

Working Futures 2017-27: Report for Wales

**Document prepared for
the Welsh Government**

by

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Acronyms

CE	Cambridge Econometrics
CQFW	Credit and Qualifications Framework for Wales
ER	Economic Region
IER	Institute for Employment Research, University of Warwick
ONS	Office for National Statistics
RMDM	Regional Multi-sectoral Dynamic Model of the UK economy
RQF	Regulated Qualifications Framework
SIC	UK 2007 Standard Industrial Classification
SOC	UK 2010 Standard Occupational Classification

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Executive Summary

This report presents the *Working Futures* projections of employment for Wales and its Economic Regions, covering the period 2017 to 2027. Data on overall employment trends and employment by industry, occupation and highest educational qualification is provided in a set of tables and charts. A key focus of the report is to provide estimates of the total requirement for labour over the decade. The report also contrasts employment trends across the three Economic Regions of Wales.

The *Working Futures* projections are indicative of likely developments for the economy and the labour market over the projection period, and are not precise forecasts of what will inevitably happen. They should be regarded as a robust benchmark for debate and used in conjunction with a variety of other sources of labour market information in understanding emerging skills requirements. These projections were prepared before the emergence of Covid-19, which has had a major impact on economic and labour market prospects in the short term, both internationally as well as in the UK. It is anticipated that the macroeconomic and sectoral employment trends will be reassessed in the light of the pandemic in due course. The present results focus on longer term trends.

These projections provide the likely medium term outlook for employment in Wales, which is as follows:

- Total employment is projected to be 2.6 per cent larger in 2027 than 2017, an annual average rate of growth of 0.3 per cent. This is slightly slower than the rate of employment growth projected for the whole UK.
- The economy's requirement for labour over this period could be more than 11 times greater than the increase in employment, due to the need to replace workers leaving the workforce.
- Women are likely to account for the great majority of the net employment increase over the period 2017 to 2027. Female employment is projected to grow by 4.9 per cent (close to the UK average rate), but male employment growth is estimated to be slower than the UK average.
- Part-time employment accounts for the bulk of the employment increase, but male full-time employment is projected to contract.
- The number of self-employed is also projected to be smaller in 2027 than 2017.
- The relative shift of employment away from the manufacturing sector towards the service sector is projected to continue. Non-market services is projected to account for

nearly a third of jobs in 2027. Trade, accommodation and transport is expected to be the second largest sector throughout the decade, while employment in business and other services increases.

- The shift in the occupational profile of employment away from lower-skilled occupations towards higher-skilled occupations is projected to continue. The largest job losses are likely to be in administrative and secretarial occupations (mainly affecting women), skilled trades and process, plant and machine operatives (both of which affect men more than women).
- Employment is projected to expand in professional, associate professional, managerial and caring and leisure occupations. However, it is estimated that there will still be a substantial number of job opportunities in declining occupations, due to the need to replace workers leaving the labour market.
- The average level of highest educational qualification among those in employment in Wales increased between 2007 and 2017. This trend is projected to continue between 2017 and 2027. However, the trend towards higher level qualifications is expected to be slower than for the UK as a whole in Wales.
- The percentage of workers with lower level or no educational qualifications is projected to become very small. In contrast, the percentage with a higher education qualification is expected to increase fastest. In addition, the projections suggest replacement demand will be highest for those with higher education qualifications, and negative for those with the lower level or no qualifications.
- The local *Working Futures* projections suggest only small differences in expected rates of employment change between the three Economic Regions. It is anticipated that the regions will experience broadly the same pattern of change as Wales as a whole.
- North Wales is expected to gain employment slightly faster than the rest of Wales. The projections suggest that the share of manufacturing in total employment will remain largest in North Wales, with the share of the service sector continuing to be largest in South-East Wales.
- Thus, manual jobs are projected to be more common in North Wales, while South-East Wales is expected to gain employment fastest in non-manual occupations associated with the service sector. The shift in the educational profile of employment towards the more highly qualified is anticipated to be faster in South-East Wales than in the other Economic Regions.

Detailed information from the *Working Futures* 2017-27 projections is available in MS Excel workbooks for Wales and its Economic Regions. This includes projections for South East Wales, North Wales and South West & Mid Wales, as well as projections for South West Wales and Mid Wales separately.

1. Introduction

This report presents the *Working Futures* projections of employment for Wales covering the period 2017 to 2027. This is the seventh in a series of labour market projections undertaken by the Warwick Institute for Employment Research and Cambridge Econometrics. Projections for the UK and its constituent nations and Government Office Regions were sponsored by the Department for Education (for England). The Welsh Government has commissioned additional projections for the Economic Regions of Wales, which are summarised in this report.

Working Futures is unique as it is the only freely available set of employment projections available for the UK. It offers comprehensive coverage of the entire UK labour market, being derived from the full range of published official statistics. It provides an employment baseline by sector, occupation and local area, allowing an understanding not only of the likely broad changes in the labour market, but also the implications for the skills mix in each industry sector.

However, all projections are subject to uncertainty, and therefore the *Working Futures 2017-2027* projections should be regarded as indicative of likely developments for the economy and the labour market over the projection period, rather than being precise forecasts of what will inevitably happen. The results provide a robust benchmark for debate and are intended to be used in conjunction with a variety of other sources of labour market information.

Many of the trends presented are resilient and are not sensitive to modest unanticipated shocks, but the projections are being published in a period when two unprecedented 'shocks' with unknown ramifications are being experienced simultaneously. The projections incorporate assumptions about the impact of Brexit, but were prepared before the onset of the Covid-19 pandemic which emerged from China at the end of 2019. This has already had a major impact on economic and labour market prospects in the short term, and there is as yet no consensus over the magnitude and trajectory of the resulting economic recession. The social and economic "lockdowns" which have been introduced internationally, as well as in the UK specifically, have had a significant impact on economic activity levels across the economy, but especially in the service sector. At present the industries affected, the magnitude of the slowdown, its duration and whether the economic system will return to its previous form of organisation are all unknown.

The present projections set out the medium term outlook for employment patterns, focussing on occupations and qualifications and thus provide an indication of how the pattern of employment would evolve if the economy and society returns to normal. It is anticipated that the macroeconomic and sectoral employment trends will be reassessed in the light of the pandemic in due course. The present results focus on longer term trends, drawing on robust estimates of the complex long-term interrelationships between consumption and production.

The employment projections in *Working Futures 2017-2027* provide a comprehensive and detailed picture of the UK labour market, drawing upon the best available data on demographics, education and employment and a detailed and proven macroeconomic model. These projections indicated UK GDP growth of around 1.1 per cent per annum, and an increase of nearly 1 million in the number of jobs over the decade.

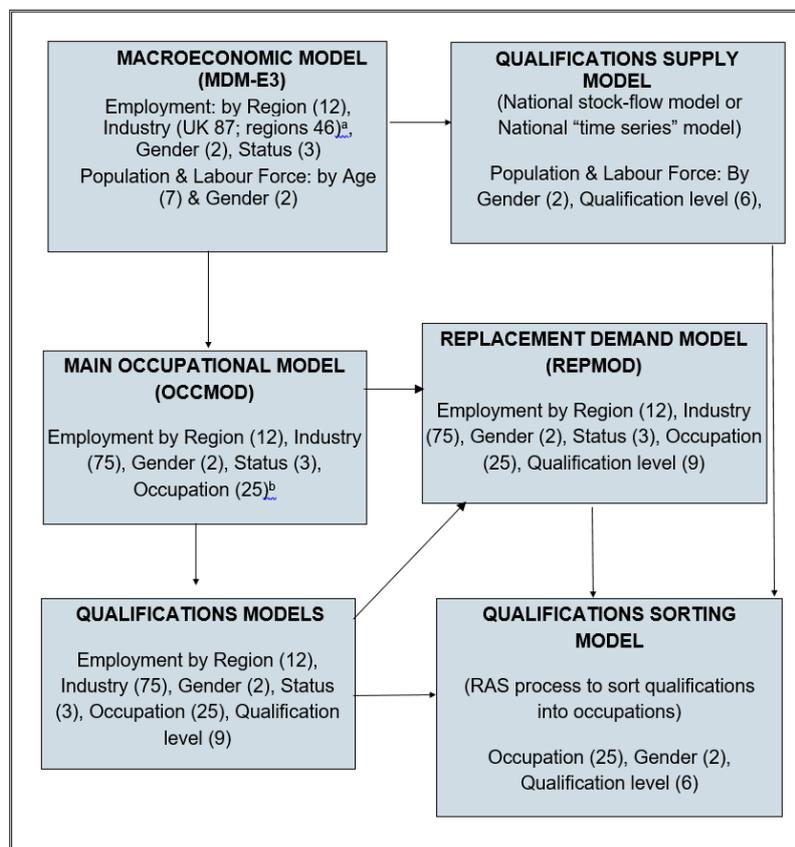
For the UK as a whole, slower population growth in an ageing population leads to a reduction in the projected rate of increase in labour supply over this period. However, increasing labour market participation rates and the increase in the pension age for women means that the growth in the labour force is likely to be faster for women than men. Ageing of the workforce also means that the total requirement for labour will be vastly greater than the change in total employment, due to the need to replace older people leaving the workforce (even in industries and occupations in which the demand for labour is projected to decline). The number of people in self-employment is projected to fall slightly. The shift towards service sector industries and away from lesser skilled towards more highly skilled occupations is anticipated to continue. The supply of highly qualified individuals is projected to be greater than employer's demand for them.

The published UK reports from *Working Futures* also present summary information from the projections for Wales. This report explores these projections in much more detail, focussing on employment. A series of chapters show how employment is expected to change by gender and labour market status, going on to consider the changing industrial pattern of employment, occupational change and the changing profile of employment by highest educational qualification. Using the projections for Economic Regions, the report also considers geographical variations in employment trends within Wales.

