, falling by only two per cent. In terms of broad sectors, only distribution / hospitality has seen growth over this two year period; since employment fell across the UK in this sector over the same period, Wales may have outperformed the UK in this area.

Figure 2.11: Workforce jobs: change by broad sector in Wales (June 2008 to June 2010)

Source: ONS (2010c), Labour Market Statistics Release October 2010: Wales

2.14. The skills of the workforce

We end this chapter with a brief review of the skills that are available in the current workforce. We focus in particular on skills as measured by qualification level, although, as we noted in chapter one, this is only one measure of skills.

Table 2.13: Highest qualification held by working age adults by CQFW⁴ level

	Wales	UK
2004		
Qualified to CQFW level 4 or above (%)	25	28
Qualified to CQFW level 3 (%)	19	19
Qualified to CQFW level 2 (%)	21	20
Qualified below CQFW level 2 (%)	17	18
No qualifications (%)	17	15
2009		
Qualified to CQFW level 4 or above (%)	30	32
Qualified to CQFW level 3 (%)	21	20
Qualified to CQFW level 2 (%)	21	20
Qualified below CQFW level 2 (%)	15	17
No qualifications (%)	14	11

Source: StatsWales

Table 2.13 shows that 30 per cent of adults resident in Wales now hold a qualification at level four or above, an increase of five percentage points on 2004 but two percentage points behind the UK average. However, the gap has closed slightly over this five year period.

⁴ Credit and Qualification Framework for Wales.

A higher proportion of women than men are qualified at level four or above. 31 per cent of women are qualified at this level compared with only 28 per cent of men.

The proportion of adults with no qualifications has seen a significant decline of around three points but is still three points higher than UK. This gap has widened slightly since 2004, moreover.

Around two-fifths of adults are qualified at intermediate level (levels two and three) in Wales, which is similar to the UK average. This proportion has remained fairly static since 2004.

Men are more likely to be qualified at intermediate level. 43 per cent of males hold their highest qualification at level two or three, compared with 38 per cent of females.

It is notable that there is a strong correlation between the likelihood of being in employment and the level of qualification held. The employment rate is much higher for people qualified at degree level and above than for people qualified at intermediate level, who in turn have a higher rate than low qualified and unqualified people. Moreover, the employment rate in respect of higher qualified people is fairly constant across Wales, whereas it varies significantly between local areas for those without qualifications and is significantly lower in areas recognised as deprived, such as the Heads of the Valleys (Welsh Assembly Government, 2010e).

2.15. Conclusions

This chapter has provided a broad brush picture of the key characteristics of jobs and skills in Wales, as this is the foundation for understanding our skill requirements.

Before the recession, the UK had enjoyed a sustained period of **long term economic growth**, often out-performing many other EU and OECD countries. Growth in Wales lagged behind that of the UK during this period.

The current level of employment in Wales is 150,000 higher than 15 years ago, in spite of the impact of the recent recession.

The economy and labour market are **globally connected and dependent**, with exports of goods equivalent to over one-fifth of total GVA in Wales.

Wales' economy and jobs are strongly regionally concentrated: the economic region of South East Wales alone contributes almost a half of all Wales' jobs. There are also variations in regional employment and productivity levels as well as in economic structure – both sectoral and occupational.

Commuting patterns have a significant bearing on the supply of labour in Wales.

Around 47,000 people commute into Wales to work, equivalent to four per cent of the total number of people who work in Wales. There is a net outflow of workers, however, with 87,000 Welsh residents working outside Wales.

The employed workforce is ageing. More than 40 per cent are now aged 45 or over, and the numbers of those over 64 in employment has grown by almost 60 per cent in four years, though the age composition of different sectors does differ. Four per cent of the employed workforce is of ethnic minority origin, and this has changed little in recent years. However, the proportion of employment accounted for those born outside the UK has increased from around four per cent to six per cent since 2004.

The distribution of employment by occupation and sector is strongly gendered. For example men occupy the vast majority of skilled trades and operative employment while women dominate in administrative / secretarial and personal service occupations. This will be a particular issue where occupations with high levels of gender segregation have significant existing and / or future skills shortages.

People also predominantly work full time: around seven out of ten do so, though 'atypical' employment is also considerable, and has implications for skills development. One in four work part time, one in eight are self employed, and six per cent are on temporary contracts. And, while most businesses are small, employing relatively few people, in fact more than half of people in Wales actually work for medium size and large businesses with 50 or more employees.

In terms of the 'sectoral' structure of employment, **the largest sectors are public administration, education and health**, together accounting for more than one job in three. Distribution, hotels and restaurants account for around one job in five and banking, finance and insurance one in eight. Manufacturing accounts for one job in ten and construction one in 12.

In terms of the 'occupational' structure of employment, **those which employ the largest number of people are the higher skilled groups of managers/senior officials and associate professional/technical jobs.** Together, they account for more than a quarter of all jobs. Both the sectoral and occupational structure of employment remain strongly gendered.

Where have the new jobs come from in recent years? Overall, the vast bulk of growth has been in personal services (+20,000), professional (+16,000) and associate professional/technical (+12,000) roles. **Employment growth has been concentrated in higher level occupations and has therefore been skill-intensive.**

It appears that the UK and Wales have recently emerged from the deepest recession for possibly 80 years, though the impact on unemployment to date has been less marked than in the recessions of the early 1980s and 1990s. Nonetheless, unemployment has risen significantly, and more markedly in Wales than in the UK. **The recession has also impacted most, in terms of employment, on lower skilled and intermediate occupations**, rather than on 'white collar' higher skilled occupations, although some high skilled occupations have been adversely affected. **Its sectoral impact has been most severe on manufacturing and transport jobs.**

The qualification profile of adults in Wales is broadly similar to that of the UK, although a higher proportion hold no formal qualifications and a slightly lower proportion are qualified at level four and above.

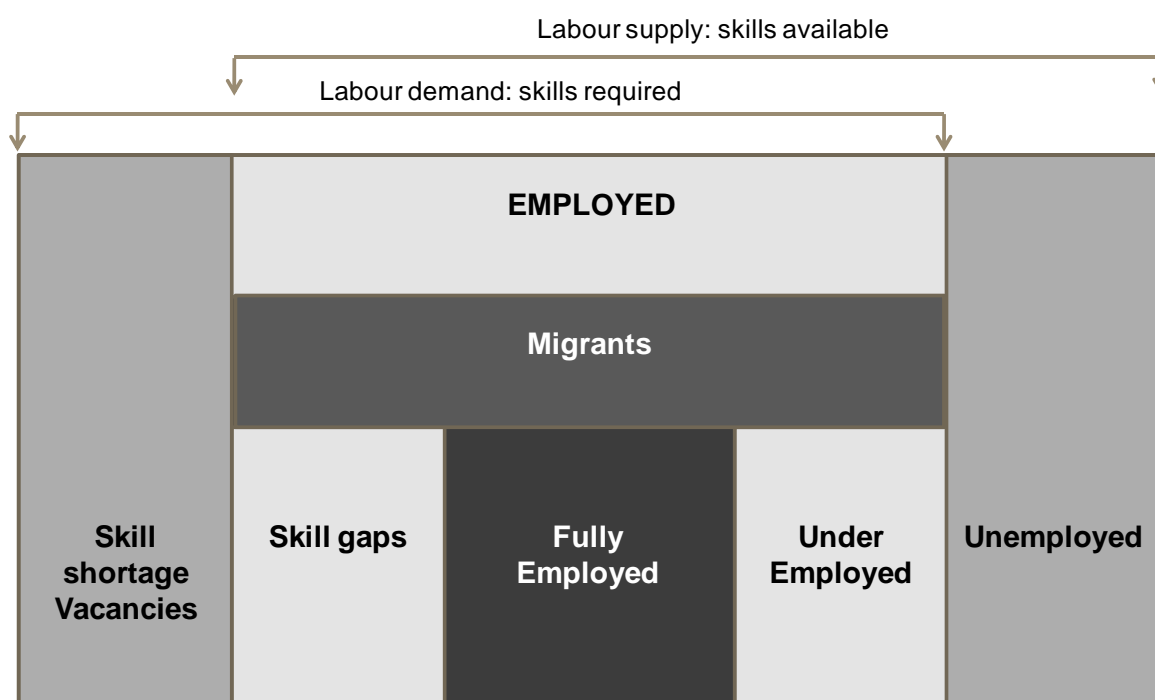
3. Current skills mismatch

3.1. Introduction

Imbalances and mismatches in the labour market can take a number of forms. This chapter first sets out the framework we have developed to examine current skills mismatches, which will enable us to identify the key skills issues in a coherent and systematic approach way. In short, it is these mismatches that need to be addressed in adopting a strategic approach to skills development to meet labour market needs.

The framework we have developed, and which is set out in Figure 3.1, below, enables us to examine the degree of match/mismatch in the labour market, through examining the various components of the lack of alignment between the demand for, and supply of, skills.

Figure 3.1: Framework for assessing demand/supply mismatch



There are five components of mismatch. First, labour demand may not be fully met if the labour supply does not possess the volume/type of skills available sufficient to meet those needs. These 'skill shortages', where employers are unable to, or have difficulty in, recruiting/filling their vacancies are effectively a measure of the mismatch between demand and supply, and represent an 'excess demand' for these skills as well as a key 'pinch point' in the system.

Secondly, labour supply may exceed labour demand, giving rise to unemployment and the existence of an unused/unwanted 'skills surplus.' These may be corrected by market trends in wages and worker behaviour, with workers responding to market signals to acquire the skills in shortage, or they may persist for a range of reasons associated with market failures or failures of public policy.

Thirdly, we can extend our analysis to the 'internal' labour market of organisations. It may be the case that, though employed, some workers may not be fully proficient in their job and do not meet all of their employers' needs. This represents an internal 'skill gap,' and is also damaging as it reduces the organisation's capability and restricts its opportunity to fulfil its potential.

Fourthly, it may also be the case that rather than there being a 'skill gap' where demand (the skills required) exceeds supply, (the skills available), there may be 'underemployment' where the skills that the workforce possess are not fully utilised but rather "underemployed" in their current job.

Finally, we complete our assessment of skill mismatches by examining one final component of the employed workforce: migrants. Although employers recruit migrants for a range of reasons, if they are unable to hire domestic workers because the skills are not available in sufficient quantity or quality, they may hire employees from abroad to meet their needs. While this is beneficial for the employer and to the migrant, and indeed has no negative impact on domestic workers if the jobs would have remained unfilled, it may reduce the 'incentive' for domestic workers to acquire these skills. In a relatively open labour market like that in the European Economic Area (EEA), employers may 'prefer' on occasion to hire migrants for reasons of productivity or cost. It may also be a public policy objective to maximise employment opportunities for domestic workers, and so an assessment of the jobs that migrants hold is the final piece of our skills mismatch jigsaw. We now examine each of the components of potential mismatch in turn.

It is necessary to raise an important technical point at this stage. The latest available data relating to skills shortages and gaps in Wales date from the Future Skills Wales employer survey of 2005⁵ (Young and Morrell, 2006). Because these data are now more than five years old they are of limited value in assessing the current position around skills deficits. In respect of shortages, whilst the demand for labour has risen considerably since that time, current conditions mean that labour demand is relatively low. Moreover, the skills of the workforce in Wales have risen since 2005 and the pattern of labour demand has also changed, as we saw in chapter 2.

Therefore, in assessing the incidence and level of skills shortages and gaps in Wales we have extrapolated forward the results of the Future Skills Wales 2005 Sector Skills Survey using National Employer Skills Survey (NESS) data for England. The NESS time series extends to 2009 and therefore covers some of the impact of the recession. Our approach involves applying the percentage change by broad industry in the level and incidence of skills shortages observed in England between 2005 and 2009 onto the 2005 baseline for Wales. Data relating to skills deficiencies at sectoral level, collected by Sector Skills Councils also helps us to fill the gap created by the lack of timely national skills survey data and provide a specific flavour to our analysis of the jobs affected by skills shortages.

To aid understanding of the extrapolations, the following table provides a comparison of the "baseline" positions for Wales and England in respect of key indicators of skill deficit, drawing on NESS and the Future Skills Wales survey. The table shows a broadly similar picture for the two countries in 2005, although the incidence of skill gaps was somewhat higher in Wales. Of course, this does not mean that the both nations have followed a similar trajectory since then. Only with the publication of results from the UK Employer Skills Survey 2011 will we have access to more current data.

⁵ There is one key exception. An estimate for 2010 is available for the proportion of Welsh establishments with skill gaps. This is considered in section 3.6, below.

Table 3.1: Summary of key indicators of skill deficits by country, 2005

	Wales	England
<i>Skills shortages</i>		
% establishments with skill shortage vacancies	4	5
Skill shortage vacancies as a % of employment	0.5	0.7
<i>Skill gaps</i>		
% of establishments reporting skill gaps	20	16
Skills gaps as a % of employment	6	6

Source: Future Skills Wales 2005; National Employers Skills Survey2005 (England)

We have provided further analysis of the Future Skills Wales 2005 Sector Skills Survey in Appendix 1.

3.2. Skill shortages: national, regional, occupational and sectoral priorities

To what extent do employers have difficulty in recruiting the people they need? In which sectors, regions and occupations are these difficulties most pronounced?

Skills shortage vacancy (SSV) is a technical term used to describe a subset of vacancies, which are defined as “hard-to-fill” because of a lack of skills, work experience or qualifications in the candidates applying for a role. This measure deals with a deficiency of skills in the labour pool external to organisations, as opposed to measuring a lack of proficiency among the internal labour pool of an organisation, known as a skills gap.

3.2.1. The national picture

The number of skill shortage vacancies (SSVs) in Wales is relatively small. Using our extrapolations of skills deficits (see introduction to this section) we estimate that there are currently around 2,000 across the whole Welsh economy. This low figure partly reflects the impact of the recession but even prior to the downturn in 2005 the figure was estimated to be only 5,000 (Young and Morrell, 2006).

This means that for every 1,000 employees in Wales there are likely to be only two SSVs, compared with 5 SSVs per 1,000 employees in 2005.

Employer surveys conducted at sector level in Wales by SSCs also support this picture of reducing skill shortages (see paragraph 3.2.4).

Skills shortages only affect a small minority of organisations: four per cent of Welsh establishments in 2005. Almost nine out of 10 SSVs occur in establishments with less than 25 employees.

3.2.2. The regional picture

We do not have current estimates of the geographic distribution of skill shortages. In 2005 the distribution of SSVs by Welsh economic region was broadly in line with the distribution of the employment base, with some over-representation in South West Wales and under-representation in South East Wales (Young and Morrell, 2006).

3.2.3. The occupational picture

Looking at the occupations with the highest shares of total shortages, we estimate, based on our extrapolations, that associate professional and skilled trades are most significant, as in 2005. However, machine operatives, which accounted for the third highest share of SSVs in 2005 are, we believe, now less important, having seen a steeper than average decline in shortages, along with skilled trades and sales / customer service roles. We might expect to see a decline in operative and skilled trades shortages since Wales is experiencing a long-term decline in numbers of people employed in these areas and both have been hard hit by the recession.

The analysis conducted by the SSCs in their sector assessments used as inputs to this Audit provide a detailed and generally more up to date insight into the nature of skills shortages. It is important to note that among those SSCs who have measured the incidence of hard to fill vacancies over the course of the last 12-18 months there appears to have been a significant fall in the volume of reported hard-to-fill vacancies (Worcester Research, 2010).

At associate professional level, the occupational group with the highest density of skills shortages, specific examples include a shortage of sports coaches in the active leisure

sector (SkillsActive, 2010) and of qualified investment advisers in financial services (FSSC, 2010). Technicians in the energy and utilities sector are also highlighted as being a key shortage (EU Skills, 2010).

In addition there is a shortage of skilled and experienced advice workers, counsellors and community development workers and other positions that require interaction with service users and the possession of specific skills (Skills for Justice, 2010).

In terms of skilled trades, notable examples of skills shortages include:

- Skilled chefs in the hospitality sector, with identified deficiencies in technical areas such as knife skills, as well as team working skills (People 1st, 2010);
- Skilled butchers (Improve, 2010); and
- A shortage of skilled and qualified craft operatives in the engineering construction sector (SummitSkills, 2010).

With regard to SSVs in personal services occupations, employers of social care workers have reported difficulties in recruiting and retaining staff in the past, although there is evidence that recruitment difficulties are now easing (Skills for Care and Development, 2010).

In financial services most skills shortages in Wales are in sales and customer service roles (FSSC, 2010).

A wide range of professional roles are affected by skills shortages, including food scientists and technologists in the food manufacturing sector (Improve, 2010), and experienced engineers in the energy and utilities sector (EU Skills, 2010).

3.2.4. The sectoral picture

In terms of absolute numbers, we estimate, based on our extrapolations, that skills shortages currently predominate in finance / business services, “other”⁶ services and wholesale / retail. In terms of their density relative to levels of employment they are also likely to be most significant in “other” services and finance / business services but also in hospitality. The broad areas in which the level of shortages is believed to have fallen most sharply between 2005 and 2009 are construction, transport / communication and production.

SSC analysis also provides strong evidence of a reducing trend in skill shortages in particular sectors since the onset of recession. In the construction sector, for example, far fewer employers in 2009 reported shortages of skilled staff compared with the previous 12 months. In 2008, in Wales 19 per cent felt there had been times when they lacked the number of skilled workers they required, compared to 12 per cent in 2009 (ConstructionSkills, 2010). Proskills also reports a significant decline in skills shortages for the process and manufacturing industries (Proskills, 2010).

In the absence of up to date skills survey data it is difficult to assess whether there are currently distinctive features to the profile of Wales’ skills shortages. The UK-wide employer skills survey being undertaken in 2011 should help to address this key question. However, as an interim measure it may be useful to look at the past profile of deficits in Wales relative to those in England, since there is potential for these patterns to re-emerge as the economy recovers. The following points can be made about skill shortages in Wales relative to England, based on Shury *et al* (2010) and Young and Morrell (2006):

⁶ Other services covers miscellaneous activities including leisure, cultural, sporting and entertainment activities; sewage and refuse disposal; and personal service activities such as hairdressing and dry cleaning.

- In occupational terms, there was a relatively high proportion of skill shortages in skilled trades and associate professional / technical roles and low proportions in administrative and elementary occupations; and
- In sectoral terms, a high proportion of SSVs were in construction and other services and a low proportion in public administration / education / health.

3.3. Qualification deficits

Earlier in this chapter it was noted that skills shortages are believed to be concentrated in “intermediate” level jobs/skills, primarily associate professional / technical and skilled trades roles. It is interesting to compare this concentration with the stock of qualifications in the workforce and how that has been changing (see Table 3.2).

Around 30 per cent of the working age population are not qualified to level 2, while around 30 per cent are qualified to a minimum of level 4. 20 per cent are qualified to level 3. However, the proportion qualified to level 3, the level most closely associated with intermediate jobs, has remained largely static over time, whereas there has been a significant increase in recent years in the proportion qualified to level 4 and above, and a similar reduction in the proportion with low / no qualifications.

Table 3.2: Level of highest qualification held by adults of working age in Wales, 2009

Calendar year	Level 4 and above (%)	Qualified to CQFW level 3 (%)	Qualified to CQFW level 2 or above (%)	No qualifications (%)
2001	22.1	17.4	60.4	21.5
2002	23.2	18.4	63.3	18.5
2003	24.1	19.2	64.9	17.3
2004	25.3	19.5	66.1	17.0
2005	25.8	19.3	66.4	16.2
2006	25.9	20.3	67.8	15.7
2007	27.2	19.9	68.5	14.9
2008	28.2	20.7	70.3	13.9
2009	29.6	20.3	70.6	13.7

Source: *Statistical Bulletin: The Levels of Highest Qualification held by Working Age Adults in Wales, 2009*

We can examine the data on qualification levels by occupation in order to see what proportion of those in a particular job are qualified to a minimum “appropriate” level. However, allocating the ‘right’ minimum level to the ‘right’ occupation is by no means straightforward. For instance, while there may be widespread agreement that people in ‘professional’ occupations should be qualified to at least level 4, in some sectors managers could also be expected to be qualified at level 4, while in others level 3 might be more appropriate. Nonetheless, it is useful to assess the proportion of workers without minimum qualifications “appropriate” to their occupation, as it provides an additional perspective on the question of skills deficits, not least in the respect that public policy interventions often focus on the development of formal qualifications. The definition we have used is as follows: the proportion of managers and professionals without level 4+; the proportion of associate professional/technical workers who do not hold a level 3+; and the proportion of workers in other occupations without a level 2+. The results of the analysis are presented in Table 3.3.

Table 3.3: Proportion of workers without minimum “appropriate” qualifications for their occupation

Occupational group	Wales	UK
Managers and professionals (below CQFW level 4)	35%	36%
Associate professional and technical (below level 3)	24%	26%
Other occupations (below level 2)	34%	35%
Total	33%	34%

Source: ONS (2010) Annual Population Survey, January to December 2009

Note: Workplace basis. Occupation is based on main job of respondent.

The deficit is highest in management and professional occupations. 35 per cent of all managers and professionals in Wales lack the “appropriate” level of formal qualification, compared with around one quarter of associate professionals and one third of workers in the remaining occupations. It is notable that Wales has a slightly lower deficit at all levels compared with the UK average.

Further analysis shows that the overall ‘qualification deficit’ is generally higher, in proportionate terms, in the manufacturing-related sectors than in service related sectors (particularly those linked to public services), although in absolute terms the numbers of workers without appropriate qualifications is highest in retail, hotels/catering and health and social care.

The following table shows that the proportion of workers in Wales affected by a notional qualification deficit appears to have fallen to a notable extent in recent years.

Table 3.4: Change in the proportion of workers without minimum “appropriate” qualifications for their occupation in Wales; 2004-2009

Occupational group	2004	2009	Change (percentage points)
Managers and professionals (below CQFW level 4)	40%	35%	-6
Associate professional and technical (below level 3)	27%	24%	-3
Other occupations (below level 2)	39%	34%	-5
Total	37%	33%	-5

Source: Annual Population Survey

Note: Workplace basis. Occupation is based on main job of respondent. Percentage point change may not appear to sum due to rounding.

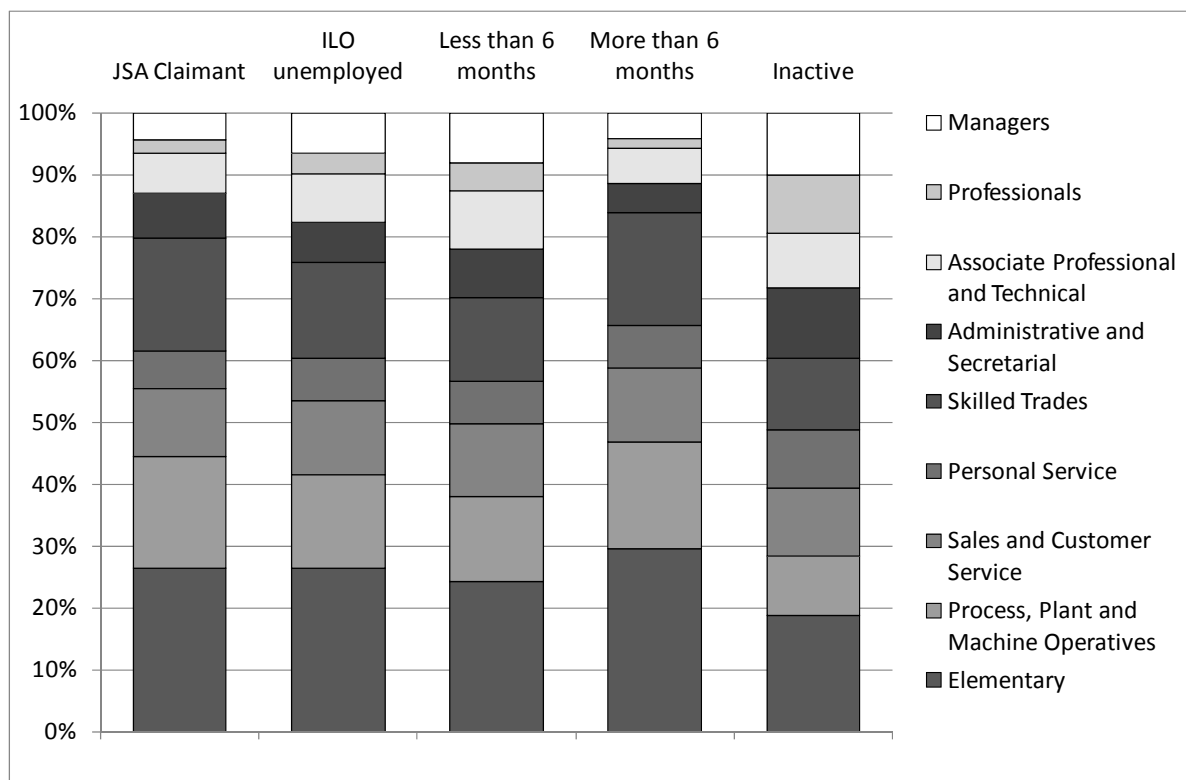
All three broad occupational levels saw a decline in such deficits and, looking in more detail, the decline was particularly marked among managers and workers in personal service roles (which saw falls of nine points and 10 points respectively). This trend could be interpreted as evidence of growing demand from employers for qualifications and associated skills; however, it is at least partly a reflection of supply side factors, particularly the number of qualified young people entering the labour market.

3.4. The skills of the unemployed

As we can see from Figure 3.2, the occupational distribution of those out of work in Wales is significantly different from those that are in work and, indeed, from the main sources of jobs growth in the labour market. 44 per cent of Jobseeker’s Allowance (JSA) claimants, 42 per cent of the ILO unemployed and 47 per cent of the longer term unemployed were previously in operative or elementary occupations. This is between twice and four times the proportion of the unemployed found in the ‘top’ three occupational groups (managers, professionals

and associate professionals). Obviously there is a profound mismatch between the jobs that need to be done and the jobs that the unemployed are probably able to do without significant up-skilling. This represents a major ‘surplus’ of skills that are not in high demand in the labour market. This problem is even more severe for those on the JSA and the long-term unemployed than for the short term unemployed and economically inactive.

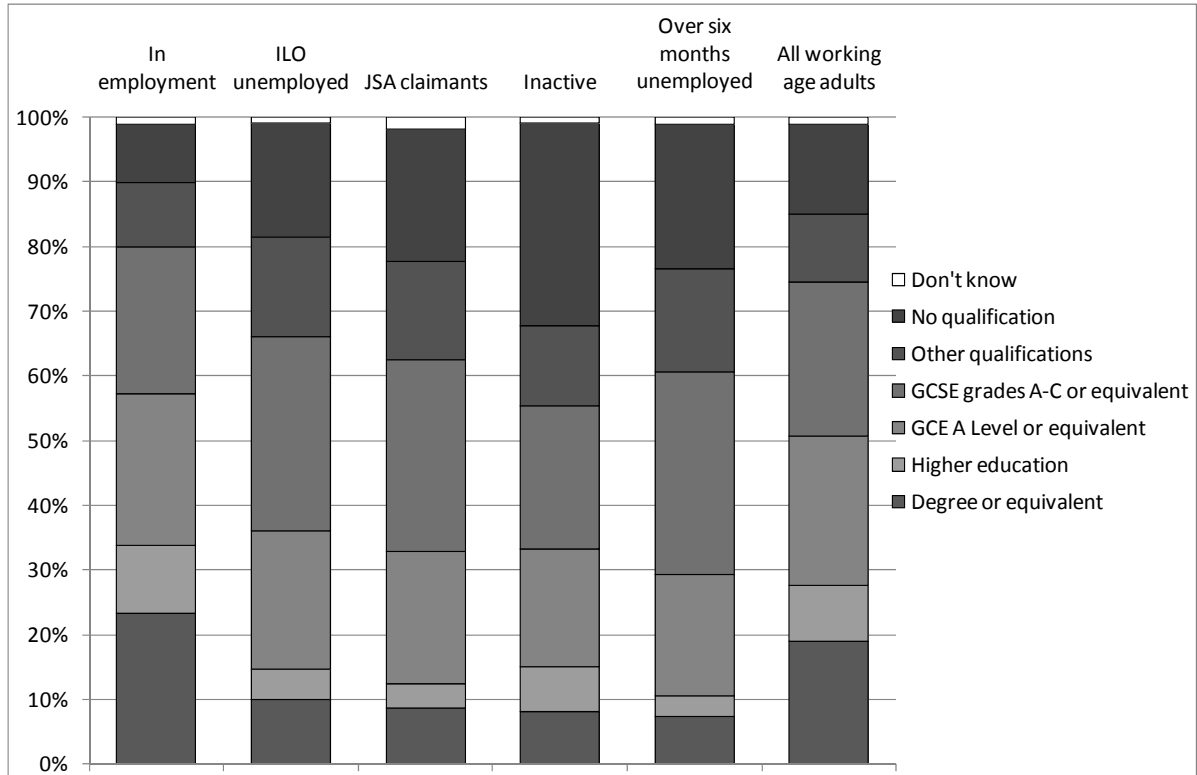
Figure 3.2: Previous occupation of inactive and unemployed adults in Wales



Source: ONS (2010) Annual Population Survey, January to December 2009

Figure 3.3 provides a picture of the qualifications of the unemployed and compares this to the qualifications of those in work. At both the top and bottom of the qualification distribution we can see that the unemployed have substantially lower qualifications levels than those in employment. For example, only nine per cent of those in work have no qualifications compared to 22 per cent of the longer term unemployed. Nevertheless, it is still the case that, for example, one in ten of the ILO unemployed have a degree, and more than one third have a qualification at level 3 or above. So, while there is a substantial mismatch between the skills of those not in work (as measured by qualifications and their previous job) and those in work, it is also the case that many have at least the qualification level that mirrors that of those in work. Whether these skills are appropriate for the job opportunities available is another question.

Figure 3.3: Highest level of qualification for unemployed and economically inactive adults in Wales

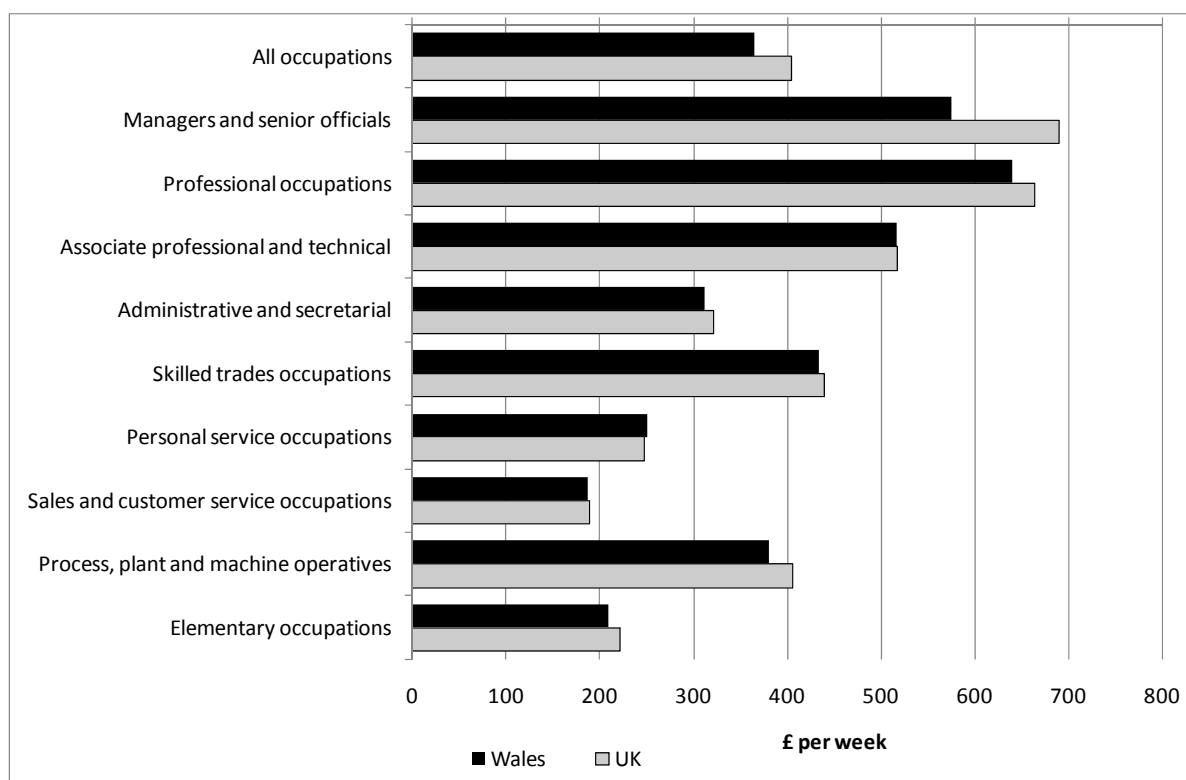


Source: ONS (2010) Annual Population Survey, January to December 2009

3.5. Wages

Level of earnings is an important indicator of the balance between supply and demand of labour across the various occupations. Figure 3.4 shows the wide differences in wage levels between the major occupational groups in Wales.

Figure 3.4: Median gross weekly earnings of employees in Wales by occupation; April 2010



Source: Annual Survey of Hours and Earnings

As of April 2010, median gross weekly pay for all employees in Wales was £365. The three higher-skilled occupations of managers, professionals and associate professionals each attracted median rates of pay that were well above this figure. The occupational major group with the highest median gross weekly earnings was professionals at £575. On the other hand, sales and customer service occupations were the lowest paid with median earnings of £190. Personal service and elementary occupations also displayed median rates of pay that were well below the overall median. The two “manual” occupational groups of skilled trades and operatives each have rates of pay above the overall median.

Median weekly pay in Wales was around 90 per cent of the overall figure for the UK. With the key exception of managers, differences in earnings between Wales and the UK were smaller for individual occupational groupings. This suggests that the overall earnings gap between Wales and the rest of the UK is at least partly explained by the occupational mix (Welsh Assembly Government, 2011a).

Analysis by Welsh Government points towards an overall shift in recent years toward the highest paid occupations in terms of employment and hours worked but combined with a polarisation of employment between the highest and lowest paid occupations. One explanation for this focuses on the substitution of technology and particularly computers for human labour in skilled but routine tasks, such as book keeping and precision manual jobs. Because of the skills required, these occupations are not at the bottom of the earnings distribution. By contrast, technology cannot be substituted for the non-routine functions of the highly paid professional and managerial occupations and, to a lesser extent, the functions of ‘unskilled’ jobs that are easy for the vast majority of humans to undertake but difficult for machines to replicate (Welsh Assembly Government, 2007).

Turning to wage returns to qualifications, the main message from the evidence at UK level is that higher levels of qualification attract higher wage returns. Academic qualifications carry a

premium over vocational qualifications and higher level vocational qualifications carry a premium for level 4 and above. However, when the time taken to study for qualifications is taken into account the gap between vocational and academic qualifications narrows because of the longer study time required for the latter. Returns to qualifications vary between sectors and there are occupational patterns to the returns to intermediate vocational qualifications with skilled occupations and personal service occupations providing the largest premia (UKCES, 2010a). The evidence suggests that the general patterns at the aggregate UK level are replicated in each of the four countries of the UK, including Wales (Dickerson, 2008).

3.6. Skill gaps: the national, occupational, sectoral and regional picture

We now turn to the existence of skill gaps within the existing employed workforce. Skill gaps arise where employees are seen to be not fully proficient in their job.

3.6.1. The national picture

Data on the incidence of skill gaps among business establishments are available from Welsh Government's 2010 survey of employers (Cutts *et al*, 2010). We rely on our extrapolations for an estimate of the level of skill gaps in the Welsh economy (see paragraph 3.1 for details of the extrapolations).

According to the 2010 survey, 28 per cent of establishments report a skills gap of some kind in their existing workforce. This represents a significant increase of eight percentage points over the level recorded in 2005 by the Future Skills Wales survey⁷.

Skill gaps have a higher incidence among larger organisations, according to the 2010 survey. 40 per cent of establishments with 50 or more employees are affected compared with barely a quarter of smaller organisations with fewer than 10 employees. Nevertheless, because such small establishments outnumber larger organisations, they account for a dominant share of total skill gaps in the economy.

Based on our extrapolations, the proportion of workers reported as exhibiting skill gaps is estimated to be eight per cent, equivalent to a total of around 84,000 workers. This is a significant increase on the 64,000 workers (six per cent of total workers) estimated to be affected in 2005.

The reality of the labour market is that there will be a good deal of substitution between skill shortages and skill gaps. When faced with inadequate applicants, some employers will leave the vacancy unfilled (a skill shortage), whilst other employers may feel it is better to recruit someone who is not appropriately skilled, in which case the deficiency will reveal itself as a skill gap. To overcome this issue, the two separate indicators can be combined into a single measure: the proportion of establishments who report that they face a 'skills issue'. In view of the increase in the incidence of skills gaps in Wales between 2005 and 2010 it seems reasonable to speculate that there has been a significant increase in this measure, in spite of the reduction in skill shortage vacancies.

⁷ It is perhaps helpful to compare the figure from the 2010 survey on incidence of skill gaps with that produced from our extrapolations, as it is the one indicator for which we have current survey data. This comparison provides the reader with a basis for assessing the likely accuracy of the other extrapolated estimates. Our extrapolations give a figure, *for 2009*, of 25 per cent of establishments in Wales reporting a skill gap.

3.6.2. The occupational picture

In 2005 the largest proportions of skills gaps were found among sales, machine operative and elementary workers. Based on our extrapolations, we estimate that at the present time sales / customer service and machine operative roles continue to contribute the largest numbers of skill gaps, together with administrative / secretarial, rather than elementary, roles. The evidence suggests that the most rapid areas of growth in numbers of skills gaps between 2005 and 2009 are likely to have been the higher level roles of managers and professionals.