2. Methodology

The prime focus of *Working Futures* is to develop quantitative projections of the skill needs of the economy, as measured by the changing occupational and qualification profile of employment. The foundation for these projections is the well-established multi-sectoral macroeconomic model of the UK economy (RMDM) developed by Cambridge Econometrics (CE) and detailed occupational and qualification forecasting modules developed by the Institute for Employment Research (IER) at Warwick University. Figure 2.1 demonstrates how the various models which together create the *Working Futures 2017-2027* projections are inter-related and the level of detail which the models generate.

Figure 2.1: The Working Futures 2017-2027 modelling framework



Best practice worldwide suggests that labour market projections should be firmly grounded on an understanding of how the economy as a whole is changing. Changes in employment structure are intimately tied up with the development of the economy more generally. This has been operationalised in the form of the regional Multi-sectoral Dynamic Model of the UK economy (RMDM) by Cambridge Econometrics (CE). This has a Keynesian structure and

comprises over 5,000 behavioural and technical relationships. Its main components are equations explaining consumption, investment, employment, exports, imports, and prices. At its heart is an input-output matrix, which deals with the flows of goods and services between industries and determines total industrial outputs. The model generates estimates of output, productivity and employment for all the main industrial sectors in the UK and its nations and regions. In the model, key drivers (investment, productivity, prices, technical change, competitiveness, imports and exports) are modelled separately for each industry and nation / region and scaled to sum to UK totals. RMDM is able to capture the impact on productivity of the changing structure of the economy and the impact of new technologies and changes in organisational and individual behaviour, as well as major economic “shocks”. Employment is treated as the demand for labour, derived from the national / regional demand for goods and services.

The *Working Futures 2017-2027* macro forecasts take a fairly cautious view of the impact of Brexit, making the assumption that there will be a transition deal negotiated with the EU, and that there is not a disorderly Brexit. As noted in the introduction, the projections were constructed before the emergence of Covid-19. The macroeconomic and sectoral forecasts thus make no attempt to reflect the effects of the virus and the measures taken to deal with it on the economy and labour market in the short to medium term.

Estimates of occupational employment are generated by econometric models created by the IER based on research about the factors expected to influence occupational structure at the sectoral level. The IER also models the supply and demand of labour by highest level of educational qualification and makes estimates of the “replacement” demand for labour over the projection period resulting from workers leaving employment due to retirement and job mobility. While replacement demand is an important concept for understanding the full picture of labour demand, the data necessary to fully operationalise the concept is not available. Therefore, it does not include estimates of occupational and geographical mobility of workers. While the replacement demand estimates measure the need to replace those retiring, these are based on the age structure of the UK workforce, rather than population data for the nations and regions of the UK and the local areas for which projections are prepared. It should be noted that all employment estimates are of the number of jobs, rather than a headcount of individuals.

Local projections were commissioned for the three Economic Regions of Wales (North Wales, Mid & South-West Wales and South-East Wales along with projections for Mid Wales and South West Wales separately) by the Welsh Government. These provide a quantitative benchmark of labour market trends based on the same macroeconomic scenario and assumptions as for the national/regional projections. They do not incorporate any specific local knowledge or insight and are intended as a starting point for further analysis.

The *Working Futures 2017-2027* projections are based on a set of explicit assumptions about some of the key economic, technological and social trends. They broadly assume that past patterns of behaviour and performance will continue into the future, and that there will be a negotiated Brexit settlement. In addition, as noted above, the projections were prepared prior to Covid-19 outbreak. A key advantage of the *Working Futures* projections is that they provide a common and consistent economy wide overview of skill needs, allowing detailed comparisons across sectors. The projections should not be interpreted as providing a precise numerical picture of future employment, but rather they set out the implications of the assumptions outlined above. Users of the projections are therefore advised to focus on changes in patterns of employment for industries and occupations.

3. Headline employment projections for Wales

Employment in Wales is projected to grow slowly – by 2.6 per cent - over the decade 2017 to 2027, with the annual average rate of growth being 0.3 per cent (Table 3.1). The rate of employment growth in the UK as a whole over the decade is projected to be only slightly faster, at 2.8 percent. Wales is projected to experience slower employment growth than England, but faster growth than Northern Ireland. Scotland stands out with a higher rate of employment growth than the other UK nations (3.3 per cent).

Table 3.1: Projected employment change 2017-2027

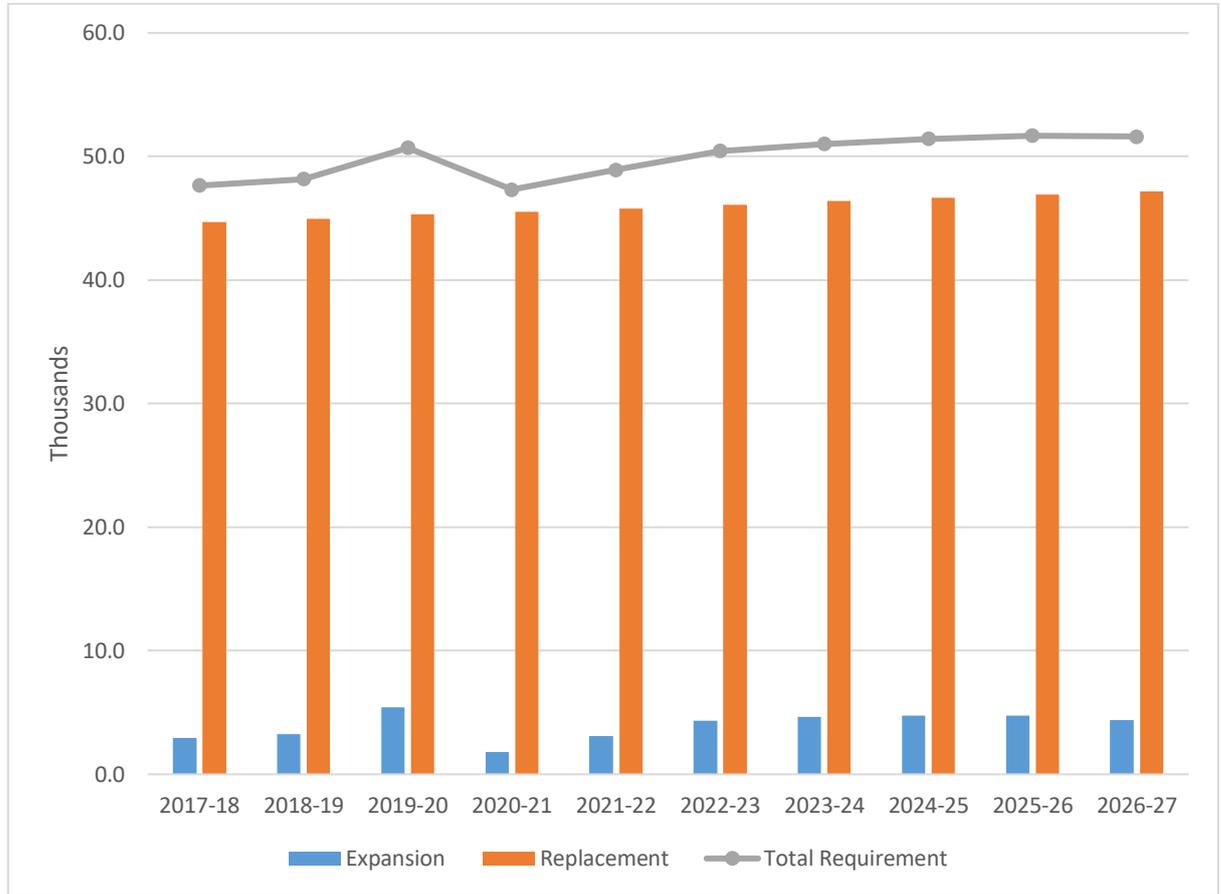
UK Nation	2017 (000s)	2027 (000s)	Change (000s)	% Change	Annual average rate (%)
Wales	1,529.7	1,569.2	39.4	2.6	0.3
England	29,638.6	30,458.7	820.1	2.8	0.3
Northern Ireland	873.4	893.6	20.2	2.3	0.2
Scotland	2,806.3	2,899.5	93.2	3.3	0.3
United Kingdom	34,848.0	35,821.0	973.0	2.8	0.3

Source: *Working Futures, 2017-2027*

However, this provides only a partial view of the likely demand for labour in Wales over the decade. The model projections of employment represent an estimate of “expansion demand” – that is the change in the total number of jobs available between two points in time. A more complete picture of the economy’s requirement for workers over the period is provided by adding an estimate of “replacement demand”, which measures the number of new workers required to replace those being lost due to retirement. The magnitude of replacement demand reflects people born during the “baby boom echo” of the later 1950s and early 1960s reaching retirement age during the projection period.

From Table 3.2, it can be seen that while the difference in the number employed from 2017 to 2027 is projected to be 40 thousand, it is estimated that employers will have to recruit over half a million workers over the decade in order to maintain the level of employment. Figure 3.1 demonstrates that the total annual requirement for labour could vastly exceed employment growth due to expansion demand throughout the period.

Figure 3.1: Projected annual expansion demand, replacement demand and the total requirement in Wales, 2017-2027



Source: Working Futures 2017-2027

The relative magnitude of expansion and replacement demand and their contribution to the total requirement for labour over the period 2017 to 2027 is similar in all four countries of the UK (Table 3.2), but replacement demand forms a higher percentage of the total in Northern Ireland and Wales and a lower than average percentage in Scotland.

Table 3.2: Expansion and replacement demand and total requirement, 2017-2027

UK Nation	Employment (000s)		Labour Demand 2017-2027 (000s)			Replacement Demand as % of Total Requirement
	2017	2027	Expansion demand	Replacement demand	Total requirement	
Wales	1,529.8	1,569.2	39.4	503.5	542.9	92.7
England	29,638.5	30,458.6	820.1	9865.5	10,685.6	92.3
Northern Ireland	873.4	893.6	20.2	287.0	307.2	93.4
Scotland	2,806.3	2,899.5	93.2	924.9	1,018.2	90.8
United Kingdom	34,848.0	35,821.0	973.0	11,580.9	12,553.8	92.2

Source: *Working Futures, 2017-2027*

4. Change in employment by gender and employment status for Wales

Overall, women are projected to account for the great majority of the increase in expansion demand over the period 2017 to 2027 (Table 4.1). Female employment is projected to grow by 4.9 per cent in Wales (slightly faster than the UK average rate), but male employment growth is expected to be slower than the UK average. Male full-time employment is projected to contract, while male part-time employment grows rapidly, but more slowly than for the UK as a whole. For women, full-time employment is projected to grow at a similar rate to the UK average, but part-time work is projected to grow faster than the UK average, and to account for the majority of the employment increase.

For men and women taken together, the projected increase in part-time employment is nearly five times that for full-time employment, with the rate of change for Wales being very similar to the UK in each case. The number self-employed is projected to decline by 3.9 per cent, a faster rate of decline than for the UK as a whole, and to mainly result from male job loss, since the projected decline in self-employed females is very small.

Table 4.1: Projected employment change by gender and employment status in Wales, 2017 to 2027

Gender and status	Employment in Wales			Change, 2017-2027 (%)	
	2017 (000s)	2027 (000s)	Change (000s)	Wales	UK
Male	771.5	773.4	1.9	0.3	1.0
<i>Full-Time</i>	516.5	508.2	-8.2	-1.6	-1.1
<i>Part-Time</i>	115.7	133.7	17.9	15.5	16.4
<i>Self-employed</i>	139.3	131.5	-7.8	-5.6	-4.0
Female	758.3	795.7	37.5	4.9	4.8
<i>Full-Time</i>	346.1	362.4	16.3	4.7	4.7
<i>Part-Time</i>	334.3	356.1	21.8	6.5	6.1
<i>Self-employed</i>	77.8	77.2	-0.6	-0.8	-0.9
Full-Time employees	862.5	870.6	8.1	0.9	1.2
Part-time employees	450.1	489.8	39.7	8.8	9.0
Self-employed	217.2	208.8	-8.4	-3.9	-2.9
Total in work (000s)	1,529.8	1,569.2	39.4	2.6	2.8

Source: *Working Futures, 2017-2027*

The shift from male to female employment is demonstrated in Table 4.2, which presents the percentage of employment by gender and employment status in 2017 and 2027. Women are projected to comprise the majority of those in work for Wales in 2027, in contrast to the UK as a whole. For men, there is projected to be a shift towards part-time working, while the balance of full- and part-time employment remains relatively unchanged for women. The percentage share of part-time jobs is projected to be higher in Wales than the UK in both 2017 and 2027. Projected changes in the shares of full- and part-time employment in Wales are very similar to those for the UK as a whole. The percentage self-employed is projected to be higher in Wales than for the UK as a whole in both 2017 and 2027, but the projected differential between Wales and the UK is slightly smaller in 2027 than 2017. The projected percentage self-employed is higher for men than women in both years.

Table 4.2: Projected employment shares by gender and employment status in Wales, for 2017 and 2027

Gender and status	Wales			UK		
	2017	2027	Difference 2027- 2017	2017	2027	Difference 2027- 2017
<i>Percentage shares of all workers by gender</i>						
Males	50.4	49.3	-1.1	52.3	51.4	-0.9
Females	49.6	50.7	1.1	47.7	48.6	0.9
<i>Percentage shares of all workers by status</i>						
Full-Time employees	56.4	55.5	-0.9	59.3	58.4	-0.9
Part-time employees	29.4	31.2	1.8	27.6	29.3	1.7
Self-employed	14.2	13.3	-0.9	13.1	12.3	-0.7
All workers	1,529.8	1,569.2	39.4	34,848.0	35,821.0	973.0
<i>Percentage of male workers</i>						
% Males Full-Time	66.9	65.7	-1.2	69.5	68.1	-1.4
% Males Part-Time	15.0	17.3	2.3	14.5	16.8	2.2
%Males Self-Employed	18.1	17.0	-1.0	16.0	15.2	-0.8
<i>Percentage of female workers</i>						
% Female Full-Time	45.6	45.5	-0.1	48.2	48.2	0.0
% Female Part-Time	44.1	44.8	0.7	42.0	42.5	0.5
% Female Self-Employed	10.3	9.7	-0.6	9.8	9.3	-0.5

Source: *Working Futures, 2017-2027*

Table 4.3 presents the implications of these employment trends for the overall employment rate and economic activity rate by gender. The economic activity rate increased for women between 2007 and 2017, while that for men declined. The economic activity rate for men is

projected to continue to decline between 2017 and 2027. The female economic activity rate is also projected to decline, to a slightly greater degree than for the UK as a whole. This probably reflects the growth in the number of people of retirement age and above during this period.

The percentage of adults in employment (the employment rate) increased between 2007 and 2017, mainly due to a marked increase in the female employment rate. This increase is projected to continue between 2017 and 2027, while the male employment rate is projected to be slightly lower in 2027 than 2017. The projected increase for females is greater than that for the UK as a whole, while the projected fall in the male employment rate is slightly smaller in Wales than the UK average.

Table 4.3: Projected employment and economic activity rates for Wales by gender, 2007 to 2027.

Indicator	2007	2017	2027	Change, 2017-2027	
				Wales	UK
Employment rate	70.4	74.4	75.4	1.0	1.2
Male	75.7	78.5	77.0	-1.5	-0.4
Female	65.1	70.4	73.7	3.3	2.8
Economic activity rate	58.4	58.5	57.3	-1.2	-1.2
Male	64.7	62.9	60.9	-2.0	-2.1
Female	52.4	54.3	53.8	-0.5	-0.4

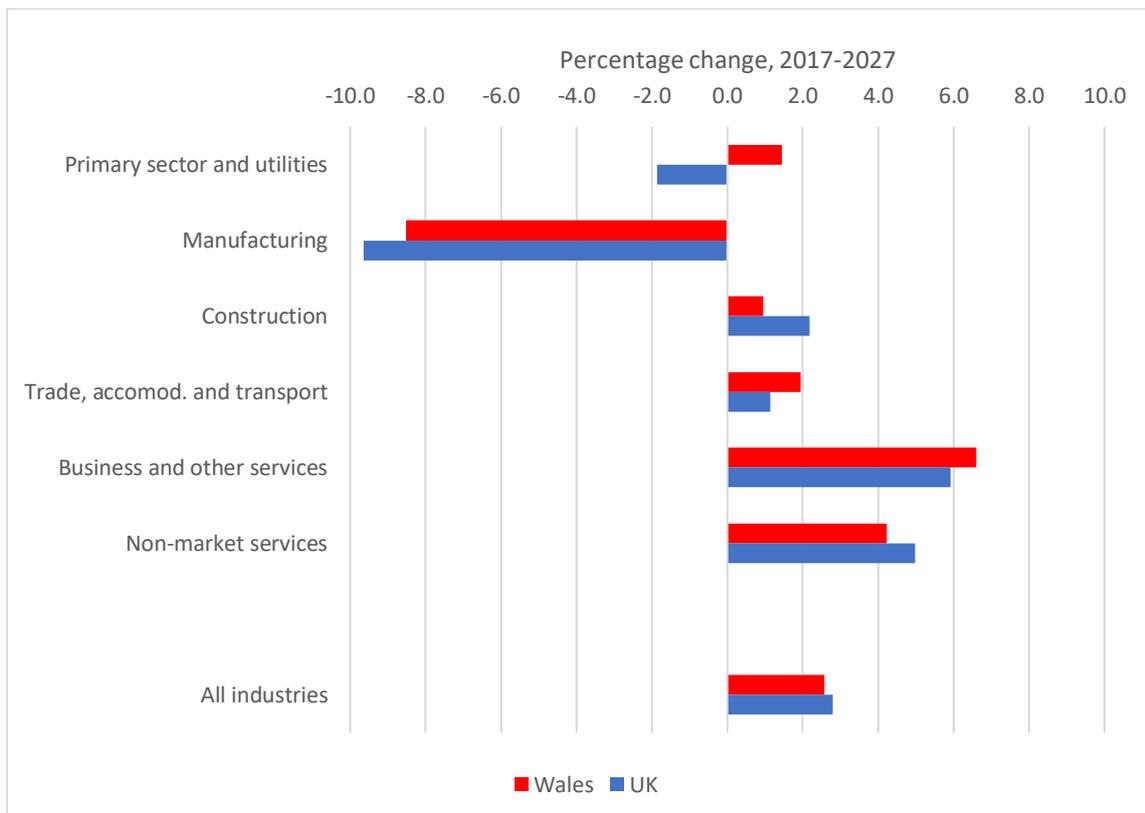
Source: *Working Futures, 2017-2027*

Note: The economic activity rate is the percentage of people aged 16 or over who are economically active. The employment rate is the percentage of people aged 16 to 64 who are working.

5. Employment change by industry for Wales

The *Working Futures* 2017 to 2027 projections yield data on employment trends for 22 industries, which group into six broad industry sectors¹. Data for both levels of industry classification are presented here for Wales, with percentage rates of change for 2017-2027 compared with those for the UK as a whole.

Figure 5.1: Employment in Wales by broad industry sector, 2007-2027



Source: *Working Futures*, 2017-2027

Percentage changes in employment by broad industry sector over the period 2017 to 2027 are compared for Wales and the UK in Figure 5.1. Overall employment growth is projected to be slightly slower for Wales than the UK. Within this overall trend, the primary sector (agriculture, mining and energy) is projected to gain employment in Wales while losing employment in the UK as a whole, while the manufacturing sector is projected to lose jobs, at a slightly slower rate than the UK average. The construction sector is projected to grow more

¹ Details of these sectors and industries can be found in Table A.2.1, which shows how they are defined in terms of the 2007 UK Standard Industrial Classification and how they relate to each other.

slowly than the UK average over this period. Business and other services is projected to gain employment faster than any other sector, slightly faster than the UK average. The rate of projected employment growth in non-market services is slower, growing at less than the UK average rate. Employment in trade, accommodation and transport is projected to grow by about 2 per cent, at a faster rate than the UK average.