We believe that the highest density of gaps, relative to overall employment levels, is in sales / customer service, machine operative and skilled trades roles.

3.6.3. The sectoral picture

Skills gaps are pervasive across sectors but we estimate that the largest numbers are to be found in the broad areas of production, finance / business services and public administration / education / health. The density of skills gaps is highest, relative to overall employment, in hospitality, finance / business services and “other” services.

The incidence of skills gaps, in terms of the proportion of establishments reporting one or more skills gap, is fairly even across sectors. Establishments in the public administration / education / health sector are more likely than average to say that they have a skills gap (33 per cent compared with 28 per cent). Conversely, those from the distribution / hospitality group are less likely to state they had a skills gap (24 per cent versus 28 per cent on average) (Cutts *et al*, 2010).

The findings of the Future Skills Wales 2005 survey indicate that the nature of skill gaps, in terms of the type of skills lacking, varies by sector. Key points include:

- Problem solving skill gaps were particularly common in public administration, hotels and catering and construction.
- Customer handling gaps were particularly prevalent in hospitality, retail and wholesale but also public administration.
- Job-specific technical and practical skill gaps were particularly common among establishments in production, public administration and other services
- Sectors experiencing the highest incidence of skill gaps across the broadest range of skills included public administration and defence, hotels and catering and retail and wholesale.

According to the Future Skills Wales 2005 survey, a need to improve Welsh language skills affected almost a quarter of establishments reporting skill gaps, with a particularly high prevalence among employers in public administration, education and hospitality. A large proportion of SSCs highlight Welsh language deficiencies in their assessment reports. Sectors particularly affected by this include:

- Healthcare (Skills for Health, 2010)
- passenger transport (GoSkills, 2010)
- Hospitality and tourism (People 1st, 2010)
- Energy and utilities (EU Skills, 2010)
- Active leisure (SkillsActive, 2010)
- Care (Skills for Care & Development, 2010)
- Logistics (Skills for Logistics, 2010)
- Creative media (Skillset, 2010).

In the lifelong learning sector the skills gap with the highest incidence relates to the ability to deliver learning or information in Welsh, which is reported by more than half of employers in the sector (LLUK, 2010).

3.6.4. Skill gaps: the regional picture

The Future Skills Wales 2005 survey found that the distribution of skill gaps across the regions was remarkably even – with the incidence and density of gaps almost identical across the four economic regions. The absolute number of employees with skills gaps was highest in South East Wales, reflecting its size.

The distribution of skill gaps by occupation was also broadly similar across regions, with significant concentrations among sales and operative staff, in particular. In some cases the distribution of gaps was more spatially uneven with disproportionate shares among operative occupations in the North Wales and South East Wales and among elementary occupations in Mid Wales.

3.7. The types of skills causing SSVs and skill gaps

The major types of skills which account for SSVs and skill gaps fall into two main categories: these are technical/practical skills, together with a range of “generic” or cross-cutting skills.

According to the Future Skills Wales 2005 Survey, concerns about customer-handling, communication skills, problem-solving and team working were each reported in respect of at least one-third of SSVs, while concerns about these same generic areas were each flagged in respect of more than 50 per cent of skill gaps.

These concerns reflect a mixture of job specific skills encapsulated in the technical category and generic skills which are becoming increasingly important to employers (Green, 2009).

Deficiencies of basic skills (literacy and numeracy) are also significant in terms of both gaps and shortages and are particularly important for skills gaps reported in respect of operative roles.

The types of skills needed among staff with skill gaps are typically associated with occupational categories. Management skills shortages are most commonly found in management occupations and administrative staff are more likely to lack administrative skills such as IT user skills, for example. Gaps related to technical / practical skills are most prevalent among associate professional, skilled trades and operative occupations.

In England, survey evidence indicates that employer concerns about both SSVs and skill gaps have increased in recent years (Shury *et al*, 2010). For example, the proportion of establishments with skill shortages who cited a lack of technical / practical skills as the cause increased from 52 per cent in 2007 to 62 per cent in 2009, with a similar kind of increase also evident for the full range of generic skills. It is possible that the recession may have led to short-term changes in the level and types of skill gaps encountered by organisations but the very high level of skill gaps being reported raises questions about the capacity and capability of existing learning provision to meet these needs.

3.8. Underemployment: skills needed versus skills available

The main focus of the analysis so far has been on deficiencies of skills relative to demand. It may be the case; however, that the skills available are more than sufficient and that people's skills may be being under-used.

We can view the relationship between the skills we need and the skills we have available by comparing the overall supply of skills (as measured by qualifications) and the demand for skills, as measured by the jobs that require them (based on job holders' perceptions).

The Skills at Work research (Felstead *et al*, 2007) provides evidence on the overall balance of the supply and demand for qualifications. This study has been examined in detail in *Ambition 2020* (UKCES, 2010).

The findings suggest that in Wales, as in the other UK nations, 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. The excess is greatest at levels two and three. The exception is for people for whom the highest requirement is a professional qualification, where there is a small excess demand.

Table 3.5: Qualifications Demand and Supply, Wales, 2006

	Demand (000s)	Supply (000s)	Difference (% of supply)
Level 4 or above	314	365	14%
<i>Degree</i>	167	241	31%
<i>Professional qualifications</i>	147	125	-18%
Level 3	195	310	37%
Level 2	202	296	32%
Level 1	127	144	12%
No qualifications	390	148	-164%
Total	1,226	1,263	3%

Source: Felstead, Gaillie, Green and Zhu (2007), *Skills at Work 2006*.

Robust time-series data are not available for Wales, however UK-level analysis indicates that the most notable trend is the fall in excess supply of level three and the increase in excess supply at level four and above i.e. the supply of graduates is outpacing the growth of jobs that require them.

Table 3.6: Qualification and skill matching Wales and the UK, 2006

	Wales %	UK %
Overqualified	39.9	39.0
Comprising:		
Real over-qualification	19.4	16.8
Formal over-qualification	20.4	22.2
Over-skilled	37.6	32.7
Under-qualified	13.4	13.8
Qualification-matched	46.8	47.2
Among which:		
Matched but over-skilled	14.8	12.3

Source: Felstead, Gaillie, Green and Zhu (2007), *Skills at Work 2006*.

Definitions:

Over-qualified: Respondents have achieved a higher qualification level than is required to get their job.

Over-skilled: Respondents either i) disagree/strongly disagree that they have enough opportunity to use the knowledge and skills that they have; or, ii) have very little or little opportunity to use their past experience, skill or abilities in their job.

Real over-qualified: over-qualified and over-skilled.

Formal over-qualified: over-qualified but not over-skilled.

Under-qualified: an 'under-qualified' individual has a qualification at a lower level than that currently required to get the job he/she now holds.

Qualification-matched: neither over-qualified nor under-qualified.

Note: Qualification-matched, over-qualified and under-qualified add to 100%, but subject to rounding.

This research compares people's qualification levels with the qualifications someone would need to get the job they are doing, and also asks whether the jobs individuals hold draw on the full range of skills and experience that they possess. The analysis shows that the proportion that are over-qualified is similar in Wales and the UK at around two-fifths of those in employment, although the proportion that are over-skilled (not utilising their full range of skills and experience) is significantly higher in Wales. Moreover, when we combine these two measures, the proportion who are "real-overqualified", i.e. over-qualified in a formal sense **and** not utilising their skills fully is also somewhat higher in Wales.

Data for Wales is not sufficiently robust to enable us to pin-point the jobs in which real overqualification is most prevalent. Analysis of the research at UK level suggests that this type of mismatch is highest among lower-level service occupations, such as elementary administration occupations, customer service occupations and sales occupations and is much lower across higher level occupations. It is likely that this picture is associated with relatively well-qualified people getting jobs at lower pay in lower-ranked service occupations where qualification requirements are generally lower; while those who find employment in managerial and professional jobs are no more likely than before to be overqualified in their job.

This picture is supported, to some extent, by international evidence (OECD, 2008) that is also reviewed at length in *Ambition 2020* (UKCES, 2010). This shows that in the UK there are roughly a third more high skilled jobs than high skilled workers but that growth in supply between 1998 and 2006 exceeded demand by a factor of around six to one. It also shows that the relative growth in demand is very low compared with other OECD countries.

Overall then, the supply of skills as measured in this study, exceeds demand at a number of skill levels. Such comparisons of the 'skills of jobs' with the 'skills of people' clearly raise the issue of whether it is 'deficient demand' for skills, rather than excessive availability of skills, that is the problem. The demand for, and supply of, skills can be misaligned because either is too low or too high. Indeed, they may even be in equilibrium, but at 'too low' a level to secure long-term prosperity. However, the relatively low levels of skills in Wales and the UK, when combined with the existence of only limited skill shortages / gaps and a potentially

excessive supply of skills and qualifications relative to demand, strongly imply a potential weakness in the demand for skills in the UK and Wales.

3.9. Migration

Another potential measure of imbalance between the skills available and the skills needed is migration. Although employers recruit migrants for a range of reasons, if they are unable to hire domestic workers because the skills are not available in sufficient quantity or quality, they may hire employees from abroad to meet their needs. In some senses, then, migrant labour market participation provides a barometer of mismatches between market demand and indigenous labour supply, although skills are not the sole factor driving these mismatches. This will be especially true of jobs held by migrants from within the EEA and those entering the UK from outside the EEA via the Points-Based Migration system.

Here we focus in particular on those occupations and industries that have a high level of reliance on migrant labour. It should be noted that the definition of migrants used here is broad and includes anyone that does not have the UK as their country of birth. We examine occupations or sectors which have a high level (absolute number) of migrant workers and, to a lesser extent, a high proportion of migrants.

According to the Annual Population Survey for January to December 2009, around 77,000 people employed in workplaces in Wales were born outside the UK.

Detailed analysis at occupational and industry level is constrained by the reliability of available data for Wales. This particularly affects niche areas which have a high density of migrants but relatively low absolute numbers in employment. In these cases statistical estimates are of low quality. However, where occupations are also present at the top of the overall UK list of migrant-intensive occupations this can offset some of our concerns about statistical reliability.

Taking all of this into account, those occupations (at SOC minor group level) which seem to have a high proportion of employment accounted for by migrants, include a mix of higher and lower level occupations: health professionals (29%), food preparation trades (16%), managers in hospitality and leisure (16%), assemblers / routine operatives (15%) and elementary cleaning occupations (11%).

Analysis at UK level indicates that the distribution of migrants varies depending on whether they are from within the EEA or from outside the EEA. On the whole, non-EEA immigrants tend to be employed in relatively high level occupations. This seems to be reflected in the Welsh picture with health associate professionals and health professionals the two largest groups among non-EEA migrants. EEA immigrants tend to be more heavily represented in lower level elementary occupations (in cleaning and personal services, for example) and operative occupations (process, plant and machine operatives, for example).

Turning to those occupations with a high level of migrants in absolute terms, by far the largest source of migrants at SOC sub-major group (2-digit) level is elementary administration and service occupations, which includes elementary cleaning roles and elementary personal service roles such as kitchen staff and waiters / waitresses. As well as operative roles and corporate managers, caring personal service occupations are also important and include workers in health care and childcare. Health professionals and health associate professionals are also among the key migrant occupations. In terms of the latter, nurses are the main source of migrant employment.

Table 3.7: Top migrant occupational groups in Wales

SOC Code	Occupation	Level of employment occupied by all migrants (000s)	% of all employment in SOC accounted for by migrants
92	Elementary administration and service occupations	10,500	9%
81	Process, plant and machine operatives	5,100	11%
61	Caring personal service occupations	4,800	5%
11	Corporate managers	4,600	4%
22	Health professionals	4,600	29%
32	Health and social welfare associate professionals	4,600	7%

Note: Workplace basis. A minimum cell size of 40 unweighted cases has been applied.

Source: ONS (2010) Annual Population Survey, January to December 2009

With regard to absolute numbers, the list of key industry sectors for migrant employment broadly matches that seen at UK level. The emphasis is very much on service activities, including health and social care, hotels and catering, retail, education, business services and public administration. The sectors with the highest density of migrant employment (as a proportion of all employment) appear to be food / drink manufacture, hotels and catering and health and social care.

Table 3.8: Top migrant sectors in Wales

Sector	Level of employment occupied by all migrants (000s)	% of all employment in sector accounted for by migrants
Health and social care	16,600	8%
Hotels and catering	9,700	14%
Retailing	6,600	5%
Education	6,400	5%
Other business services	5,200	6%
Public admin and defence	4,700	5%

Note: Workplace basis. A minimum cell size of 40 unweighted cases has been applied.

Source: ONS (2010) Annual Population Survey, January to December 2009

3.10. The scale and importance of different dimensions of mismatch

If we combine together the five dimensions of mismatch we have discussed, we can gain an understanding of their relative scale and importance.

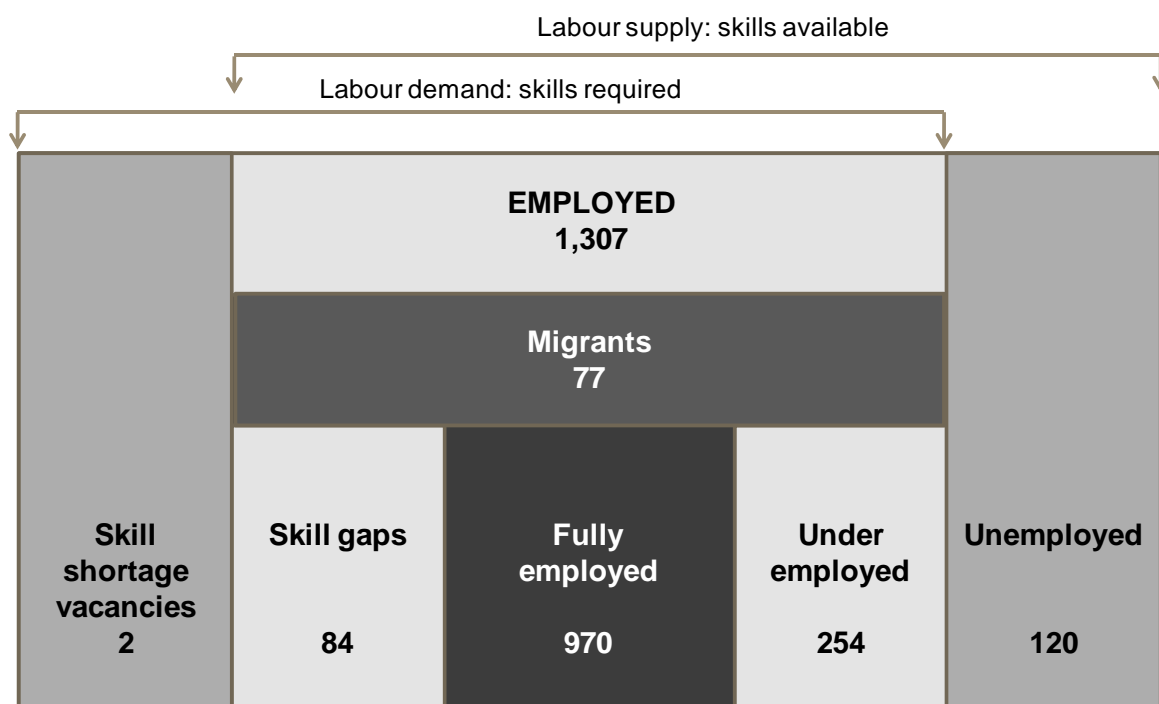
The data analysed for the Audit show that:

- There are in the region of only 2,000 skill shortage vacancies in the economy, with the impact of the recession serving to reduce an already small number. Far more significant are the 84,000 employees who suffer from skill gaps;
- According to Labour Force Survey estimates (from quarter four 2010) there are 120,000 unemployed people in Wales. In addition to this we should add an estimated 254,000

- employees who are underemployed⁸. Taken together, this means there are more than 370,000 people who are un- or underemployed in the workforce; and
- On this basis, we estimate the number of fully-employed (i.e. those not suffering from skill gaps or believed to be over-qualified) to be in the region of 970,000 out of an employed workforce (in Welsh workplaces) of 1.307m.

The diagram also shows the number of migrants currently employed. This is based on the widest definition of migration being (i) all non-UK born people currently employed and (ii) without any time limited on their date of entry. Of course, a proportion of these migrants could be underemployed or suffer from skill gaps in their current job.

Figure 3.5: Skills mismatches: key components in Wales



Note: Numbers are shown in 000s

3.11. Conclusions

What if employers are unable to, or have difficulty in, employing the people they need to because they are not available in sufficient numbers with the skills they require? What if people have the ‘wrong’ sorts of skills to be able to access job opportunities? And what, indeed, if the people already in work are either not fully proficient in their jobs or are over-qualified for them? These issues of skill mismatch have been the focus of this chapter.

As previously noted, we must be cautious in our use of some of the following findings because of the out of date nature of the available employer skills survey data and the consequent need to use extrapolations of the current skills deficit position.

‘Skill shortages’ are important because they constrain organisations from being able to meet market needs, opportunities or public service objectives, and are a prime signal of a

⁸ This is estimated from the work of Felstead and Green (2007). It is derived by applying the proportion who fall into both of the following categories: i) are estimated to be ‘real over-qualified,’ that is have qualifications higher than those which are needed to get the job they currently hold; and ii) use very little or little of their skills in their present job.

'mismatch' between supply and demand, between the skills available and skills required. However, as we have seen, the imbalances/mismatches in the labour market can also take a number of other forms and we need to look at these together to give a more complete picture of mismatch.

Overall, the evidence suggests that **skill shortages are relatively small**. We estimate that there are only 2,000 shortages in Wales, in the face of recessionary conditions and a reduced demand for labour.

Skill shortages affect just two per cent of establishments, based on our estimates, predominantly in small organisations. **The highest proportion of skill shortages are believed to be in skilled trades and associate professional occupations**, and this is where their "density" (relative to employment) is highest also.

Sectorally, skill shortages predominate, in terms of absolute numbers, in finance / business services, "other" services and wholesale / retail. But in terms of their density we believe they are most significant in "other" services and finance / business services but also in hospitality.

We have also shown that **the occupational characteristics and qualification levels of unemployed people differ substantially from those of people in work**, and that this represents a significant mismatch between the skills of the former and those most required by employers. Nonetheless, a significant minority of unemployed people do possess both higher level qualifications and occupational experience more associated with current labour market requirements.

Whilst skill shortages and unemployment represent skill deficiencies which arise in the 'external' labour market, skill gaps arise within the 'internal' labour markets of organisations. The most recent data (for 2010) show that **skill gaps affect 28 per cent of employers**. The proportion of the employed workforce estimated to exhibit a skill gap is estimated, based on our extrapolations, to be around eight per cent, or 84,000 workers. Skill gaps are pervasive across sectors and occupations, but are **particularly notable in sales, machine operative and skilled trades occupations** in terms of absolute numbers of gaps and their density relative to employment. In sectoral terms we estimate that they have the highest density, relative to employment, in **hospitality, finance / business services and "other" services**.

In 2005, more than half of skills gaps were linked to technical/practical skills. The level of technical gaps was highest in manufacturing, public administration and other services. In terms of generic skills, the most frequently reported deficiencies were problem solving, customer handling, and communication skills, each of which contributes to more than 50 per cent of gaps.

In regional terms, South East Wales accounts for more than half of all skills gaps, reflecting its share of total employment. The incidence and density of gaps is remarkably even across the economic regions and the profile of skills gaps is also broadly similar, although employer reports of Welsh language gaps are highest in North Wales and Mid Wales.

Migrant labour market participation provides an indication of mismatches between the skills required by the labour market, and those available in the domestic labour force. The leading occupational areas highlighted by this analysis are elementary service roles, such as cleaners and waiters / waitresses; process / plant / machine operatives; caring personal service occupations; and higher level roles in the health sector, including health professionals and nurses.

Moreover, there is some evidence of **a significant level of "underemployment", where some workers are over-qualified and over-skilled for the jobs that they are doing**.

If we put all these aspects of mismatches together we can see how they stack up in terms of scale. It is clear that we need to address both 'external' and 'internal' labour market mismatches as well as both demand and supply issues.

Quantitatively, as with the UK as a whole, the issue is primarily one of un-used/under-utilised skills, associated with a deficiency of demand, rather than one of skill needs that are currently unmet. Nevertheless, both are important.

4. The drivers of change and their skills implications

4.1. Introduction

Looking to the future, how is the demand for skills likely to change as labour markets respond to structural trends and developments in the coming years? What are the main forces stimulating change, and what are their possible implications for skills?

This chapter provides an overview of the major drivers of future demand for, and supply of, skills. The analysis of drivers of future change follows a framework covering political, economic, environmental, social, technological, and demographic change, and provides a review of key developments within each of the drivers. The purpose is to indicate the nature and direction of major types of change, and provide a broad analysis of how they may influence skills demand and supply. This qualitative analysis can be placed alongside our technical labour market forecasting to add value to our understanding of future skill needs.

This chapter is based primarily on extensive work undertaken through the Welsh horizon scanning/scenario development study specially commissioned as part of the National Strategic Skills Audit research (SAMI, 2010). This study reviewed the 100 or so UK-level drivers originally identified in the UKCES Strategic Skills Audit for England 2010. These drivers were then reassessed according to their potential impact and likelihoods of occurring within a Welsh context. From this Welsh-focused review, key drivers for Wales were identified for further detailed analysis and horizon scanning. These form the basis for the following chapter.

In addition to examining the likely direction and the nature of change this chapter provides:

- Indicative analysis of the impact of different drivers on employment and skills;
- Analysis of those occupations and sectors where change is likely to be most pronounced; and
- An assessment of the varying level and nature of impact on employment and skills of the key drivers within different scenarios of the future.

4.2. Main skills drivers

To gain a purchase on the future, we want to examine, in a systematic way, the main drivers of change that will impact on the labour market and jobs in the coming years. We categorise the drivers under seven headings of change and examine them in turn.

The categorisation used here is based on the work of Davies et al (2001). This work emerged from a detailed study conducted for the Performance and Innovation Unit of the Cabinet Office, which synthesised the findings of over 50 recent studies and grouped them into core sets of drivers. As such, it is probably the most systematic study of this type available. These 'seven drivers of change' are presented diagrammatically in Figure 4.1. It is the relationships between the drivers that are critical to determining impact. The dependencies mean that each may mitigate or reinforce each other's impact, and it is therefore important to recognise these dynamics in analysing the trends in the demand for, and supply of, skills.

Figure 4.1: The major drivers of change



4.3. Summary of the key drivers

Economics and globalisation: including rate of overall economic growth, distribution of wealth between individuals and nations, management practices and structure of organisations, nature of the workforce and international trade. Economic growth in developing economies may create pressure on the UK and Wales to move into higher value-added markets, which may lead to increasing demands for higher level skills in some jobs, reduced demand for lower-skilled routine jobs and place demands on capacity to adapt to the requirements of emerging overseas markets.

Regulation and multi-level governance: covering management of borders between states, threats to (inter)national security, changes in global power, national and international conflict, and domestic regulation. Regulation can have an important influence on skills supply because it may affect labour supply through controlling entry to, and exit from, education and the labour market, and can influence skills demands through setting of either training, product or service standards.

Demographic and population change: covering the impact of global population change, relative changes between advanced, developing and transitional nations, changes in the age profile of populations, migration pressures, infertility and life expectancy. Demographic change can be an important influence on skills needs because it can affect labour supply through population change and location of different sources of labour, and population change in itself can lead to increases and decreases in consumer demand for different kinds of goods and services, leading to expansion and contraction in related job volumes.

Environmental change (whether due to natural causes or human agency): covering climate change, pollution, changes in demand levels for different types of energy; availability and use of water and food; development of cities versus rural areas; disease and deforestation. Environmental change may lead to skills needs as a result of government policy and investment to tackle climate change through stimulating the development of a low carbon economy.

Technological change (including new developments and new applications of existing technologies): covering development of biotechnology, nanotechnology and AI (Artificial Intelligence), digital communications and IT. The development of technologies may create demands for skills at higher levels in research and development (R&D), and at lower levels in manufacturing new products devised, while there may also be skills needs requirements in supporting consumers to use new technologies.

Changing values and identities: covering family structures, attitudes towards government, citizenship, education, religion. Changes in values and identities will include attitudes to work and may therefore affect labour supply through influencing choices about type and conditions of work.

Changing consumer demand: covering changing consumer choices and expectations about type and quality of products and services. The development of niche consumer markets, consumer preferences for tailored goods and services and rising consumer expectations about service quality may lead to skills needs within a variety of segments of the service sector.

4.4. The key drivers in detail

In this section, we discuss in more detail the nature of change associated with each of the factors, together with some indication of the skills implications that each of these drivers of change are likely to have. This qualitative analysis is based on the horizon scanning work described in paragraph 4.1.

4.4.1. Economics and globalisation

Economic performance at global and national level will have a critical bearing on future demand for skills in Wales.

Economic growth in the UK and Wales

Following the financial crisis and subsequent recession the global economy appears to have stabilised somewhat but there remain important imbalances that need to be resolved and this process could have significantly different impacts on the global, European, UK and Welsh economies. There is still a risk of a further financial crisis and instability.

There are views that the Welsh economy will be slower to recover from recession than the rest of the UK. This suggests difficult times ahead in all but the most optimistic scenarios. Of sectors seen as important to Wales, tourism and construction appear to be two industries at particular risk. The rate of recovery will also impact upon the size of the UK financial services sector, which was hard-hit in the 2008 banking crisis.

If higher levels of growth are achieved and mirrored in consumer spending, the demand for most existing skills will be increased, with the potential to exacerbate latent skills shortages. In addition, demand for higher value products and services will be stimulated, improving the prospects for various industries and specifically increasing the demand for soft skills and sector-specific technical skills.

Cost and availability of capital

Capital investment is a key driver of jobs. Successful development of the Welsh economy will require capital at an economic price; the absence of this could lead to less capital-intensive/more labour-intensive activities throughout the UK.

Wales has been relatively strong in attracting foreign capital and such capital may again be attracted if Wales is seen as a competitive location for investment. The provision of skills and strong supply chains are important here, together with the quality of the infrastructure and environment. The benefits are new jobs and often the import and naturalisation of new skills.

Conversely in a world of global mobility, if Wales cannot provide the right skills and infrastructure, not only will potential foreign employers go elsewhere, indigenous employers may seek to relocate outside Wales to find the skills they need.

The UK financial markets are still a great source of expertise and a source of capital, and Wales has a good share of financial services skills. Financial services skills will be needed to find and manage capital.

Inward investment will come with training demands. Flexible provision of specialist skills will be needed. A background of a labour force with the right general skills will be a competitive advantage.

Infrastructure and networks

Much of Wales' existing infrastructure is old. Some of it is already being replaced and this is likely to continue to at least some degree, in spite of the constraints on capital investment (SAMI, 2010).

Wales' location in relation to markets demands good communication systems, physical and virtual. Improvements and replacements will be desirable to improve communication systems, including national high bandwidth broadband. Intelligent transport systems will need networks to manage them.

Much of the built environment will need retro-fitting to meet modern insulation standards. The Welsh accelerated programme for reducing carbon footprint, if sustained, will heighten the need for investment to improve infrastructure (Welsh Assembly Government, 2010a).

Changes in sourcing of resources and energy will require new or reinforced networks, and in Wales this may be significant notably in relation to wind, tidal and nuclear electricity. Micro generation at the householder or local community level will require installation of equipment and connection to the existing network with implications of higher skills levels for installation engineers. Gas storage and open EU gas markets will need a strong supply network.

Traditional skills for repairing and replacing existing physical infrastructure (water, gas, nuclear etc) will continue to be needed, but a blend of old and new technologies will require the understanding of their interactions and the ability to read and understand continually changing installation procedures.

There will be a requirement, sooner or later, for adaptation to new climate and weather conditions. More employment will be directed towards projects such as flood defences, improving drainage systems, protecting transport systems, predicting and managing extreme meteorological conditions.

This will have a range of impacts on the employment and skills landscape.

Increasingly complex new digital infrastructure, networks, and systems will require higher levels of skills in design, programming and installation of networks and for installation of ancillary and consumer units.

High demand for digital access for a wide range of users will lead to high levels of demand for maintenance operatives. However some jobs could be lost as much network maintenance can be done remotely. Network users (i.e. the general public) may also need training in the use of new systems.

An effective broadband network will facilitate training and education in remote areas and help provide focussed training for niche businesses, especially SMEs.

Existing industries

In spite of the wide range of opportunity presented by new technologies and industry, existing industries will play the majority role in the employment landscape in 2020. Nevertheless, they will have to adapt and improve to survive with new sources of competition within their own industries and from new industries. Investment in skills will play a major part in their survival.

The European Commission predicts that in 2020, almost three quarters of jobs in the EU will be in services, with substantial job creation in areas like business services. Manufacturing

and the primary sector are forecast to lose a large quantity of jobs while construction should tend to stabilise. Replacement demand would still provide a substantial number of job openings in manufacturing, which will therefore remain a crucial sector for the EU economies. This broad pattern of change is supported by forecasts for the UK and Wales, including *Working Futures* (see chapter 5, below).

Existing industries will need to invest in skills to replace staff that retire/leave but will also need up-skilling to ensure that existing employees can cope with new techniques, materials or standards brought about by regulation, market forces, new products or the search for productivity gains.

For operatives to achieve high levels of performance, higher precision and care in manufacture, installation, use and maintenance is required, which in turn requires higher levels of care at all stages. Operatives and others will need to read, understand and obey what is written on the label or on their pocket electronic installation manual.

In some sectors, such as office or administration functions, employees will be required to have additional competences as more routine functions are automated. For example in the financial sector middle office functions will require people highly skilled in financial processes but also with more legal expertise, an international background, language skills and a good knowledge of IT.

In many knowledge-intensive sectors both managerial skills and scientific knowledge are needed. In social care and education further skill upgrading is needed to improve the quality of services. This reflects the growing demand from employers for cross-cutting key competencies, such as problem-solving and analytical skills, self-management and communication skills, linguistic skills, and more generally, "non-routine skills".

To survive, most sectors will need to adapt. For example, high street retailers may need to provide a higher level of service to compete against the ease-of-use and pricing of on-line retailing. On the other hand any increase in on-line buying will demand new marketing, CRM and logistics skills.

Knowledge economy

The knowledge economy describes a process whereby the economic competitiveness and performance of organisations are increasingly determined by their investment in 'knowledge based' or intangible assets such as R&D, design, software, human and organisational capital, and brand equity and less by investment in physical assets such as machines, buildings, and vehicles.

New technologies and developments in the organisation of work result in job expansion at the ends of the job spectrum but especially at the higher level. New technologies cannot yet substitute either the "non-routine" tasks typical of high-skilled occupations (e.g. cognitive and communication tasks), or low skilled jobs, especially in the service sector (e.g. personal care). However, medium skilled routine tasks and repetitive work can be replaced more easily by automation and computerisation, or outsourced overseas, with a consequent decline in jobs at this level.

The proportional growth of highly skilled jobs and, to a lesser extent, lower skilled jobs at the expense of intermediate jobs is referred to as "the hourglass", reflecting the shape and the rate of job creation, wide at the top and bottom and relatively narrow in the middle. The squeeze in the middle does not necessarily mean an overall reduction in jobs, but "good" jobs towards the lower end of the scale will be harder to get and will require more training.

This is borne out to some extent by the *Working Futures* projections which suggest future growth in the share of employment accounted for by all of the “high level” occupations (managers, professionals and associate professionals), growth for some “lower level” occupational groups, most notably personal service occupations, and reduced shares for some “mid-level”, routine / semi-skilled occupational groups, including operatives, administrative / secretarial and skilled trades (see section 6.2, below).

There is a range of implications for employment and skills:

- Demand for more soft skills (such as assimilation of information, communication, relationships, logic, knowledge management) will increase, meaning that lifelong learning is important to prevent people slipping down the scale;
- New forms of certification could be developed to demonstrate possession of these soft skills;
- With automation of manual or knowledge-based transactions, there will be fewer transactional skills needed; and
- Excess attention to top end skills for a few may reduce the volume of training at the middle or bottom levels where the bulk of skills needs reside and there may be a tendency for the mid-skilled to slide down the scale rather than climb up. Good advice and information on the benefits of training, or even incentives to train, may be necessary.

Emergence of developing countries as significant economic powers

Globalisation has been fuelled by the emergence of the BRIMICS countries – Brazil, Russia, India, Mexico, Indonesia, China, and South Africa – as growing economic powers with large and, in most cases, young populations. Their growth rates prior to recession exceeded those of major Western economies, including the EU, the US and Japan. In many developing countries, economic prosperity has also fuelled a massive expansion of the middle classes.

Growth in emerging economies presents significant export opportunities for UK and Welsh firms. To capitalise on opportunities in a developing country businesses need to develop an understanding for how that country does business, how it can complement rather than necessarily compete, and how it can access enabling skills such as appropriate language skills and financial advice.

Emerging economies are also investing significant amounts in secondary and higher education. This supply of skills is enabling developing countries to compete not only on cost but also on the quality of their human resources. In order to respond, developed countries need to prioritise skills relating to innovation, creativity and entrepreneurship, and place a greater emphasis on lifelong learning.

4.4.2. Regulation and governance

The increasing impact and scale of regulation, the role of government at different levels and changes to the retirement age will have a significant impact on employment and skills in Wales.

Regulation

Regulation of business and private activities is generally expected to increase although to a substantially different level of intensity and with different targets in different scenarios (see below).

Regulation is an important driver in relation to skills needs and training in many industries, including hospitality, food and drink manufacturing, energy generation and supply, financial services and social care. It impacts primarily on health, safety and security, but also in relation to the environment and in labour markets. Employees need training in health and safety, environmental and other regulated activities and require certification or accreditation to undertake many jobs. Companies need to provide adequate training to ensure employees do not transgress regulations applicable to the company.

Certification is currently a major reason for training and will remain so. Constraints imposed by insurance companies can be just as important as legal restrictions.

Regulation is imposed within the UK as a result of global, EU, and national legislation and agreements. Wales has the potential for introducing an additional layer of regulation on its economy.

In the England Audit reference was made to a number of broad trends, including the role of public sector procurement regulation on levels of workforce competence and to increasing risk aversion, particularly in response to new technologies, which may lead to public pressure on government to impose regulatory standards.

High levels of certification of individuals will increase training requirements. Increasingly tight regulation could impede on-the-job-training with a significant impact on training programmes.

New jobs may also arise in inspection and regulation in the workplace and at home, such as in electrical and gas certification of properties, as well as with respect to a raft of environmental, financial and commercial regulations.

Government intervention

The level of public spending as a proportion of GDP has a significant impact on jobs and training demands.

Welsh Government action in terms of levels of public intervention and funding of education and training could have a significant impact on jobs and skills.

For the medium term, the key questions appear to be whether cuts in government spending will lead to permanent loss of particular workforce skills, whether those made redundant in the public sector will have the right skill-set and mind-set to compete for employment in the private sector, and whether specific retraining will be needed for public sector employees to re-skill to meet private sector needs⁹.

Public procurement requirements can also be a significant driver of demand for training. Procurement may enhance skills at all levels and training clauses and contractual skill requirements can have an influence on skills at all levels (Binks, 2006).

Devolution, the EU and trade liberalisation

Given growth in the EU and trade liberalisation, markets available to UK exporters will grow. Liberalisation will lead to economies of scale for successful businesses, but will also permit earlier and more intense competition from abroad. Liberalisation of trade in services will encourage the clustering of knowledge-based skills (law, design, finance etc.). A shift

⁹ An important Welsh Government intervention is Adapt which has been set-up to retrain public sector employees who are being made redundant or taking advantage of voluntary exit schemes.

towards protectionism would have opposite effects. The degree and direction of liberalisation or protectionism may vary between scenarios (see below).

The current level of devolution in the UK is reinforced by regionally-focused EU policy. The EU believes that it has a strong role to play in the development of skills although it recognises that many aspects should be dealt with at the national or regional level. EU grants to Wales have been significant over the current seven year cycle¹⁰ but the level of their renewal in 2013 is uncertain at present, due to competition for aid from the new east and central European member states, and will be different under alternative scenarios.

Devolution throws more responsibility onto the Welsh Government and much will depend upon how this responsibility is executed. The Welsh Government has the power to make Wales more or less attractive to new business through a variety of actions and policies. Some of these are covered in Government Interventions to 2020.

European legislation, even beyond skills and training issues, such as policy on migration, energy and resources, health and safety or compliance and regulation, could have a significant impact. These are largely considered in the section on Regulation as a driver.

Retirement age and school leaving age

Raising the state pension age in the UK by one year, and raising the age at which women are entitled to a state pension from 60 to 66 will lengthen possible working lives. It is also likely to increase the quantity and quality of skills supply. In England this must be offset against the raising of the UK compulsory leaving age from education or training to 17 in 2013 and 18 in 2015, although this is not the current policy in Wales.

In the medium to long-term, the relatively younger segments of today's workforce will have higher levels of qualifications than the older age cohorts who are retiring from the labour market. Across the EU the proportion of working age population with low educational attainments (closely linked to age) is decreasing. This, in turn, means that in future there will be a greater supply of workers with higher education levels. As a result, current forecasts point to the risk of elementary jobs being increasingly occupied by workers with mainly intermediate level qualifications (Cedefop, 2009).

4.4.3. Technological change

The rate of change of technology is increasing, and life cycles are becoming shorter, with consequent impact on skills.

ICT will continue to change the way we work, and play. A high percentage of workers are increasingly likely to need ICT skills, to exploit the technology to work more productively. Trends that will affect work include open source software; user-generated content; video-conferencing and distance working; cloud computing; accessing online training; new mechanisms for interacting with computers; and new ways of displaying information.

Other technologies that are new today will become pervasive by 2020 with major advances in genetics and personalised healthcare, biotechnology, and new smart networks and infrastructure.