Table 5.1: Employment change by sector, 2017-2027

Industry sector	Employment 2017		Employment 2027		Change 2017-2027		
	(000s)	Share of all employment (%)	(000s)	Share of all employment (%)	Wales (000s)	Wales (%)	UK (%)
Primary sector and utilities	81.6	5.3	82.7	5.3	1.2	1.4	-1.9
Manufacturing	146.8	9.6	134.3	8.6	-12.5	-8.5	-9.6
Construction	107.1	7.0	108.1	6.9	1.0	0.9	2.2
Trade, accommodation and transport	380.5	24.9	387.9	24.7	7.4	1.9	1.1
Business and other services	336.2	22.0	358.3	22.8	22.2	6.6	5.9
Non-market services	477.6	31.2	497.8	31.7	20.2	4.2	5.0
All industries	1,529.8	100.0	1,569.2	100.0	39.4	2.6	2.8

Source: *Working Futures, 2017-2027*

The percentage of projected total employment and the percentage employment change by sector over the period 2017 to 2027 is presented in Table 5.1. Employment in the primary and manufacturing sectors is projected to be maintained better than in the UK a whole, though employment in construction is projected to grow at less than half the UK rate. A slow relative shift of employment from the production to service sectors is projected, but there are contrasting trends between the latter. Non-market services (including health, education and public administration) is projected to remain the largest individual sector, but to gain employment more slowly than the UK average. Trade, accommodation and transport is projected to gain employment more quickly than the UK average, but more slowly than the average for Wales. However, employment in business and other services is projected to grow more quickly than in the UK as a whole. Employment growth in this sector is projected to account for more than half of the total employment increase for Wales.

Table 5.2 shows the projected percentage shares of total employment in each of the 22 industries over the period 2007 to 2027. Trends for the production industries mirror those for the sectors they fall within. For most service sector industries, projected percentage shares differ little across the three years. The share of the wholesale and retail trades is projected to fall over this period, while that of accommodation and food increases. The percentage working

in public administration and defence is projected to decline over the period. The share of employment in education is projected to be higher in 2017 than either 2007 or 2027, while the percentage working in health and social work is projected to grow across all three years, but with the increase between 2017 and 2027 being smaller than in the preceding decade.

Table 5.2: Projected shares of employment in Wales, by industry, 2017-2027

Industry	Percentage of employment		
	2007	2017	2027
<i>Primary sector and utilities</i>			
Agriculture	2.6	3.9	3.8
Mining and quarrying	0.1	0.2	0.1
Electricity and gas	0.3	0.5	0.5
Water and sewerage	0.6	0.7	0.8
<i>Manufacturing</i>			
Food drink and tobacco	1.7	1.3	1.2
Engineering	1.8	1.1	1.0
Rest of manufacturing	8.8	7.2	6.4
<i>Construction</i>			
Construction	8.1	7.0	6.9
<i>Trade, accomodation and transport</i>			
Wholesale and retail trade	15.1	13.2	13.0
Transport and storage	3.5	2.6	2.6
Accommodation and food	6.8	9.0	9.2
<i>Business and other services</i>			
Media	0.8	0.6	0.6
Information technology	1.5	1.9	1.9
Finance and insurance	2.6	2.1	2.3
Real estate	1.0	1.5	1.5
Professional services	4.9	4.7	4.9
Support services	5.7	5.7	5.9
Arts and entertainment	2.6	2.7	2.9
Other services	2.6	2.9	2.9
<i>Non-market services</i>			
Public admin. and defence	6.8	5.5	5.3
Education	8.6	9.1	8.7
Health and social work	13.3	16.6	17.7
Total	1409.0	1529.8	1569.2

Source: *Working Futures, 2017-2027*

Table 5.3: Projected employment change in Wales, by industry, 2017-2027

Sector and Industry	Employment 2017		Employment 2027		Change 2017-2027		
	(000s)	Share of all employment (%)	(000s)	Share of all employment (%)	Wales (000s)	Wales (%)	UK (%)
<i>Primary sector and utilities</i>							
Agriculture	59.8	3.9	60.0	3.8	0.2	0.3	-5.1
Mining and quarrying	2.7	0.2	2.2	0.1	-0.5	-18.6	-12.6
Electricity and gas	7.7	0.5	7.5	0.5	-0.2	-2.3	0.8
Water and sewerage	11.3	0.7	13.0	0.8	1.7	14.8	6.5
<i>Manufacturing</i>							
Food drink and tobacco	20.2	1.3	18.1	1.2	-2.1	-10.4	-7.7
Engineering	16.8	1.1	16.0	1.0	-0.8	-4.8	-5.0
Rest of manufacturing	109.8	7.2	100.2	6.4	-9.6	-8.7	-11.1
<i>Construction</i>							
Construction	107.1	7.0	108.1	6.9	1.0	0.9	2.2
<i>Trade, accommodation and transport</i>							
Wholesale and retail trade	202.0	13.2	203.9	13.0	1.9	0.9	1.3
Transport and storage	40.4	2.6	40.0	2.6	-0.4	-1.0	-1.9
Accommodation and food	138.1	9.0	143.9	9.2	5.9	4.2	3.0
<i>Business and other services</i>							
Media	8.7	0.6	8.9	0.6	0.1	1.5	2.3
Information technology	29.0	1.9	30.2	1.9	1.2	4.1	7.8
Finance and insurance	32.2	2.1	35.4	2.3	3.2	9.8	-1.0
Real estate	22.3	1.5	24.2	1.5	1.9	8.7	4.4
Professional services	71.6	4.7	76.8	4.9	5.2	7.3	7.4
Support services	86.8	5.7	92.3	5.9	5.5	6.4	6.6
Arts and entertainment	41.6	2.7	45.6	2.9	4.0	9.6	9.1
Other services	43.9	2.9	45.0	2.9	1.0	2.4	4.6
<i>Non-market services</i>							
Public admin. and defence	83.6	5.5	82.7	5.3	-0.9	-1.1	-0.5
Education	139.4	9.1	136.8	8.7	-2.6	-1.9	0.3
Health and social work	254.6	16.6	278.3	17.7	23.7	9.3	9.7
All industries	1,529.8	100.0	1,569.2	100.0	39.4	2.6	2.8

Source: *Working Futures, 2017-2027*

Table 5.3 shows how employment is projected to change for the individual industries within sectors compared to the UK from 2017 to 2027. Agriculture is projected to gain employment slowly, in contrast to the faster than average rate of job loss for the industry in the UK as a whole. Mining and quarrying and food, drink and tobacco are projected to lose employment

most rapidly, and at a faster rate than the UK average, but the projected employment growth rate for water and sewerage is more than double the UK as a whole. Employment in engineering and the rest of manufacturing is projected to decline but less rapidly than the UK average. Construction employment is projected to grow more slowly than the UK average. In the trade, accommodation and transport sector, projected employment growth is greatest for the accommodation and food industry, with the projected rate of growth exceeding the UK average, in contrast to wholesale and retail (where growth is projected but at a slower rate than the UK average) and transport and storage (which is projected to lose employment). The largest projected employment gains in the business and other services are for professional services and support services, while the projected rate of employment increase is fastest for finance and insurance, arts and entertainment and real estate, in each case at a faster rate than the UK average. There are contrasting trends within the non-market services sector. The education and public administration and defence industries are projected to experience employment loss at a rate faster than the UK average, while employment in health and social work is projected to have the largest job increase, being nearly a tenth larger in 2027 than 2017.

Table 5.4: Expansion and replacement demand by industry sector, Wales 2017-2027 (000s)

Industry sector	Employment (000s)		Labour demand 2017-2027 (000s)			Replacement Demand as % of Total Requirement	
	2017	2027	Expansion Demand	Replacement Demand	Total Requirement	Wales	UK
Primary sector and utilities	81.6	82.7	1.2	26.8	28.0	95.8	106.3
Manufacturing	146.8	134.3	-12.5	40.1	27.6	145.3	154.0
Construction	107.1	108.1	1.0	30.2	31.2	96.8	93.0
Trade, accommodation and transport	380.5	387.9	7.4	122.7	130.1	94.3	96.6
Business and other services	336.2	358.3	22.2	112.2	134.4	83.5	85.1
Non-marketed services	477.6	497.8	20.2	171.4	191.6	89.5	88.1
All industries	1,529.8	1,569.2	39.4	503.5	542.9	92.7	92.2

Source: *Working Futures, 2017-2027*

Table 5.5: Expansion and replacement demand by industry, Wales 2017-2027 (000s)

Sector and industry	Employment (000s)		Labour demand 2017-2027 (000s)			Replacement Demand as % of Total Requirement	
	2017	2027	Expansion Demand	Replacement Demand	Total Requirement	Wales	UK
<i>Primary sector and utilities</i>							
Agriculture	59.8	60.0	0.2	20.3	20.5	99.1	118.6
Mining and quarrying	2.7	2.2	-0.5	0.7	0.2	390.9	189.8
Electricity and gas	7.7	7.5	-0.2	2.2	2.0	108.8	97.3
Water and sewerage	11.3	13.0	1.7	3.6	5.3	68.5	82.9
<i>Manufacturing</i>							
Food drink and tobacco	20.2	18.1	-2.1	5.7	3.6	159.1	136.3
Engineering	16.8	16.0	-0.8	5.0	4.2	119.5	121.4
Rest of manufacturing	109.8	100.2	-9.6	29.5	19.9	148.3	170.1
<i>Construction</i>							
Construction	107.1	108.1	1.0	30.2	31.2	96.8	93.0
<i>Trade, accomodation and transport</i>							
Wholesale and retail trade	202.0	203.9	1.9	64.0	65.9	97.1	96.0
Transport and storage	40.4	40.0	-0.4	12.3	11.9	103.4	106.3
Accommodation and food	138.1	143.9	5.9	46.4	52.2	88.8	91.9
<i>Business and other services</i>							
Media	8.7	8.9	0.1	2.7	2.8	95.3	93.3
Information technology	29.0	30.2	1.2	8.4	9.6	87.5	80.1
Finance and insurance	32.2	35.4	3.2	11.2	14.4	78.0	103.2
Real estate	22.3	24.2	1.9	7.8	9.7	80.2	88.7
Professional services	71.6	76.8	5.2	24.3	29.5	82.3	82.3
Support services	86.8	92.3	5.5	27.9	33.5	83.5	83.5
Arts and entertainment	41.6	45.6	4.0	14.6	18.6	78.6	79.5
Other services	43.9	45.0	1.0	15.2	16.3	93.6	88.6
<i>Non-marketed services</i>							
Public administration and defence	83.6	82.7	-0.9	27.1	26.2	103.5	101.6
Education	139.4	136.8	-2.6	47.1	44.5	105.9	99.1
Health and social work	254.6	278.3	23.7	97.2	121.0	80.4	80.0
All industries	1,529.8	1,569.2	39.4	503.5	542.9	92.7	92.2

Source: *Working Futures, 2017-2027*

All sectors are projected to have a continued requirement for recruitment throughout 2017-2027 due to the need to replace workers leaving the labour market (Table 5.4). The relative importance of replacement demand is greatest for the manufacturing sector, because this is the only sector in which expansion demand is negative. The high average age of construction workers is reflected in replacement demand being 30 times larger than expansion demand. Replacement demand represents less than 100 per cent of the total labour requirement of the service sector. The trade, accommodation and transport and business and other services sector both have total requirements over 130 thousand, with the percentage represented by replacement demand slightly less than the UK average. The continuing importance of non-market services in providing employment opportunities in Wales is highlighted by the sector accounting for more than a third of the total employment requirement.

Turning to individual industries (Table 5.5), the largest replacement demand over the decade 2017-2017 is projected for health and social work, followed by wholesale and retail trade, education and accommodation and food. The health and social work industry is distinctive in experiencing both relatively high expansion demand and high replacement demand. The ratio of replacement demand to total labour requirement is high relative to the UK for education (possibly because there is a high percentage of older workers). In declining industries (such as mining and quarrying) the ratio of replacement demand to total labour requirement is extremely high. In contrast, this percentage tends to be low for growing industries. Water and sewerage and finance and insurance stand out as having particularly low percentages (which are also lower than the UK average).

Table 5.6 shows how the gender breakdown of employment varies by industry sector during the projection period. Women are projected to (just) form the majority of people in work by 2027. While nearly half of all workers were female, there was clear gender segregation in 2017, with women dominating employment in non-market services, while representing only a quarter of those in manufacturing industry and just over an eighth of construction workers. The female share of each sector is projected to increase slightly in each sector, but the differential in this percentage by sector barely changes by 2027.

The percentage of employment part-time is projected to increase in all sectors. The largest increases are for the non-market services sector and primary sector and utilities. Part-time employment is least common in male-dominated sectors (notably construction), but formed around two-fifths of employment in both 2017 and 2027 in trade, accommodation and transport and non-market services.

The percentage of jobs filled by the self-employed is projected to decline by 0.9 per cent overall between 2017 and 2027 and in all sectors except manufacturing. The decline in this

percentage is expected to be greatest in the primary sector and utilities. This and the construction sector display the largest percentage of self-employed in both years. The projected percentage self-employed is lowest in the non-market services and manufacturing sectors in both 2017 and 2027.

Table 5.6: Gender profile and flexibility measures by sector, 2017 and 2027

Sector	% Female		% Part-time		% Self-employed	
	2017	2027	2017	2027	2017	2027
Primary sector and utilities	26.6	29.2	11.2	14.8	46.3	42.2
Manufacturing	24.4	26.2	7.3	8.6	6.0	6.3
Construction	13.0	13.5	8.0	8.4	35.7	33.5
Trade, accommodation and transport	47.7	48.0	42.9	44.2	10.0	8.6
Business and other services	49.4	49.1	20.9	21.3	21.1	20.6
Non-market services	71.0	72.2	39.3	42.0	4.8	4.4
All sectors	49.6	50.7	29.4	31.2	14.2	13.3

Source: *Working Futures, 2017-2027*

Table 5.7 shows that more than two-thirds of workers are projected to be female in both 2017 and 2027 in the health and social work, other services and education industries. Women are also projected to form the majority of workers in public administration and defence, real estate, finance and insurance, accommodation and food and arts and entertainment. Over 90 per cent of jobs in mining and quarrying are projected to be male in both 2017 and 2027, with construction being the next most male-dominated industry. Amongst predominantly male industries, the female share of employment is projected to increase markedly in agriculture, engineering, transport and storage and information technology. The female share of employment is projected to fall in electricity and gas, water and sewerage, wholesale and retail trade, media, finance and insurance, real estate, professional, support and other services.

The only industry in which a majority of jobs are projected to be part-time in both 2017 and 2027 is accommodation and food. Around two-fifths of employment in education and health and social work is estimated to be part-time in 2017, with this percentage projected to increase by 2027 in both industries. The projected percentage of part-time jobs is very low in mining and quarrying, and only slightly higher in electricity and gas, the remainder of manufacturing industries and construction. Projected increases in the percentage working part-time are largest in media, information technology, public administration and defence, education, agriculture and transport and storage.

Table 5.7: Gender profile and flexibility measures by industry, 2017 and 2027

Industry	% Female		% Part-time		% Self-employed	
	2017	2027	2017	2027	2017	2027
<i>Primary sector and utilities</i>						
Agriculture	26.8	30.7	10.2	14.2	61.6	56.6
Mining and quarrying	9.1	9.7	1.1	1.1	2.7	3.2
Electricity and gas	24.2	19.5	6.5	5.9	11.5	11.9
Water and sewerage	31.3	31.1	21.8	25.3	0.0	0.0
<i>Manufacturing</i>						
Food drink and tobacco	33.3	33.6	9.4	10.8	6.3	6.1
Engineering	30.1	32.3	7.8	10.1	4.3	4.8
Rest of manufacturing	21.9	23.9	6.9	8.0	6.2	6.5
<i>Construction</i>						
Construction	13.0	13.5	8.0	8.4	35.7	33.5
<i>Trade, accomodation and transport</i>						
Wholesale and retail trade	50.0	48.3	40.8	43.0	10.5	7.7
Transport and storage	20.0	25.0	12.8	16.7	20.1	20.5
Accommodation and food	52.4	54.0	55.0	53.6	6.4	6.5
<i>Business and other services</i>						
Media	39.1	37.9	27.3	36.2	13.0	12.4
Information technology	22.8	26.3	7.0	12.0	7.5	8.7
Finance and insurance	57.3	56.3	20.1	19.5	11.7	11.0
Real estate	60.2	58.8	27.6	26.7	16.1	16.4
Professional services	52.1	51.3	17.8	17.6	17.5	17.6
Support services	40.2	39.2	23.8	24.0	14.1	12.8
Arts and entertainment	53.6	54.8	30.1	28.5	30.3	30.7
Other services	67.3	66.3	16.7	16.5	52.4	50.7
<i>Non-market services</i>						
Public admin. and defence	58.3	61.2	35.0	39.4	1.7	1.8
Education	66.8	67.9	41.4	45.5	7.7	6.9
Health and social work	77.5	77.6	39.6	41.0	4.3	4.0
All industries	49.6	50.7	29.4	31.2	14.2	13.3