Unpredicted (and unpredictable) scientific breakthroughs are possible, particularly in the inter-disciplinary areas where these sciences overlap. There is the potential for

¹⁰ According to the Welsh European Funding Office, Wales will benefit from around £1.9 billion of investment from EU structural funds between 2007 and 2013.

revolutionary scientific breakthroughs at the intersection of the converging nano-bio- and cogno-sciences, which could generate completely new technologies.

The trends in technology will drive a need for more research and development and result in more manufacturing of new products, although increased research and development activity may not lead to large numbers of new jobs.

New industries do not just need technological skills but require a range of skills which change as the technology moves from research to market to production, then in-service use and maintenance.

The increasing level of technology available in many sectors will require more technicians in the sector, or retrained existing practitioners, to use and implement the new technologies. Indeed, in some cases marketing, in-service use and maintenance of new equipment will provide very many more jobs and more training demands than manufacturing the equipment. Medical and educational technologies are possibly important cases in Wales.

Because of the predicted pervasive nature of ICT across the economy, there may be a need for a greater proportion of the workforce to use basic office and workplace digital tools more productively, to keep up to date with new software and to maintain productivity improvements as new ways of working emerge.

New industries and jobs are not necessarily directly based on new technology, but can be derived from it. For example, the internet and ICT has opened up new routes to market and new forms of retail industry. Online commerce requires different skills to traditional commerce, but needs few technological skills. iPod “apps” offer a route to market for entertainment, datasets, expertise and games. On-line purchases should be delivered through improved logistics and customer care and CRM should be enhanced and changed to suit the new market structure.

New industries, such as offshore wind farms, will often span several existing recognised sectors and will need sectors to work together to provide the right skill sets. There appear to be opportunities for multi-skilling as new technologies bring new ways of working (see below).

“Death of distance”

Improvements in communications, given the continuation of the trend for free trade, will give all industries the opportunity to source inputs and sell outputs globally, and, using IT, to add value in the most economic location. By 2020, techniques such as video-conferencing and software to recognise facial expressions are likely to have developed to the point where effective inter-personal communications can be made over computer links. Younger workers who grew up with social networking tools are more likely to be ready to use technology in this way. Older workers will have to learn and adapt to collaborative working at a distance.

Global work groups can become just as effective as local groups. In any industry with global economies of scale, the ability to assemble a team quickly anywhere in the world will be a significant competitive advantage. An implication of this is that if any type of work, including professional high end jobs, can be done anywhere, there may be less migration.

The opportunity for Welsh and UK industry to off-shore some of its activities may increase. On the other hand, Wales has a reputation and experience in winning off-shoring work from around the world, and from within the UK, notably from London and the South East. It has also an established administration for seeking FDI. To keep Wales as an attractive

destination, the labour force needs to have the right skills and the flexibility to adapt to new methods and industries.

More importantly it will become easier to off-shore more and more non-manufacturing jobs to cheaper locations where there is a growing number of well-qualified young graduates available at lower salaries. This presents the risk that high-status professional tasks become more likely to be outsourced to cheaper countries. On the other hand, there is more scope for white-collar businesses located in the UK to win business from abroad, if they have the skills and infrastructure in place and an exploitable competitive advantage.

In a low-carbon scenario, the ability to conduct international business without travel becomes an essential technology for international trade.

The new technologies and methods also provide valuable new tools for the delivery of training, using distance learning to optimise the use of specialist trainers, reach inaccessible areas, provide affordable service to SMEs and provide affordable specialist training to niche businesses.

New business models and new ways of working

Advances in ICT are facilitating improved logistics and supply chain management. ICT has also driven significant trading advantages through smarter customer data as well as the development of e-retailing, home shopping and lean retailing. Vertical integration has increased over the past decade and is likely to continue, with more producers dealing directly with consumers.

“Time to market” is becoming a key competitive factor. The traditional value chain has changed considerably over the past 20 years. The reputations of companies – their innovative capacity, product quality, and respect for delivery times - are important determinants of business performance.

One of the strongest recent trends in manufacturing has been the blurring of the traditional division between manufacturing products and providing services, with new distribution channels for recycled/ reused goods and new forms of contractual arrangement such as leasing rather than sale of goods. Manufacturers are becoming more interested in their final customers and the care they need. More manufacturers are seeking direct contact with their customers for repairs and maintenance.

In time, managers at the top will no longer be the prime leaders of change: they will design sophisticated networks that link up individuals and enable others to take the lead. Being at the top will be about designing, managing and repairing these networks.

Employees need to learn that priorities will change. Different attitudes will be required and new and different ways of working with other people, either locally or at distance, will have to be learned. Successful companies will be those that can adapt to changing business methods, and this will require adaptable trained staff at all levels.

In successful companies everyone is a salesman, everyone is a representative of the company. Attitudes will need to change significantly, in some industries from top to bottom, as global competition increases. Manufacturers will need to learn more about retail customer care.

There is also potential for expansion of self-employment or small business development drawing on digital media and e-commerce in the creative and cultural sectors as these

technologies afford small craft-based enterprises access to a global market place. This may lead to workers in craft industries requiring additional ICT skills.

4.4.4. Environmental change

Wales' response to environmental challenges will have a direct and significant impact on jobs and skills in the period to 2020.

Reducing carbon emissions and resource use

This driver covers the whole area of mitigation of climate change and the impact of consumption of non-renewable resources.

The current trend of increasing regulation to reduce carbon emissions from the EU and within the UK is likely to continue. Wales has elected currently to demand a faster reduction in carbon footprints than the rest of the UK, and this will affect industry, government and the public.

The price of energy is likely to rise, either through supply/demand mechanisms or through taxation/ regulation, although the rate of increase is uncertain.

Energy industries will need to develop new technologies to increase efficiency, improve their methods of production, and use new technologies to replace inputs which become less available.

Wales is well placed to capitalise on the trends for renewable energy and energy efficiency. It has potential for hydro, wind, wave and tidal power and nuclear installations. In addition, Milford Haven is already one of Europe's largest oil and gas ports and has developed liquefied natural gas (LNG) capacity to supply 30 per cent of the UK's gas requirements, so can take advantage of the likely increase in use of LNG in the UK over the next couple of decades.

There is a range of implications for jobs and skills arising out of this agenda:

New building techniques and industrial processes will require new skills. New energy infrastructure will require investment, and provide jobs.

The level of job creation which is connected directly to new low carbon energy devices may be relatively small within Wales, which currently has little in the way of relevant manufacturing. Other aspects of energy saving will require a significant amount of skills development, however: working in a more energy-efficient manner will require new patterns of behaviour such as less travel, less commuting, less waste.

Various changes in work practices and skills are expected, including:

- Skills for regenerating brown field sites and retrofitting built environment;
- More precision in all aspects of work, including building, manufacturing and administration, in turn demanding higher skill levels;
- Changes in manufacturing design and process;
- Evolution of skills during working life;
- More focus on lifecycle cost of goods and investment, not just the initial capital cost;
- Increased care in the use of all resources and improved recycling habits in all fields of employment; and
- Increased certification/accreditation to meet new regulations.

Land and the urban / rural balance

Wales has a distinct pattern of urbanisation with its narrow urban coastal strips in the north and south and a large rural expanse in the centre. In spite of a net flow from rural Wales to the towns, Wales' lack of a critical mass of urbanisation / agglomeration, serves as a limiting factor on business formation and growth. This has probably been a disadvantage to job creation and productivity, with the implication that Wales' ability to move up the career quality chain is limited and demand for high end skills is reduced.

In rural areas there is concern that it is often difficult to provide services and retain staff.

In some deprived areas of Wales the low development value of land has the potential to limit investment and hence job creation (SAMI, 2010).

Planning restrictions are cited as a cause of lack of investment in the coastal strips. There are also planning issues in the rural areas, where a balance between development (for instance for tourism or housing) and preserving the rural environment can be difficult to achieve.

4.4.5. Demographic and population change

The size and structure of Wales' population together with patterns of migration will be key determinants of future labour supply.

Migration and population growth

The population of Wales is increasing overall in spite of a birth rate a little below that of England. Even some rural areas are experiencing population increase with accompanying infrastructure stresses. However there is a declining population in some of the most deprived areas such as the Heads of the Valleys.

Labour is increasingly mobile and migration is a key driver of the employment landscape, often driven itself by relative skills supply. Migration can be, and has been in the past, a solution to skill or labour shortages in Wales. However this can work in both directions as skilled employees can leave if the employment opportunities outside Wales are greater, although over the past decade there has been net immigration.

Internal migration is a feature of the UK employment landscape and Wales has a strong interplay with the rest of the UK. Gross flows to and from the rest of the UK have been around 70,000 per annum, compared to gross flows from Wales to and from international destinations of just under 8,000 (SAMI, 2010).

Net immigration in Wales is twice the birth rate. However, although non-UK immigration is significant, it is below average UK levels and ethnic diversity in Wales in different skills sectors varies from a half to a quarter of equivalent UK levels.

In our scenarios (see below), the international migration picture is a key differentiator between the envisaged futures for the UK with sharply differing levels of international migration. These effects are likely to be diluted for Wales because of the high levels of immigration from England.

Migration is linked to other drivers. The economic performance of Wales will tend to drive migration (in and out). The evolution of "death of distance" will reduce the need to migrate because economic migrants will no longer necessarily have to move to work for companies based overseas; the jobs might migrate to the skills rather than vice versa.

From 2005 to 2009 the only age group with a net outflow was the 16-24 cohort, attributed to students and graduates searching for education and careers. This must be significant. Only South East Wales had a net inflow in this age range, but it shows a significant outflow in the 25-44 age range. All of this South East Wales variance comes from Cardiff and is possibly due to the concentration of higher education institutions in the city.

Some of the implications of this driver for jobs and skills are as follows:

- University funding changes could impact on the migration patterns and hence on demand for university places in Wales;
- The inflow of older people will accelerate the demand for care services and associated skills; and
- Some skills shortages could be satisfied by immigration.

Ageing workforce

Demographic projections indicate an ageing workforce for Wales but this effect should not be overstated. While the current peak in the working population, 45/46 years, will age to 55/56 years by 2020, the average age of the workforce increases by less than 2 months over the same period, although this does not allow for possibly very significant changes in retirement ages, or the impact of migration (SAMI, 2010).

Over the next ten years, employers will find it increasingly difficult to grow their workforce without inward migration. A comparison between the age structure of the Welsh population and that of the UK reveals higher numbers of the old and lower numbers of the young in Wales. The overall population of working age (aged 20 to 65) increases by nearly two per cent over the next two years but then declines again to be very close to the 2009 figure by 2020. This, however, is again before the possible impact of immigration and any changes in retirement age.

It is uncertain whether the increased number of retirees in the next ten years will be richer or poorer than those of today. They are likely to be fitter. If they are as rich, or richer, the grey market for leisure and healthcare will increase. There is likely to be more demand for healthcare and leisure industries. This effect may also be linked to new healthcare technologies aimed at keeping older people in their home.

In spite of a general desire to retire earlier, changes in legislation and in the affordability of pensions may force people to work longer, probably with a need for retraining or up-skilling, and a move from manual to non-manual work.

As the population ages and new young talent becomes less available, employers and employees will need to re-skill or up-skill existing talent.

In some scenarios a sense of cooperation or community could lead to older people undertaking more voluntary work as they retire, thus releasing younger paid employees for other jobs. The volunteers will need training to adapt to new technology.

4.4.6. Consumers' needs and expectations

Consumers and consumer behaviour are central drivers of the economy and the skills and employment landscape.

Consumers are becoming used to being treated and courted in many aspects of their lives. Retailers in particular offer the consumer increased choice, low prices, immediate fulfilment, a pleasant and captivating experience, and money-back guarantees.

The growing grey market will generate demand for health and social care and leisure services. An issue particularly relevant to Wales is finding adequate numbers of people who want to work in the growing care service sector.

Lifestyle changes such as healthier living will generate new service jobs; new fashions and trends will create new or replacement jobs in manufacturing, distribution and retailing.

Use of the internet is making consumers better informed and more discerning. However consumers are likely to continue to shop in physical stores but will be looking for a fuller shopping experience.

Consumer expectations are likely to transfer across to the use of public services in general and to training in particular. Simple messages, simple access to services and rapid response will be necessary to achieve desired outcomes from the provision of both public and private services.

Good personal skills and maintaining high quality of workmanship can be seen to be important in most scenarios. Both public and private sector jobs will be affected by these trends, which will be reflected in the types of jobs people have but will also reflect on individuals' attitudes to the provision of training.

Both private and government training services need to become more customer-focused and accessible and will need to provide training in interpersonal and service skills. High level personal skills will be demanded by customers and clients.

There may be greater demand for personal/care services.

4.4.7. Changing values and identities

Values and identities have a key bearing on individuals' attitudes to the world of work. Language and national identity is a distinctive component in Wales...

Ambition and individualisation

Over the next ten to twenty years, changes in the population's ambitions and values are likely. Already recognised is the new Generation Y, born between 1980 and 2000, which is the next cohort of middle managers and will have very different attitudes to new technology as well as having different values. Generation Y, like other generations, has been shaped by the events, leaders, developments and trends of its time.

The rise of instant communication technologies and social networking sites may explain Generation Y's reputation for being peer-oriented due to easier facilitation of communication through technology. This trend of communication is continuing into the post-Y generation.

Expression and acceptance has been highly important to this generation. Generation Y is also said to be more radically and culturally tolerant than previous generations, but is still questioning, ambitious and has high expectations.

However the experience of all generations over the next few years could lead to a nation with significantly different attitudes by 2020, dependent on the following:

- The strength of economic growth and the employment prospects;
- Changes in working conditions and wealth (for the employed skilled and semiskilled); and
- Changes in leisure time with or without the funds to enjoy it (for the growing proportion of retired people).

Likely implications of this driver for employment and skills are as follows:

- Generation Y will provide a more flexible workforce and will demand and use new methods of learning with delivery of training online or through virtual reality;
- Ambitious individuals will need training in entrepreneurial skills to help them to achieve their goals;
- There is a possibility of reduced career expectations of some being replaced by greater interest in economic or job security; and
- Changes in the relationship between the trainee and the trainer as a group of potentially ambitious and achieving employees have the means to fulfil those ambitions through training. Improved methods of training can be adopted.

Language

The Welsh language is a strong focus for national identity and culture.

The cumulative effect of migration over time has led to around one-quarter of the Welsh population being born outside Wales. The number of Welsh speakers in rural Wales is falling but this is being balanced by an increase in the towns and cities as a result of the success of including Welsh in the school curriculum. The Welsh Language Act 1993 gave the Welsh language parity with the English language in the public sector in Wales.

Employers are saying that Welsh is becoming more widely used by customers and that to provide the expected service, they need staff who can speak Welsh. Competent Welsh speakers are also needed by business and public bodies to comply with legislation.

4.5. The implications for skills

Table 4.1, below, summarises the implications for skills arising out of the key drivers identified in the previous analysis. It focuses on those drivers which are most likely to have a significant impact on the demand for and / or supply of, skills. Each driver is placed within a framework that seeks to assess whether the impact and scale of the driver is likely to increase or decrease, the way in which it is expected to shape demand for skills and the main sectors that are most likely to be affected. These are qualitative judgments that are subject to challenge and further discussion and debate. Nonetheless, they provide an indication of direction of travel and of broad potential impacts.

Table 4.1: Implications of drivers for changes to skills demand and supply in Wales

Nature of driver and impact on skills	Current, ongoing driver or new driver	Increase or decrease in a) impact b) scale of effects	Impact on supply of or demand for labour	Impact on demand for skills	Which sectors will be affected
Regulation and governance					
Spending cuts will lead to significant redundancies among the public sector workforce. Many of the affected workers will require a degree of re-skilling to compete for private sector opportunities.	Ongoing	Increase in impact and widespread scale	Change in the overall profile of demand for labour and increase in the available supply	There will be a reduction in demand for skills specifically associated with public sector roles	Public administration, health, education are likely to be most affected. Many businesses that lie outside the formal confines of public sector also draw on public funding.
Regulation of product service / quality and to minimise consumer risk will shape skill requirements and drive investment in training	Ongoing	Increased impact, widespread in scale	Demand	Will raise demand	All but particularly strong impact on financial services, passenger transport, food and drink manufacturing, social care
National regulation affecting age of labour market exit will influence labour supply. (Raised school leaving age not adopted in Wales.)	New	Increase in impact, moderate scale	Supply	Regulation encouraging later departure from the labour market will increase labour supply but older workers will have retraining needs	All
Stronger emphasis on training as evaluation criterion in public procurement decisions may drive training investment	New	Likely increase in impact, moderate in scale	Demand	May raise demand	Public sector suppliers

Nature of driver and impact on skills	Current, ongoing driver or new driver	Increase or decrease in a) impact b) scale of effects	Impact on supply of or demand for labour	Impact on demand for skills	Which sectors will be affected
Demographic and population change					
Ageing population will lead to increase in demand for particular goods / services, leading to job growth in a range of sectors. Both high and low level occupations are likely to be affected.	Ongoing	Increase in impact, widespread in scale	Demand	Increased demand for workers in a variety of occupations. In combination with growing consumer expectations likely to lead to requirement for skill development	Widespread impact on sectors but particularly health and social care
Net inflow of workers from rest of UK may help to meet Welsh labour demand but net outflow could expose skills deficits	Ongoing	Projected increase in net inflow; scale moderate	Supply	Demand may increase as a function of reduced supply or may reduce if supply is increased	All
Government policy will determine the extent to which immigration affects supply of labour; a tightening of restrictions will limit supply	Ongoing	Likely increase in impact due to recession; moderate in scale	Supply	Immigration restrictions would raise demand for labour	All; but likely to be particularly severe for sectors with non-EEA migrants like health and social care
Reduction in size of cohort of young people and ageing workforce will lead to fewer young people in workforce and increased reliance on older workers	Ongoing	Increase in impact, widespread in scale	Supply	Demand for re-skilling of older workers to meet changing needs of economy	All
Increased life expectancy, medical advances and reduced pension provision may lead to longer working lives	New	Increase in impact, widespread in scale	Supply	Would raise demand for retraining	All

Nature of driver and impact on skills	Current, ongoing driver or new driver	Increase or decrease in a) impact b) scale of effects	Impact on supply of or demand for labour	Impact on demand for skills	Which sectors will be affected
Higher levels of qualification among young people entering labour market versus older workers will change profile of labour supply	Ongoing	Impact likely to increase, depending on impact of policy on higher education participation; scale widespread	Supply	May mitigate some existing skills needs but work experience will be important in meeting employer needs as well as formal qualifications	All
Environmental change					
Spatial shift in supply of labour away from rural areas and into urban areas	Ongoing	Likely to be increasing impact; scale of effects moderate	Supply	May reduce demand in urban areas but increase demand and potentially skills deficiencies in rural areas	Likely to particularly affect industries that are concentrated in rural areas such as agriculture and tourism
Development of low carbon infrastructure may lead to increased demand for STEM skills	New	Impact will increase but scale uncertain	Demand	Will increase demand for STEM skills in a variety of disciplines and at a range of levels	Particularly in energy generation and engineering construction
Pressure for greater efficiency in terms of energy consumption and resource utilisation will affect job content	Ongoing	Impact will increase, scale will be widespread	Demand	Will lead to change in the skills within existing jobs as well as the emergence of new job roles	All
Economics and globalisation					
Competitive advantage in international markets will increase depend on process of continuous innovation and organisational agility as overseas competitors continue to move up the value chain	Ongoing	Increase in impact, scale of effects widespread	Demand	Increased demand for managers who can facilitate organisational response to growing competitive pressures	Advanced manufacturing but also creative media, financial services

Nature of driver and impact on skills	Current, ongoing driver or new driver	Increase or decrease in a) impact b) scale of effects	Impact on supply of or demand for labour	Impact on demand for skills	Which sectors will be affected
Routine manufacturing roles will continue to be transferred to low-cost locations overseas	Ongoing	Impact will continue to be significant and effects will be widespread	Demand	The demand for routine manufacturing skills e.g. operatives will continue to decline	Manufacturing
Expansion in demand for intermediate / low level personal service skills	Ongoing	Increase in impact, scale of effects widespread	Demand	Increase in occupational demands for personal service roles. Growing consumer expectations may lead to a requirement for up-skilling	Personal service-intensive sectors including social care, hospitality and tourism
Technological change					
Development of new materials and technologies will increase skills demands and possibly create new job openings in R&D and related high level functions	Ongoing	Increase in impact; scale moderate	Demand	Increased demand, including for individuals with ability to apply high level scientific knowledge	Advanced manufacturing sectors
Continuing development of digital economy will create new skills needs	Ongoing	Increase in impact, widespread scale	Demand	Increased demand for individuals with specific technical skills but also for individuals with new combinations of generic skills	Creative industries, ICT
Exploitation of new technologies across economy will require enhanced management and leadership skills	Ongoing	Increase in impact, widespread in scale	Demand	Increased skills demands for management workforce	All

Nature of driver and impact on skills	Current, ongoing driver or new driver	Increase or decrease in a) impact b) scale of effects	Impact on supply of or demand for labour	Impact on demand for skills	Which sectors will be affected
Changing values and identities					
Changing values will affect individuals' preferences around patterns of work in terms of working time, interest in self-employment	Ongoing	Likely to increase in impact, scale likely to be widespread	Supply	May increase demand in segments of workforce where supply is affected by changing preferences	All
Increasing participation of women in labour force will increase demand for childcare and other care services	Ongoing	Impact and scale increasing	Demand	Likely to increase occupational demands in respect of caring personal service roles	All
Avoidance of careers in a variety of sectors / occupations, including care, traditional manufacturing etc may result in future skills shortages	Ongoing	Impact currently high but uncertain as to whether it will increase; scale widespread	Supply	Demand will increase as a function of supply	Care, manufacturing, low carbon sectors
Recession may reduce career expectations while leading to increased interest in jobs offering greater security	New	Impact may increase; scale likely to be widespread	Supply	May be better balance between demand and supply in some parts of the labour market	Areas like public sector and social care may benefit from increased labour supply
Increasing use of Welsh language	Ongoing	Impact increasing, widespread scale	Demand and supply	Increase in demand for Welsh speakers	Widespread effects but will be particular impact on education, passenger transport and public administration
Changing consumer demand					
Constrained consumer demand arising out of recession and fiscal consolidation will impact on a range of service and production sectors	New	Impact likely to increase; scale will be widespread	Demand	Demand for labour is likely to be weakened in sectors which are sensitive to domestic consumer demand	Most sectors of the economy, including retail, hospitality, some manufacturing sectors

Nature of driver and impact on skills	Current, ongoing driver or new driver	Increase or decrease in a) impact b) scale of effects	Impact on supply of or demand for labour	Impact on demand for skills	Which sectors will be affected
Customer service function will face challenges of fragmented consumer demand, raised consumer expectations of quality of service, more widespread direct engagement with consumers in sectors like manufacturing	Ongoing	Impact will increase, scale will be widespread	Demand	Growing skills demands in customer service function and possibly increasing occupational demands	All
Demand for skills relating to online sales and marketing, logistics management as well as remote customer relationship management	Ongoing	Impact increasing, scale widening	Demand	Growing skills demands for managers, IT roles, customer service roles	All; but particularly retail, hospitality

4.6. Implications of impact

We have already stressed the importance of not viewing each driver in isolation but rather as a set of interdependent trends; similarly the impact of drivers will vary according to the socio/political/economic environment. The potential variability in possible impact of some of the drivers on skills is captured in the horizon scanning and future scenarios development work commissioned as part of this Audit (SAMI, 2010). SAMI's work draws on the Foresight Futures Vision 2020 scenarios developed for the then Department of Trade and Industry (DTI, 2002). The scenarios are not predictive forecasts, rather they are depictions of alternative possible futures, plausible 'stories' of how the world may look in the future and intended to inform policy decision making by illustrating what society might look like under different trajectories of development.

It should be noted that these scenarios are grounded in two 'axes':

- a) the degree of influence from policy and regulation at local, national and international levels, sometimes referred to as 'systems of governance'; and
 - b) the degree of individualisation of personal values, which we can refer to as 'social values.'
- A brief overview of the alternative scenarios is given below.

Three scenarios for 2020

The '**World Markets**' scenario – individual aspirations thrive in a global economy sustained by international co-operation – reflects a world driven by aspirations of personal independence, personal and corporate wealth and mobility, to the exclusion of wider social goals; a belief in the continued efficacy of integrated global markets; and internationally co-ordinated policy, light regulation and a philosophy of 'minimal government.' In the original DTI foresight scenario, it identified likely fast growing sectors as health/leisure; media/information; financial services; bio-nanotechnology.

Under '**National Enterprise**' – individuals and governments seek autonomy and independence – people aspire to personal independence and material wealth, embracing liberalised national markets to secure national self reliance and security but political and cultural institutions are strengthened to buttress national autonomy in a more fragmented world and international co-operation is limited. In the original foresight scenario, fast growing sectors were identified as private health/education; domestic and personal services; tourism; retail; and defence.

In '**Global Sustainability**' – a caring world where individuals value community and look to government for welfare and sustainability – people aspire to high levels of welfare within communities characterised by shared values, more equal distribution of opportunities and a sound environment; they believe these objectives are best achieved through active public policy and international co-operation; and markets are regulated to encourage competition. In the original foresight scenario, fast growing sectors were identified as education/training; large systems engineering; new and renewable energy; information services. For more detail, see SAMI, 2010.

It should not be assumed that these three scenarios are equally likely nor are they exclusive. The eventual outcome may comprise a 'blend' from each of them, or they may combine to form another 'scenario.' The scenario approach alerts us to the uncertainty inherent in the future, yet makes it more explicit.

4.6.1. Common trends in skills drivers and demands across scenarios

In their analysis of the scenarios, SAMI (2010) identify that some drivers will be common in their nature and likely impact under all three visions of the future.

Demographic drivers appear to be more predictable than other factors as they are based on ongoing long-term trends. This means that greater certainty can be attached to the need to confront socio-economic challenges and skills demands arising from these developments including the provision of care services and the possibilities arising for servicing an older consumer population.

Globalisation drivers affecting the location of manufacturing are likely to have a pervasive effect, coupled with the use of ICT which will enable increasing flexibility in the location of production and work for individuals as well as organisations. The operation of these drivers would be affected to only a moderate extent by the different scenarios (see below).

In broad terms technological change is a common feature of all scenarios; however, the types of technological innovation which will have most impact are extremely difficult to predict, suggesting that a broader common policy objective may be required of fostering capacity to exploit innovations. The availability of training and learning materials and environments which can be accessed online will feature in all of the scenarios. Design, media and engineering innovations have the potential to continue as strengths of the national economy under all scenarios, and a generalised demand for higher level skills may occur as the source of competitive advantage for UK firms that move to higher value-added markets.

4.6.2. Key differences in implications for skills demand between scenarios

The key differences between the scenarios relate to the degree of government intervention and the extent to which it promotes or restricts integration with the global economy. This has a profound bearing on the nature and level of the impact of individual drivers, and their implications for employment and skills.

Structural change in the economy of Wales would be more pronounced and rapid under the World Markets scenario, with an acceleration of existing trends. This would lead to the steady attrition of traditional industries which continue to see an erosion of their competitive advantage in global markets. Moreover, investment in new industries would have a strong tendency to gravitate to existing clusters of expertise under this scenario, which in some cases reside at UK rather than Welsh level.

The pace of technological change and associated trends like the development of the knowledge economy is also more rapid under the World Markets scenario, as a result of heightened competition, investment and spread of best practice.

The level and nature of investment in infrastructure, including digital infrastructure, varies markedly across the three scenarios. Under the globalised, liberalised World Markets scenario substantial infrastructure development would be driven by private sector development, whilst under National Enterprise such development would be constrained by a lack of access to global sources of capital. Under the Global Sustainability scenario, development would be driven by public as well as private investment, with a greater emphasis on sustainable, low carbon infrastructure.

More generally the Global Sustainability scenario would drive greater government investment in the low carbon agenda, with associated skills demands in energy generation,

building services, engineering and advanced manufacturing enterprises, and a broader array of resource and waste management skills needs across the wider economy.

Differences in the degree of government intervention have a direct impact on migration across the three scenarios. Under the World Markets scenario there would be a highly mobile labour force with major international competition for skilled workers and with immigrants filling low-paid service jobs. Levels of immigration would be much lower under the National Enterprise scenario, particularly among unskilled workers, as a result of government controls. The UK would therefore need to be more self-reliant and able to ensure that the education and training system produces a labour force with balanced skills.

Moreover, a 'National Enterprise' scenario would see a more intensive approach to regulating product standards and qualification levels directly where these affect goods and services that are perceived as having high consumer risk. This could lead to higher demands for skills in financial, property and healthcare services, for example.

In an environment of strengthened national political and cultural institutions defined by the National Enterprise scenario, demand for Welsh language skills might increase, driven by heightened cultural identity and government employment policy.

The second dimension of each of the scenarios relates to individualism of personal values. In the World Markets scenario, high levels of personal ambition and individualism shape career choice, whereas under the other scenarios considerations of economic security, quality of life and serving the community play a more prominent role.

4.7. Conclusion

In this chapter, we have gained an insight into the likely direction, type and nature of drivers of change and how these drivers may affect employment and skills in Wales.

The drivers and scenarios demonstrate the high degree of uncertainty and risk attached to predicting the future but nonetheless increase our insight into how skill needs in Wales are most likely to change in the coming years.

Our examination of the implications of the drivers of change for skills demands shows that the **general trend is for increased demand in skill levels, chiefly amongst higher skilled occupations.**

This qualitative analysis of key dynamics/processes, when set alongside our more technical forecasting of employment, can add real value to our understanding of future skill needs.

5. Key sectors and their skills needs

5.1. Introduction

This chapter draws together the major sources of evidence on current and likely future sectors of economic and jobs growth, together with the evidence on the skill deficiencies that these sectors currently face, and those that they could face in the future. The evidence base comprises:

- The *Working Futures* projections of occupational and sectoral change to 2017;
- A purpose-built model to identify economically significant sectors potentially constrained by skill deficits;
- An examination of the skill needs of the sectors identified in *Economic Renewal* as potential priorities for future jobs and growth; and
- Insights from the sector skills assessments completed by SSCs, clusters of SSCs and other experts.

5.2. The core scenario: evidence from Working Futures

The core scenario upon which the initial commentary about future skills demand is based is taken from *Working Futures 2007-17* (Wilson et al, 2008). The econometric models upon which these predictions are based is robust and well tested. However, they also rely on extrapolating future demand based on historical long-term trends. This makes them less able to capture the impact of exogenous shocks which produce discontinuous change; so for example, the effects of the current recession are not accommodated within these forecasts.

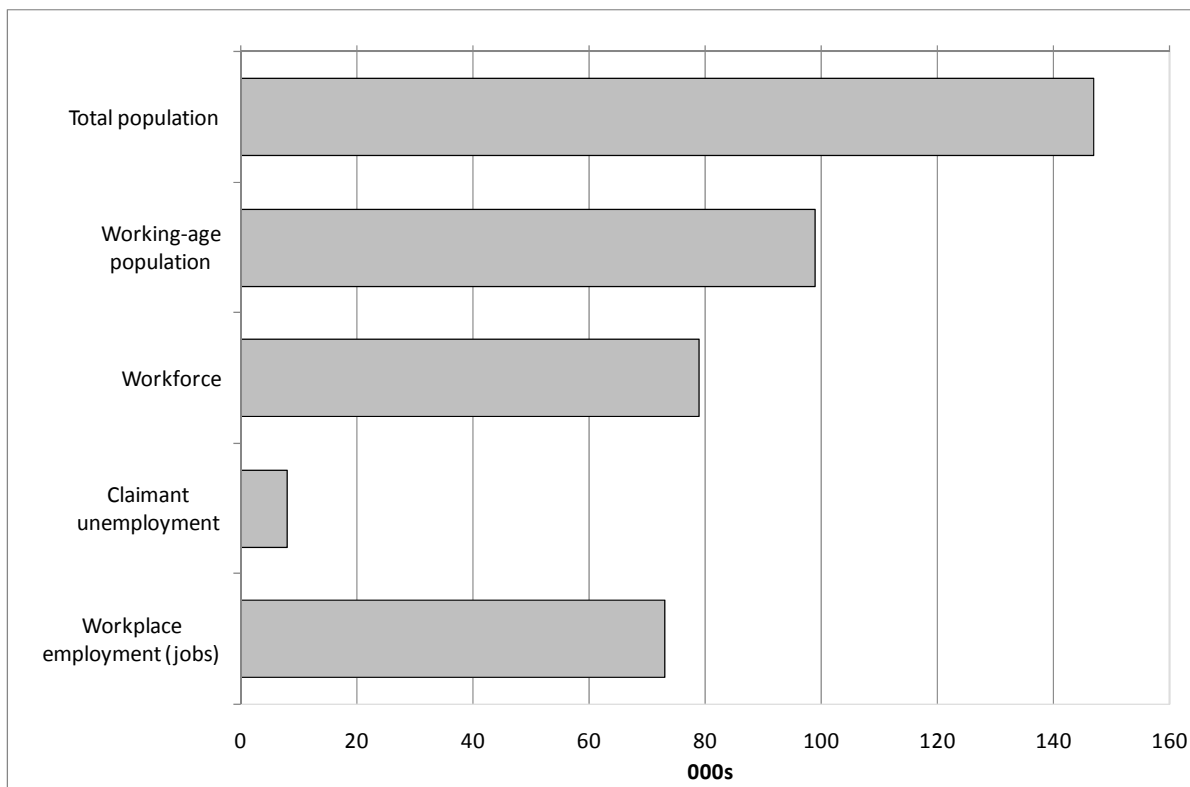
However, it is important not to conflate structural trends and cyclical movements, and to recognise that recoveries from previous recessions have seen employment and the structure of the economy resume broadly their previous paths relatively quickly. Whilst the relative magnitude of change across sectors is likely to remain, it may, however, be the case that some 'rebalancing' of the economy takes place, with financial services, construction and parts of the public sector growing less than expected. It is in this area where qualitative scenario-based assessments of major national or global change, or where more recent sectoral and regional forecasts can also add value.

Further, the *Working Futures* forecasts use a standard sector classification, and are therefore unable to identify emerging sectors. Essentially, the approach to this part of the Audit consists of considering the projections made in *Working Futures* and assessing the nature and likelihood of any deviations from the proposed trends. When combined with an understanding of the drivers of change (as outlined in chapter four), their potential impact, and the implications of the different scenarios, this can provide us with a rounded view of likely developments in jobs and skill needs.

What is the projected overall employment change?

Figure 5.1 shows projected employment change for Wales between 2007 and 2017, drawing on data from *Working Futures 2007-17*. It shows an expansion in both jobs and the size of the potential workforce. It estimates a net growth in jobs in Wales of around 70,000, while the workforce is expected to grow by a little more, resulting in a small increase in unemployment.

Figure 5.1: Changes in key labour market indicators for Wales, 2007-17 (000s)



Source: *Working Futures 2007-17* using CE/IER estimates, CE projections C81F9A (revision 900), *CrossRegional.xls* (Table R.4)



While we expect an expansion in the demand for labour in the longer-term, the ongoing impact of the recession may mean that both the pattern and strength of demand may be different from that identified in the *Working Futures* projections. The expected public sector job losses and the positive impact on manufacturing employment of the low exchange rate of sterling may be particularly significant in this regard. As previously noted, however, the experience of previous recessions is that the structural changes occurring can be over-estimated, with economies returning to broad, long-term, structural patterns of growth in the recovery periods and beyond. It is more likely that the absolute growth in jobs, however, will be constrained.

Projected employment change by sector

Within the overall projections for employment growth, there is significant sectoral variation, as demonstrated by Table 5.1.

Table 5.1: Projections of employment by industry group, absolute levels and changes (000s); Wales

	Levels			Changes		
	2007	2012	2017	2007-2012	2012-2017	2007-2017
Agriculture	28	26	24	-2	-2	-4
Mining, quarrying & utilities	9	8	7	-1	-1	-2
Food & drink manufacture	24	25	25	1	0	1
Textiles & clothing	4	3	3	-1	-1	-2
Wood, paper & publishing	18	16	16	-2	-1	-2
Chemicals	30	28	27	-2	-2	-4
Metals & metal goods	28	24	20	-4	-4	-9
Machinery manufacture	28	25	23	-3	-2	-5
Transport equipment	25	23	21	-2	-2	-4
Other manufacturing	12	10	10	-1	-1	-2
Construction	108	115	116	7	1	8
Wholesale distribution	71	74	75	3	1	4
Retailing	152	155	161	3	5	9
Hotels & catering	94	100	105	6	5	11
Transport & storage	44	46	50	2	4	6
Post & telecoms	17	17	17	0	0	0
Financial services	33	35	35	2	1	2
Professional services	31	35	39	4	5	8
Computing	12	13	15	1	1	3
Business services	134	142	144	8	2	10
Public administration	88	87	87	-1	0	-1
Education	120	123	125	3	2	5
Health & social care	194	207	217	13	10	23
Other services	91	99	108	8	9	17
Total	1,395	1,437	1,467	42	31	73

-  Sectors where employment is expected to fall by at least 5,000
 Sectors where employment is expected to rise by at least 10,000

Source: Working Futures 2007-17 using CE/IER estimates, CE projections C81F9A (revision 900), 25WA.xls, (Table 3.4a)

Overall employment expansion is expected in 13 of the industries, whilst employment is expected to contract in 11 industries. The major growth industries in terms of jobs are:

- Health and social care, with employment expected to rise by more than 20,000, around a quarter of total growth;
- Other services sector, which is expected to see growth in employment of around 17,000, much of it coming from cultural, sporting and recreational activities;
- Hotels and catering, with expected growth of 11,000; and
- Business services, projected to see a rise in employment of 10,000 over the period.