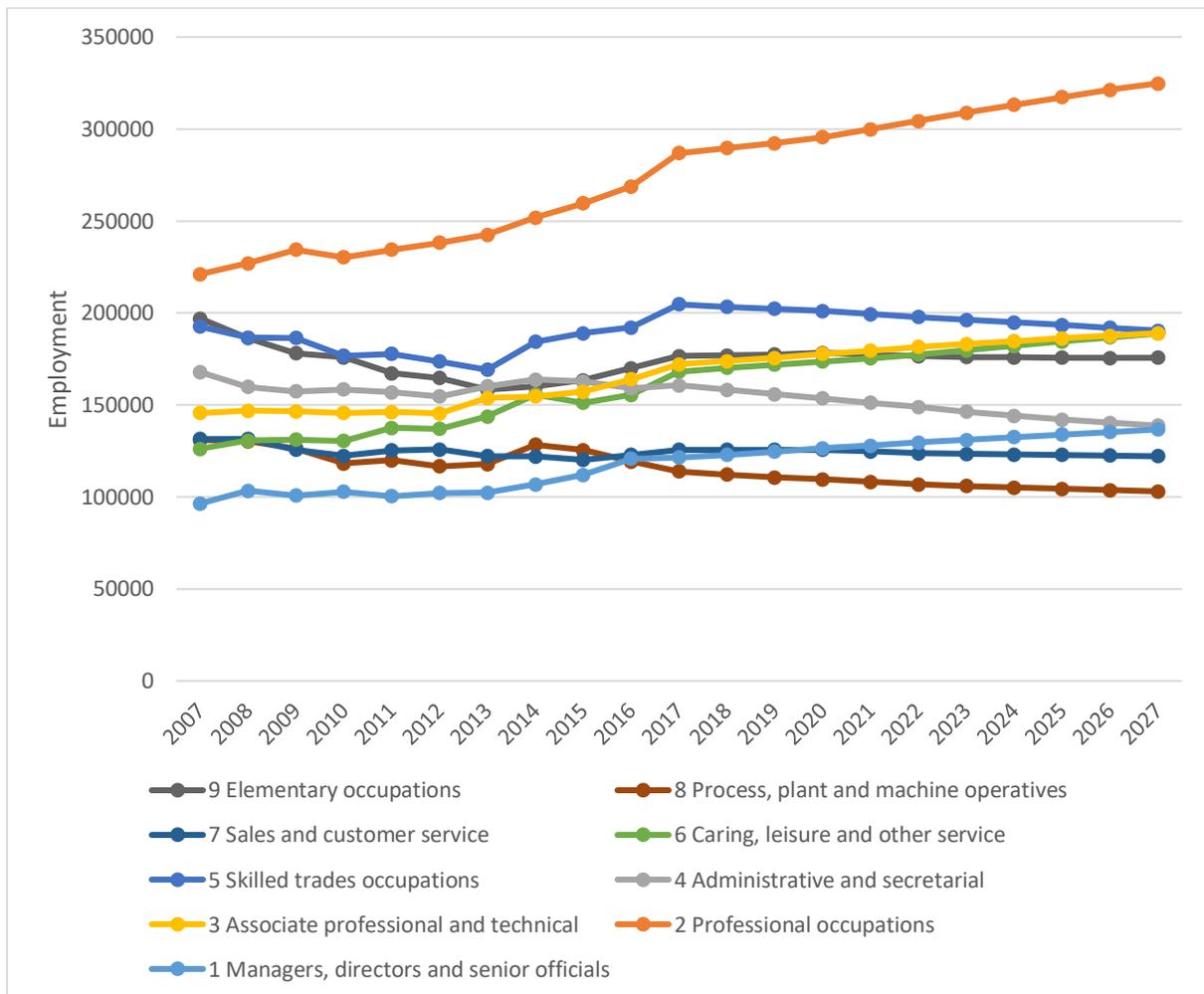
Source: *Working Futures, 2017-2027*

Agriculture and other services had the largest percentage of self-employed workers in 2017 and were the only sectors in which a majority of workers were self-employed. While this is projected to remain the case in 2027, it is expected that the share of self-employed workers will decline in both industries, with a particularly large fall in agriculture. Over a third of workers in construction are projected to be self-employed in both years. The sectors with the next largest projected shares of self-employed workers are arts and entertainment, transport and storage and professional services industries. While the overall percentage self-employed is projected to decline over the decade, the share of self-employed is projected to increase in a number of industries, such as information technology, engineering and transport and storage.

6. Employment change by occupation

Working Futures 2017-2027 is a key source of labour market information by occupation. These are represented using the nine Major Groups and 25 Sub-Major Groups of the 2010 Standard Occupational Classification (SOC).²

Figure 6.1: Employment trends in Wales by SOC major group, 2007 to 2027



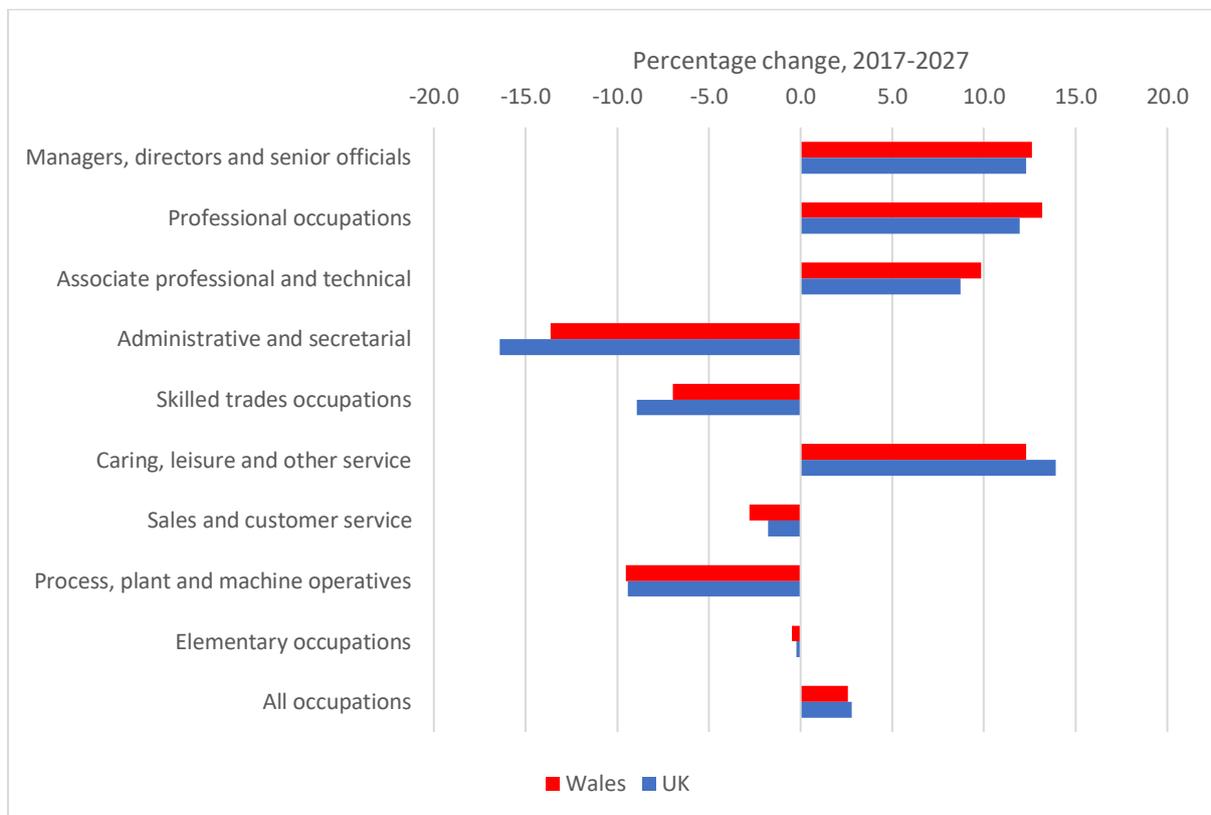
Source: *Working Futures, 2017-2027*

Figure 6.1 depicts the overall trend in employment in Wales for the nine SOC major groups over the period 2007 to 2027. A gradual divergence in job prospects by occupation is apparent. Employment in administrative and secretarial, skilled trades occupations, sales and customer

² Table A.2.2 shows how SOC Major Groups and Sub-Major Groups are related.

service and process, plant and machine operatives declines throughout the period. In contrast, employment growth is apparent in the managerial, professional and associate professional occupations (Major Groups 1 to 3) and in caring, leisure and other service occupations (Major Group 6). Figure 6.2 presents the projected trend in employment by SOC major group between 2017 and 2027, demonstrating that the projected rate of growth of employment in “white-collar” jobs is faster than the UK average (but the projected rate of loss of skilled manual and administrative jobs is slower) in Wales.

Figure 6.2: Projected employment changes for Wales by SOC major group, 2017 to 2027



Source: *Working Futures, 2017-2027*

Table 6.1 summarises the trend for employment to grow faster in “white collar” occupations over the period 2017 to 2027. The percentage share of employment in SOC Major Groups 1 to 3 is projected to increase from 37.9 per cent in 2017 to 41.4 per cent in 2027, with the share of professional occupations increasing most, gaining 37.8 thousand jobs, and increasing faster than the UK average. Employment in caring, leisure and other occupations is also projected to grow much faster than the average for all occupations (by 12.3 per cent – slightly slower

than the UK average). The number of jobs in administrative and secretarial occupations is projected to decline by 21.9 thousand, but the projected rate of decline is much lower than for the UK as a whole. In contrast, the rate of loss of jobs in sales and customer service occupations is greater than the UK average, while the projected number of jobs lost is greatest for administrative and secretarial occupations. Turning to “blue-collar” jobs, employment in skilled trades occupations is projected to decline by 14.3 thousand (at a slower rate in the UK as a whole), and employment for process, plant and machine operatives is projected to be 10.8 thousand lower in 2027 than 2017. The number of jobs in elementary occupations is projected to fall by only 800.

Table 6.1: Projected employment change 2017-2027 by SOC Major Group

SOC Major Group	Employment 2017		Employment 2027		Change 2017-2027		
	(000s)	Share of all employment (%)	(000s)	Share of all employment (%)	Wales (000s)	Wales (%)	UK (%)
1 Managers, directors and senior officials	121.4	7.9	136.7	8.7	15.3	12.6	12.3
2 Professional occupations	286.9	18.8	324.8	20.7	37.8	13.2	11.9
3 Associate professional and technical	172.1	11.2	189.0	12.0	16.9	9.8	8.7
4 Administrative and secretarial	160.6	10.5	138.7	8.8	-21.9	-13.6	-16.4
5 Skilled trades occupations	204.7	13.4	190.4	12.1	-14.3	-7.0	-8.9
6 Caring, leisure and other service	168.1	11.0	188.8	12.0	20.7	12.3	13.9
7 Sales and customer service	125.7	8.2	122.1	7.8	-3.5	-2.8	-1.8
8 Process, plant and machine operatives	113.8	7.4	103.0	6.6	-10.8	-9.5	-9.4
9 Elementary occupations	176.5	11.5	175.6	11.2	-0.8	-0.5	-0.2
All occupations	1,529.8	100.0	1,569.2	100.0	39.4	2.6	2.8

Source: *Working Futures, 2017-2027*

Table 6.2: Projected employment change 2017-2027 by SOC Sub-Major Group

SOC sub-major group	Employment 2017		Employment 2027		Change 2017-2027		
	(000s)	Share of all employment (%)	(000s)	Share of all employment (%)	Wales (000s)	Wales (%)	UK (%)
11 Corporate managers and directors	75.8	5.0	86.8	5.5	11.0	14.5	13.8
12 Other managers and proprietors	45.6	3.0	49.9	3.2	4.4	9.6	8.6
21 Science, research, engineering and technology professionals	49.0	3.2	53.2	3.4	4.3	8.8	9.1
22 Health professionals	96.4	6.3	112.4	7.2	15.9	16.5	14.9
23 Teaching and educational professionals	93.7	6.1	104.3	6.6	10.5	11.3	12.3
24 Business, media and public service professionals	47.8	3.1	54.9	3.5	7.1	14.8	11.8
31 Science, engineering and technology associate professionals	25.2	1.6	25.3	1.6	0.1	0.5	1.3
32 Health and social care associate professionals	31.2	2.0	36.3	2.3	5.1	16.3	15.6
33 Protective service occupations	16.7	1.1	15.8	1.0	-0.9	-5.4	-2.8
34 Culture, media and sports occupations	26.1	1.7	28.9	1.8	2.8	10.9	6.2
35 Business and public service associate professionals	72.9	4.8	82.7	5.3	9.8	13.4	11.9
41 Administrative occupations	127.5	8.3	120.0	7.6	-7.5	-5.9	-8.3
42 Secretarial and related occupations	33.1	2.2	18.7	1.2	-14.4	-43.5	-48.1
51 Skilled agricultural and related trades	44.6	2.9	43.6	2.8	-1.1	-2.4	1.5
52 Skilled metal, electrical and electronic trades	60.3	3.9	52.8	3.4	-7.5	-12.4	-15.0
53 Skilled construction and building trades	55.6	3.6	55.9	3.6	0.3	0.5	-0.5
54 Textiles, printing and other skilled trades	44.1	2.9	38.1	2.4	-6.0	-13.5	-15.7
61 Caring personal service occupations	134.0	8.8	156.4	10.0	22.3	16.7	18.5
62 Leisure, travel and related personal service occupations	34.1	2.2	32.4	2.1	-1.7	-4.9	-1.6
71 Sales occupations	96.7	6.3	88.4	5.6	-8.3	-8.6	-6.9
72 Customer service occupations	28.9	1.9	33.7	2.1	4.8	16.6	14.6
81 Process, plant and machine operatives	78.3	5.1	66.3	4.2	-12.0	-15.3	-22.1
82 Transport and mobile machine drivers and operatives	35.5	2.3	36.6	2.3	1.1	3.2	-0.3
91 Elementary trades and related occupations	30.0	2.0	30.1	1.9	0.1	0.2	-4.4
92 Elementary administration and service occupations	146.5	9.6	145.6	9.3	-0.9	-0.6	0.4
All occupations	1,529.8	100.0	1,569.2	100.0	39.4	2.6	2.8

Source: *Working Futures, 2017-2027*

Table 6.2 presents projected employment change for SOC Sub-Major groups. The largest percentage job losses are for secretarial and related occupations, while the fastest increases are in caring personal service occupations, customer service occupations, health professionals, health and social care associate professionals, business, media and public service professionals, corporate managers and directors and teaching and educational professionals. The largest projected increases in employment between 2017 and 2027 are for

caring personal service occupations, health professionals, corporate managers and directors teaching and educational professionals, and business and public service associate professionals. The pattern of employment change is quite similar to that for the UK as a whole, but Wales is projected to experience less rapid loss of employment in some declining occupations such as process plant and machine operatives, secretarial and related occupations, elementary trades and related occupations and skilled metal electrical and electronic trades.

Table 6.3: Labour requirement for Wales, 2017-2027 by SOC Major Group

SOC major group	Employment (000s)		Labour requirement 2017-2027 (000s)			Replacement Demand as % of Total Requirement	
	2017	2027	Expansion demand	Replacement demand	Total requirement	Wales	UK
1 Managers, directors and senior officials	121.4	136.7	15.3	47.0	62.4	75.4	75.9
2 Professional occupations	286.9	324.8	37.8	100.4	138.2	72.6	74.2
3 Associate professional and technical	172.1	189.0	16.9	56.5	73.4	76.9	79.0
4 Administrative and secretarial	160.6	138.7	-21.9	50.1	28.2	177.6	210.0
5 Skilled trades occupations	204.7	190.4	-14.3	56.9	42.6	133.5	149.2
6 Caring, leisure and other service	168.1	188.8	20.7	65.0	85.7	75.9	74.1
7 Sales and customer service	125.7	122.1	-3.5	39.9	36.4	109.7	106.1
8 Process, plant and machine operatives	113.8	103.0	-10.8	31.9	21.1	151.5	145.6
9 Elementary occupations	176.5	175.6	-0.8	55.7	54.9	101.5	100.7
All occupations	1529.8	1569.2	39.4	503.5	542.9	92.7	92.2

Source: *Working Futures, 2017-2027*

The projected labour requirement for Wales over the period 2017 to 2027 is presented for SOC major groups (Table 6.3) and sub-major groups (Table 6.4), distinguishing the contribution of expansion demand and replacement demand to the total labour requirement.

The largest component of the projected total labour requirement is for professional occupations, followed by caring, leisure and other service occupations and associate professional occupations. Replacement demand is lowest for process, plant and machine operatives, sales and customer service occupations, administrative and secretarial, and skilled trades occupations. The percentage of total labour requirement which is replacement demand is particularly high for declining occupations (for example, administrative and secretarial, process, plant and machine operatives and skilled trades occupations),

reflecting the relatively high average age of workers in these occupations. However, even where occupations are in overall decline, there will still be a need for new workers (e.g. secretarial and skilled metal workers).

Table 6.4: Labour requirement for Wales, 2017-2027 by SOC sub-major group

SOC sub-major group	Employment (000s)		Labour requirement 2017-2027 (000s)			Replacement Demand as % of Total Requirement	
	2017	2027	Expansion demand	Replacement demand	Total requirement	Wales	UK
11 Corporate managers and directors	75.8	86.8	11.0	28.4	39.4	72.2	73.2
12 Other managers and proprietors	45.6	49.9	4.4	18.6	23.0	81.0	82.6
21 Science, research, engineering and technology professionals	49.0	53.2	4.3	12.7	17.0	74.8	74.4
22 Health professionals	96.4	112.4	15.9	37.1	53.0	69.9	72.5
23 Teaching and educational professionals	93.7	104.3	10.5	33.3	43.8	75.9	74.9
24 Business, media and public service professionals	47.8	54.9	7.1	17.3	24.4	71.0	75.1
31 Science, engineering and technology associate professionals	25.2	25.3	0.1	6.7	6.9	98.0	95.4
32 Health and social care associate professionals	31.2	36.3	5.1	12.9	18.0	71.6	72.8
33 Protective service occupations	16.7	15.8	-0.9	3.6	2.7	133.3	114.1
34 Culture, media and sports occupations	26.1	28.9	2.8	8.9	11.7	75.8	84.2
35 Business and public service associate professionals	72.9	82.7	9.8	24.4	34.2	71.4	73.9
41 Administrative occupations	127.5	120.0	-7.5	41.4	33.9	122.1	134.0
42 Secretarial and related occupations	33.1	18.7	-14.4	8.7	-5.7	-151.7	-113.8
51 Skilled agricultural and related trades	44.6	43.6	-1.1	15.4	14.3	107.5	96.0
52 Skilled metal, electrical and electronic trades	60.3	52.8	-7.5	14.4	6.9	207.9	274.2
53 Skilled construction and building trades	55.6	55.9	0.3	15.9	16.1	98.4	101.7
54 Textiles, printing and other skilled trades	44.1	38.1	-6.0	11.2	5.2	214.1	255.4
61 Caring personal service occupations	134.0	156.4	22.3	53.9	76.2	70.7	69.2
62 Leisure, travel and related personal service occupations	34.1	32.4	-1.7	11.1	9.4	117.6	105.0
71 Sales occupations	96.7	88.4	-8.3	30.2	21.9	137.9	129.7
72 Customer service occupations	28.9	33.7	4.8	9.7	14.5	67.0	69.7
81 Process, plant and machine operatives	78.3	66.3	-12.0	18.9	7.0	272.3	3,985.0
82 Transport and mobile machine drivers and operatives	35.5	36.6	1.1	13.0	14.1	91.9	101.0
91 Elementary trades and related occupations	30.0	30.1	0.1	8.5	8.5	99.4	119.6
92 Elementary administration and service occupations	146.5	145.6	-0.9	47.3	46.4	101.9	98.7
All occupations	1529.8	1569.2	39.4	503.5	542.9	92.7	92.2

Source: *Working Futures, 2017-2027*

The Sub-Major groups (Table 6.4) which are expected to have the largest total labour requirements over the decade 2017-27 are caring personal service occupations, health professionals, elementary administration and service occupations and teaching and educational professionals. In three of these, replacement demand reinforces a projected increase in employment. Elementary administrative and service occupations differs from the other three, because employment is projected to decline and replacement demand represents the entirety of the requirement for labour. Corporate managers and directors, business, media and public service professionals and business and public service associate professionals also display fairly high labour requirements driven by employment expansion as well as replacement demand, while administrative and sales occupations are estimated to have substantial total labour requirements despite reductions in projected employment.

Table 6.5: Gender profile and flexibility measures by SOC Major Group, 2017 and 2027

SOC Major Group	% Female		% Part-time		% Self-employed	
	2017	2027	2017	2027	2017	2027
1 Managers, directors and senior officials	36.6	40.0	11.3	13.1	30.8	26.8
2 Professional occupations	57.8	61.0	25.0	27.8	8.0	7.6
3 Associate professional and technical	46.3	50.5	18.0	20.3	16.1	15.6
4 Administrative and secretarial	73.8	68.7	39.4	39.2	3.2	2.8
5 Skilled trades occupations	12.4	13.2	7.8	7.9	39.8	40.4
6 Caring, leisure and other service	83.8	83.2	45.4	49.4	9.7	8.0
7 Sales and customer service	67.1	66.2	59.7	61.0	3.1	2.4
8 Process, plant and machine operatives	15.7	13.1	13.1	15.6	9.7	9.6
9 Elementary occupations	46.1	43.0	49.9	51.1	6.2	5.3
All occupations	49.6	50.7	29.4	31.2	14.2	13.3

Source: *Working Futures, 2017-2027*

Table 6.5 shows that women formed a large majority of those working in the caring, leisure and other services, administrative and secretarial and sales and customer service occupations Major Groups in 2017 and this is projected to remain the case in 2027. In the second of these, their share is projected to fall, as employment in this occupation contracts. In contrast, the female share of employment in the expanding managerial and professional occupations is projected to increase between 2017 and 2027. The percentage projected to work part-time is highest for sales and customer service and elementary occupations. The percentage of those employed part-time is projected to be higher in 2027 than 2017 in all Major Groups except

administrative and secretarial occupations, with the largest increase for caring, leisure and other service occupations. The projections suggest that in 2027 skilled trades occupations and managers, directors and senior officials will continue to be the occupations with the lowest percentage of part-time employment, although the latter is expected to see growth in line with the average for all occupations while the proportion of the former working part time is expected to remain largely unchanged. Self-employment was most common in skilled trades occupations and for managers, directors and senior officials in 2017 and this is projected remain the case in 2027. The percentage self-employed is lowest for sales and customer service and administrative and secretarial occupations.