These growth industries, which represent a mix of relatively high and relatively low skill sectors, already account for a large share of employment: close to 40 per cent. Any current skill shortages within these sectors may be exacerbated by future expansion and have a limiting impact on growth. It is important to know, therefore, which sectors are both (a) the most significant in terms of their contribution to the economy; and (b) those which suffer most from skills deficiencies. It may then be possible or desirable to focus to some greater

degree on these parts of the labour market in order both to reduce the most significant skill deficiencies in the economy, and to remove an important barrier to the development of jobs in these sectors. This does not imply that the sole focus of action should be on such sectors, but merely that these are likely to be important sectors. Furthermore, this analysis should be placed alongside the additional analysis later in this chapter.

These projections are also broadly consistent with the implications of the major drivers in skills demands discussed in the previous chapter. For example, health and social care employment, in particular, may expand significantly beyond long run trends, as a result of the ageing population.

Sectors predicted to experience significant decline in employment are generally in manufacturing and include engineering, chemicals and metals and metal goods. Public administration and defence is also expected to experience a decline in the numbers employed. This will be intensified by public sector spending cuts to reduce the size of the fiscal deficit that has grown considerably during the recession.

A comparison with projections for the UK, as presented in the England Audit (UKCES, 2010a), shows that certain sectors are expected to grow at a significantly faster rate than the UK average. These include:

- Transport and storage;
- Professional services; and
- Other services (which includes leisure and cultural activities).

In addition, employment in agriculture is projected to see a lesser decline in Wales than across the UK.

There are also sectors where growth is expected to be significantly lower (or decline greater) than the UK average. These include:

- Business services; and
- Metals and metal goods.

5.3. Significant sectors potentially constrained by skill deficits: a model

To identify significant sectors constrained by skills deficits, we have developed a model which both assesses the economic significance of a sector and the extent to which it suffers from skills deficits.

5.3.1. Defining the economic significance measures

To identify the economic significance of a sector, a measure has been developed which captures the performance of each sector in the UK economy across the two key dimensions of the economy: productivity and employment. Sectors can be defined as economically significant because of their level or growth in terms of productivity. Analysis from *Working Futures* shows that the three sectors with the highest levels of productivity are currently mining, quarrying and utilities; financial services; chemicals; and post and telecommunications. Productivity, however, is not the only criterion of economic significance. The level and growth of employment is also important. Here, the analysis shows that health and social care; business services; and retail are the sectors with the highest employment levels. In order to measure economic significance, we combine the two key dimensions of productivity and employment into one overall measure. We combine both

the levels of productivity and employment, which signify their contribution to the current volume of output, with changes in productivity and employment which signify their contribution to economic growth, the growth in output.

The productivity indicator used consists of two measures derived from Working Futures 2007-2017:

- Labour productivity in 2007 (based on the proportion of GDP attributable to a sector divided by the sector's proportion of total employment); and
- The growth in labour productivity between 2002 and 2007.

The employment indicator consists of two measures derived from the Working Futures 2007-2017:

- Employment levels in 2007; and
- The growth or decline in employment between 2002 and 2007.

5.3.2. Defining the skills deficit measures

To identify skill deficiency, the skills measures we use consider two forms of skills deficit:

- Reported skills deficits; and
- Occupation/qualification deficits.

Reported skills deficit

This consists of two indicators based on data from the Future Skills Wales Survey 2005. These are:

- The ratio of reported skill shortage vacancies (i.e. vacancies that employers find hard-to-fill due to a lack of suitable qualified, skilled or experienced applicants) to employees in each sector; and
- The proportion of employees that the employer believes are not fully proficient at their job, i.e. the extent of skill gaps.

It is important to highlight here the out-of-date nature of the skills survey data and the impact that this has on the model in terms of quantifying current skill deficits. Elsewhere in this report we have used extrapolations to update the position against high level skill deficit indicators. For technical reasons we have not used such an approach in respect of the disaggregated sectoral skill deficit data used to populate the model. In those instances where we believe that the skills deficit situation has changed markedly for a sector since 2005 (in the case of the construction sector, for example) we have qualified the results of the model in the commentary on the analysis (see section 5.6).

Occupational qualification deficits

Reported skills shortage and gap indicators may overlook situations where employers are unaware of a skills deficit, or where employers alter job design, competition strategies or product and service ranges to accommodate skills deficits even if they are 'sub-optimal' for organisational performance. Employers may therefore experience a 'hidden' or latent skills deficit. There are no direct measures of such skills deficits, but we calculate a proxy indicator based on the adequacy of qualification level relative to the level of occupation (although we recognise that qualifications are not perfect measures of skills and there is not a perfect alignment of qualification levels and occupational level). The three measures used cover:

- The proportion of managers and professional workers qualified to a minimum level of level 4 or above;

- The proportion of associate professionals or technicians qualified to a minimum of level 3 or above; and
- The proportion of all other workers with level 2 or above qualifications.

Each measure is weighted according to the occupational distribution of the sector. For example, if managers and professionals accounted for 30 per cent of all jobs in a particular sector then the weight for the relevant measure in that sector would be 0.30.

It should be noted that the available data for the three measures are not reliable for Wales; therefore we have substituted UK-level data. The occupational distribution weightings, however, are based on Welsh data.

5.3.3. Which are the current key sectors?

We report below the relative ranking of sectors based on the calculation of overall measures for both economic significance and skills deficits¹¹. It is worth noting that a sector could have a high relative position if it scored highly on one of the measures. For example, a high ranking in the economic significance measure can be because of high productivity performance or employment (or indeed both). However, in the analysis we show only the results of the overall measures. Appendix 2 provides more detail for those that require it, ranking the sectors separately on the productivity and employment measures.

Sectoral economic significance measure

Table 5.2 shows that the sectors scoring highest on economic significance are primarily in private sector service activities: financial services, business services, health and social care and retail. The lowest scoring are wood, paper and publishing, other manufacturing (i.e. that not elsewhere specified) and textiles.

Skills deficit measure

Table 5.2 also shows the sectors which display the greatest 'skills deficit' on the overall measure are construction, financial services, other manufacturing, and retail.

¹¹ For each measure the sectors are ordered on a scale (from 0 to 1). The lowest is given the score of 0 and the highest is given the score of 1. The remaining sectors are positioned proportionately to their score on the measure between 0 and 1 and then aggregated to produce a composite score (again between 0 and 1). This approach gives a more appropriate representation of the differences between sectors than alternative approaches such as ranking, as it enables recognition of the different degrees of 'distance' between the values.

Table 5.2: Sectoral economic significance and skill deficiency measures: the sectors ranked

Highest scoring sectors (most significant first)	Economic significance	Skills deficits
1	Financial services	Construction
2	Business services	Financial services
3	Health & social care	Other manufacturing
4	Retailing	Retailing
5	Transport & storage	Professional services
6	Post & telecoms	Other services
7	Transport equipment	Hotels & catering
8	Hotels & catering	Metals & metal goods
9	Mining, quarrying & utilities	Wholesale distribution
10	Public administration	Machinery manufacture
11	Chemicals	Wood, paper & publishing
12	Construction	Textiles & clothing
13	Computing	Computing
14	Machinery manufacture	Chemicals
15	Other services	Post & telecoms
16	Education	Business services
17	Wholesale distribution	Transport equipment
18	Professional services	Mining, quarrying & utilities
19	Food & drink manufacture	Transport & storage
20	Agriculture	Food & drink manufacture
21	Metals & metal goods	Public administration
22	Textiles & clothing	Agriculture
23	Other manufacturing	Education
24	Wood, paper & publishing	Health & social care

5.3.4. A sector priority matrix

The key sectors – based on combining the economic significance and skills deficit measures, are identified in Figure 5.2. The sectors which currently have the highest relative economic significance while also being constrained by the highest level of skill deficits (i.e. those in the top right quadrant) are financial services, retail, post and telecoms and business services, with the last two sectors lying just within the quadrant.

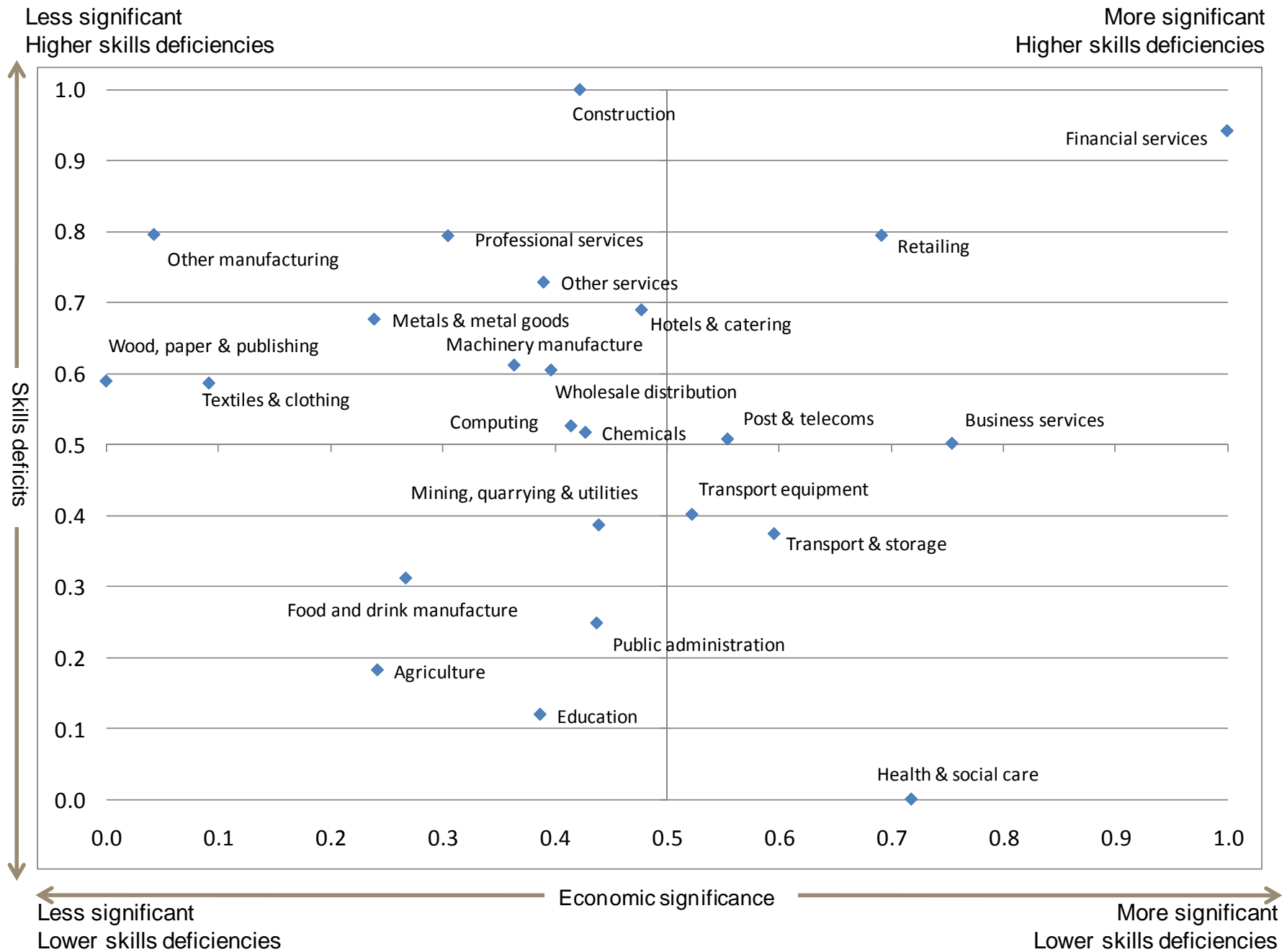
Sectors in the top left quadrant, several of them manufacturing related, experience significant skills issues but are of lesser economic significance overall.

It is instructive to compare the results with those for the UK, as presented in the Skills Audit for England (UKCES, 2010a). The key points for the UK relative to Wales are:

- Retail features within the top right quadrant as in Wales;
- Financial services, post and telecoms and business services all lie within the bottom right quadrant indicating high economic significance but a relatively lesser susceptibility to skills deficits than in Wales; and
- Computing is placed in the top right quadrant for the UK but only in the bottom left for Wales (but see future model, below).

Two of the four key sectors identified in Wales have high levels of female employment. Women account for more than 60 per cent of total employment in both financial services and retail.

Figure 5.2: A sector priority matrix – current



5.4. Identifying future economically significant sectors with potential skills issues

While it is important to identify economically significant sectors which are currently constrained by skill deficits, it is also valuable, but more difficult still, to identify those sectors which are expected to be economically important in the future and which are likely to face skills constraints.

In terms of future economic significance, we again look at productivity and employment:

- Future labour productivity is based on two measures:
 - Projected labour productivity in 2017; and
 - Labour productivity in 2007 and the productivity forecast for each sector between the two periods 2007 to 2012, and 2012 to 2017.
- Future employment based on:
 - Projected levels of employment within each sector in 2017; and
 - The average change in employment forecast for the sector between the two periods 2007 to 2012, and 2012 to 2017.

On the skills deficit side there are, of course, no available data on future skill shortages, skill gaps or sectorally-specific forecasts of qualifications levels. So, a future-oriented model needs to look elsewhere.

Future skills deficits and mismatches are at risk of occurring where the need for new employees is greatest, as in principle it is most likely to outstrip supply and to be quantitatively more important to the economy and labour market. It is clear from both *Working Futures* and future insights offered by the sector-based skills assessments, that the demand to replace people who leave existing jobs, primarily through retirement, is the key dimension of future demand for labour. Projections of this 'replacement demand' for labour are available from *Working Futures*, and have been used here as a proxy measure for skills requirements. This is more of a measure of demand for employment than skills, but does provide an indication of where skills constraints are most likely to occur due to the volume of demand for people to take the place of existing experienced employees. It differs from the measure of employment used on the economic significance side of the model, being based on replacement demand rather than net actual growth in jobs.

5.4.1. A future-oriented sector priority matrix

On this basis of future economic significance, the key sectors include those associated with the digital economy: computing and telecommunications (which also includes postal services) but also includes business services, health and social care and financial services. On the skills demand side, the key sectors are a mix of public and private sector services: health and social care, retailing, education and business services (see Table 5.3).

Table 5.3: Future sectoral economic significance and skill deficiency measures: the sectors ranked

Highest scoring sectors (most significant first)	Economic significance	Skills deficits
1	Computing	Health & social care
2	Health & social care	Retail
3	Business services	Education
4	Financial services	Business services
5	Post & telecoms	Hotels & catering
6	Chemicals	Construction
7	Retail	Other services
8	Education	Public administration
9	Wholesale distribution	Wholesale distribution
10	Mining, quarrying and utilities	Transport & storage
11	Other services	Financial services
12	Transport	Professional services
13	Construction	Chemicals
14	Public administration	Agriculture
15	Machinery manufacture	Machinery manufacture
16	Hotels & catering	Metals & metal goods
17	Transport equipment	Food & drink manufacture
18	Metals & metal goods	Transport equipment
19	Food & drink manufacture	Wood, paper and publishing
20	Other manufacturing	Post & telecoms
21	Agriculture	Computing
22	Wood, paper and publishing	Other manufacturing
23	Professional services	Mining, quarrying and utilities
24	Textiles & clothing	Textiles & clothing

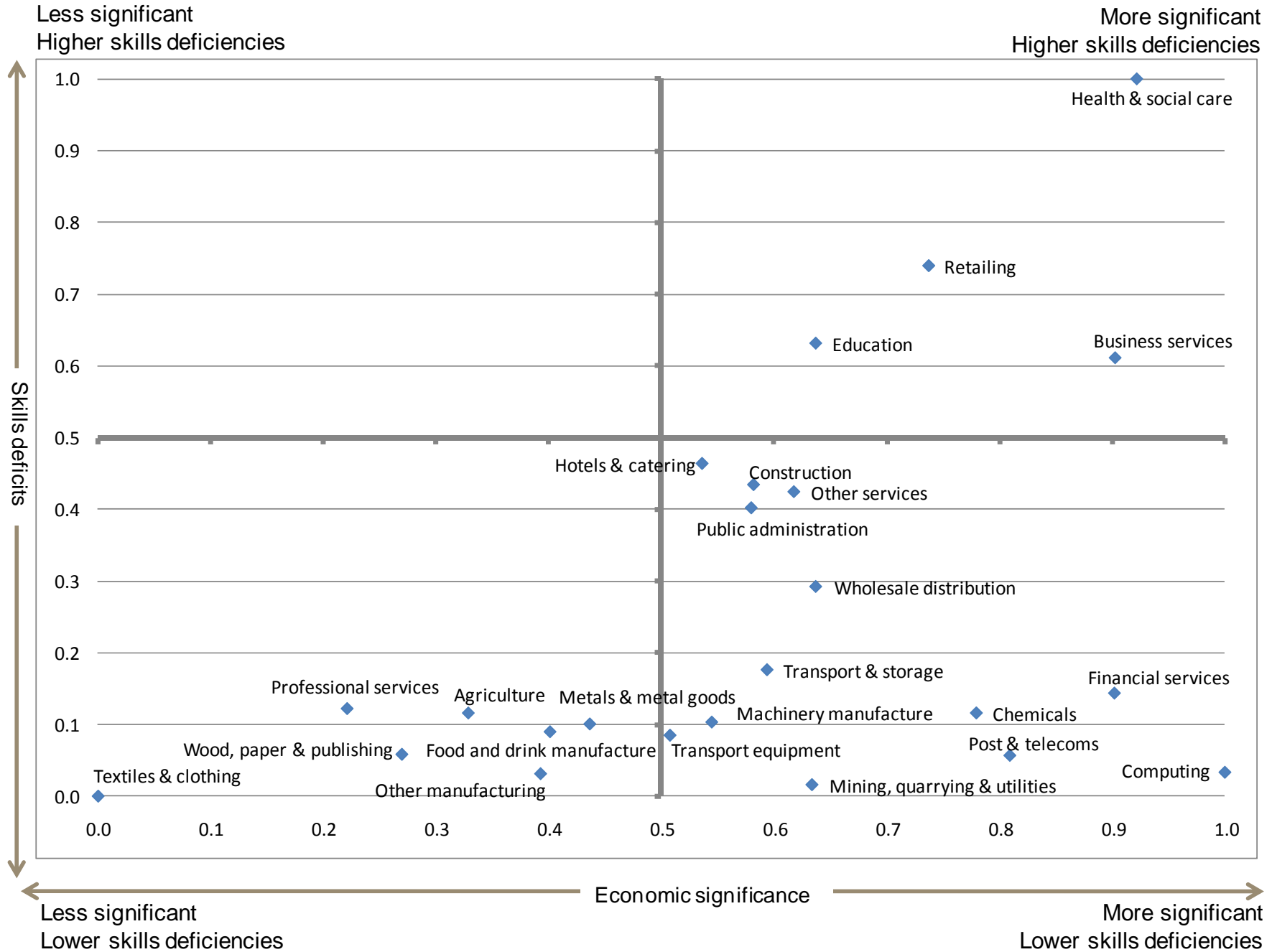
When combined into the matrix (Figure 5.3), we can see that health and social care, retail, education and business services display both high economic significance and are expected to have the highest replacement demands for jobs.

It is notable that computing markedly improves its position in terms of economic significance in the future model compared with the current model, as a result of high projected rates of productivity and employment growth in the period to 2017.

A comparison with the UK results from the model, as presented in the England Audit (UKCES, 2010a) shows similar results to Wales. Health and social care, retail, education and business services all feature in the top right quadrant, as in Wales.

Three out of the four sectors highlighted in Wales as combining high future economic significance and high replacement demands also have high current levels of female employment. Women account for around three-quarters of employment in health and social care, more than 60 per cent of retail employment and more than 70 per cent of employment in education.

Figure 5.3: A sector priority matrix – future



There will always be limitations to a 'data-driven' approach such as the one we have used here. The reality is that any data used are historical in nature (even forecasts for growth are based on projections of historical data, and incapable of identifying radical or unexpected changes). In addition, standard classification systems do not adjust fast enough to reflect change in the real economy and cannot identify 'emerging industries.' For these reasons, it is also important to use additional sources of evidence, including qualitative data. Use of a range of sources allows for a more rounded interpretation, and it is to this evidence we now turn.

5.5. Priority sectors identified in Economic Renewal: a new direction

Economic Renewal: a new direction (Welsh Assembly Government, 2010b) sets out the role devolved government can play in providing the best conditions and framework to enable the private sector to grow and flourish. A key element of this role is a targeted approach by government to addressing economic priorities through a focus on six priority sectors. These sectors are:

- ICT;
- Energy and environment;
- Advanced materials and manufacturing;
- Creative industries;
- Life sciences; and
- Financial and professional services.

The six sectors are viewed as being "strategically important to Wales", demonstrating above average growth at the UK level, projected to perform well into the future and of significant importance to Wales in terms of employment. They are also important as enablers within the wider economy, for example in creating green jobs, driving resource efficiency and moving to a low carbon economy. An additional dimension is that some of these sectors can also be classed as "emerging", meaning that their scope does not closely align to existing industry classifications and statistical data are not always readily available.

Analysis carried out by Welsh Assembly Government, based on provisional definitions of the sectors, suggests that together they form a significant part of the Welsh economy. In aggregate they:

- Account for more than a fifth of private sector enterprises in Wales;
- Account for more than a quarter of private sector employees and a fifth of the self-employed;
- Generate average full-time gross weekly earnings in excess of the average for all sectors in Wales;
- Are characterised by an enterprise birth rate that is almost twice that of non-priority sectors; and
- Have a skills-intensive employment structure, with 50 per cent of total employment residing in management, professional and associate professional roles compared with an average of 39 per cent for the wider Welsh economy (Welsh Assembly Government, 2011b).

The priority sectors account for a smaller proportion of total employment in Wales than in the UK, however, at 19 per cent, compared with 24 per cent for the UK (Welsh Assembly Government, 2011b).

We have undertaken, as part of this Audit, to review these sectors. To do this we have, first of all, drawn on the statistical analysis conducted by Welsh Government. We have supplemented this with UK evidence drawn from the cluster reports produced as part of the 2010 England Audit. There is a good match between the coverage of these cluster reports and the economic renewal sectors, with reports available for the following:

- Digital economy;
- Low carbon industries;
- Advanced manufacturing;
- Life sciences and pharmaceuticals; and
- Financial and professional services.

A number of SSCs worked in collaboration to assess the potential employment significance and skills demands within these sectors. This work has been supplemented by three reports externally contracted to experts: one undertaken by the Institute for Employment Research (Hogarth *et al*, 2010) on the bio-medical sector and two undertaken by PwC, on the low carbon energy generation and financial services sectors (PwC, 2010a, 2010b). As part of its 2010/11 programme of work around strategic skills, the UK Commission has also commissioned an additional overarching skills assessment for the creative industries, produced by Creative & Cultural Skills SSC and Skillset (Creative & Cultural Skills SSC and Skillset, 2010).

The prime focus of the cluster reports is at UK rather than Wales level. We feel they are still useful since they contain findings that have relevance and implications for the Welsh picture. We have also drawn on supplementary material with a specific Welsh focus, where available, including Sector Skills Assessment reports produced for Wales by the SSCs.

Clearly, there is a need for further analysis around these six sectors, building on the existing cluster reports but with a specific focus on the Welsh dimension.

Below we summarise the key findings from the range of reports.

5.5.1. ICT / digital economy

The digital economy comprises two broad components: technology and content activities. Technology provides the infrastructure and platforms through which content is delivered. Content industries include creative media, covering: film, animation, commercials, pop promos, corporate production, facilities and interactive media, advertising, music and design. However, looking beyond these “core areas”, the use of digital technologies to support business activities in non-IT sectors is perhaps even more important.

The digital economy cluster report (e-skills *et al*, 2009) demonstrates that the digital economy makes a significant contribution to the overall UK economy, employing approximately one person in 11 in the working population, and generating high levels of value-added linked to highly skilled jobs. Moreover, harnessing its potential will be key to the UK's future competitiveness and prosperity.

According to the Welsh Government's provisional estimates, the ICT sector has employment of around 22,000 in Wales. The number of employees working in this sector is estimated to have fallen by more than a quarter between 2005 and 2009 (Welsh Assembly Government, 2011b). It should be noted that the definition of the ICT sector used as the basis for calculating these estimates differs¹² from that used by e-skills and this helps to explain the following apparent disparities between the two sets of estimates.

According to e-skills UK, the IT & Telecoms industry contributes five per cent (in excess of £1.2 billion) of Wales' total Gross Value Added (GVA). Three per cent of people employed in Wales work in the IT & Telecoms workforce, equivalent to employment of 39,000 people, which is made up of 16,000 people in the IT & Telecoms industry itself and 23,000 IT professionals working in the wider economy. Economy-wide, 30,000 people are employed in

¹² e-skills' definition of the IT & Telecoms industry includes software publishing, telecommunications, computer programming, data processing and computer repairs. Welsh Government's definition includes additional manufacturing activities, such as manufacture of computers and electronics, that have been hard-hit in employment terms in recent years, contributing to the decline in employment shown in their estimates. The definition adopted by the Government does not include software publishing and digital media because these are classified as part of the creative industries according to the widely used definitions developed by the Department for Culture, Media and Sport.

IT & Telecoms professional roles. Modelling for the period 2009 – 2014 suggests a need for an average of 3,500 new entrants a year into IT & Telecoms professional job roles.

In Wales, as elsewhere in the UK, there is still considerable opportunity for more firms to adopt and exploit ICT (particularly advanced ICT). Indeed, e-skills UK estimate that optimisation of ICT could generate an additional £1.1 billion in GVA across the Welsh Economy over the next 5-7 years. In particular there are potential benefits for small firms, especially those employing 10 or less, which are least likely to have fully adopted and optimised advanced ICT e.g. through trading online. Deployment of super fast broadband across Wales will be key to realising this uplift in GVA.

Looking at the results of the above sector priority modelling and comparing them with those from the England Audit (which were based on UK data) it seems clear that the computing sector (which is broadly equivalent to the technology component of the digital economy as set out above) is *currently* of lesser economic significance to Wales than it is to the UK as a whole. In the UK ranking of current priority sectors computing is placed fourth out of 25, whilst in Wales it is placed 13th out of 24. However, *Working Futures* projections suggest that this will change rapidly and that computing will head the sector rankings in 2017 in terms of economic significance. Computing's ranking for susceptibility to skills deficiencies is low; this perhaps reflects a somewhat skewed picture as the sole indicator available for this dimension is replacement demands and computing has a relatively young workforce.

The growing importance of ICT is also reflected in e-skills UK's forecasts. While employment in the overall Wales workforce is forecast to increase at 0.26% per annum for the coming decade, under e-skills' model, the IT industry is forecast to grow at 1.21% per annum, nearly five times faster.

Growth in employment of IT & Telecoms professional occupations across the wider economy is also anticipated to be substantial: at 1.13% per year it is forecast to grow at over four times the Wales average between 2010 and 2019. This growth is expected to manifest itself mainly amongst the more senior level roles i.e. software professionals along with IT strategy and planning professionals and ICT managers, whilst jobs such as database assistants and clerks, telecoms engineers and computer engineers are forecast to decline. In addition, replacement demands means that there is a need for an average of 3,500 new entrants a year into IT & Telecoms professional job roles.

A detailed analysis of the incidence and nature of IT & Telecoms related skills shortages in Wales is not currently possible, however it does appear that within the UK at least, the incidence of such shortages is at its lowest level since data was first collected by e-skills UK. Turning to skills gaps, 13% of Wales' firms are experiencing gaps in the skills of their IT & Telecoms professionals, with technical and business skills most commonly lacking (e-skills UK, 2010).

Demand for skills in Wales is predicted to continue to be primarily in high value roles such as project management, systems architecture, business process, change management, security, risk management, analytics and web / internet development, with an increasing need for customer, consumer and business-oriented skills as well as sophisticated technical competencies.

In the immediate term (1-3 years) employers report a priority need for IT & Telecoms professionals to have high level security and data protection skills to enable them to develop, integrate and maintain security solutions across many different systems and applications.

Across the UK a key issue affecting IT undergraduate provision had been the massive decrease in numbers of applicants to single subject Computing courses. In Wales, however, the number of applicants has gradually been increasing since 2004 but is yet to reach the

2002 figure of 815. In 2008/09 there were 1,325 Computing and Telecoms degree qualifiers from HEIs in Wales, 5% of the total number of UK Computing and Telecoms degree qualifiers.

In FE there was a 13% decline in the number of people 'in learning' on IT professional courses and an 11% decline in people 'in learning' on IT user courses in Wales between 2007/08 and 2008/09.

Turning to the wider economy, the England Audit found evidence of growing development needs for IT user skills at 'advanced' or higher level and for increased volumes of skills development at lower levels for workers who do not currently use digital technology at work. In addition, individuals require IT user skills to interact socially, to seek and secure employment and to engage with public and marketed services. This is reinforced by survey evidence for Wales: one in six Welsh employers (16%) responding to the e-skills UK 2010 employer survey stated that there were gaps between the skills held by their IT user staff and those needed by the firm – a figure well above the norm for the UK (11%). e-skills UK also stress that the point that managers and leaders in every sector need to have the ability to fully exploit the strategic potential of technology (e-skills UK, 2010).

In the UK the content component of the digital economy is the largest producer of radio and TV in Europe, has the third largest filmed entertainment market globally and has the largest publishing industry in Europe. It is also renowned for its music output and creativity.

Wales has a significant creative media sector (see paragraph 5.5.4 on creative industries for key estimates). It is developing a reputation as a centre of excellence for TV drama production and is beginning to punch closer to its weight in terms of feature film production output. These developments provide a platform on which to build and explore further commercial opportunities and entry to new markets. Wales will need a Creative Media workforce fully equipped with the skills to take maximum advantage (Skillset, 2010).

Skillset's sector skills assessment of the creative media sector (Skillset, 2010) found that despite the attractiveness of the content component and a long term over-supply of potential new entrants, there remains a shortage of skills in the following areas:

- Multi-skilling: an understanding of different technology platforms and their impact on content development, and new approaches to working in cross-functional creative / technical teams within and across companies;
- Multi-platform skills for digital content: the creative and technical skills to produce content for distribution across all potential platforms, and the ability to understand and exploit technological advances;
- Management, leadership, business and entrepreneurial skills: especially project management for multi-platform development; the hybrid skills combining effective leadership with innovation, creativity and understanding of technology, and the analytical skills to understand audience interests and translate it into business intelligence; and
- IP and monetisation of multi-platform content: understanding of intellectual property legislation to protect from piracy, and exploiting intellectual property internationally to take full advantage of emerging markets. There is a particular focus on the ability to deal with the problem of illegal downloading and copyright infringement.

5.5.2. Energy and environment

The Welsh Assembly Government's *Economic Renewal* strategy highlights protection and enhancement of the environment as an important business cluster, covering activities such as low carbon energy, energy efficiency, energy storage and infrastructure, pollution control, environmental management and research and consultancy.

According to the Government's provisional estimates, the energy and environment sector has employment of around 32,000 in Wales, accounting for a share of total employment in the country that is higher than the UK average for the sector. Moreover, the number of employees working in this sector is estimated to have grown by more than a third between 2005 and 2009 (Welsh Assembly Government, 2011b).

Existing analysis of needs in the low carbon energy activities, conducted as part of the UK Commission's strategic skills programme, provides an insight into skills needs in this part of the energy and environment sector.

The low carbon energy generation sector comprises marine, micro generation, nuclear and carbon capture and storage, all of which, (except nuclear), are in the early stages of development and implementation. The sector is currently relatively small scale in terms of direct jobs. At the UK level around 30,000 people are employed in low carbon energy generation, 80 per cent of whom are employed in the nuclear industry (PwC, 2010a). The sector has a great deal of potential for growth. Wales possesses abundant wind and marine resources and potential sites for carbon capture and storage (CCS). Government will play a critical role in fostering the growth of this sector by stimulating demand with incentives and by removing barriers that could otherwise hinder growth.

The civil nuclear industry is of strategic importance in Wales, supplying the equivalent of 40 per cent of the nation's electricity needs. The industry centres on Trawsfynydd, in Gwynedd (currently being decommissioned) and the Wylfa site on Anglesey. North Wales accounts for three per cent of the UK's total nuclear workforce of 24,000 people (Cogent, 2010).

Wind and nuclear will be the most important sectors in driving growth between now and 2020, given the ambitious plans for installing new capacity to 2020 and providing that barriers, including access to financing and planning, can be overcome. This is likely to lead to the creation of relatively large numbers of jobs in construction and installation.

If new build programmes proceed in the nuclear sector, there will be an immediate need for skills in the manufacturing, engineering construction and construction supply chains (PwC, 2010a). This could take the form of skills shortages in the decommissioning sector and in the areas of nuclear safety and quality assurance in the supply chain.

A report by SummitSkills for the Welsh Assembly Government suggests that despite the relatively low level of installation to date, 68 per cent of companies in Wales are having trouble recruiting fully qualified and experienced personnel in the microgeneration sector and 73 per cent of companies have identifiable skills gaps in terms of the number of staff trained in microgeneration technologies (SummitSkills, 2008).

Marine and carbon capture and storage are unlikely to contribute materially to employment in the period to 2020, but are more likely to come to fruition post-2020 (PwC, 2010a).

The growth of the low carbon sector is likely to produce a general demand for the supply of engineering, science and specialist professionals. The sector will therefore need to compete for STEM graduates with the economy as a whole. An indicative list of the diverse range of skills required would include:

- Aeronautics engineers for the wind industry;
- Marine geologists to develop offshore carbon capture storage facilities; and
- Project managers with engineering expertise.

The 'greening' of existing jobs through changes in the way existing activities are carried out is expected to lead to a significant demand for skills across a wide range of areas. Examples include a need for more fuel-efficient ways of driving in the logistics sector (Skills

for Logistics, 2010), knowledge of sustainability and energy management issues for facilities managers and managers in the housing sector (Asset Skills, 2010) and a need for electricians to develop additional skills around installation of solar PV panels (UKCES, 2010a).

5.5.3. Advanced materials and manufacturing

This sector covers “industries and businesses which use a high level of design or scientific skills to produce innovative and technologically complex products and processes” (Semta *et al*, 2009). In this context *Economic Renewal* highlights the automotive, aerospace and electronics industries as particular strengths for Wales in the advanced manufacturing sphere.

With regard to official statistics it is difficult to disaggregate advanced activities from the broader range of manufacturing industries. It is worth noting that as of 2009 the manufacturing sector in Wales still had employment of close to 140,000 (source: Annual Population Survey).

Analysis carried out by Welsh Government on the basis of a provisional definition of the sector indicates that there are around 43,000 employees in businesses covered by the sector and that the sector in Wales accounts for a share of total employment that is higher than the UK average. Just under a third of total employment is in the higher level roles of managers, professionals and associate professionals. It should be noted that the number of employees in advanced manufacturing in Wales fell by around five per cent between 2005 and 2009, although this takes into account some of the impact of the recession (Welsh Assembly Government, 2011b).

Advanced manufacturing activity is of particular importance because in many cases it forms vital parts of the supply chain for other sectors, including the digital economy and the life sciences sector, as well as making a major contribution to the low carbon economy. Another important key feature of advanced manufacturing is intense research and development activity creating a need for high and intermediate level STEM skills and the ability to commercialise innovations. It is notable that expenditure on research and development by businesses in Wales, although growing, accounts for only two per cent of the UK total, which is significantly lower than Wales’ share of GVA (ONS, 2010g). It could be argued that investment in higher level skills is essential if Wales is to shift the balance of its manufacturing base towards higher-value, more sustainable activities.

Aerospace

According to Semta, Wales accounts for around six per cent of UK aerospace employment (Semta, 2007) and makes a significant contribution to the Welsh economy through, for example, the presence of Airbus’ wing manufacturing facility (North East Wales) and a cluster of engine maintenance activity in South Wales. Data from the Annual Population Survey for 2009 indicates that around 6,000 people are employed in this industry in Wales.

The role of information technology, lightweight composites, low operation and maintenance costs, and environmental factors such as pollution and noise are all shaping the design and manufacture process in the sector, with implications for skills. In addition, the sub-sector is highly regulated with stringent safety and quality stipulations. A key challenge for the sector in Wales and the UK is global competition from other EU countries for high value aerospace research and development.

It is notable that the occupational mix of the Welsh aerospace workforce is different to the UK average for the sector, with a greater predominance of operative workers and a lesser

proportion of higher skilled workers in management, professional and associate professional roles (Semta, 2007).

Distinctive skills challenges facing the sector including the following:

- Presence of skills gaps relating to aircraft engineering, metalworking, welding and fabrication and CNC machine operations;
- Increasing complexity of intermediate skilled trades roles as investment in new technology and a focus on moving up the value chain has led to an "offshoring" of lower value craft and operator level production activity. This creates a constant workforce development requirement for up-skilling and multiskilling;
- Intense competition for a decreasing pool of skilled workers and STEM graduates; and
- High average workforce age that creates a risk of the loss of critical skills through retirement.

Aerospace employment across the UK is likely to decrease in the future due to movement up the value chain, productivity improvements and supply chain rationalisation; however, significant replacement demands will create a positive net requirement.

It is expected that there will be a need for leadership and management skills at "global standards" together with professional staff that provide a mix of technical and business skills to meet future requirements for developing and designing commercially viable technology. A wide range of technical skills will be needed in addition to high level general engineering skills, including mechanical, electrical, electronics and specific aerospace skills due to new product development that cuts across different engineering disciplines.

Electronics

The UK electronics industry is worth £23 billion a year and is now the world's fifth largest in terms of production (Semta, 2007). Around six per cent of UK electronics employment is in Wales, compared with almost 80 per cent in England, 13 per cent in Scotland and in two per cent in Northern Ireland. According to the Annual Population Survey for 2009, around 6,000 people in Wales are employed in the manufacture of computer, electronic and optical products.

A key trend within the sector is that high volume electronics manufacturing is gravitating to Eastern Europe and the Far East. The UK sector's future will lie in research and development, design and high value, low volume manufacturing.

It is expected that overall employment across the electronics sector will decline in the future but that there will be a positive recruitment requirement as a result of replacement demands. This trend will be combined with a changing occupational mix, with a reduced proportion of lower-skilled people employed due to changes in technology, manufacturing processes and work practices and an increased focus on high value new product development activity.

The UK cluster report focuses on silicon electronics and plastic electronics, two areas that have been identified as major potential contributors to growth in advanced manufacturing.

Plastic/printed electronics uses inks made of semi-conductive organic polymers to print very thin electrical circuits on flexible or rigid surfaces. Applications include clothing or medical equipment such as tissue dressings with built-in sensors, wafer thin batteries and electronic paper. The sector relies heavily on STEM-related skills but the cluster report (Semta *et al*, 2009) notes that many of the production processes being used in the sector are without precedent and require the development of completely new skills which will need to be constantly refreshed to keep pace with technological developments. A key asset for Wales

in this area is the Welsh Centre for Printing and Coating based at Swansea University, one of only five research centres in the UK that support plastic electronics R&D.

Automotive

Around 10,000 people in Wales are employed in the manufacture of motor vehicles and trailers (source: Annual Population Survey, 2009). Just over 90% of automotive employment is in England, with 5% in Wales, 2% in Scotland, and 2% in Northern Ireland (Semta, 2007). The automotive sector in Wales accounts for the highest share of total national employment of any of the UK nations. Two volume vehicle manufacturers produce car engines in Wales: Ford in Bridgend and Toyota in Deeside. The Welsh Automotive Forum notes that Wales “is emerging as a centre of excellence for performance engineering and the motor sport industry”.

Automotive employment is projected to fall as automation and contracting out of assembly work lead to a lower requirement for operators and indirect workers. However, future demand for higher level skills is expected to be strong and there will be a much greater requirement for associate professionals (technicians). Up-skilling of team leaders will be critical to implementing product market strategies based on genuine lean operation, advanced supply chain management and faster new product development (Semta, 2007).

Semta (Semta, 2007) observes that the lower proportions of employees with a higher education, degree or equivalent qualification in Wales, relative to the UK, could constrain future automotive R&D activities.

The three sub-sectors considered here represent only part of the scope of advanced manufacturing activity. The UK cluster report (also examines industrial biotechnology and nanotechnology). Taking the whole area of advanced manufacturing together there is a series of general conclusions that can be drawn about the skills needs of this sector of the economy:

- High-level technical skills represent the most important element of skills demand and need to be addressed through an effective supply of STEM graduates, post-graduates and post-doctoral researchers, with an understanding of specific technologies or of the underlying sciences;
- Skills development needs to support the multidisciplinary approach that is critical to exploiting the wide range of application areas for cutting-edge technologies; meaning that expertise in the technology itself needs to be augmented by knowledge and understanding of the various application areas, either at the individual level or across multi-disciplinary teams;
- Effective exploitation and commercialisation of emerging technologies requires capable and competent technical support staff; and
- Commercialisation of new technologies within short life-cycles demands skills in intellectual property (IP) management, new product and process development and implementation, production and manufacturing engineering, and marketing.

5.5.4. Creative industries

This sector involves companies in advertising; architecture; publishing; radio and TV; animation; design; film; music; software and computer services; computer games; designer fashion; crafts; performing arts; and the arts and antique market. Three Sector Skills Councils represent employers across the majority of the sectors within the Creative Industries: they are Skillset, Creative & Cultural Skills and e-skills UK. The common themes in this diverse sector are the focus on creativity for business success, communication and customer focus.

Provisional estimates produced by Welsh Government indicate total employment of more than 30,000 in the creative industries in Wales. Although employment is substantial it accounts for only 2.5 per cent of total employment, compared with an UK average of 4.3 per cent. Robust time-series data are available for employees only (i.e. the self-employed are not included) but these data show robust growth of 11 per cent between 2005 and 2009 (Welsh Assembly Government, 2011b).

Aside from a very small number of large companies employment is concentrated in a very large number of 'micro' enterprises employing less than 10 people and by a large number of sole traders/freelancers. This gives the sector a particular dynamic. Jobs are predominantly concentrated in associate professional and technical roles accounting for around two-fifths of all employment and managerial and professional jobs which account for a further one in ten (Creative & Cultural Skills and Skillset, 2010).

The key drivers of change facing the sector include globalisation, the growth of digitalisation, and the development of user led content and market fragmentation.

Current skills issues include recruitment into the sector where there is an over-supply of potential entrants but mismatch between their skills and those the sector needs. Looking across the various creative sub-sectors this particularly relates to sales and marketing skills, multi-skilling and using specific software packages such as Photoshop, Avid and Final Cut Pro. Lack of creative talent is also a key issue (Creative & Cultural Skills and Skillset, 2010).

The skills needs associated with digital media have already been considered (see paragraph 5.5.1). In addition to these, there are skills shortages and gaps across the following areas:

- Broadcast engineering: continuing to be an area of skills shortage;
- Archiving: archiving of digital content is increasingly seen as a challenging issue for the future;
- Sales and marketing: being particularly important in commercial radio and an emerging need in other sectors;
- Supply chain management: managing disaggregated production processes across continents;
- Foreign language skills: as part of operating in a global marketplace;
- Other business skills: these include human resources competency, financial management and project management;
- Fundraising skills: These are particularly in demand for performing arts, visual arts and cultural heritage; and
- Creative skills: These include skills such as story-writing, music composition, etc and are often in demand for film, literature, performing arts, music and cultural heritage sub sectors.

Future growth prospects for this sector are difficult to forecast. Skillset reports that creative media businesses in Wales have been hit by the severity of falling advertising revenues and commissions, access to finance and other factors, leading to increased redundancies and a possibility of rising levels of part-time and freelance working, and the loss of skilled and experienced workers to other industries. Nonetheless it is Skillset's view that it is highly likely that growth in the creative media sector will return, led by developments in relation to multi-platform and digital output.

A "baseline" scenario prepared by Creative & Cultural Skills SSC (Creative & Cultural Skills, 2010) indicates strong output and employment growth for the creative industries at a UK level in the period to 2020 but small declines against both indicators for the creative industries in Wales for the same period. However, there is confirmation of growth in net

employment for highly skilled occupations requiring level 4 and above skills and specific technical occupations that require skills at level 3.

5.5.5. Life sciences

The UK is a global centre of excellence in the life sciences sector, which comprises the pharmaceutical, medical technology and medical biotechnology sub-sectors. The UK cluster report notes that this sector makes a major contribution to UK output and generates an average level of GVA per employee that is three times the average for the whole economy.

Provisional estimates produced by Welsh Government suggest that employment in life sciences in Wales is around 13,000, accounting for a similar proportion of total employment to the UK average. The number of employees in the sector remained fairly flat between 2005 and 2009. Around 4,000 people are employed as bio scientists and biochemists across the Welsh economy (source: Annual Population Survey, 2009).

The UK forecast for the sector is, at best, one of stable employment levels and net contraction in the medical technologies sub-sector. There will be significant replacement demands, however: as much as one third of the workforce in pharmaceutical and medical technology may retire over the next 15 years.

Rapid technological change and the central importance of new product development to the sector mean that a key challenge will be to meet increasing demand for graduates and postgraduates in engineering and biological sciences, in the face of heightened competition for highly qualified staff from other sectors. In future the level of knowledge and skills expected from graduates and postgraduates is also expected to be higher, wider and require a more inter-disciplinary approach (Hogarth *et al*, 2010).

A range of skills are currently in short supply, many of them in niche / specialist areas but nonetheless critical to the future performance of the sector. These include biological skills, such as biochemists, pharmacists and clinical pharmacology; chemistry (in areas such as analytical chemistry, synthetic chemistry); physics; and chemical engineering.

Data for England taken from the National Employers Skills Survey shows that employers looking to recruit biological scientists and biochemists face severe problems finding individuals with the required skills, experience or qualifications; nearly three in five (58%) vacancies for this occupation were reported to be SSVs (Shury and Oldfield, 2008).

Generic skills needs include: leadership and management plus lean management styles; negotiation and procurement skills (when dealing with customer such as the NHS), communication, basic computing, medical devices regulation, numeracy, literacy and scientific skills more generally (Hogarth *et al*, 2010).

The sector also relies on the maintenance of a competent technical workforce for its manufacturing activities. For example, a shortage has been identified at UK level of up to 5,000 engineering and craft technicians to fill replacement demand in the pharmaceutical and medical biotechnology sub-sectors. There are recruitment problems in the medical technology sub-sector relating to skilled trades and machine operatives, particularly those allied to engineering; functions which are essential to the manufacture of medical products.

5.5.6. Financial and professional services

In this context, financial services include banking, insurance and asset management; professional services comprise architectural and engineering services, housing and property, and legal services.

There is a total of around 124,000 employees working in this area, according to provisional estimates produced by Welsh Government (Welsh Assembly Government, 2011b), making it the largest of the economic renewal sectors. The evidence suggests that in proportionate terms financial and professional services is under-represented in Wales, accounting for 15 per cent of total employment compared with an UK average of 20 per cent. The sector has grown strongly in Wales in recent years, however, with the number of employees increasing by around 18 per cent between 2004 and 2009, according to Welsh Government estimates.

The financial services sector has in recent years been a major source of growth in the UK economy. This is reflected in its number one ranking in terms of current economic significance in our sector priority modelling and its continuing high position in respect of future economic significance. Evidence from recent reports for this cluster suggest a need for caution regarding future growth prospects, however, particularly those for job creation.

It is estimated that UK employment has declined by an estimated five to 10 per cent since its peak in 2007 before the financial crisis (PwC, 2010b). Forecasts of future employment in the UK indicate muted growth at best, ranging from a best case of a five per cent increase in employment in financial services by 2020, while under a worst case scenario, there may be a 25 per cent reduction. Globalisation will have a major impact, with the axis of financial trading potentially shifting to a number of Asian cities, while technology will allow businesses to disperse their activities, including back office functions, globally.

Financial Services Skills Council forecasts that sector output, which moves in line with the wider economy in Wales, will see slight growth of 0.2 per cent in 2011 (FSSC, 2010). The recovery will be mainly led by a 3.5 per cent increase in financial advice employment in 2011. While growth is set to return in 2011 a sluggish recovery will mean that the financial services sector will not recover to previous levels by 2014.

In spite of the employment outlook, regulation, globalisation and consumer demand will drive future skills needs. Demand is expected to grow for actuaries, specialist underwriters, compliance staff, risk managers, capital modellers, accountants (all at level 5); retail bank managers at level 4; claims professionals, IT and legal staff at level 3; and, sales and customer service roles. The UK cluster report refers to particular shortages of actuaries, which will intensify as insurance companies seek better means of managing and mitigating their risks and the requirements of Solvency II (European regulation of insurers) take effect in 2012. Meanwhile, supply is held back by long training periods, low pass rates and low industry attractiveness (PwC, 2010b).

The introduction of the Retail Distribution Review in 2012 will impose a requirement to hold a level 4 qualification for investment advisors in the financial services sector. The FSSC concludes that, UK-wide, around 60,000 people are likely to need the new qualification (excluding those who already meet the standard) based on estimates produced by the FSA (FSSC, 2010).

Analysis commissioned by Financial Services SSC found that Cardiff is one of 30 significant concentrations of financial services activity in the UK (FSSC, 2008). Cardiff accounts for more than one third of Welsh employment in financial services; however, there is an insufficient level of local interaction and of supporting infrastructure to warrant it being classified as a cluster. Much of the employment in Cardiff's financial services sector has come relatively recently, primarily thanks to the development of large contact centres.

Moreover, firms are small and often skewed towards the support services sector. The difficulty of attracting specialised back-office functions and client facing activities away from central London is noted, because of the availability of skilled staff in London, proximity to customers, access to knowledge and the credibility of having a London address. Nonetheless, the report concludes that available skills have played a part in attracting recent investment and that, in view of this, and its developing infrastructure, Cardiff can be viewed as an emerging cluster for financial services.

The recession has also had negative consequences for professional services. Engineering, construction and legal related activities have been hit by the suspension of privately-funded construction and engineering projects whilst occupations related to property design, development and transactions have suffered major job losses. Nonetheless a range of skills needs are expected in the future (Skills for Justice *et al*, 2009), including:

- Sustainable development experts in housing and property, while knowledge of zero carbon building design and retrofitting will be required in the architectural and engineering sub-sectors;
- Paralegals working in legal services will need to be up-skilled in transactional work along with enhanced procurement and tendering skills required in response to the introduction of market based Legal Aid procurement; and
- Valuation experts and surveyors are expected to be needed in the housing and property sub-sector.

5.6. Other key sectors

Drawing on the work of the SSCs and the results of our modelling of sector economic significance and skill deficiencies, there are several additional sectors that merit further attention. We cover four such sectors briefly below:

5.6.1. Retail

Retail is highlighted by both our current and future sector priority models as a Welsh sector of economic significance constrained by skills deficits.

Its status as a current priority is underpinned, in terms of skills deficits, by a high level of skills gaps and a high proportion of workers with occupational qualification deficits, although skills shortages are low. The use in the model of employer survey data dating from 2005 raises the question of whether this reflects the true current position. Evidence from England suggests that it may well do. Analysis from the National Employer Skills Survey (Shury *et al*, 2010) indicates that in England in 2009 the retail sector accounted for 17 per cent of total skills gaps and that there was an above average incidence of gaps among retail establishments together with an above average density of gaps in the retail workforce.

With regard to economic significance, it is retail's high current level of employment, together with its recent employment growth performance, that mainly contributes to its high ranking. Current productivity is low relative to other sectors but has improved significantly in recent years. It is also notable that retail productivity in Wales (GVA per employee) is significantly lower than the UK average (Skillsmart Retail, 2010).

Turning to the future, in spite of significant projected improvements in its absolute performance it is expected that retail will still hold a low productivity ranking relative to other sectors by 2017. It is projected to continue to perform well in employment terms: it will remain a key employment sector in 2017 and has a high ranking in terms of employment growth for the period. In the period from 2007 to 2017 it is projected that there will be almost 70,000 job openings in retail, mostly due to replacement demands.

Factors that may militate against the realisation of the employment growth that has been projected for retail include: the emergence of over-capacity in the sector as consumer spending is constrained by economic conditions; a continuing switch toward online spending at the expense of labour-intensive high street functions; the ongoing roll-out of labour-saving new technology such as self check-out facilities.

The skills gaps that retail currently faces are primarily in the following areas: customer handling, technical and practical skills and management. The main managerial skill gap areas are entrepreneurial skills, commercial acumen/awareness and leadership skills/vision (SkillsSmart Retail, 2010).

The key skills challenges the sector is expected to face in the future are around:

- Improving customer service and product knowledge to meet increased customer expectations (see paragraph section 6.4 for more on the occupational dimension to customer service);
- Enhanced web design skills, frontline administration, data analysis, logistics and distribution to support online retailing development;
- Staff up-skilling to support the introduction of technological advancements designed to drive up productivity; and
- A need to adapt human resource management practices to take account of a reduced availability of young people as potential recruits and the growing prominence of older people in the retail workforce.

5.6.2. Construction

In our model the construction sector has the highest ranking of all sectors in Wales with regard to its current susceptibility to skills deficiencies. This is due to a very high historic level of skills shortages, combined with significant skills gaps and occupational qualification deficits.

The model draws on employer survey data from 2005 in making this assessment. If we take the situation in England as a guide to the likely trend in Wales since 2005, it seems likely that skills shortages have moderated to a significant extent. The National Employer Skills Survey shows that in 2007 ConstructionSkills had the second highest ratio of skills shortages to employees of any SSC footprint and the highest share of skills shortages of any SSC footprint. This was principally driven by shortages among skilled trades occupations. By 2009 these problems had eased significantly. The density of skills shortages in the ConstructionSkills footprint had fallen to match the average observed for the whole economy (falling from 14 SSVs per 1,000 employees in 2007 to 3 SSVs per 1,000 employees in 2009).

This picture of moderating skills shortages in construction is supported by further evidence from ConstructionSkills (ConstructionSkills, 2010) This points, first of all, to an over-supply of graduates and newly qualified staff to fill construction professional roles, such as that of architect. It also points to a large fall in general recruitment difficulties for skilled positions in 2009 compared with 2008.

Based on the results of our model, construction has a middle ranking position in terms of its economic significance to Wales. Its level of productivity and its performance in terms of recent productivity growth are both low relative to other sectors in Wales. Its contribution to employment and recent performance in terms of employment growth are much more positive, however. This general pattern of moderate significance in productivity terms combined with a strong employment contribution is carried over into the future model. In addition, projected replacement demands are substantial, at more than 40,000.

ConstructionSkills' own forecasts of the future performance of the sector at UK level, based on its "core scenario", suggest that construction output will begin to recover towards the end of 2011 but that sector growth, at around 1.6 per cent per annum, will be below the average rate of GDP growth. The forecast is based on assumptions of continued strength in the infrastructure sector, returning investor confidence in the commercial sector and a recovery in private sector housing demand (ConstructionSkills, 2010).

5.6.3. Hospitality

The current economic significance of hospitality is mainly founded on its major contribution to employment in Wales and its positive recent performance with regard to employment growth. The level of productivity in the sector in Wales is the lowest of any examined in our model, reflecting the wider UK position.

In terms of current skills deficits, the sector's high ranking within our model is founded on significant skills shortages, skills gaps and occupational qualification deficits.

Since the model draws on 2005 employer survey data for skills gaps and shortages it is important to qualify our assessment using more recent data, albeit relating to England. Analysis from the National Employer Skills Survey for 2009 shows that hospitality has a slightly above-average density of skills shortages (ratio of SSVs to employees) whilst the proportion of the sector's employees affected by skills gaps is far in excess of the average for all sectors, with elementary roles accounting for almost two-thirds of these gaps. This suggests that the hospitality sector in Wales is likely to be still subject to a significant level of skills deficits.

The key skills priorities facing the sector relate to chef skills, a need for enhanced customer service in the face of increasing customer expectations and a need for improved management skills linked to structured development pathways. There is also a requirement for enhanced support for those thinking about starting their own business in the sector (People 1st, 2010).

Employment in the sector is projected to grow strongly in the period to 2017, according to the *Working Futures* data used in our model. Moderate improvements in productivity over this period, however, will do little to advance the position of hospitality relative to other sectors.

Replacement demands will be significant at almost 50,000 for the period 2007 to 2017.

The economic downturn and the possibility of reduced consumer spending may negatively affect future employment growth in the sector.

5.6.4. Health and social care

Health and social care is highlighted by our future sector priority model as a Welsh sector of economic significance constrained by skills deficits.

Like other labour-intensive sectors, health and social care has a low level of productivity relative to other sectors. However, it is ranked at number one among the sectors contained in our model in terms of its contribution to current employment. This position is projected to be carried forward through rapid employment growth between 2007 and 2017. Productivity in the health and social care sector, however, is expected to improve in the period to 2017 but from such a low base that its position relative to other sectors will remain unaffected.

The sector is ranked in a low current position in our model in terms of skills deficits, with moderate levels of skills shortages, skills gaps and occupational qualification deficits. As previously noted, the model relies on 2005 survey data in respect of gaps and shortages. More up to date analysis for England taken from the National Employers Skills Survey of 2009, suggests that this may well still be the broad position, since the ratio of skills shortages to employees is only slightly above the overall average (personal service roles, associate professionals and professionals being the main occupational groups affected) whilst the proportion of staff affected by skills gaps is also close to the overall average (personal service roles account for more than two-fifths of total gaps in the sector).

Turning to our indicator of future skills needs, however, health and social care is expected to have the highest replacement demands of any sector in Wales, projected to be in the region of 75,000.

The key occupational skills needs of this sector are reviewed in detail in 6.4 as are the key factors that are likely to influence the level of future employment growth in the sector.

5.7. Towards priority sectors

Synthesising the material and messages from the different sources of information discussed here is difficult, and interpretations need to be made with caution. The issues of forecasts, footprints and timescales as well as the inherent uncertainty about the future, about emerging sectors and the impact of the drivers of change through time, all make a solid assessment difficult.

Nonetheless, an indicative comparison of the magnitude of likely employment demand in different sectors is shown in Table 5.4. The *Working Futures* and priority sectors models rely on numerical projections of the level and projected level of employment growth. The final columns list the *Economic Renewal* sectors discussed above.

Table 5.4: Summary of key sectors

Sectors with highest forecast employment growth (from <i>Working Futures</i>)	Economically significant sectors potentially constrained by skill deficits		Government emerging sectors (from <i>Economic Renewal</i>)
	Current	Future	
Health and social care	Financial services	Health & social care	
Other services	Retailing	Business services	
Hotels / catering	Business services	Retailing	Digital economy
Business services	Post and telecommunications	Education	Financial / professional services
Retailing			Creative industries
			Advanced manufacturing
			Energy and environment
			Life sciences

Looking purely at future employment as a criterion, health and social care, other services, hotels / catering and business services are key, with each projected to see employment growth of more than 10,000 between 2007 and 2017.

The emerging digital sector – based at least in part on the computing and telecommunications sectors – is likely to be a major driver of the economy over the next 10 years both in its own right, and through the transformational properties of the goods and

services it produces. The digital sector is likely to have significant employment expansion demands.

Financial and business services have substantial labour demands, but the analysis suggests that the effects of recession and globalisation may be more profound than other parts of the economy, potentially limiting job creation in this sector over the short to medium-term, although both are still likely to be important economically.

The creative sector has seen strong growth in recent years. There is a degree of uncertainty as to whether this will be carried forward in Wales in the future, although the SSCs responsible for this part of the economy present a range of opportunities for the sector that would generate growth.

The remaining sectors of life sciences, advanced manufacturing and energy and environment are less likely to generate very large numbers of jobs and skill requirements compared to the sectors above. The skills are, however, likely to be specific and impact heavily on productivity, competitiveness and growth prospects. These sectors are based on new technologies, many of which have potential to be significant economically and in employment terms, but that potential is difficult to predict with any certainty. However, the availability of sufficient skills, particularly STEM skills will be crucial.

Efforts to generate a more environmentally sustainable economy are likely to affect existing jobs rather than create new ones. The creation of new jobs in what can be described as the 'low carbon sector' (centred on carbon-free energy production) are likely to be relatively modest, though environmentally crucial.

This assessment highlights the importance of a few large sectors to future employment, but should not detract from the importance of sectors with smaller job creation potential to the economy. Some of the data presented illustrates that GVA per employee in the smaller high technology sectors can be substantial. We should also be alert to the consequences of skills shortages which may relate to very small numbers of jobs, but could potentially constrain growth in an entire industry. The next chapter seeks to identify some of these risks by highlighting skills shortages and skill gaps at occupational levels within sectors.

5.8. Conclusions

This chapter has looked at sectors of potential strategic importance in terms of jobs and skills. We first looked at likely growth sectors in terms of jobs and then sought to identify key sectors in terms of both economic significance and skill needs, now and in the future. We also reviewed the key sectors identified by *Economic Renewal* as being of particular potential significance for the future.

Over the next few years, employment expansion is expected in a range of sectors – including health and social care which alone accounts for almost one third of expected total employment growth. The “Other services” category, which includes culture and sport activities, is also expected to grow significantly, as is retail and business services.

We undertook an initial assessment to identify significant sectors of the economy which are also potentially constrained by skill deficiencies both now and in the future.

Taking the **current situation** first, we found that sectors which exhibit both the greatest economic significance and greatest skill deficiency are **financial services, retail, business services and post / telecommunications**.

In terms of the **future**, the sectors which combine growing significance and future skill needs are **health and social care, business services, retail and education**.

The quantitative assessment we have undertaken is valuable and offers insight into the key sectors that may merit attention in terms of action on skills. However, it is important to remember that this assessment is based on quantitative analysis of existing sectors only, and that qualitative data also offers valuable insights, particularly into new or 'emerging' sectors.

We now turn our attention to an examination of the occupational areas where skills demand and potential mismatches are likely to be most significant.

6. Key future occupational skills needs

6.1. Introduction

As with the previous chapter, this chapter takes the *Working Futures* projections as its starting point and then supplements these with findings from the sector skills assessment reports produced by SSCs plus externally commissioned work on sectors of particular interest. In this chapter, however, attention is turned to look in more detail at likely future *occupational* skills needs within and across sectors.

6.2. What are the likely patterns of occupational change?

Table 6.1 shows the projected demand for workers in different occupational categories in absolute numbers and their share of the workforce.

Table 6.1: Predicted changes in employment by occupational categories; major groups. Wales: all industry sectors

	Absolute numbers (000s)			% shares			Net changes (000s)
	2007	2012	2017	2007	2012	2017	2007-17
1. Managers & Senior Officials	177	190	202	13%	13%	14%	25
2. Professional Occupations	168	181	194	12%	13%	13%	26
3. Associate Professional & Technical Occupations	178	189	200	13%	13%	14%	22
4. Administrative, Clerical & Secretarial Occupations	153	150	143	11%	10%	10%	-10
5. Skilled Trades Occupations	171	168	163	12%	12%	11%	-8
6. Personal Service Occupations	126	139	151	9%	10%	10%	24
7. Sales & Customer Service Occupations	112	114	116	8%	8%	8%	4
8. Machine & Transport Operatives	134	132	127	10%	9%	9%	-7
9. Elementary Occupations	176	173	173	13%	12%	12%	-3
Total	1,395	1,437	1,467	100%	100%	100%	73

■ Largest net increases in employment within occupations.

■ Largest net decreases in employment within occupations.

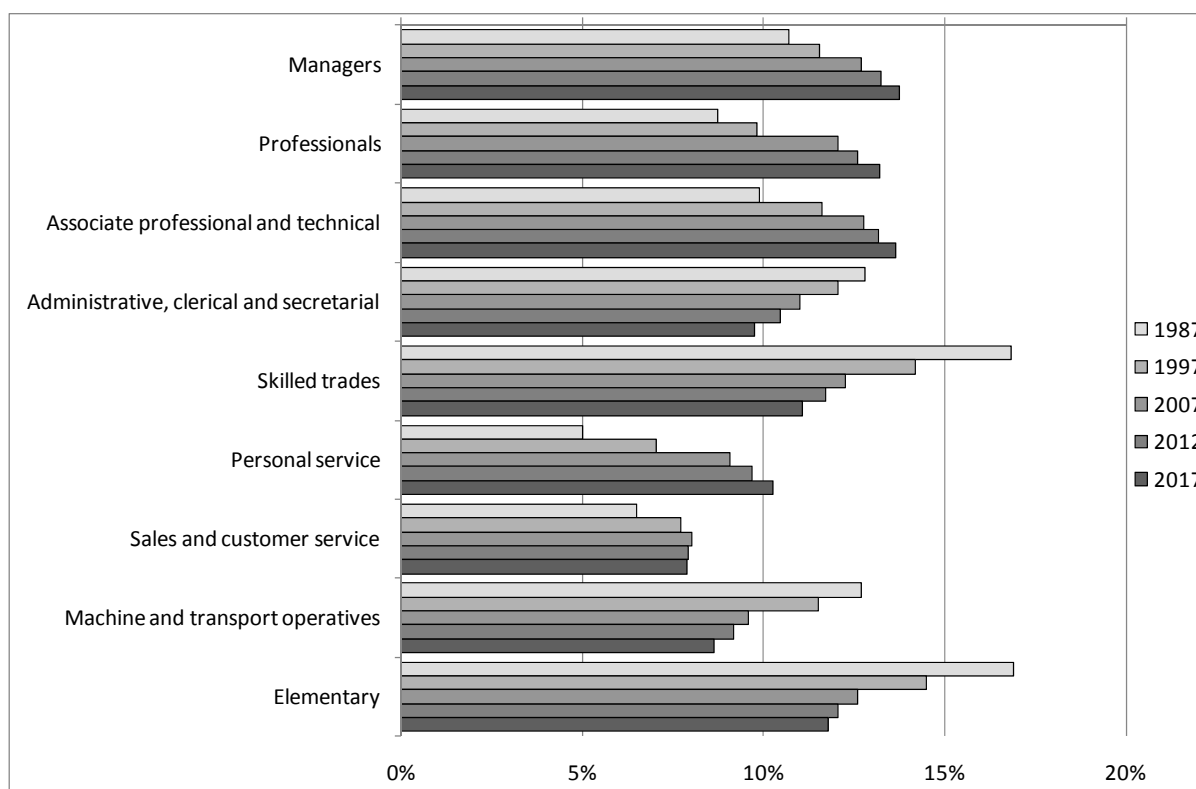
Source: *Working Futures 2007-17*, using CE/IER estimates and CE Projections

Our forecasts suggest that in broad terms, actual expansion in the number of jobs is most likely in the higher skilled groups of managers, professionals and associate professional / technical. Indeed, growth in these three groups in the period to 2017 is likely to be equivalent to the entire net increase in employment for the period. These jobs account for 37 per cent of current jobs and are projected to account for 41 per cent by 2017 – a growth of more than 70,000 jobs. The other key area of growth is personal service occupations, where 24,000 additional jobs are projected to arise.

A contraction in the number of jobs is expected in administrative / secretarial, skilled manual trades and operative occupational groups. However, it is expected that, by 2017, more than 400,000 jobs will still exist in the “bottom” three occupational groups of sales / customer service, machine / transport operatives and elementary occupations – 28 per cent of all jobs in Wales.

If we take a longer term view of both the past and the future, we can see the long term structural changes in occupational structure very clearly (Figure 6.1). The substantial growth in managerial, professional and associate professional / technical occupations is marked, as is the substantial growth in personal service occupations. The decline in administrative / secretarial, skilled trades, operative and elementary roles is also very evident.

Figure 6.1: Changes in occupational structure in Wales 1987-2017 (% of employment)



Source: Working Futures 2007-17

To place these expected changes in context we present a comparative picture of the projections for the Wales and UK over the period 2007-17 (see Table 6.2). This comparison reinforces the fact that employment in the three higher level occupations accounts for a smaller share of the total in Wales than for the UK (37 per cent in Wales versus 43 per cent for the UK). It also shows that this deficit in higher level employment is expected to continue and perhaps widen slightly in the future. Employment in “intermediate occupations” from administrative / clerical occupations down to sales occupations, will decline only slightly overall (by around one percentage point) in Wales but will contract by around twice this amount in the UK, as a result of a more rapid contraction in administrative and skilled trades roles in the UK and slightly more rapid growth in personal services in Wales. Routine and unskilled roles (operative and elementary occupations) will retain a larger share of employment in Wales than in the UK. They are expected to account for 20 per cent of the total by 2017 compared with a UK average of 17 per cent.

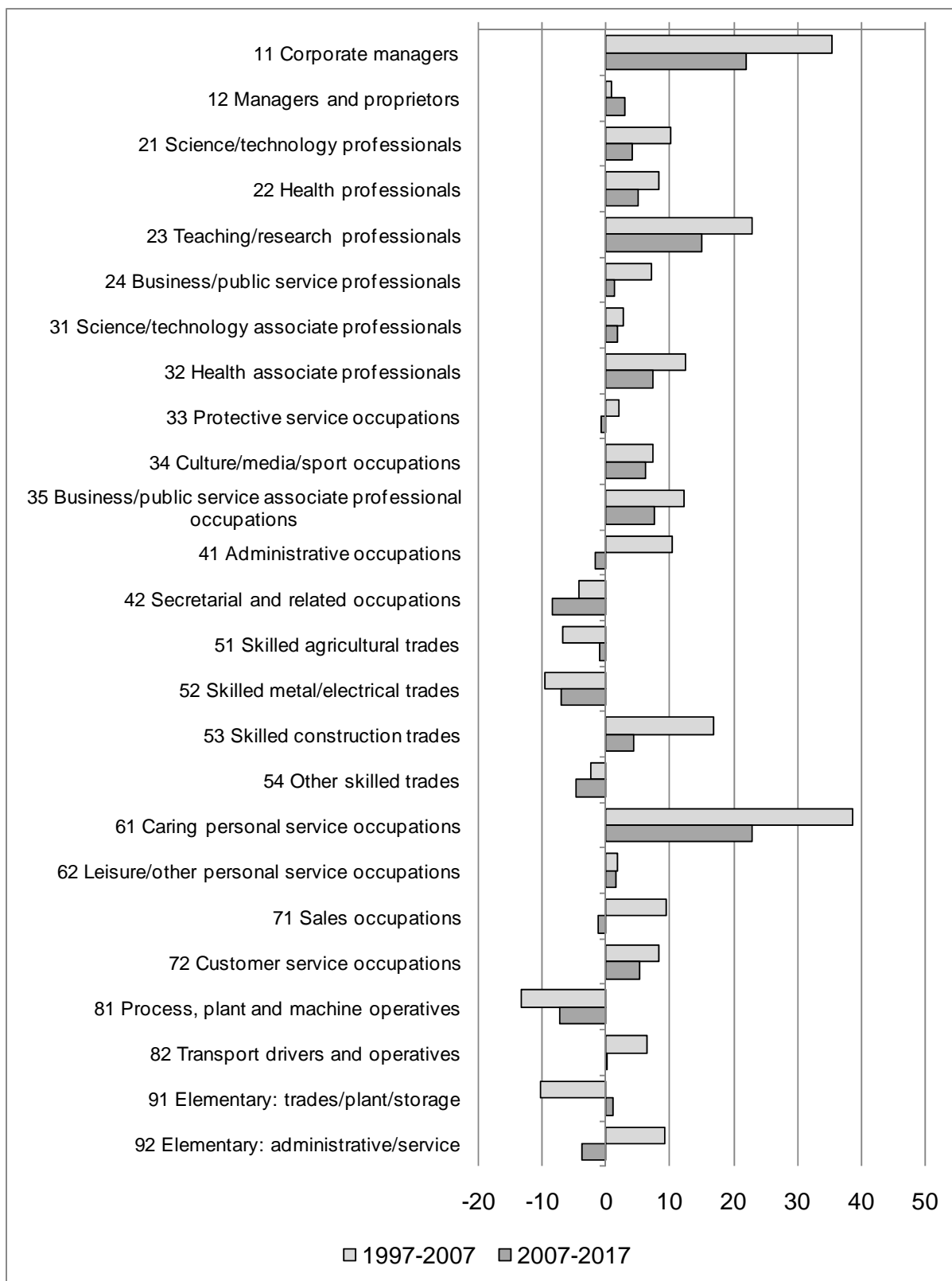
Table 6.2: Predicted changes in employment profile (% shares) by occupational categories; major groups. Wales and UK: all industry sectors

	Wales - % shares			UK - % shares		
	2007	2012	2017	2007	2012	2017
1. Managers	12.7%	13.2%	13.7%	15.5%	16.3%	17.2%
2. Professional	12.0%	12.6%	13.2%	13.1%	13.7%	14.3%
3. Associate Professional & Technical	12.8%	13.2%	13.6%	14.3%	14.9%	15.4%
4. Administrative, Clerical & Secretarial	11.0%	10.4%	9.8%	11.9%	10.9%	10.0%
5. Skilled Trades	12.3%	11.7%	11.1%	10.9%	10.2%	9.6%
6. Personal Service	9.1%	9.7%	10.3%	7.9%	8.4%	8.8%
7. Sales & Customer Service	8.0%	7.9%	7.9%	7.7%	7.7%	7.6%
8. Machine & Transport Operatives	9.6%	9.2%	8.6%	7.3%	6.9%	6.5%
9. Elementary	12.6%	12.1%	11.8%	11.3%	10.9%	10.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: *Working Futures 2007-17*

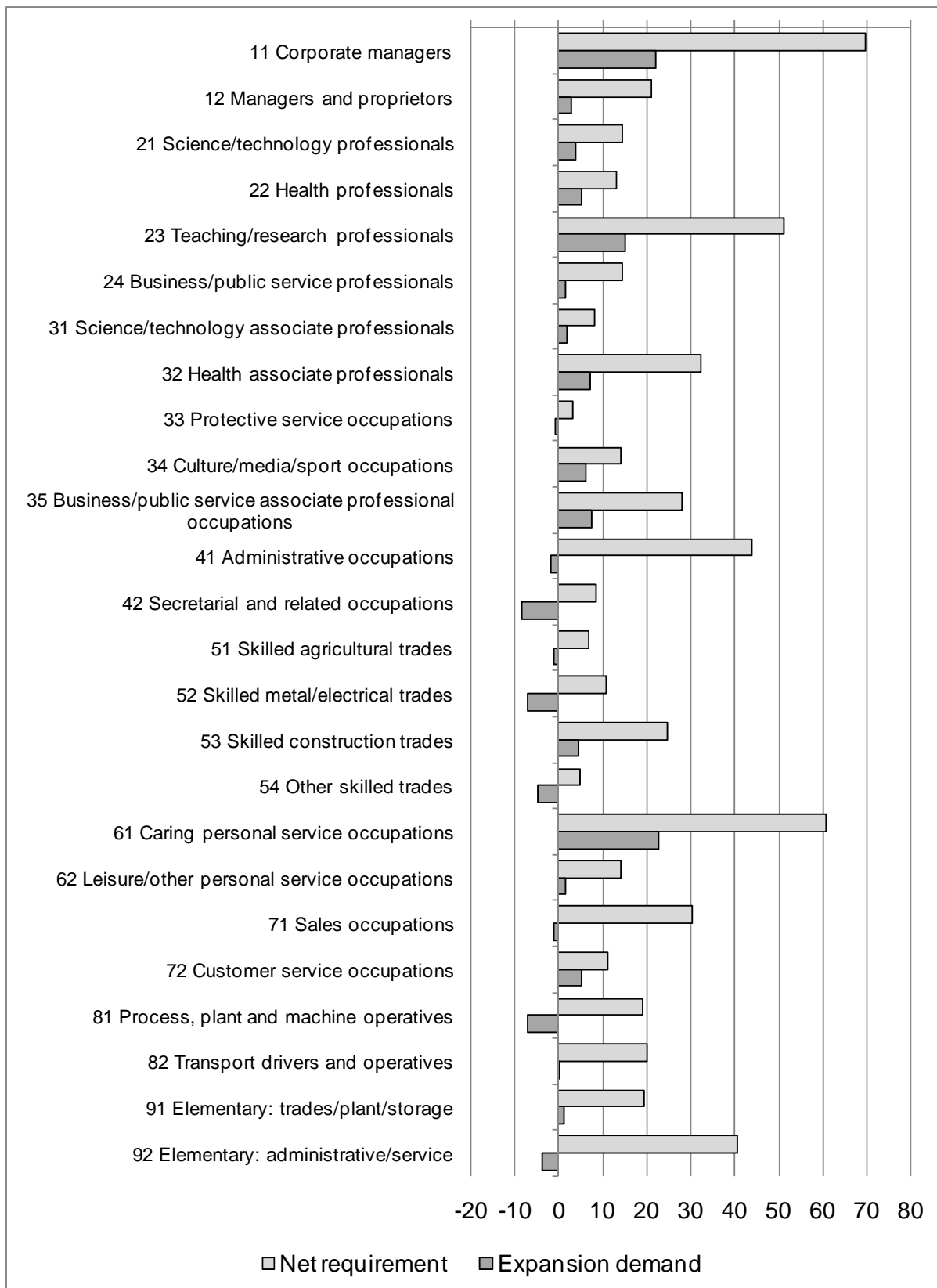
Figure 6.2 provides a greater degree of granularity to projected occupational change in Wales, and compares the expected change in the coming years with recent years. However, such changes are aggregate growth (and contraction) figures. They do not take full account of total job requirements because opportunities arise as current jobholders retire or change occupation. Figure 6.3 thus shows the anticipated additional “expansion demand” and the net requirements of occupations which also includes replacement demand.

Figure 6.2: Changes in occupational employment structure by sub-major groups (000s), Wales, 1997-2017



SoSource: *Working Futures 2007-17*

Figure 6.3: Net requirements by Standard Occupational Classification (SOC) 2000 sub-major group (000s), Wales, 2007-17



Source: Working Futures 2007-17

Overall, the net requirement is for more than 580,000 job openings, only 73,000 of which is new, structural demand. The vast bulk, the remainder of more than 500,000, is for replacement demand. The overall requirement is equivalent to approximately 40 per cent of current total employment.

A similar picture is projected for the UK over the same period with 13.4m job openings, 11.5m of which will be the result of replacement demand. The overall requirement for the UK also represents around two-fifths of current employment.

It is projected that high level occupations (managers, professionals, associated professionals) will contribute almost a half of job openings in Wales over the period 2007-17. Intermediate roles (defined as administrative, skilled trades, personal service and sales roles) will contribute more than one third of openings. Around one in six openings will come from lower level occupations (operative and elementary roles).

In some occupations, replacement demand is particularly high even if there is no new growth in the occupation (e.g. in skilled building trades). Taking account of replacement demand is critically important as it represents jobs where skill replacement will be required. The occupational groups with the largest projected volumes of replacement demand are corporate managers, caring personal service occupations, teaching/research professionals and administrative occupations.

In sum the data show that:

- Corporate managers account for both the main source of overall expansion and the main growth source in the management group. Among professionals, demand is especially strong for teaching/research professionals, in terms of both expansion demand and replacement demand;
- At associate professional level, health associate professional occupations and business/public service occupations will contribute the bulk of the projected net requirement, with replacement demand playing a significant role for both sub-groups;
- In the skilled trades group, positive expansion demand will be limited to construction trades. The net requirement projected for other sub-groups will result from replacement demand offsetting a decline in new demand for workers in these areas;
- Care work accounts for most of the expansion in personal service roles and this sub-group contributes more than 10 per cent of the total net requirement across the workforce;
- Within the sales and customer service group, customer care is the main source of expansion demand but direct sales roles contribute the majority of the net requirement due to strong replacement demand;
- Net job decline is projected for the machine and transport operatives group but this will be offset by significant replacement demand to create a positive requirement for job entrants; and
- Two-thirds of the projected net job openings in the elementary occupations group will be concentrated in low-skilled service work, with the remainder in production and storage employment.

6.3. What are the likely future changes in occupations within industrial sectors?




The discussion so far has focused on occupations in the economy as a whole, but how does this pattern of occupational change vary across different sectors in Wales?

Table 6.3 provides detail of likely change in demand for specific occupations within different sectors. Particular attention is drawn to those “occupation / industry” groups which may be of special importance i.e. where the level of future growth of the sector and / or occupation is especially large. This enables us to indicate the significant concentrations of potential job growth.

Table 6.3: Occupational change in Wales across the 27 industries. Sub-major groups

	11	12	21	22	23	24	31	32	33	34	35	41	42	51	52	53	54	61	62	71	72	81	82	91	92	
Agriculture	-				-	-		-	-	-	-	-	-	-	-		-		-				+		-	
Mining, quarrying & utilities			-	-		-	-	-	-	-	-	-	-	-	-		-		-				-	-		
Food & drink manufacture	+	+			+	+		+		+	+			+	-		-	+								
Textiles & clothing	-	-	-	-	-	-		-	-		-	-	-		-		-	-	-	-	-	-	-	-	-	-
Wood, paper & publishing					+		-	-	-		-	-						-		-	-					-
Chemicals								-	-			-	-				-	+		-	-	-	-	-	-	-
Metals & metal goods			-	-		-	-	-	-		-	-	-	-	-		-		-	-	-	-	-	-	-	-
Machinery manufacture			-			-	-	-		-			-	-	-	+	-						-			-
Transport equipment			-			-	-	-					-	-	-	-	-			-						-
Other manufacturing							-	-	-		-	-	-				-	-	-	-	-	-				-
Construction	+	+			+							-	-				-	+	+							+
Distribution relating to motors					+								-							-						
Wholesale distribution					+					+			-					+			+					
Retail			+		+			-					-	+		+		+								
Hotels & catering			+		+	+	+	+		+								+			+		+	+	+	
Transport and storage	+	+	+	+		+	+		+	+		+			-		-	+		+	+					
Post & telecommunications									-						-		-	+		+	+	-				
Financial services		-		+													-	+	+		+					
Professional services				+	+							+					-	+		+	+			+		
Computing	+				+		+	-		+	+	+						+			+			+	+	
Business services										+			-				-	+			+					
Public admin and defence					+								-	-	-	-	-	+	-	-						
Education													-	-	-	-	-		-	-		-				-
Health & social care	+		+	+	+		+						-	-			-		-							-
Other services	+		+		+		+	+		+	+			+		+					+			+		

Source: Working Futures 2007-17

-  Level of employment in 2007 and/or 2017 is 5,000 or greater
- +
-
-  Growth in employment in the sector or occupation between 2007 and 2017 is forecast to be 10% or greater
-  Growth in employment in the sector or occupation between 2007 and 2017 is forecast to be -10% or less

Key to occupations (column headings)

- 11 Corporate managers
- 12 Managers and proprietors
- 21 Science/technology professionals
- 22 Health professionals
- 23 Teaching/research professionals
- 24 Business/public service professionals
- 31 Science/technology associate professionals
- 32 Health associate professionals
- 33 Protective service occupations

- 34 Culture/media/sport occupations
- 35 Business/public service associate professional occupations
- 41 Administrative occupations
- 42 Secretarial and related occupations
- 51 Skilled agricultural trades
- 52 Skilled metal/electrical trades
- 53 Skilled construction trades
- 54 Other skilled trades

- 61 Caring personal service occupations
- 62 Leisure/other personal service occupations
- 71 Sales occupations
- 72 Customer service occupations
- 81 Process, plant and machine operatives
- 82 Transport drivers and operatives
- 91 Elementary: trades/plant/storage
- 92 Elementary: administrative/service

The likely areas of most significant future occupational change are summarized in Table 6.4 below:

- **High growth occupations in large sectors with expanding employment:** where the occupations are likely to experience growth of at least 20 per cent in sectors with employment growth of over 20 per cent and where the sector employs at least 50,000 people;
- **High growth occupations in sectors with expanding employment:** where the occupations are likely to experience growth of at least 20 per cent, and growth in employment in the sector or occupation is forecast to be 20 per cent or greater;
- **High growth occupations in large sectors:** where the occupations are likely to experience growth of at least 10 per cent in sectors employing at least 50,000 people; and
- **High growth occupations across multiple sectors:** where the occupations are predicted to experience growth of at least 20 per cent.

Table 6.4: High growth occupations by sector in Wales

High growth occupations in large sectors with expanding employment	High growth occupations in sectors with expanding employment
<ul style="list-style-type: none"> • Corporate managers, health professionals and teaching / research professionals in health and social care • Corporate managers, health associate professionals and culture/media/sport occupations in Other services 	<ul style="list-style-type: none"> • Corporate managers and administrative occupations in transport and storage • Administrative occupations and caring personal service occupations in professional services
High growth occupations in large sectors	High growth occupations in multiple sectors
<ul style="list-style-type: none"> • Corporate managers in construction • Culture/media/sport occupations and caring personal service occupations in business services • Caring personal service occupations in public administration and defence 	<ul style="list-style-type: none"> • Caring personal service occupations • Teaching/research professionals • Customer service occupations • Culture/media/sport occupations

Source: *Working Futures, 2007-2017*

6.4. Other evidence to qualify these likely changes

The previous evidence presented in this chapter is based on forecasts made prior to the recession. This means the actual volumes of employment growth anticipated are likely to be somewhat less than suggested. The recession and recovery may also lead to changes in the structure of employment. However, it is important to distinguish cyclical from structural trends and also to recognise that long term structural trends have, at least in the past, tended to re-assert themselves in post recession periods.

Evidence from other sources on likely occupational change within sectors does provide substantial additional support for a number of the patterns outlined above but provides a strong note of caution in others. We now outline and summarise the main trends from the studies provided by SSCs as key inputs to the Audit.

1. The scale of the high projected demand for corporate managers and health professionals in the health and social care sector must be viewed with caution in view of major changes to public policy in healthcare

Managers and health professionals represent substantial employment segments within the health and social care sector, both in Wales and across the UK. The projected rapid growth rates for Wales are broadly reflected in the wider UK picture, as set out in *Working Futures*, although the UK growth rate will not be as pronounced as in Wales. In addition to significant expansion demand both of these occupational segments of the health and social care sector are projected to see substantial replacement demands.

This picture is consistent with the evidence from chapter four on the long-term factors driving expanded demand for healthcare services including the increase in the size of the elderly population, rising expectations about what health care should be available and increasing disposable incomes. It is notable that Wales spends more on health per head of population than Northern Ireland and England (Skills for Health, 2010).

Demographic trends will stimulate demand from both individuals and government, although the level of public sector expenditure on health care is the crucial factor. According to Skills for Health, the health sector is entering a period of high uncertainty due to the recent establishment of the coalition government and attendant policy changes, coupled with public sector funding changes. There are decisions still to be made across the public sector that could have a significant impact on the employment levels across the sector, which bring into question the scale of future growth projected by *Working Futures*.

Although the future outlook for employment in these roles is uncertain it is clear that the demands placed on these roles will increase, leading to development needs. In spite of the fact that the NHS has been protected from many of the cuts other public institutions have been confronted with, there is a strong need for significant efficiency savings to take account of surging demand. These efficiency savings will require better skills utilisation and development as well as management. Particular skills needs highlighted for the management workforce include the management of volunteers and improved employee engagement (Skills for Health, 2010).

There is also huge potential for ICT to reshape the way that services are delivered across the health sector with implications for health professionals and clinicians. ICT developments are bringing remote diagnostics, or even surgery, within ever closer reach. The technology for faster and more accurate diagnosis and more effective treatment in a range of areas is also rapidly evolving and will continue to shape the skills of those working within the sector.

Health associate professionals, including nurses, form a large part of the health and social care sector. According to Skills for Health, nurses represent 25 per cent of the healthcare workforce (Skills for Health, 2010). At UK level specialist nurses and therapists in certain roles have been identified as skills shortage occupations by the Migration Advisory Committee (MAC, 2009). *Working Futures* projects employment growth of 11 per cent for health associate professionals for the period 2007-2017 and substantial replacement demands of 25,000 for the same period.

The high density of migrant workers in this sector and particularly within health professional roles (see section 3.9) perhaps reflects a mismatch between skills demand and supply of domestic workers. There is some evidence, however, that the NHS workforce is more in balance and is moving towards self-sufficiency to a greater extent than in the past decade, with a significant expansion in the number of UK trained health professionals (King's College 2008b). Any remaining dependency on migrants may need to be reduced in view of the recently announced cap on non-EU migrants and the likelihood that the UK will in the future be a relatively less attractive destination for skilled migrants.

2. There will be significant demand for front line caring personal service occupations

According to the Annual Population Survey around 100,000 people in Wales are employed in caring personal service occupations and this is projected to be one of the fastest growing of all occupational groups, according to *Working Futures*, with net expansion of 23 per cent expected between 2007 and 2017. Projected replacement demands over this period are also substantial at around 40,000.

The specific occupations that fall within this sub-major group include care assistants (by far the largest component), educational assistants and nursing auxiliaries. All three of these feature in the current top 20 occupations by employment in Wales (see Table 2.6).

Again, the key trends of a growing elderly population and heightened consumer expectations of what care services should deliver, serve to drive increasing volumes of demand and a requirement for improved quality of service, all set within a regime of workforce regulation. There is limited scope to substitute technology for workers in front line care services whilst there are some concerns about finding adequate numbers of people who want to work in care roles. This may be reflected in the substantial number of migrants working in the health and social care sector and within caring personal service occupations. In the past the sector has been extremely reliant upon women who want to combine part time paid employment jobs with other family or caring responsibilities. However, the pool of women in this position is decreasing at a time when demand for care services is increasing. The low status of social care and poor pay are thought to make the sector increasingly unattractive when compared to alternatives. In addition, the gendered nature of the work has made it hard to attract men to work in the sector (Moriarty *et al*, 2008).

It is notable that the legislative frameworks for social care for each of the four UK nations differ and public policy is largely decided by the Welsh Government which has devolved powers for this sector. In this context, the Social Services budget within the Welsh Government has been safeguarded until 2015, although this may lead to a situation of rising demand / costs and static real-terms income for social care providers. The recent report of the Independent Commission on Social Services recommended a continued programme of workforce regulation and a programme of work to secure career pathways, commitment and investment in continued professional development and research.

We have seen that, by virtue of its size, the health and social care sector is a major source of skills gaps and contains large numbers of workers who are formally underqualified, although the latter is a major focus for action by stakeholders within the sector. There are a number of key, related characteristics of current and emerging skills needs among care workers (Skills for Care and Development, 2010), including the following:

- There is growing demand for “cross-boundary” workers who can operate at the interface of health and social care in order to support the “reablement” agenda and the push for people to remain independent and at home for as long as possible. This trend also creates a need for skills around multidisciplinary team working;
- There is a need, in the interests of people-focused outcomes, to move from what may sometimes be regarded as overly prescribed and narrow task driven roles for care and support workers to roles that incorporate the functions of assessing needs, planning, coordination, reviews and working alongside others;
- The skills of care workers need to adapt to the establishment of new service practices and norms in response to a move toward personalised and self-directed support;
- There is a need to address recruitment and retention issues and maintain staff levels; and
- The need of service users for a service in Welsh is increasingly reflected in a visible skill need in all parts of the care sector.

A further area of skill needs among care-related roles is a deficit of advice workers, counsellors and community development workers and other positions that require interaction with service users such as victims, survivors and witnesses of crime and in substance misuse. The main reasons for these shortages are a lack of specific skills and necessary experience (Skills for Justice, 2010).

3. There will be a requirement for increased front line customer care capacity and capability

More than 20,000 people are currently employed in customer service roles across the Welsh economy. Projected employment growth of more than 25 per cent between 2007 and 2017 reflects a wider UK trend. This growth is expected to be spread across a range of both marketed and public service sectors, most notably business services, retail, financial services and hospitality.

Employment growth in Wales of 13 per cent between 2008 and 2009 in this occupational area (source: Annual Population Survey) supports a picture of a longer term rise in demand.

As chapter four demonstrates the growing importance of customer care is founded on strong economic and social drivers. Greater disposable income and changing tastes and preferences mean a shift in the pattern of demand towards high quality goods and services, many of which require customer care, personal attention and face-to-face human interaction. However, there is little question that current economic conditions are affecting consumer behaviour.

It is notable that the wider SOC major group of sales and customer service occupations accounts for almost a quarter of reported skills gaps and has the highest density of gaps of any major group (see section 3.6.2). As well as core customer handling skills, these gaps are primarily related to deficits of team working skills, problem solving skills and communication skills. The density of skills shortages is below average in this area.

Analysis conducted by Skillsmart Retail confirms that customer handling is currently a key skill gap area for the retail sector and that in the future customer service will be critical to

maintain “point of difference”, whilst improved product knowledge will be required to meet increased customer expectations (Skillsmart Retail, 2010). Similarly, in financial services, sales and customer service roles are currently the most commonly cited cause of skills shortages (FSSSC, 2010).

Looking to the future, a wide range of sectors identify customer service as a skill area of growing importance, including, cleaning (Asset Skills, 2010), passenger transport (Go Skills, 2010), the motor industry (IMI, 2010), environmental and land-based industries (Lantra, 2010), hospitality and tourism (People 1st, 2010) and active leisure (Skillsactive, 2010).

4. There is a significant and growing demand across culture, media and sport occupations

More than 20,000 people are currently employed in Wales in this category, which covers a wide and diverse range of occupations across broadcast media, advertising, design, sport and leisure and the arts.

Future employment growth in Wales in this occupational group (projected by *Working Futures* to be 27 per cent between 2007 and 2017) again mirrors a wider trend across the UK, driven by a general expansion of the creative and leisure industries and of creative roles across the broader economy.

In the future growth could be hit by a slowdown in consumer spending in response to fiscal tightening, the weak housing market and high levels of personal debt. Moreover, the current process of fiscal consolidation will have a significant effect on direct subsidies to cultural and arts organisations.

A “baseline” scenario prepared by Creative and Cultural Skills SSC (Creative & Cultural Skills, 2010) indicates strong output and employment growth for the creative industries at a UK level in the period to 2020 but small declines against both indicators for the creative industries in Wales. However, there is confirmation of growth in net employment for highly skilled occupations requiring level 4 and above skills and specific technical occupations that require skills at level 3.

A key concern across the whole of the creative industries is the lack of required skills and “industry readiness” among recent graduates, reflecting rigidities in the educational and training infrastructure in adapting to specific and changing needs (Creative and Cultural Skills and Skillset, 2010).

In active leisure, skill shortage vacancies are most likely to occur in associate professional roles as well as personal service occupations. The former includes roles such as coaches, teachers, instructors, activity leaders and playworkers. Skills considered to be deficient include customer handling, team working, technical and practical skills, communication and problem solving skills. This is a significant area since it is estimated that there are around 58,000 sports coaches in Wales, albeit the majority operate on a voluntary basis (SkillsActive, 2010).

5. There is likely to be continued growth among teaching professionals

According to *Working Futures* projections, the occupational sub-major group of teaching / research professionals will, along with corporate managers and caring personal service occupations, be among the fastest growing of all occupations between 2007 and 2017, with net growth in employment of around 19 per cent. Projected replacement demands for this occupational area are 36,000 for this period.

The impact of the recession and fiscal consolidation on future demand for teaching professionals (teachers account for 95 per cent of employment in this category), is difficult to predict. The lifelong learning sector will undoubtedly have to adapt to a more “marketised” environment for education and training, in which learners and employers meet a greater proportion of the costs of these services. As in other nations, FE employers in Wales report that the economic downturn has brought about an increase in student numbers (LLUK, 2010).

Lifelong Learning UK (LLUK) identifies future challenges in respect of teaching and learning related skills, including skills in blended learning, skills in supporting the employability of others, skills in sustainable development, innovation and education, skills in teaching priority sector subjects, technician class skills, and skills for embedding equality and diversity. Related to this is a need for the FE sector to adapt to alternative styles of learning arising out of the Welsh Baccalaureate and the Education for Sustainable Development and Global Citizenship initiative from the Welsh Government (Welsh Assembly Government).

In addition, employers are often looking for a combination of job-specific skills; for example, combining teaching with additional “process” skills such as project management.

Future skills priorities highlighted by LLUK include:

- Managing change, especially the impact of the ongoing challenging economic situation;
- Responding to the learner voice, especially as learners are required to pay more fees;
- Commissioning skills, especially when drawing on reduced public funding;
- Learning coaching skills; and
- Digitisation skills with social networks being used as learning environments.

LLUK highlight skills shortages and gaps in relation to Welsh language skills across the lifelong learning sector, which are expected to present an ongoing challenge in the future. This is particularly an issue for organisations within bi-lingual Local Authorities where there is a requirement that a service be provided in both Welsh and English.

6. There is evidence of a need for improved management skills across a range of sectors

The sub-major group of corporate managers is the largest of any occupational category at this level, with employment of over 120,000. *Working Futures* projects net growth of 16 per cent between 2007 and 2017 coupled with substantial replacement demands of close to 50,000.

Much of this projected growth is linked to changes at sectoral level: in terms of rapid developments in work organisation and in the way technology is used. Sector Skills Assessment reports highlight the current and emerging skills deficiencies that are linked to these processes of change. The widespread nature of these needs is reflected in the fact that almost all SSC reports make explicit reference to deficiencies in leadership and

management competency (Worcester Research, 2010). A number of the types of skill need are common to a range of sectors, including the following:

- Strategic thinking and planning;
- Management of change;
- Project management;
- Time management;
- Change management;
- People management and motivation; and
- Entrepreneurship and commercial awareness.

Change management, involving a strong component of people management, is a key requirement both now and for the future among managers in a wide range of sectors across the economy. This is a key area which will be important for optimising the capability of staff, organisational reputation and ensuring the long-term staff retention, and improved service delivery.

Public spending cuts are the source of profound change in a number of sectors. In the housing sector change management skills will be important in enabling the workforce to respond to the impact of changes in government policy, which may lead to changes in individuals' job roles, such as increased multi-skilling and also in the nature of their working relationships, with an increased focus on collaborative working (Asset Skills, 2010). In the lifelong learning sector, managing change is among the top ten skills gaps currently facing the sector and is also among the top ten expected future skills priorities highlighted by employers (LLUK, 2010). The drivers behind this skill need include new ways of working in terms of learning delivery (including delivery in Welsh), responding to the learner voice as learners are required to pay more fees, a need to keep pace with new learning technologies (social networks are increasingly being used as learning environments, for example), more efficient utilisation of resources and responsiveness to policy change. In the health sector there is pressure to transform the workforce in order to provide greater efficiency and to respond to growing expectation of service performance. This will need to be effected through high-quality workforce planning, together with systematic change management processes (Skills for Health, 2010). In the sector represented by Skills for Justice there is a need and an opportunity for better co-ordination and cooperation in order to provide a seamless experience for service users. This creates a need for change management skills to promote cultural change and tackle "silo mentalities" across organisations at all levels (Skills for Justice, 2010).

Technology is also an important driver with regard to this skill need. Change management represents a core competence for the business services element of IT industry and demand for skills in this area is expected to increase (e-Skills UK, 2010). In the food manufacturing sector the need for change management skills is closely linked to the implementation of new technologies and processes, including lean manufacturing production (Improve, 2010).

The nature of the management function varies widely across sectors and is also determined by the size and structure of organisations, leading to variations in skills needs. Some sectors are characterised by layered management structures. For example, SummitSkills' assessment of the building services engineering sector highlights particular needs at first line management and middle management levels (SummitSkills, 2010). In other sectors owner-managed businesses are prevalent. For example, Lantra's assessment of needs in the land-based sector identifies a need for improved management and business skills among the self-employed (Lantra, 2010).

There are also short to medium term challenges facing managers as the economy recovers from recession and industries seek to adapt to a new environment. In the construction sector, for example, there will be a need for greater management skills as firms attempt to be as flexible as possible, operate profitably in a competitive environment, and make the best use of the skills of their current workforce (ConstructionSkills, 2010).

The food and drink manufacturing and processing industry is typical of a range of manufacturing sectors in its emerging need for high quality managers and supervisors to facilitate the adoption of new manufacturing and processing techniques e.g. lean manufacturing, Radio Frequency Identification (RFID), High Pressure Processing (HPP) to drive competitiveness and create a world class sector.

Other examples of current and emerging skills needs include:

- Management skills that are responsive to more demanding regimes of regulation in the logistics and passenger transport sectors (Skills for Logistics, 2010 and Go Skills, 2010);
- Enhanced management skills to deal with more complex logistics systems in the logistics sector (Skills for Logistics, 2010);
- Risk management skills in lifelong learning and government sectors (LLUK, 2010 and Government Skills, 2010);
- Management and leadership skills that can be applied in the context of new service delivery models in the social care sector e.g. leading multi-agency teams (Skills for Care and Development, 2010);
- Procurement and commissioning skills and commercial awareness to become an expert customer, to ensure contracted services deliver value for money in the public sector (Government Skills, 2010; Skills for Care and Development, 2010; Skills for Justice, 2010). Equally, some private sector industries have identified needs for skills in contract, negotiation and client relationship management (in cleaning services and facilities management) (Asset Skills, 2010);
- Financial management skills (Government Skills, 2010; People 1st, 2010; Asset Skills, 2010);
- Financial risk management skills, understanding of capital markets, corporate risk, application of ethics and influencing skills among senior managers in financial services and accountancy professions (FSSC, 2010; PwC, 2010b);
- Retail management skills, combining a mixture of entrepreneurial skills, commercial acumen and leadership skills / vision (Skillsmart Retail, 2010); and
- Data security management across the wider economy (SAMI, 2010) and protection of intellectual property (e-skills UK, 2010; Skillset, 2010).

7. There is evidence that skill gaps among managers may hamper exploitation of the potential of technology, IT and the digital economy

There is fairly strong evidence, much of it presented elsewhere in this report, that management skills are critical to harnessing the potential of technology and hence driving overall sector performance.

Within industries linked to digital media production there are skills gaps relating to understanding and exploiting digital technological advances. For managers, this will require project management skills for multi-platform development, mixing conventional leadership skills with innovation, creativity and understanding of technology; there will also be a requirement for skills to exploit intellectual property and develop new business models using digital platforms (see paragraph 5.5.1 for further detail).

In advanced manufacturing industries the capability to adapt existing products or materials for new applications is a key requirement. Critical success factors include management capability to develop innovation processes and to understand complex end-user markets, such as, in the case of medical technologies, the highly regulated healthcare sector and NHS procurement processes (see paragraphs 5.5.3 and 5.5.5).

Potential benefits from technology use and exploitation extend beyond sectors which are heavily reliant on technology as a major driving force for innovation. We have seen that e-skills UK estimate that optimisation of ICT could generate significant productivity benefits across the Welsh Economy (see paragraph 5.5.1). The performance of management is a critical factor in realising these benefits. Key examples are as follows:

- In the financial services sector information technology is fundamental to new product innovation and greater automation of processes. The capability of management in leveraging the potential of technology is central to future competitiveness (PWC, 2010b);
- In the retail sector there is a major challenge around the effective deployment of e-commerce solutions (Skillsmart Retail, 2010);
- In the hospitality sector the use of technology is growing while the quality of a business' online presence is key to attracting customers. There is evidence, however, that smaller businesses find it difficult to maximise online opportunities and meet customers' expectations because of a lack of the required skills in the organisation (People 1st 2010);
- In the public sector, effective management of digital technology presents a clear opportunity to make services more accessible and more cost effective (Government Skills, 2010); and
- In lifelong learning, optimising the use of online learning mechanisms presents a key challenge for the sector (LLUK, 2010).

8. There is likely to be moderate demand for highly skilled STEM-related occupations

Working Futures projects that science and technology professional occupations and science and technology associate professional occupations will each see positive demands in terms of both expansion and replacement demands over the period 2007 to 2017, albeit on a moderate scale. Expansion demand is projected to be around 6,000 in total for the two groups, whilst expansion demand is expected to be around 17,000.

Projections commissioned by Semta, meanwhile, suggest that there will be a net requirement across Semta's sectors in Wales for 8,400 engineers, scientists and technologists (1,200 per annum) during the period 2010 to 2016 (Semta, 2010).

Supplementary evidence also points towards continuing demand for STEM-related occupations, particularly higher skilled roles in specialist areas. In some of these specialist areas the impact on productivity and competitiveness will be disproportionately large relative to the employment requirement. This is partly because an inadequate number of people with high-level skills and scientific training constitutes one of the key factors that constrains growth in advanced sectors in the UK. This means the UK cannot take advantage of the fact that modern production methods mean that labour is a diminishing proportion of total costs (*Wilson et al*, 2008).

SSCs' sector skills assessments provide specific examples of current skills deficits and emerging needs.

Among the 25 per cent of engineering establishments in Wales reporting skills gaps, businesses were most likely to highlight gaps associated with professionals and craftpersons as those with the greatest impact on firm performance. For the Science industries the skills gaps that were most likely to be reported were in professional, associate professional/technician and management occupations. Deficiencies in technical skills, such as computer-aided design and electrical engineering, were flagged as being of particular importance (Semta, 2010).

In the food and drink manufacturing and processing industry it is expected that there will be a continuing need to address the need for food scientists and technologists with higher level skills (Improve, 2010). This demand is expected to be driven by the need to meet sophisticated consumer needs, to develop innovative products, and to implement new technologies which foster cutting-edge food preservation and manufacturing techniques. There is evidence of current skills deficits. For example, survey research found that one in five employers in the sector in Wales struggle to fill vacancies for this role. The role is critical to quality assurance and new product development within the sector and not only in the manufacturing / processing stage of the supply chain but also at the retail stage. Retail employers also highlight a shortage of these specialist skills (Skillsmart Retail, 2010). In common with other parts of the broader manufacturing sector there is also a requirement in food and drink manufacturing and processing for engineers with higher level skills that have the ability to adapt and learn about bespoke machinery which is required for complex automated systems.

In the energy and water sector STEM skills are integral to the planning, construction and maintenance of infrastructure and around 45 per cent of jobs require a specific degree. Degree level science and engineering skills are already in short supply in the sector. Demand for individuals with electrical, mechanical, power systems, design and planning skills at degree level are expected to be driven up as infrastructure expansion projects, including low carbon energy technologies, begin to “ramp up” (EU Skills, 2010).

In our review of emerging / priority sectors, including energy and environment, life sciences and advanced manufacturing, we noted the crucial importance of science and engineering professionals to the competitiveness and future growth of these sectors.

In view of the expected increase in demand for STEM graduates, a number of SSCs express concern about the likely intensification of competition between sectors for such recruits; this is in spite of the recent modest growth in the volume of higher education students studying STEM subjects (Worcester Research, 2010).

9. Associate professional and technician roles will be of widespread importance and critical to the future of some sectors

The sources of evidence reviewed in this report consistently point to an expansion in demand for workers at associate professional and technician level. This is expected to come about through net expansion in employment at this level but also through a shift in the proportions of the workforce working at different occupational levels.

There are a number of trends that are driving increased demand, particularly in respect of this latter mechanism. Firstly, the increased technological complexity of products, services and processes combined with contraction of routine manufacturing and processing operations will have an up-skilling effect on existing roles. Secondly, in sectors exposed to globalisation and to relocation of production, high order capabilities around research and development and innovation will be critical to survival. Examples of both these trends were highlighted in our review of advanced manufacturing (see paragraph 5.5.3) and it is notable

that increased demand at this occupational level will in some cases take place in a wider context of declining overall employment for the host industry.

The issue of skills needs at “technician” level in the manufacturing sector is an important one. The precise location of these roles within standard occupational and qualification frameworks is imprecise, but they generally require a specialist relevant level three or four qualification. There are around 12,000 people employed in science / engineering technician (SOC 311) jobs in Wales (source: Annual Population Survey, 2009) but in addition there are more than 50,000 jobs in the related area of skilled metal and electrical trades (SOC 54). Semta reports that among those establishments in the Science industries¹³ with skills gaps, 31 per cent indicate that gaps at associate professional / technician level have the most significant impact on their business

Third, in the public sector pressures resulting from increased pressures on public spending are highlighting the need to deliver high quality services cost-effectively by using the most efficient staffing methods. This has led to recent innovations in delegation of discrete tasks and functions of professional roles to associate professionals or technicians with a clearly defined area of competence or to paraprofessionals who are able to provide a generalist support role within a closely prescribed set of powers. Examples include a suite of roles loosely classified as assistant and advanced practitioners in the health service (Skills for Health, 2010).

We have also seen that associate professional roles form the core of the workforce in the creative industries and are forecast to see the fastest rate of employment growth in this sector.

6.5. Conclusions

This chapter has shown that in broad terms, **expansion in the number of jobs is most likely to be found in the higher skilled occupations** of managers, professionals and associate professional / technical occupations. **The other major growth occupation looks likely to be personal service occupations**, where more than 20,000 additional jobs may arise. On the other hand, **declines are anticipated in administrative/secretarial, skilled manual trades and operatives**.

However, it is important to note that these changes in overall growth (and decline) do not take full account of the total job requirements because, in addition to new additional jobs, **it will be necessary to fill the job opportunities that arise as current jobholders retire**. Both sets of skill needs will need to be met. Replacement demand is especially important among corporate managers; teaching/research professionals; administrative occupations; caring personal services and elementary occupations in services. **Overall, 12 per cent of the potential 580,000 job openings are ‘new,’ the bulk is to replace those leaving employment**.

It is also possible to examine these occupational changes on a sector-by-sector basis, creating a ‘matrix’ of occupation/industry requirements. To do this we looked at high growth occupations in four types of sector: large sectors with expanding employment; sectors of expanding employment; large sectors; and otherwise ‘contracting sectors.’

We then reviewed the detailed sector studies, which corroborate and support much of evidence on these trends. In particular, the cluster sectors provide evidence of:

¹³ Defined as R&D in natural sciences and engineering.

- Skill gaps emerging amongst managers and professionals across a range of sectors, in relation to ICT the digital economy and technological change more broadly;
- High levels of anticipated demand for corporate managers and health professionals in the health and social care sectors;
- A need for improved management skills across several sectors, often specific in character, related to the sector;
- A high demand for highly skilled, specific STEM related occupations;
- Widespread demand for associate professional and technician roles, across a wide range of sectors;
- Significant expansion of frontline personal service occupations, especially in the care sector; and
- Skills demands in front-line customer care occupations.

Additionally, individual sectors experience a range of particular skills challenges.

7. Conclusions and strategic priorities

7.1. Introduction

The National Strategic Skills Audit has identified current and likely future trends in demand for skills and employment in Wales over the coming five to 10 years, using a range of available national data sources, and supplemented by a detailed analysis of sectoral and occupational analysis. It has sought to provide greater insight into, and foresight of, Wales' existing and future skills needs.

In this final chapter we draw together the material analysed so far, and set out some priority areas for action in the short, medium and longer term. We focus, more specifically, on the occupations and sectors where most attention is required if we are to ensure Wales has the essential skills it needs both today and tomorrow to meet the emerging labour market demands, and, ultimately, to maximise economic growth and prosperity. To provide context to this thinking we also highlight some of the key characteristics of jobs and skills that are distinctive to Wales.

The intention of this chapter is not to be prescriptive, but to provide intelligence about strategic skills needs to stakeholders in the skills and employment system and act as a basis for better informed choices, and enable further dialogue and action on the most pressing skills priorities for Wales. The aim is to assist all stakeholders in making their education, training and development decisions, enabling a better response to current needs. It should help inform and influence all stakeholders so that they take appropriate action on demand and supply and get a better balance between the 'skills we need and the skills we've got.'

7.2. Key characteristics of skills needs in Wales

To provide context to our analysis of skills priorities in section 7.3 we have drawn together a range of key conclusions about skills and opportunities in Wales, which show how Wales' position is distinct from that of the wider UK.

The profile of current jobs is different

The sectoral profile of employment in Wales is different to that of the UK. In broad terms there is a higher proportion of employment in primary activities, most notably agriculture, and a lower proportion in service activities (although Wales has strong representation in some specific service activities). Manufacturing and construction are slightly "over-represented" in Wales.

To provide a concrete example of this differing industry structure, if Wales' sectoral profile matched that of the UK it would have 60,000¹⁴ more people employed in finance, business services and professional services.

Compared with the UK there is a smaller proportion of employment in high level occupations and a greater proportion in intermediate and low level jobs. If Wales' occupational profile of employment matched that of the UK it would have around 60,000 more people employed in high level occupations (managers, professionals, associate professional / technical) and around 25,000 fewer people employed in lower level occupations (operatives and elementary occupations).

¹⁴ This analysis relates to people employed in workplaces in Wales and is based on data from the Annual Population Survey for January to December 2009.

Differences in occupational structure are likely to persist

Based on *Working Futures* projections, it is expected that higher level occupations will continue to increase their share of total employment in Wales in the period to 2017, at the expense of intermediate and lower level occupations. Despite this, the projections suggest that the proportion of employment in higher level occupations will remain below that of the UK; while there will be a continuing over-representation of employment in lower level occupations. This is due to a more rapid process of occupational restructuring at UK level.

There may be differences in the profile of mismatches in Wales

In the absence of up to date skills survey data it is difficult to assess whether there are currently distinctive features to the profile of Wales' skills deficits, in a quantitative sense, partly because of the unknown impact of developments since then, most notably the recession. In chapter 3 of this report we have briefly examined the past profile of deficits in Wales relative to those in England, since there is potential for these patterns to re-emerge as the economy recovers. These comparisons show a high representation of skills gaps in production and construction sectors and among machine operative jobs. These comparisons have not informed our assessment of priorities to any significant extent because of the concerns outlined above. The UK-wide employer skills survey planned for 2011 should help to address these key questions.

With regard to "under-employment" of workers, Wales appears to have a slightly higher proportion of people who are "real-overqualified", i.e. both over-qualified in a formal sense and not utilising their skills fully.

Commuting patterns affect the balance between supply and demand

Wales has strong links with the economy and labour market of England, particularly in its border areas and around its coastal corridors. Inward and outward commuting flows of skilled workers have the potential to influence the balance between supply and demand of labour, particularly since inward commuters have the strongest representation in skills-intensive occupations i.e. managers, professionals and associate professionals. It is notable that there was a sharp reduction in the level of commuting into Wales between 2008 and 2009.

Distinctive geographic patterns within Wales in terms of supply and demand

The profile of employment varies significantly across Wales' economic regions. For example, the manufacturing sector is of particular importance to North Wales, agricultural employment predominates in Mid and West Wales, whilst in South East Wales a relatively large proportion of employment is concentrated in higher level occupations and financial services. Changes in the urban / rural balance referred to in chapter 4 also have the potential to impact on the balance between supply and demand of labour at local level. This means that the profile of opportunities varies markedly across regions and localities.

Government policy in Wales influences the supply and demand of skills

Government policy in Wales could serve to influence the future nature of jobs and skills demand. For example, Wales' accelerated programme for reducing carbon footprint could serve to intensify demand for jobs and skills, many at a higher level, associated with the development of the low carbon infrastructure. The Government's prioritisation of the six *Economic Renewal* sectors could serve to increase demand for jobs and skills linked to those sectors, such as STEM professionals, associate professionals in the finance sector and creative workers in digital media. On the supply side, Wales' current policy on the

school leaving age could affect the balance of labour supply and demand in sectors that employ large numbers of young people, such as hospitality.

The recession has had a particularly deep impact on some sectors in Wales

We have seen that the recession has had a more severe impact on the employment rate in Wales than is the case for the wider UK. Particular sectors and occupations have also been harder hit in proportionate terms. For example, jobs in the production sector and in machine operative roles have seen a steeper decline than at UK level. It is unclear whether this will have a medium to long term impact on the composition of labour demand in Wales.

7.3. Priority areas for action

In this final part of the analysis within the Audit, we seek to identify the skills which are strategic priorities for action, both currently and in the future. In particular, we focus attention on the most pressing areas that have been identified in the analysis, which are accentuated when the data is brought together. This is essentially where there are:

- Current and/or anticipated future skills needs, which are significant in scale or volume already in the labour market, or are expected to be a significant requirement in terms of future needs;
- Significant current and/or emerging skills needs which are already making (or likely to make in the future) a significant contribution to economic performance (although they may be more moderate in scale); and
- Concerns over whether the skills needed will be adequately met and hence there is a skills deficit (or there may be questions over future supply if future demand is stimulated).

We identify where short, medium and long-term action is needed, and discuss the implications if action is not taken. As discussed earlier (for example chapter three), such action may be in terms of supply or demand. Thus whilst it could involve action to re-skill or up-skill people, it could also equally involve action on the demand side to ensure better job-matching and that people's skills are effectively managed and utilised.

In prioritising the areas for action, we draw on the risk-based approach adopted in Australia (Skills Australia, 2008) as this has already been used and effectively deployed in a policy context, in developing a national workforce development strategy. The approach enables us to identify the key occupations, and in turn related sectors, where there are most likely to be important strategic skills needs, which risk not being effectively met. The risk-based approach uses the following criteria:

- Degree of certainty – this essentially considers the likelihood of the drivers of the skills demand materialising, and, the risk of supply failure, with assessments ranging from 'unknown certainty' to the outcome being definite. It also includes consideration of the significance of the skill deficit under multiple scenarios;
- Magnitude – this considers the scale of action required based on the magnitude of skills needs. Essentially, this is broadly based on the numbers of jobs that need filling. Future assessments of magnitude capture total employment demand and incorporate both replacement demand as well as new jobs;
- Lead time – this seeks to assess the length of time taken to rectify the skills deficit. In doing so, it also considers whether there is an absence of alternative preferred strategies to overcome the deficit. It deploys categories ranging from short to long term, with: the long lead time being more than five years, three-five years capturing the medium lead time, and less than three years applying to the short lead time. This measure includes

- both the learning time required for individuals and the set up time for any new training or educational provision; and
- Criticality – this seeks to assess the potential risk to economic growth and development according to:
 - I. The priority sectors analysis of chapter five to identify where the opportunity costs of skills deficits could be high to the economy; and
 - II. The analysis in chapter six to identify where the consequences of skills deficits could be high within industries, even if the numbers of jobs involved are small.

Therefore, some of the likely deficits are about capacity – i.e. insufficient numbers of people with the necessary skills and knowledge, and others are about capability – the numbers of people exist, but their skill sets needs to change in order to meet changing needs.

Depending on how these factors combine, each skills deficit is then given an importance rating or ‘traffic light’ colour, indicating how much of a priority it is for action. The only weighting given to these factors is whether the opportunity costs of skills deficits could be high to the economy overall and require immediate action. Where this is most severe it automatically results in a top priority rating, which is signified with the colour red. More specifically, the ratings used are:

- Red, reflecting skills deficits which are of critical importance to the economy and require immediate action, either because there are current skills needs already not being met and/or because lead times are such that early action is required to fully optimise economic growth potential and avoid deficits in future;
- Pink, reflecting skills deficits which are again of critical importance to the economy or a particular part of the economy or sector, in terms of expansion, survival and/or optimising returns, but which may be smaller in scale and have a shorter lead time than for those rated as red; and
- Amber, reflecting skills deficits which are important to the economy and/or a distinct sector rather than critical (although the degree of certainty may be less clear and hence the true impact unknown, where the skills needs are connected to a developing or emerging sector in the economy). Furthermore, skills deficits are either moderate in scale and/or can be filled in a medium to short time frame.

Green ratings are not separately identified as these represent areas where generally there is a better alignment between supply and demand and hence less pressing skills issues requiring additional action.

Figure 7.1 presents a summary of the results of our priorities analysis. The table is organised under broad skill/occupational priority headings (these are illustrated in the white rows in the table), it also seeks to show in which sectors of the economy the effects are being felt (or expected to be felt). Overall, the analysis taken together points to the importance of a number of key strategic skills we need to address to meet the emerging demands of the labour market and, ultimately, to maximise economic growth. In general, this broadly highlights higher skilled occupations including managers, professionals and associate professional and technicians. But it also extends to some other areas such as personal service occupations and skilled trades in particular parts of the economy, as well as more pervasive generic skills.

A number of key trends provide the context for the priorities analysis:

- Current demand: The largest numbers of people in the current labour market are collectively employed as managers, professionals and associate professionals. Indeed, these occupations account for almost two-fifths of all jobs today;
- Broad skills shortages: We estimate that associate professional and skilled trades occupations account for the largest shares of skills shortages. These occupations also display the highest density of shortages relative to numbers employed;
- Skills gaps: We estimate that the largest proportions of total skills gaps are found in sales, machine operative and elementary roles but gaps are significant across all occupational groups, including management roles;
- Future trends and drivers of change: Drivers of change, structural trends and developments in the coming years in the economy are expected to accentuate the demand for many of these high level skills, particularly because of their importance in securing a continuing edge and competitive advantage within key sectors, and an ability to respond to on-going changes in the labour market due to factors such as the effects of globalisation, technological advancements and developing consumer demands; and
- Future demand: Jobs amongst corporate managers, professionals, associate professionals and technicians are anticipated to exhibit the highest levels of anticipated demand in the future too, with their combined proportion of total employment expected to increase from 37 per cent in 2007 to 41 per cent by 2017 (Wilson *et al*, 2008). But in addition, personal service occupations also exhibit higher growth, which is accentuated when replacement demand due to people retiring from the labour market is also included. Such trends highlight key future skills demands for skilled trades and administrative staff.

In addition, our initial assessment has sought to identify those sectors of the economy where particular attention to skills needs might be targeted. Whilst this is only an initial assessment which we need to review and develop over time, these sectors also feature within the priority assessment below. For instance:

- Key sectors: Our earlier analysis identifies those sectors which currently exhibit the greatest economic significance and skill deficits. These include: financial services; retail; business services; and post / telecommunications. The sectors which combine growing economic significance and future skills needs, are health and social care; business services; retail; and education; and
- Emerging Sectors: In addition, the analysis has included the emerging sectors identified by Government as offering particularly significant potential for economic expansion and in turn job opportunities: low carbon; advanced manufacturing; financial and professional services; ICT / the digital economy; and life sciences. Again, the analysis here is not conclusive and will inevitably need to be enhanced over time, but some initial insights are included below.

Given these general trends, we now summarise the main priorities in our priority action matrix.

Figure 7.1: Priority action matrix

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
Management roles					
Increasing skill and occupational demands in respect of corporate manager roles across a wide range of industry sectors (Red rating)	<p>Growth in occupational demands is expected to be highest in the following sectors:</p> <ul style="list-style-type: none"> • Transport and storage • Health and social care • Other services • Construction. <p>Management skills gaps are pervasive across sectors but there is evidence that they are particularly prevalent in business services, production and hospitality</p>	<p>Definite</p> <p>Increasing demand for managers is a well-established trend in the labour market. There is evidence of widespread management skills gaps, which are probably growing in number</p>	<p>Large</p> <p>There are c.120,000 managers employed in Wales. It is projected that there will be a net requirement for corporate managers of 70,000 between 2007-17</p> <p>According to the findings of Future Skills Wales 2005, there were almost 5,000 management skills gaps, a figure that is believed to have increased since then, based on our extrapolations</p>	<p>Medium</p> <p>Skill requirements vary by industry and on the job development is needed as well as formal education and training</p>	<p>This skill need is critical to a wide range of industries and hence to the overall economy of Wales. It is critical in terms of its potential impact on productivity and it is expected that this occupation will continue to increase its share of total employment in Wales</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
<p>Need to improve management capability in exploitation of technology in order to optimise business benefits</p> <p>(Red rating)</p>	<p>Impact is believed to be economy-wide but specific evidence is presented in the Audit for financial services, retail, hospitality, lifelong learning</p>	<p>Definite</p> <p>There is evidence, including quantitative evidence, of current skills gaps within individual industries</p> <p>A range of qualitative analysis suggests that this need will intensify</p> <p>e-skills UK stress the importance of enabling managers across the economy to exploit the strategic potential of ICT</p>	<p>Large</p> <p>Highlighted by a wide range of sectors</p> <p>We believe that most managers in most sectors are affected to some extent</p>	<p>Medium</p> <p>Could require a combination of formal training and on the job development</p>	<p>e-skills UK presents evidence of substantial potential business benefits and productivity uplift from optimising use of information technology. They estimate this could be worth an additional £1.1bn in GVA across the Welsh economy over 5-7 years; this is significant in an economy that generates total GVA of £45bn per annum</p>
<p>Management capability to drive product and process innovation, to commercialise / re-purpose products / processes for new markets and to exploit intellectual property rights</p> <p>(Pink rating)</p>	<p>Advanced manufacturing, including life sciences, and digital sectors, in particular</p>	<p>Definite</p> <p>There is evidence of existing deficits within individual industries</p> <p>There is evidence of existing deficits in this area for advanced manufacturing and creative media</p>	<p>Small</p> <p>Available evidence does not allow us to quantify the scale of need</p> <p>Need is mainly confined to high level roles in the identified sectors, which are relatively few in number e.g. fewer than 10,000 are employed in management, professional and associate professional roles in advanced manufacturing</p>	<p>Medium</p> <p>There are implications for the education system (probably at HE level) as well as for development in the workplace</p>	<p>Up-skilling of a small number of individuals could lead to significant productivity benefits with potential spillovers for wider economy</p> <p>Continuous innovation is critical to survival of these sectors in high value markets</p> <p>Protection of IPR critical to competing in global markets for businesses in priority sectors</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
<p>Change management skills (including staff engagement) driven by impact of public spending cuts and increased competition</p> <p>(Pink rating)</p>	<p>Economy-wide</p> <p>Specific examples include health, lifelong learning, housing, justice and community safety</p> <p>We believe that this need extends beyond these sectors but the evidence is less concrete</p>	<p>Definite</p> <p>All workforces will be subject to the impact of changing government policy, technological change, increasing consumer demands and global competition, requiring continual change in business operations and workplace organisation</p>	<p>Large</p> <p>Pervasive and large scale skill need</p>	<p>Short to medium</p>	<p>Will be key to successful adaptation to change across the economy and securing maximum effectiveness from workforce as well as retention of critical skills within companies / industries</p>
<p>Management capability to support development of digital content for a range of media platforms. Well-developed project management skills are required to take account of shift to outsourcing, distributed project teams and use of freelancers</p> <p>(Amber rating)</p>	<p>Creative / digital media</p>	<p>Likely</p> <p>Highlighted by Skillset as a clear skill priority for creative media sector in Wales</p>	<p>Small</p> <p>For example, 20,000 people in total are employed in the creative media sector in Wales, according to Skillset, with only a proportion facing skills needs in this area</p>	<p>Medium</p> <p>Could require concerted action by the industry to influence HE provision and workforce development arrangements. Ability to undertake development likely to be affected by nature of organisational structures in the sector</p>	<p>Critical to enhancing the performance of this key creative industry as part of Wales' strategy for economic renewal. Also, strong links to ICT and wider digital economy agenda. Impact in terms of job volume expected to be relatively limited.</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
<p>Specific management capability in procurement, commissioning and financial management</p> <p>The constrained financial conditions created by the recession mean that these skills are critical to winning business and ensuring value for money and quality of service in the public sector</p> <p>(Amber rating)</p>	<p>Range of private sectors (e.g. life sciences, legal services, facilities management, cleaning services) as well as government, education, health and care sectors. Companies in the private sector need the skills to win business through public procurement processes while customers in the public sector need to maximise quality and value for money</p>	<p>Definite</p> <p>There is already evidence of skills deficits, according to a range of SSCs, driven by economic and fiscal conditions</p>	<p>Believed to be small, although it is difficult to quantify scale in exact terms</p> <p>Managers with purchasing responsibilities represent a substantial group</p>	<p>Short</p> <p>Sectors could potentially address this deficit through targeted programmes of development</p>	<p>Critical to business performance and productivity in these sectors</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
Professional roles					
<p>IT professional skills, including an immediate priority need for high level security and data protection skills and an increasing need for customer and business-oriented skills as well as technical competencies</p> <p>(Pink rating)</p>	<p>Skills are needed in the IT industry but also required by IT professionals working across the wider economy</p>	<p>Definite</p> <p>Firms report that security and data protection is the IT issue most likely to have an impact on their business in the next one to three years</p> <p>One in ten firms in Wales currently report skills gaps among their IT professionals</p> <p>Demand for IT professionals has been strong in recent years</p>	<p>Medium</p> <p>30,000 people are employed as IT professionals across the Welsh economy and it is estimated that there are 3,500 job openings per annum in this field (e-skills UK, 2010)</p>	<p>Medium to long</p> <p>Level 3 or above qualification</p> <p>Need to consider formal education system (HE) as well as development of existing workforce</p>	<p>Critical in terms of performance of IT sector but importance also pervades wider economy</p> <p>IT sector is projected to be of growing economic significance according to our sector prioritisation model</p> <p>Data security critical to reputation preservation in all sectors</p> <p>Job volumes may be significant, reflecting future occupational demands for IT professionals</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
Teaching professionals (Pink rating)	Education	<p>Likely</p> <p>Projections suggest substantial occupational demands arising out of both expansion and replacement demands</p> <p>Evidence of current skills deficits linked to changing nature of teaching role and developing modes of delivery</p> <p>Volume of demand could be tempered by public spending cuts and need for efficiency savings</p>	<p>Large</p> <p>More than 60,000 people are currently employed in this area with projected net requirement for 2007-17 of more than 50,000 (including replacement demands of 30,000)</p>	<p>Medium</p> <p>Requires level 4 or above qualifications</p>	<p>High quality of teaching delivery is critical to overall future competitiveness of Wales as well as performance of education sector</p> <p>Impact in terms of job volume is also likely to be significant</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
<p>Strong demand for health professionals (primarily medical practitioners)</p> <p>(Pink rating)</p>	<p>Health</p>	<p>Likely</p> <p>Projections suggest there will be strong expansion and replacement demands in this area</p> <p>Powerful forces driving demand, including ageing population, increased incidence of long-term conditions etc</p> <p>Strong occupational demands will not necessarily translate into skills deficits. There is limited evidence of current shortages and gaps, although employment of migrants is significant</p> <p>Ability of state and individuals to pay for health services in a period of austerity is a key constraining factor. Employment growth may also be offset by productivity gains</p>	<p>Medium</p> <p>Around 17,000 people are employed in this occupation in Wales, with a projected net requirement of 13,000 for period 2007 to 2017</p>	<p>Long</p> <p>Requires level 4 or above qualifications</p>	<p>This occupation is critical to the performance of the health and social care sector and to wider societal well being</p> <p>There is a potential impact on the productivity of the sector but also an impact in terms of job volume</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
<p>Science and technology professionals in life sciences</p> <p>Includes specialised postgraduate STEM skills e.g. for bio scientists including pharmacologists, pathologists, analytic / synthetic chemists; chemical / instrument engineers</p> <p>(Amber rating)</p>	<p>Life sciences</p> <p>Healthcare</p>	<p>Likely</p> <p>Much of the available evidence is at UK rather than Wales level (i.e. from UK Commission's cluster report). This needs to be supplemented with an assessment of Welsh skills needs</p> <p>Development of new technologies and growing global competition make heightened skills needs very likely</p>	<p>Small</p> <p>Total employment in life sciences in Wales is around 13,000</p> <p>Around 4,000 people are employed as bio scientists / bio chemists across the Welsh economy</p>	<p>Long</p> <p>Requires postgraduate qualifications, specialist training and workplace orientation</p>	<p>These high level skills are critical to survival and development of life sciences sector in high value added markets</p> <p>This is an <i>Economic Renewal</i> priority sector</p> <p>The likely requirement is small in terms of job volume but the highly skilled individuals have a disproportionate impact on business performance</p> <p>Consideration will need to be given to this area if Wales is to pursue its ambition of moving its manufacturing base up the value chain</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
<p>STEM skills for high level occupations in manufacturing</p> <p>Disciplines range across engineering, chemistry, physics, electronics, nanotechnology, supplemented by understanding of technology application areas and ability to work within a multi-disciplinary approach</p> <p>(Amber rating)</p>	<p>Advanced manufacturing</p>	<p>Likely</p> <p>Projections suggest that there will be positive expansion demands as well as significant replacement demands in this area</p> <p>This is supported by qualitative evidence: product development / innovative capability is already critical to performance of advanced manufacturing businesses. However, manufacturing in Wales could decline more rapidly than expected.</p> <p>There is evidence from SSCs of current skills deficits in Wales (e.g. skills gaps among professionals in the engineering sector) as well as from UK cluster report</p> <p>Evidence of shortages is more limited but there is evidence of competition from other sectors for STEM graduates</p>	<p>Small</p> <p>For example, Semta projections suggest that there will be a net requirement for around 1,000 engineers, scientists and technologists per annum in the industries it covers</p> <p>Relatively small numbers of highly skilled / qualified individuals are required but they are of critical importance to the performance of businesses and sectors</p>	<p>Long</p> <p>Requires postgraduate qualifications, specialist training and workplace orientation</p>	<p>Critical to performance and survival of an <i>Economic Renewal</i> priority sector in intensely competitive global market environment</p> <p>Impact would mainly be felt in terms of productivity rather than job creation</p> <p>Investment in skills in this area may be critical if Welsh manufacturing is to move up the value chain and Wales is to reduce its exposure to branch plant investment</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
<p>Science and technology professionals for low carbon economy (Amber rating)</p>	<p>Low carbon generation industries will require specialist engineering and other STEM skills to develop infrastructure e.g. aeronautics engineers for wind industry</p>	<p>Likely</p> <p>Most elements of low carbon energy generation are at an early stage of development, which limits our ability to assess the scale and nature of skill needs</p> <p>However, a range of skill requirements are envisaged to support roll-out of low carbon infrastructure</p> <p>Welsh government has committed to a faster rate of roll-out of low carbon initiatives but public / private investment and appeal of low carbon products / services in marketplace may determine actual progress</p>	<p>Small</p> <p>Low carbon energy generation currently employs only 30,000 UK-wide but only a very small proportion are in STEM roles in Wales</p> <p>Also likely to see offsetting declines in employment e.g. in mainstream utilities</p>	<p>Medium to long</p> <p>Requires development of level 4 or above qualifications or adaptation of existing skills</p>	<p>These skills are critical to the development of the low carbon sector and will be essential if Wales is to capitalise on the particular opportunities that lie in this area, as set out in <i>Economic Renewal</i></p> <p>Job volume is likely to be small, at least initially</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
<p>Current shortage of food technologists (Amber rating)</p>	<p>Food and drink manufacturing</p>	<p>Definite</p> <p>Already evidence of shortages in this area according to Improve, the SSC for the food and drink manufacturing and processing industry</p> <p>Likely to intensify with growing importance of R&D in this sector</p>	<p>Small</p>	<p>Long</p> <p>Requires level 4 or above qualifications</p>	<p>Critical to the future of the industry in UK / Wales in terms of raising productivity. Job volume is small</p>
<p>Demand for actuaries (Amber rating)</p>	<p>Financial services</p>	<p>Possible</p> <p>Needed in the sector to monitor and assess financial risk</p> <p>There is evidence of acute shortages at UK level but little evidence to enable us to assess scale of problem in Wales</p>	<p>Believed to be small based on current small level of employment</p>	<p>Long</p> <p>Level four qualification is required and there is evidence of long training periods, low pass rates and low industry attractiveness</p>	<p>Although job volumes are small this area is critical to the industry and to financial stability of UK</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
Associate professional roles					
<p>Health and social care associate professionals, most notably nurses</p> <p>(Red rating)</p>	<p>Health</p>	<p>Very likely</p> <p>This is a substantial area of employment for which significant expansion and replacement demands are projected</p> <p>It is believed that health and social care associate professionals are an important source of skills shortages in Wales</p> <p>Migration may also mask the real extent of deficits</p>	<p>Medium to large</p> <p>More than 40,000 people are employed as health and social care associate professionals</p> <p>Projected net requirement for 2007-17 is more than 30,000</p>	<p>Medium to long</p> <p>Professionalisation of these roles creates a requirement for level four qualifications</p>	<p>Critical to the performance of the sector. Also potential for significant impact in terms of job volume</p>
<p>Technician roles</p> <p>Occupational and skills demands in respect of technicians who can install, maintain and run complex manufacturing / processing equipment and have holistic understanding of innovation and whole product / process lifecycle</p> <p>(Pink rating)</p>	<p>Manufacturing, including advanced sectors such as life sciences</p> <p>Utilities</p> <p>Process sectors</p> <p>Potentially in low carbon generation</p>	<p>Very likely</p> <p>Evidence of current demand and deficits at sector level from SSC analysis</p> <p>Future scale of demand partly dependent on ability of manufacturing industries in Wales to prosper in intensely competitive environment</p>	<p>Small to medium</p> <p>Around 20,000 people are employed as science / technology associate professionals in Wales but a further 50,000 are employed in related area of skilled metal and electrical trades</p> <p>Projected net requirement for science / technology associate professionals is 8,000 for period 2007-17</p>	<p>Medium</p> <p>Typically requires level 3 skills acquired through development in workplace but increasingly skills are required at level 4</p>	<p>Critical to strategy of moving into higher value-added markets and therefore to future productivity</p> <p>Job volumes likely to be fairly modest</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
Investment advisers (Amber rating)	Professional and financial services	Definite Retail Distribution Review in 2012 will impose a requirement of holding a level four qualification for investment advisers in the financial services sector, which will create a need for skills development. There is existing evidence at UK level of shortages of qualified advisers	Small Around 6,000 people are employed as finance and investment analysts / advisers in Wales, according to the Annual Population Survey for 2009	Medium Requires level four qualification	Essential to service delivery and consumer protection in the sectors in question
Advice workers, counsellors and community development workers for victims of crime / substance abuse (Amber rating)	Public and voluntary sectors	Very likely Skills for Justice highlights specialist knowledge and expertise in working with specific categories of people (e.g. victims, survivors and witnesses) as a key skills priority for its sector Spending cuts may act as a constraint on demand	Small to medium	Medium	Important for service performance in these sectors and for societal well-being

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
Sports coaches and fitness instructors (Amber rating)	Active leisure	Likely There is evidence of existing deficits and this may intensify in medium to longer term with a more active ageing population There has been significant employment growth in this area in Wales in recent years	Small Around 8,000 people are employed in sports and fitness occupations in Wales, according to Annual Population Survey (2009), although many more people are active in a voluntary capacity	Short	Important for optimising national health and well-being

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
Skilled trades					
<p>Continued demand for workers in skilled trades occupations</p> <p>(Red rating)</p>	Construction	Definite	Large	Medium	Critical to industries, including priority industries and important to economy through supply chains
	<p>Manufacturing including advanced manufacturing</p> <p>Low carbon economy</p> <p>Engineering construction</p> <p>Utilities</p>	<p>Projections suggest that there is likely to be a net decline in employment (aside from niche areas) but there is also expected to be significant replacement demands in this area</p> <p>Remains a key source of both skills shortages and gaps, with concerns about recurrence of shortages as recovery develops. However, migrants may play a part in addressing such future needs</p> <p>Skills intensity will continue to increase in these roles with a requirement for up-skilling and multi-skilling</p> <p>Scale of demand will ultimately be determined by future competitiveness of manufacturing in high value added global markets, progress with low carbon agenda, and speed of recovery in construction</p>	<p>Around 150,000 people are currently employed in skilled trades roles. There were more than 6,000 skills gaps in this area in 2005 and this level is believed to have increased significantly since then</p> <p>Replacement demands are projected to be more than 50,000 between 2007 and 2017</p>	<p>Requires level 3 qualification usually acquired through apprenticeship or other workplace development</p>	<p>These roles provide an important progression route into technician roles</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
<p>Current deficits for chefs</p> <p>(Amber rating)</p>	<p>Hospitality</p>	<p>Definite</p> <p>Skills shortages and gaps for chefs are identified as a key skill priority by People 1st, the SSC for the hospitality, leisure, travel and tourism sector</p> <p>There appears to have been strong employment growth in this occupation in Wales in recent years</p> <p>These problems may be intensified by limits on non-EEA migrants</p>	<p>Medium</p> <p>Around 15,000 people are employed as chefs in Wales</p>	<p>Medium</p> <p>Requires intermediate qualification</p>	<p>Essential to the productivity and performance of the hospitality industry with knock-on effects for wider economy in form of tourism etc</p> <p>Impact on job volumes also likely to be significant</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
Care / customer service roles					
<p>Growing demand for caring personal service occupations including care assistants</p> <p>(Red rating)</p>	<p>Social care</p>	<p>Definite</p> <p>Powerful forces driving demand, including ageing population, growing consumer expectations of care services, increased incidence of long-term conditions, increased participation of women in the workforce, increased regulation of care sector</p> <p>Personal service roles are believed to be the key source of skills gaps and shortages in the health and social care sector</p> <p>Migration may be masking the potential scale of shortage</p> <p>Substantial occupational demands are projected for the future</p>	<p>Large</p> <p>Almost 100,000 people are employed in caring personal service roles with more than 40,000 employed as care assistants. The projected net requirement for caring personal service occupations is over 60,000 for the period 2007-2017</p>	<p>Short to medium.</p> <p>Typically involves on the job development to qualifications at levels two and three</p>	<p>Critical to relevant industry, major contributor to employment and key to societal well-being</p> <p>This occupation also offers an important and large-scale entry route into employment</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
<p>Significant occupational and skills demands in customer service</p> <p>(Pink rating)</p>	<p>Range of sectors but particularly retail, business services, financial services, hospitality. After-care services in manufacturing also important</p>	<p>Definite</p> <p>Evidence from SSCs and from Future Skills Wales 2005 survey shows that customer handling skills are a key existing deficit</p> <p>Projections suggest significant expansion demands and replacement demands in respect of customer service jobs. Recent employment performance has been strong in this area</p> <p>Impact of recession may constrain growth in some sectors e.g. financial services, public administration</p>	<p>Medium</p> <p>Around 20,000 people are employed in customer service roles with a projected net requirement of 11,000 between 2007 and 2017</p> <p>Growth of employment of 20 per cent or more projected for a range of industries in these roles</p>	<p>Short</p> <p>Intermediate level skills / qualifications required</p>	<p>Essential to service delivery for relevant industries but technology may be substitutable in some instances</p> <p>Customer service roles offer a key route into employment and progression and it is expected that there will be job creation in this area</p>

Skill / occupational priority	Sector(s) affected	Degree of certainty – definite, likely, possible, unknown?	Magnitude – large, medium, small (current and future)	Lead time – short/medium/long?	Criticality to a) the relevant industry b) Welsh economy through GVA and/or job volume?
Cross-cutting skills					
Skills to support greater efficiency in terms of energy consumption and resource utilisation i.e. “greening” of jobs across the economy (Pink rating)	All sectors	Definite There is already evidence across a range of sectors of emerging skills needs linked to the “greening” of job content in response to consumer pressure, regulation and carbon / waste reduction targets	Large Difficult to assess full scale of impact but there is potential for effects to be felt across every job in the economy Impact is likely to be widespread but “shallow”	Short / medium Drive for energy / resource efficiency leads to a large and diverse range of skill needs that need to be addressed by individual sectors and businesses	Critical to the achievement of Wales’ aspirations for a low carbon economy Impact will mainly be in terms of changes to existing jobs rather than creation of new jobs
Employability and basic skills (team working, problem solving, communication, literacy, numeracy) (Pink rating)	All sectors	Definite All of these cross-cutting skills areas are important sources of deficits, and some are more widespread than technical / practical deficits, as evidenced by findings of SSC analysis and of the Future Skills Wales 2005 survey	Large Incidence and level of skills gaps is high for areas like team working and problem solving	Short / medium Some cross-cutting skills needs can be addressed quickly but basic skills issues are not as susceptible to resolution	Critical to performance of workforce and wider economy of Wales; some generic skills are key at all occupational levels
Welsh language skills (Pink rating)	All sectors but particularly public administration, education, hospitality, and passenger transport	Definite A number of sectors report growing demand for Welsh language skills and the emergence of skills deficits, as evidenced by findings of SSC analysis and of the Future Skills Wales 2005 survey	Medium Evidence from Future Skills Wales 2005 survey shows a significant level of skills gaps in this area	Medium to long School age education is key mechanism for driving development of Welsh language skills	Critical to performance of a wide range of sectors with customer-facing dimension This issue is of particular importance to North and Mid Wales

7.4. Conclusions

We believe that this Audit represents a valuable initial assessment of the skills priorities facing Wales and provides a strong foundation for further dialogue between stakeholders on this key issue. We hope that the process of publishing and disseminating the Audit will enable the key “change agents” in the labour market - individuals and their advisers, employers, education and training providers, public agencies and government – to adapt their behaviour in the light of intelligence on current and future skills.

High quality intelligence is crucial to inform better decisions

The purpose of this Audit is to provide insight and foresight to support a better-informed market for skills in Wales and to achieve a better balance between the skills needed and the skills available. It is clear that better informed participants in the market are likely to make better informed choices, leading to better outcomes for everyone.

The Audit adds value in this context by drawing new and existing evidence together into a comprehensive and easily-accessible synthesis and by leveraging the extensive programme of research and labour market intelligence that is already available in Wales. It takes an over-arching and longer-term perspective.

As we noted in the England Audit, it is not possible or desirable to plan precisely the ‘numbers’ of skills or jobs that we need now and in the future in particular localities, estimating demand, supply and mismatch and then structuring provision precisely to meet these needs. The labour market is too complex and dynamic and the means of adaptation of supply too slow.

Instead, the Audit is intended to provide evidence to aid decision making by individuals (particularly prospective learners), employers, education and training providers and providers of careers and skills advice. With appropriate interpretation for each of these audiences, the Audit should help:

- **Individuals** to make appropriate, well-informed choices about future learning and career opportunities;
- **Careers advisers** to support individuals in making these choices
- **Education and training providers** to assess provision and to shape skill strategies that reflect the needs of the labour market
- **Employers** to work within their representative bodies to raise demand, support strategic decision-making within businesses and promote the implementation of a system that reflects need; and
- **Policy-makers** to consider policy priorities and resource allocation in the context of a strategic overview of jobs and skills in Wales.

We can also go further than this too. While we cannot plan provision or individual / employer behaviour, we can encourage, stimulate and ‘nudge’ it, especially when intelligence is supplemented with other policy levers providing financial and/or behavioural incentives.

Skills for jobs matter

To maximise economic performance, and to generate business success and real opportunity for individuals we need to ensure that we supply “economically valuable” skills, skills which effectively meet the changing needs and requirements of the labour market. The supply of

skills must be in alignment with demand in terms of both volume and composition. Without this we risk: the existence of structural mismatches in the labour market which could come in the form of skill shortages, structural unemployment, skill gaps, underemployment, and an over-dependence on migrant workers rather than the indigenous workforce to meet the needs of the labour market. There are clear implications for economic performance and individual opportunity arising out of such a state of affairs.

Greater attention needs to be given to the issue of skill demand

The Audit draws attention to the variation in the nature and scale of different skills mismatches i.e. imbalances between the supply of skills and the skills that are demanded for specific jobs. To address these mismatches, responses are required both on the demand and supply side. Skill shortages (recruitment difficulties arising out of a lack of available skills in the labour market), require action on the supply side as do skill gaps which indicate deficiencies in skills in the internal labour market of employers. In addition, unemployed people may need to be skilled or re-skilled to meet the needs of the labour market if they are to re-enter employment.

Underemployment, however, requires a response on the demand as well as the supply side. On the one hand it can best be tackled by more companies moving up the value chain, into higher value added products and services and by employing a knowledge-intensive work organisation as a means to deploy their more highly skilled workers more effectively. An effective response, however, also requires individuals to pursue skills and qualifications that employers really do need.

Skill utilisation is key to performance

An appropriate supply of skills and effective learner choice are necessary requirements for addressing skills deficits but are not in themselves sufficient. If skills needs that are internal to organisations are to be addressed (i.e. skills gaps and underemployment, which account for a substantial proportion of total deficits) and firm performance raised then attention needs to be turned to how skills are utilised in the workplace. The implementation of high performance working (HPW) practices which seek to improve the management of organisations, and their staff, is critical in this regard.

Migrant workers raise key issues for policy-makers

The presence of non-UK migrants in the Welsh workforce has a range of implications for the labour market and skills: it can mask latent mismatches between employer demand and the supply of skills from the indigenous population and it can affect training investment as employers make ready-skilled migrants their preferred source of labour rather than training new entrants or existing workers. In addition, much migration is 'low skilled' and may act as a deterrent to employers to 'raise their game' and move to more highly skilled operations. A key point for policy is that indigenous workers have a better chance of competing with migrants for jobs when they can take advantage of improved sign-posting through advice and guidance and when they then have ready access to education and training in the skills that employers require.

Action on skills needs to take account of differing needs within sectors

A clear message from this Audit, based on the evidence of skills assessments produced by Sector Skills Councils and studies of emerging sectors is that particular sectors have specific skills priorities. Sectoral needs are driven by specific combinations of drivers of demand which impact on businesses, jobs and skills. These differences need to be acknowledged when forming policy action. On the other hand there is also clear evidence of the importance of "cross-cutting" skills needs which are pervasive across sectors.

High level skills and jobs will be critical to the Welsh economy

The Audit highlights the increasing importance of higher skills and jobs to the economy. There is a significant demand for highly skilled workers in the labour market, with the largest number of people collectively employed as managers, professionals, associate professionals and in technical roles, with associated requirements for higher level skills. Although this part of the workforce is still under-represented in Wales relative to the UK, it has grown more rapidly in Wales in recent years than at a UK level. The importance of these roles is anticipated to increase in future with the effects of drivers of change such as globalisation, on-going technological developments and continued growing sophistication in consumer demand.

Ensuring that high skilled workers hold the economically-valuable skills that will be needed in the labour market of the future presents a major challenge. The evidence of this Audit indicates that there are significant mismatches between the supply and demand of higher level skills, some of which have the potential to intensify over time. The decline in the number of young people entering the labour market in future years also means that we will increasingly be dependent on up skilling older workers already in the labour market to meet high level skills needs, and this raises issues about modes of provision, as well as the nature of provision.

Demand side issues also appear to be of a significant magnitude. Despite the recent growth in high skilled jobs, there are indications that the UK (and probably Wales) has recently experienced a relatively slow rate of high skilled job creation, and certainly one which is well below the overall growth in the supply of high skilled people. There is evidence of underemployment in the workforce, in terms of "over-qualification" in a formal sense, together with "under-utilisation" of skills. This raises questions about the relevance of

supply, and whether employers are fully optimising their employees' skills, as well as the adequacy of job matching in the labour market.

Jobs requiring intermediate level skills will continue to be important

There are also strategic skills issues at intermediate skills levels. This is particularly significant since Wales has a disproportionately large concentration of employment in intermediate roles compared with the UK and this is projected to continue.

The Audit highlights the growing importance of technicians, driven by growing technological complexity and development of global value chains, within emerging sectors as well as existing sectors. This means there is a requirement for vocational knowledge and workers with the ability to apply an in-depth understanding of a particular technical field in a practical setting. It is expected that this will be addressed by a combination of new entrants and the up-skilling of existing workers to meet the needs of evolving roles.

On the supply side, as with the UK, there has been little change in the proportion of the workforce qualified at intermediate levels (level 3). These developments call for a growing emphasis on strengthening the intermediate vocational career pathways (from level 3) to ensure that the skill requirements for these jobs can be met and people can progress into these areas.

In addition although intermediate jobs in more traditional areas (in for example skilled trades) are forecast to decline, many of these areas comprise a largely ageing workforce, and when replacement demand is taken into account, combined with issues about the adequacy of supply, this highlights significant pressing skills supply needs. High densities of current skills shortages occur in many of these areas, and have persisted for some time, although there has been some moderation due to the recession. Moreover, skilled trades are expected to be a key part of the skills mix within emerging sectors, such as advanced manufacturing.

Generic, employability and basic skills matter

So-called generic or "employability" skills, such as customer-handling, problem-solving and team-working, are pervasive across the economy and current and future requirements in this area are critical to future competitiveness and productivity. Indeed, the incidence of current deficits relating to some generic skills is higher than for role-specific technical and practical skills in the some sectors in Wales.

In fact, evidence is increasingly emphasising the importance of 'T-shaped' skillsets where technical aspects to jobs, requiring detailed knowledge and skills, are supplemented with more generic skills, which enable individuals to work more effectively with their colleagues and/or customers and apply their technical expertise in practice, often in commercial settings. Analysis of the 2005 Skills Survey (Future Skills Wales, 2005) provides evidence that employers perceive that workers lack a range of technical and practical skills in combination with generic skills.

Management skills are also a critical area of generic skill need. High quality management skills are critical to the co-ordination of processes of strategic change, the effective application of technology within businesses and the optimal deployment of staff capabilities.

Low skilled jobs are expected to persist

Despite the continued growth of highly skilled work within Wales' labour market, and a substantial decline in recent years in routine jobs, particularly at operative level, it is expected that significant employment will remain in areas that have traditionally demanded low skills. *Working Futures* projections suggest that this could be in the region of about a fifth of all jobs. The proportion is likely to be much higher in substantially growing sectors such as retail and hospitality and care of the young and elderly; in these sectors low-skilled jobs are expected to be a major source of job creation. Many such jobs experience high labour turnover, requiring constant skills replenishment and in some cases require up-skilling to meet heightened customer expectations and to meet product/service quality demands. Improving the quality of such jobs is important, not only to ensure an improved standard of goods/services but also because it is still expected that this area will be a key source of employment. These jobs are likely to be particularly important for particular segments of the labour market, including those seeking to move out of unemployment and progress through the labour market and people looking to work part-time.

7.5. Future research priorities

In order to develop further our understanding of skills needs in Wales, the UK Commission proposes to:

- Support the development and implementation of an UK-wide skills survey to provide robust, consistent and timely data on employer skills requirements at national level
- Work with Welsh Government to enhance our assessment of the skills needs of the priority sectors identified in Economic Renewal
- Consider approaches to assessing the varying pattern of skills needs at sub-national level
- Incorporate in to a future Audit the results of an updated set of Working Futures projections which take account of the impact of the recession and structural change on the labour market and skills
- Consider how best to deepen our understanding of the different dimensions of the key issue of underemployment
- Enhance the skills assessment analysis with regard to gender-related issues.

8. Appendix 1: Analysis of Future Skills Wales 2005: Sector Skills Survey

8.1. Introduction

In the following appendix we set out an analysis of the key findings from the Future Skills Wales 2005 sector skills survey. This is intended to provide detailed context to our analysis of skills deficits contained in chapter 3.

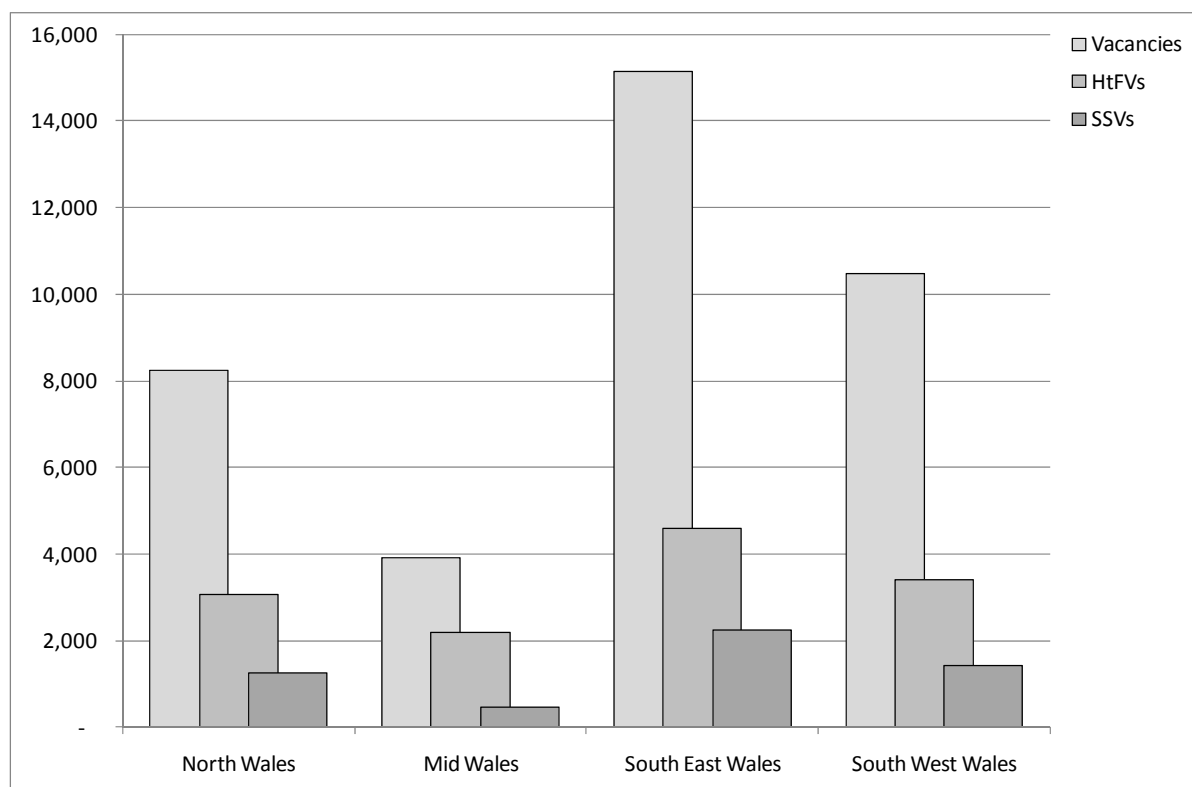
8.2. Skill shortages

First of all we examine the various dimensions of skills shortages in Wales.

8.2.1. The regional picture

The regional picture of skill shortages in Wales is shown in Figure 8.1.

Figure 8.1: Number and distribution of vacancies, hard-to-fill vacancies and skills shortage vacancies in Wales by region



Base: All vacancies

Source: *Future Skills Wales 2005: Sector Skills Survey*

	North Wales	Mid Wales	South East Wales	South West Wales
	%	%	%	%
Share of all employment	21	7	52	20
Share of all vacancies	22	10	40	28
Share of all HtFVs	23	17	35	26
Share of all SSVs	23	9	42	26
Unweighted base vacancies	1,073	452	1,877	1,360
Weighted base vacancies	8,231	3,916	15,139	10,482
Unweighted base vacancies (employers with vacancies)	1,133	499	2,198	1,204

Source: *Future Skills Wales 2005: Sector Skills Survey*

Relative to the employment base hard-to-fill vacancies are disproportionately concentrated in Mid Wales and, to a lesser extent, South West Wales. The distribution of SSVs is broadly reflective of the employment base but there is some over-representation in South West Wales and under-representation in South East Wales.

8.2.2. The occupational picture

The highest proportions of skills shortages are found in the skilled trades and associate professional occupational groups and these are also the areas which display the highest density of shortages relative to the numbers employed in the occupation. Skills shortages account for less than 0.5 per cent of employment in all of the remaining occupations, with the exception of personal services. Managers, administrative / secretarial and elementary occupations have the smallest proportions of SSVs.

Table 8.1: SSVs and SSV density by occupation

	SSVs	SSVs per 1,000 employees
<i>Unweighted base</i>	384	
All Wales	5,400	5.0
Managers and senior officials	250	1.8
Professionals	450	3.0
Associate professionals	1,250	16.7
Administrative and secretarial	225	1.9
Skilled trades	1,400	15.3
Personal service	500	5.4
Sales and customer service	425	2.8
Machine operatives	575	4.3
Elementary occupations	350	2.6

Note: Weighted figures rounded to the nearest 25

Base: SSV vacancies

Source: *Future Skills Wales 2005: Sector Skills Survey*

8.2.3. The sectoral picture

Table 8.2 shows patterns of SSVs across sectors and the critical 'skill density' measure of skill shortages. The table shows that the largest volumes of skill shortages are in business

services, retail and wholesale, other services¹⁵ and construction. Indeed, more than half of SSVs occur in these four sectors. The greatest density of skill shortages (ratio of SSVs to employment) is to be found in construction, financial intermediation and other services.

Table 8.2: SSVs and SSV density by sector

	SSVs	SSVs per 1,000 employees
<i>Unweighted base</i>	384	
All Wales	5,400	5.0
Agriculture	25	1.8
Production	475	2.8
Construction	575	14.8
Retail and wholesale	825	4.8
Hotels and catering	575	8.3
Transport, storage and communications	350	7.0
Financial intermediation	300	10.4
Business services	1,025	8.3
Public administration and defence	25	1.4
Education	175	1.2
Health and social care	375	2.3
Other services	650	10.3

Note: Weighted figures rounded to the nearest 25

	highest levels of SSVs by sector
	highest sectoral levels of 'skill density' vacancies

Base: All SSVs

Source: *Future Skills Wales 2005: Sector Skills Survey*

Further analysis of the Future Skills Wales Survey is possible, in terms of occupation by industry, although the data is not sufficiently robust to be presented in full. As we have seen the associate professional occupational group accounts for the greatest number of skill shortages overall and this is also the largest group for business services, other services and financial intermediation. Business and public service associate professionals are key for business services and financial intermediation, while culture, media, sports occupations are central for other services.

More than half of skill shortages affecting high level professional occupations are found in the business services sector, mainly in the form of shortages of business and public service professionals.

Skilled trades are the second overall largest source of skill shortages in occupational terms and the most important source of shortages for both manufacturing and construction. There are also significant numbers of skilled trade shortages in hotels / catering (chefs) and wholesale / retail distribution (motor mechanics, bakers, butchers etc).

Skill shortages in the personal service occupational group are chiefly concentrated in the other service sector, mainly in the form of leisure and other personal service occupations.

¹⁵ This is a diverse sector that covers household waste treatment, the broadcast media and sports and entertainment activities.

The largest concentration of skill shortages relating to sales occupations is the retail and wholesale sector.

8.3. Skills gaps

We now turn to the existence of skill gaps within the existing employed workforce. Skill gaps arise where employees are seen to be not fully proficient in their job.

8.3.1. The national picture

It should be noted that although we have data from Welsh Government's 2010 survey of employers (Cutts *et al*, 2010) relating to the incidence of skills gaps across Welsh workplaces, detailed and comprehensive data relating to this topic is only available from the 2005 Future Skills Wales survey.

According to the 2010 survey, 28 per cent of establishments report experiencing a skills gap of some kind in their existing workforce. This represents a significant increase of eight percentage points over the level recorded in 2005.

The distribution of skills gaps by size of establishment and occupational group, based on 2005 data, is set out in Table 8.3 and Table 8.4.

The proportion of workers reported as exhibiting skill gaps is six per cent, or around 64,000. The existence of skill gaps is more likely to be reported in larger establishments, though even amongst smaller ones (say, employing less than 25 people), the number of skill gaps still amounts, in total volume, to much more than that in the largest establishments.

Table 8.3: Incidence, number and density of skill gaps by size of establishment

	% of establishments with any skill gaps	Number of employees not fully proficient (i.e. number of skill gaps)	% of staff reported as having skill gaps	Share of employment	Share of all skill gaps
Overall	20%	63,800	6%	100%	100%
<i>Size:</i>					
Fewer than 5	16%	2,800	4%	7%	5%
5 to 24	22%	18,400	6%	29%	31%
25 to 99	23%	18,500	6%	29%	31%
100 to 199	28%	8,800	7%	14%	15%
200 to 499	28%	5,300	4%	14%	9%
500+	37%	5,700	8%	7%	10%

Base: First two columns all establishments, remainder all employment

Note: The number of employees not fully proficient has been rounded to the nearest 100

Source: *Future Skills Wales 2005: Sector Skills Survey*

8.3.2. The occupational picture

As Table 8.4 and Table 8.5 show, the largest proportions of skills gaps are found among sales, machine operative and elementary workers.

Table 8.4: Distribution of skills gaps by occupation

Number of skill gaps	63,800
	%
Managers	8%
Professional	7%
Associate professional	5%
Administrative	9%
Skilled trades	10%
Personal services	9%
Sales	24%
Machine operatives	17%
Elementary	12%

Source: *Future Skills Wales 2005: Sector Skills Survey*

Table 8.5: Distribution of skill gaps by occupation by size

Row percentages	Number of skills gaps (000)	Managers	Professional	Associate professional	Administrative	Skilled trades	Personal services	Sales	Machine operatives	Elementary
Fewer than 5	2,800	20%	6%	4%	20%	16%	3%	22%	2%	7%
5 to 24	18,400	8%	5%	7%	11%	9%	6%	33%	6%	14%
25 to 99	18,500	6%	6%	6%	5%	10%	16%	27%	9%	16%
100 to 199	8,800	6%	14%	2%	8%	8%	8%	12%	33%	11%
200 to 499	5,300	9%	5%	7%	11%	14%	0%	15%	37%	2%
500+	5,700	8%	1%	2%	18%	5%	0%	14%	50%	3%

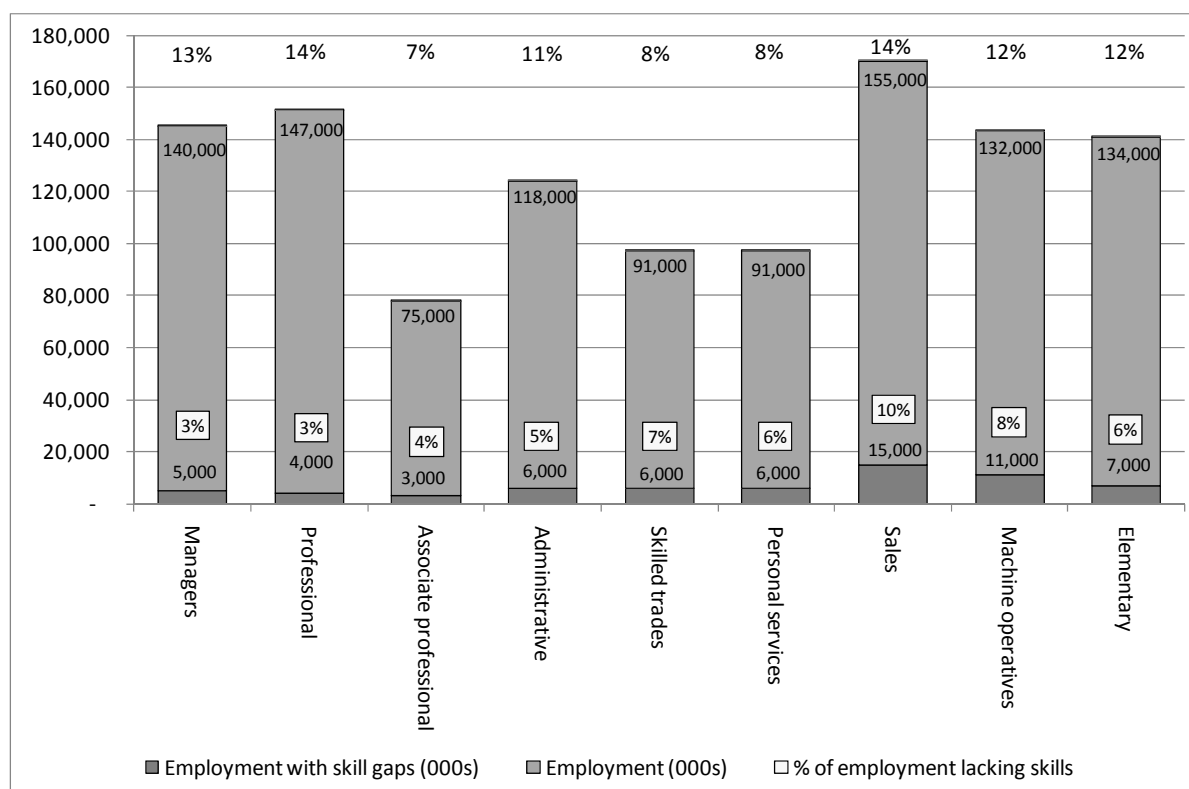
Note: The number of employees not fully proficient has been rounded to the nearest 100

Source: *Future Skills Wales 2005: Sector Skills Survey*

Managerial skill gaps are most prevalent in smaller (under five employees) workplaces, although it should be noted that most staff in these organisations occupy management roles. On the other hand machine operative skill gaps are most prevalent among larger businesses, reflecting the presence of manufacturing firms among this part of the business population.

Figure 8.2 shows that workers doing sales or machine operative roles are more likely to have skill gaps.

Figure 8.2: Distribution of skill gaps by occupation



Source: Future Skills Wales 2005: Sector Skills Survey

8.3.3. The sectoral picture

Analysing skill gaps by sectors provides the results shown in Table 8.6.

Table 8.6: Incidence and number of skill gaps by broad SIC sector

	% of establishments with any skill gaps	Number of employees not fully proficient (i.e. number of skill gaps)	% of staff reported as having skill gaps	Share of employment	Share of all skill gaps
	%		%	%	%
Overall	20%	63,800	6%	100%	100%
Agriculture	11%	200	3%	1%	0%
Production	28%	13,900	8%	16%	22%
Construction	24%	2,900	7%	4%	5%
Retail and wholesale	19%	13,200	8%	17%	21%
Hotels and catering	19%	6,300	9%	7%	10%
Transport, storage and communications	15%	2,200	5%	5%	3%
Financial intermediation	27%	3,800	13%	3%	6%
Business services	19%	5,700	5%	12%	9%
Public administration and defence	9%	500	2%	2%	1%
Education	19%	4,200	3%	14%	7%
Health and social care	21%	6,800	4%	15%	11%
Other services	22%	3,700	6%	6%	6%

Base: First column all establishments, remainder all employment

Note: The number of employees not fully proficient has been rounded to the nearest 100

■ Sectors with high or above average indicators of skill gaps



Source: *Future Skills Wales 2005: Sector Skills Survey*

The sectors with the largest shares of skill gaps are production, retail and wholesale, health and social care and hotels/catering, which, together with financial intermediation, also have higher than average proportions of staff with skill gaps. Overall, production, retail and wholesale, hotels/catering and financial services have higher shares of skill gaps than their share of employment. At least 20 per cent of employers in manufacturing, financial intermediation, construction, health/social care and other services have skill gaps. Density of skill gaps among staff groups is lower than average in public administration/defence, education, and health and social care.

The types of skill gaps within sectors also vary as shown in Table 8.7.

Table 8.7: Nature of skill gaps by broad sector

	Problem solving skills	Customer handling skills	Other technical and practical skills	Communication skills	Team working skills	Management skills	General IT user skills	Using numbers	Literacy skills	Welsh language skills
Overall	58%	57%	52%	49%	49%	40%	40%	25%	23%	23%
Agriculture	27%	24%	42%	31%	17%	24%	44%	15%	24%	44%
Production	55%	42%	76%	54%	54%	48%	42%	28%	25%	18%
Construction	63%	38%	56%	42%	39%	24%	30%	25%	31%	18%
Retail and wholesale	61%	67%	49%	53%	51%	43%	38%	27%	24%	20%
Hotels and catering	64%	78%	32%	47%	62%	45%	14%	36%	25%	29%
Transport, storage and communications	60%	53%	44%	56%	47%	28%	35%	26%	19%	23%
Financial intermediation	60%	55%	48%	51%	40%	29%	54%	12%	12%	18%
Business services	57%	51%	45%	41%	36%	48%	49%	17%	22%	25%
Public administration and defence	75%	79%	67%	89%	19%	15%	95%	14%	56%	75%
Education	53%	50%	48%	41%	54%	42%	49%	18%	26%	37%
Health and social care	54%	52%	58%	46%	46%	33%	50%	19%	29%	21%
Other services	54%	54%	66%	50%	55%	38%	41%	30%	13%	22%

-  skill gaps reported by at least 60% of employers
 skill gaps reported by at least 40% of employers

Base: All skill gaps followed up

Source: *Future Skills Wales 2005: Sector Skills Survey*

Problem solving skill gaps are most common and found in almost 60 per cent of employers reporting skill gaps in all sectors. Particularly high levels were found in public administration, hotels and catering and construction.

Customer handling skills are almost as common and are particularly prevalent in hospitality, retail and wholesale but also public administration.

Job-specific technical and practical skill gaps are the third most common area and are particularly common among establishments in production, public administration and other services.

A need to improve Welsh language skills is highlighted by almost a quarter of establishments reporting skill gaps across all sectors; such gaps are particularly prevalent among employers in public administration, education and hospitality.

Sectors experiencing the highest incidence of skill gaps across the broadest range of skills include public administration and defence, hotels and catering and retail and wholesale.

Because the presence of skill gaps within occupations within sectors understandably reflects the distribution of those occupations between sectors, it is therefore important to identify sectors with higher or lower than average shares of workers with skill gaps relative to the proportions employed in particular occupations. The results of this analysis are shown in Table 8.8.

Table 8.8: Broad sectors with a disproportionately high or low proportion of occupational skill gaps compared with employment

	Disproportionately HIGH share of employees with gaps relative to employment	Disproportionately LOW share of employees with gaps relative to employment
Managers		<ul style="list-style-type: none"> Public administration 4% vs. 16% Construction 5% vs. 13% Hotels and catering 8% vs. 17%
Professionals	<ul style="list-style-type: none"> Public administration 79% vs. 29% 	<ul style="list-style-type: none"> Financial intermediation 2% vs. 7% Health and social care 4% vs. 13%
Associate professional	<ul style="list-style-type: none"> Education 6% vs. 4% 	<ul style="list-style-type: none"> Public administration >1% vs. 16%
Administrative and secretarial	<ul style="list-style-type: none"> Business services 21% vs. 17% 	<ul style="list-style-type: none"> Construction 3% vs. 9%
Skilled trades	<ul style="list-style-type: none"> Construction 66% vs. 44% Transport, storage and communications 12% vs. 7% 	<ul style="list-style-type: none"> Health and social care 1% vs. 3% Hotels and catering 4% vs. 8%
Personal services	<ul style="list-style-type: none"> Education 17% vs. 11% Health and social care 58% vs. 37% 	
Sales and customer service	<ul style="list-style-type: none"> Retail and wholesale 65% vs. 52% Transport, storage and communications 23% vs. 9% Construction 10% vs. 3% Other services 16% vs. 8% 	
Machine operatives	<ul style="list-style-type: none"> Manufacturing 66% vs. 44% 	<ul style="list-style-type: none"> Construction 7% vs. 10%
Elementary		<ul style="list-style-type: none"> Manufacturing 5% vs. 9%

Source: *Future Skills Wales 2005: Sector Skills Survey*

The most common occupations with high shares of skill gaps relative to employment are sales/customer services which are problematic in three sectors. In contrast, low shares of managerial employees with skill gaps are found in three sectors.

8.4. The types of skills causing SSVs and skill gaps

The major types of skills reported, which account for SSVs and skill gaps fall into two main categories shown in Table 8.9 and Table 8.10. These are technical/practical skills for around half of SSVs and skill gaps, together with a range of generic skills.

Concerns about customer-handling, communication skills, problem-solving and team working are each reported in at least one-third of SSVs, while concerns about these same generic areas are each flagged in respect of more than 50 per cent of skill gaps.

Deficiencies of basic skills (literacy and numeracy) are also significant in terms of both gaps and shortages and are particularly important for skills gaps reported in respect of operative roles.

Table 8.10 shows that the types of skills needed among staff with skill gaps are, unsurprisingly, typically associated with occupational categories; for example management skills shortages are most commonly found in management occupations and administrative staff are more likely to lack administrative skills such as IT user skills. Gaps relating to technical / practical skills are most prevalent among associate professional, skilled trades and operative occupations.

Table 8.9: Causes of skill shortage vacancies

Causes of skill-shortage vacancies	
Other technical and practical skills	52%
Customer handling skills	44%
Communication skills	43%
Problem solving skills	41%
Team working skills	37%
Literacy skills	30%
Management skills	27%
Using numbers	25%
IT professional skills	17%
General IT user skills	15%
Welsh language skills	13%
Weighted base (all establishments with ss vacancies)	2,974
Unweighted base (all establishments with ss vacancies)	335

Source: *Future Skills Wales 2005: Sector Skills Survey*

Table 8.10: Skill gaps: skills lacking overall and by occupation

	Overall	Managers	Professional	Associate professional	Administrative	Skilled trades	Personal services	Sales	Operatives	Elementary
<i>Unweighted base</i>	1,997									
<i>Weighted base</i>	53,101									
	%	%	%	%	%	%	%	%	%	%
Team working skills	56	46	25	55	38	52	57	61	73	67
Problem solving skills	56	45	67	54	47	49	53	63	62	51
Communication skills	54	46	35	50	60	43	61	65	50	53
Customer handling skills	53	42	33	46	66	32	59	83	12	65
Other technical and practical skills	47	43	45	61	26	64	52	37	64	43
General IT user skills	31	36	40	45	50	24	37	26	29	17
Management skills	31	72	43	29	24	24	34	31	21	22
Using numbers	28	22	9	31	15	19	31	31	44	29
Literacy skills	26	15	8	19	17	28	42	22	50	20
Welsh language skills	20	30	27	35	26	9	24	20	11	14
IT professional skills	17	29	31	44	30	10	19	13	7	10

Base: All skill gaps followed up

Note: Column percentages exceed 100% because of multiple responses

Source: *Future Skills Wales 2005: Sector Skills Survey*

8.4.1. Skill gaps: the regional picture

Table 8.11 shows that distribution of skill gaps across the regions is remarkably even – with the incidence and density of gaps almost identical across the four economic regions. The absolute number of employees with skills gaps is highest in South East Wales, reflecting its size.

Table 8.11: Incidence and number of skill gaps by region

	% of establishments with any skill gaps	Number of employees not fully proficient (i.e. number of skill gaps)	% of staff reported as having skill gaps	Share of employment	Share of all skill gaps
Overall	20%	63,800	6%	100%	100%
North Wales	20%	13,300	6%	21%	21%
Mid Wales	19%	4,600	6%	7%	7%
South East Wales	20%	34,000	6%	52%	53%
South West Wales	19%	12,000	5%	20%	19%

Base: first two columns all establishments, remainder all employment

Note: The number of employees not fully proficient has been rounded to the nearest 100

Source: *Future Skills Wales 2005: Sector Skills Survey*

What are the skills that are lacking amongst those not considered to be fully proficient in their jobs and, in particular, does this vary significantly across the regions? Table 8.12 looks at the nature of skill gaps by region.

Table 8.12: The nature of skill gaps by region

Column percentages	All	North Wales	Mid Wales	South East Wales	South West Wales
<i>Unweighted base</i>	1,997	461	194	902	440
<i>Weighted base</i>	53,101	10,019	3,806	28,349	10,928
	%	%	%	%	%
Team working skills	56%	53%	56%	60%	50%
Problem solving skills	56%	58%	46%	55%	59%
Communication skills	54%	55%	46%	57%	49%
Customer handling skills	53%	49%	48%	54%	58%
Other technical and practical skills	47%	44%	45%	50%	41%
General IT user skills	31%	40%	32%	31%	22%
Management skills	31%	36%	40%	32%	21%
Using numbers	28%	30%	26%	28%	25%
Literacy skills	26%	28%	16%	25%	31%
Welsh language skills	20%	32%	31%	15%	16%
IT professional skills	17%	23%	16%	17%	12%

■ Highest incidence of each skill gap by region

Base: All skill gaps followed up

Note: Column percentages exceed 100% because of multiple responses

Source: *Future Skills Wales 2005: Sector Skills Survey*

Team working is the most frequently reported gap in Mid Wales and South East Wales, while problem solving is the most frequently cited in North Wales and South West Wales. The level of technical/practical skill gaps is highest in South East Wales. Skill gaps related to management skills have the highest frequency in Mid Wales. Employer reports of Welsh language gaps are highest in North Wales and Mid Wales.

Further analysis of skill gaps at regional level by occupation is possible and is shown in Table 8.13.

Table 8.13: Distribution of skill gaps by occupation within region (and employment profile comparisons)

	Number of skill gaps (000s)		Managers	Professional	Associate professional	Administrative	Skilled trades	Personal services	Sales	Operatives	Elementary
Skill gaps (profile of employment)	63,800	%	8 (13)	7 (14)	5 (7)	9 (11)	10 (8)	9 (8)	24 (14)	17 (12)	12 (12)
North Wales	13,300	%	7 (13)	6 (11)	4 (7)	7 (9)	10 (9)	10 (8)	17 (15)	25 (14)	13 (13)
Mid Wales	4,600	%	16 (15)	4 (13)	5 (7)	10 (10)	7 (7)	5 (10)	26 (15)	10 (10)	18 (13)
South East Wales	34,000	%	7 (13)	6 (14)	5 (6)	11 (12)	10 (8)	9 (8)	25 (14)	19 (13)	10 (12)
South West Wales	12,000	%	6 (13)	12 (16)	7 (8)	8 (10)	9 (8)	10 (9)	29 (14)	9 (9)	12 (13)

■ share of skill gaps at least 2% above employment share for each occupation within region

■ share of skill gaps at least 4% below employment share for each occupation within region

Base: All skill gaps (in brackets: all employment)

Note: Percentages sum to 100% in each row (subject to rounding)

Source: *Future Skills Wales 2005: Sector Skills Survey*

The distribution of skill gaps by occupation is broadly similar across regions, with significant concentrations among sales and operative staff, in particular. Skill gaps in sales and elementary occupations are high across most regions compared to the proportions employed in those occupations, in contrast to low proportions of skill gaps among managers and professionals relative to their shares of employment. Other skill gaps are more spatially uneven with disproportionate shares among operative occupations in the North Wales and South East Wales and among elementary occupations in Mid Wales.

Some regions experience relatively low shares of occupational skill gaps compared to their share of employment in these jobs. These include management occupations in all regions except Mid Wales and professional occupations in all regions except South West Wales. Skills gaps in personal services are also under-represented relative to employment in Mid Wales.

9. Appendix 2: Disaggregating the measures of economic significance

In the main text we presented findings which ranked sectors in terms of economic significance based on an overall measure combining productivity and employment indicators. As we explained in the text, a sector's relative position in these rankings could be because of its performance in either employment or productivity, or indeed, in both.

Here we disaggregate these overall measures so that readers can identify a sector's ranking on productivity and employment separately, both in terms of current and future significance.

Current sectoral economic significance

Overall ranking		Productivity				Employment			
		Level, 2007		Change 2002-07		Level, 2007		Change 2002-07	
1	Financial services	1	Mining, quarrying and utilities	1	Financial services	1	Health and social care	1	Professional services
2	Business services	2	Financial services	2	Textiles & clothing	2	Retail	2	Business services
3	Health & social care	3	Chemicals	3	Machinery manufacture	3	Business services	3	Computing
4	Retail	4	Post & telecoms	4	Transport & storage	4	Education	4	Construction
5	Transport & storage	5	Machinery manufacture	5	Post & telecoms	5	Construction	5	Transport equipment
6	Post & telecoms	6	Transport & storage	6	Retail	6	Hotels & catering	6	Health & social care
7	Transport equipment	7	Transport equipment	7	Transport equipment	7	Other services	7	Education
8	Hotels & catering	8	Food & drink manufacture	8	Hotels & catering	8	Public administration	8	Wholesale distribution
9	Mining, quarrying and utilities	9	Metals & metal goods	9	Computing	9	Wholesale distribution	9	Retail
10	Public administration	10	Computing	10	Chemicals	10	Transport & storage	10	Other services
11	Chemicals	11	Wood, paper and publishing	11	Agriculture	11	Financial services	11	Hotels & catering
12	Construction	12	Professional services	12	Metals & metal goods	12	Professional services	12	Financial services
13	Computing	13	Public administration	13	Business services	13	Chemicals	13	Transport & storage
14	Machinery manufacture	14	Wholesale distribution	14	Other manufacturing	14	Metals & metal goods	14	Public administration
15	Other services	15	Other manufacturing	15	Public administration	15	Agriculture	15	Post & telecoms
16	Education	16	Agriculture	16	Health & social care	16	Machinery manufacture	16	Food & drink manufacture
17	Wholesale distribution	17	Education	17	Food & drink manufacture	17	Transport equipment	17	Agriculture
18	Professional services	18	Other services	18	Other services	18	Food & drink manufacture	18	Chemicals
19	Food & drink manufacture	19	Construction	19	Wholesale distribution	19	Wood, paper and publishing	19	Mining, quarrying and utilities
20	Agriculture	20	Health & social care	20	Construction	20	Post & telecoms	20	Metals & metal goods
21	Metals & metal goods	21	Business services	21	Mining, quarrying and utilities	21	Computing	21	Wood, paper and publishing
22	Textiles & clothing	22	Textiles & clothing	22	Education	22	Other manufacturing	22	Other manufacturing
23	Other manufacturing	23	Retail	23	Wood, paper and publishing	23	Mining, quarrying and utilities	23	Machinery manufacture
24	Wood, paper and publishing	24	Hotels & catering	24	Professional services	24	Textiles & clothing	24	Textiles & clothing

Future sectoral economic significance

Overall ranking		Productivity						Employment					
		Level, 2017		Change 2007-2012		Change 2012-2017		Level, 2017		Change 2007-2012		Change 2012-2017	
1	Computing	1	Mining, quarrying and utilities	1	Computing	1	Metals & metal goods	1	Health & social care	1	Professional services	1	Professional services
2	Health & social care	2	Financial services	2	Chemicals	2	Chemicals	2	Retail	2	Computing	2	Computing
3	Business services	3	Chemicals	3	Metals & metal goods	3	Mining, quarrying and utilities	3	Business services	3	Other services	3	Other services
4	Financial services	4	Post & telecoms	4	Post & telecoms	4	Computing	4	Education	4	Health & social care	4	Transport & storage
5	Post & telecoms	5	Machinery manufacture	5	Other manufacturing	5	Transport equipment	5	Construction	5	Construction	5	Health & social care
6	Chemicals	6	Transport & storage	6	Machinery manufacture	6	Business services	6	Other services	6	Hotels & catering	6	Hotels & catering
7	Retail	7	Transport equipment	7	Transport equipment	7	Textiles & clothing	7	Hotels & catering	7	Business services	7	Retail
8	Education	8	Food & drink manufacture	8	Textiles & clothing	8	Post & telecoms	8	Public administration	8	Financial services	8	Financial services
9	Wholesale distribution	9	Metals & metal goods	9	Business services	9	Machinery manufacture	9	Wholesale distribution	9	Transport & storage	9	Education
10	Mining, quarrying and utilities	10	Computing	10	Mining, quarrying and utilities	10	Other manufacturing	10	Transport & storage	10	Wholesale distribution	10	Wholesale distribution
11	Other services	11	Wood, paper and publishing	11	Financial services	11	Agriculture	11	Professional services	11	Food & drink manufacture	11	Business services
12	Transport & storage	12	Professional services	12	Agriculture	12	Financial services	12	Financial services	12	Education	12	Post & telecoms
13	Construction	13	Public administration	13	Public administration	13	Wholesale distribution	13	Chemicals	13	Retail	13	Food & drink manufacture
14	Public administration	14	Wholesale distribution	14	Retail	14	Public administration	14	Food & drink manufacture	14	Public administration	14	Construction
15	Machinery manufacture	15	Other manufacturing	15	Wood, paper and publishing	15	Retail	15	Agriculture	15	Post & telecoms	15	Public administration
16	Hotels & catering	16	Agriculture	16	Wholesale distribution	16	Health & social care	16	Machinery manufacture	16	Transport equipment	16	Wood, paper and publishing
17	Transport equipment	17	Education	17	Health & social care	17	Education	17	Transport equipment	17	Chemicals	17	Agriculture
18	Metals & metal goods	18	Other services	18	Education	18	Construction	18	Metals & metal goods	18	Agriculture	18	Chemicals
19	Food & drink manufacture	19	Construction	19	Transport & storage	19	Wood, paper and publishing	19	Post & telecoms	19	Wood, paper and publishing	19	Machinery manufacture
20	Other manufacturing	20	Health & social care	20	Construction	20	Food & drink manufacture	20	Wood, paper and publishing	20	Machinery manufacture	20	Other manufacturing
21	Agriculture	21	Business services	21	Hotels & catering	21	Hotels & catering	21	Computing	21	Mining, quarrying and utilities	21	Transport equipment
22	Wood, paper and publishing	22	Textiles & clothing	22	Food & drink manufacture	22	Transport & storage	22	Other manufacturing	22	Other manufacturing	22	Mining, quarrying and utilities
23	Professional services	23	Retail	23	Other services	23	Other services	23	Mining, quarrying and utilities	23	Metals & metal goods	23	Metals & metal goods
24	Textiles & clothing	24	Hotels & catering	24	Professional services	24	Professional services	24	Textiles & clothing	24	Textiles & clothing	24	Textiles & clothing

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