Table 6.6 provides a more detailed occupational breakdown. This projects extremely high female employment shares in secretarial and related occupations (in which employment is in relatively rapid decline), caring personal service occupations (where employment is expanding rapidly but the female share is projected to fall slightly), sales occupations (also projected to lose jobs overall) and leisure, travel and related personal service occupations (which is declining slowly). Women also represent more than two-thirds of health professionals, health and social care associate professionals and teaching professionals, with their share projected to increase as employment increases. There are small projected increases in the female share of some high-status occupations in which they have been under-represented, such as corporate managers and directors and science, research, engineering and technology professionals.

Table 6.6: Gender profile and flexibility measures by SOC Sub-Major Group, 2017 and 2027

SOC Sub-Major Group	% Female		% Part-time		% Self-employed	
	2017	2027	2017	2027	2017	2027
11 Corporate managers and directors	30.6	35.1	11.1	12.7	17.8	15.3
12 Other managers and proprietors	46.6	48.6	11.6	13.8	52.5	46.7
21 Science, research, engineering and technology professionals	21.2	24.9	7.2	9.0	10.9	10.3
22 Health professionals	70.6	72.2	30.2	32.2	7.1	6.4
23 Teaching and educational professionals	65.5	67.9	32.2	36.7	4.8	4.7
24 Business, media and public service professionals	54.3	59.9	18.8	20.4	13.4	13.0
31 Science, engineering and technology associate professionals	24.1	23.8	12.9	14.1	4.5	4.2
32 Health and social care associate professionals	67.6	69.4	29.9	32.0	6.7	6.0
33 Protective service occupations	23.2	30.6	6.3	10.4	1.5	1.3
34 Culture, media and sports occupations	52.9	55.1	16.0	17.1	63.4	62.9
35 Business and public service associate professionals	47.7	52.5	18.1	20.0	10.6	9.5
41 Administrative occupations	68.8	65.8	37.5	38.3	3.5	3.1
42 Secretarial and related occupations	93.3	87.2	46.9	45.4	2.3	1.2
51 Skilled agricultural and related trades	21.7	23.1	5.2	7.2	83.8	80.3
52 Skilled metal, electrical and electronic trades	1.8	1.9	3.0	3.5	11.2	10.5
53 Skilled construction and building trades	2.5	3.2	2.5	3.0	56.8	56.1
54 Textiles, printing and other skilled trades	30.0	32.3	23.4	21.9	13.1	13.1
61 Caring personal service occupations	87.6	86.8	49.6	53.6	3.3	3.0
62 Leisure, travel and related personal service occupations	68.8	66.1	28.7	29.6	34.9	31.7
71 Sales occupations	69.7	69.7	67.6	71.5	3.5	2.7
72 Customer service occupations	58.4	57.2	33.4	33.5	1.8	1.6
81 Process, plant and machine operatives	20.6	17.4	10.7	12.4	4.4	3.9
82 Transport and mobile machine drivers and operatives	4.6	5.4	18.5	21.3	21.3	19.9
91 Elementary trades and related occupations	22.6	27.2	18.3	22.7	12.1	11.2
92 Elementary administration and service occupations	50.9	46.3	56.4	57.0	4.9	4.1
All occupations	49.6	50.7	29.4	31.2	14.2	13.3

Source: *Working Futures, 2017-2027*

The pattern of part time working across sectors is projected to be similar in 2027 to 2017 with the percentage working part-time being highest for sales occupations, elementary administration and service occupations, caring personal service occupations, secretarial and related occupations and administrative occupations. The percentage working part-time is projected to be smallest in skilled metal, electrical and electronic trades and skilled agricultural and related trades in 2027 (these occupations also had the smallest shares in 2017). The only

sub-major groups in which the percentage working part-time is projected to fall between 2017 and 2027 are textiles, printing and other skilled trades and secretarial and related occupations.

The percentage self-employed is particularly high in both 2017 and 2027 for skilled agricultural and related workers (over 80 per cent), culture, media and sports occupations (over 60 per cent), skilled construction and building trades (over 50 per cent), other managers and proprietors (just under half) and leisure, travel and related personal service occupations (around a third). It is also above average for transport and mobile machine drivers and operatives and corporate managers and directors. A very small percentage of protective service occupations, customer service occupations and secretarial and related occupations are projected to be self-employed. Self-employment is not projected to grow in any sub-major group. Larger falls are expected in leisure, travel and related personal service occupations, other managers and proprietors and skilled agricultural and related trades.

7. Employment change by qualification level

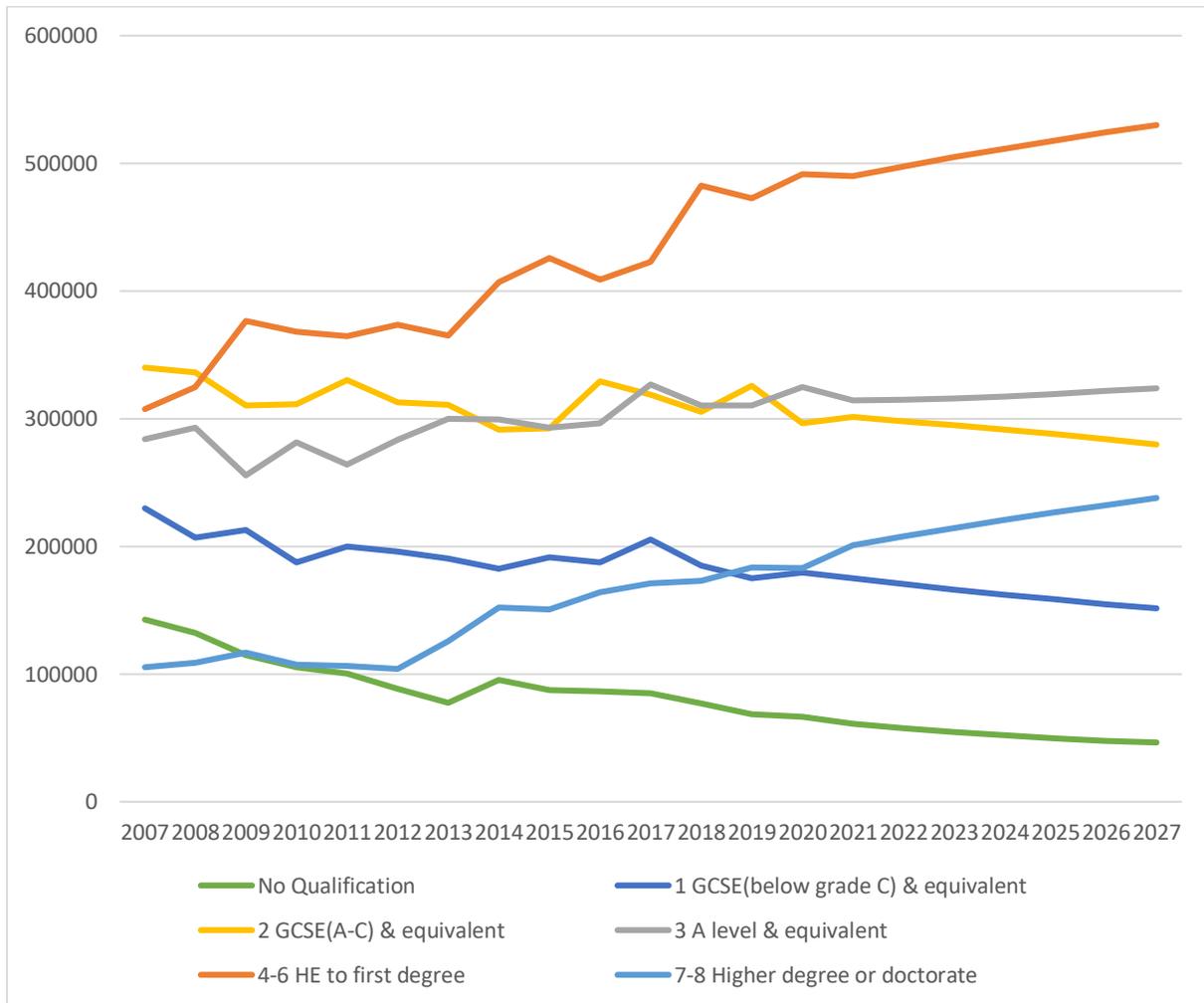
The average level of highest educational qualification³ among those in employment in Wales was increasing between 2007 and 2017 and is projected to continue increasing between 2017 and 2027 (Figure 7.1). The share of those with no qualifications diminishes from 10 per cent to 3 per cent of all in work over this period, and that for people whose highest qualification is less than an A-level is projected to fall from 50 per cent in 2007 to 30 per cent in 2027. The percentage share of those with higher degrees as their highest qualification is projected to double (reaching 15 per cent in 2027), while people with a higher education qualification are projected to form a third of all in work by 2027 (Figure 7.2).

While the share of highly qualified people in the Welsh workforce is increasing, and is projected to continue increasing, this trend is slower than in the UK. Figure 7.3 shows that the percentage of people employed who have a higher education qualification is higher in the UK as a whole than in Wales. Furthermore, the percentage of employed people whose highest qualification is less than an A-level is higher in Wales than in the UK as a whole. Figure 7.3 provides more detail on how the educational profile of employed people is estimated to evolve in the UK as a whole between 2007 and 2027, with high percentage losses of those qualified to Level 1 or below and dramatic gains for those qualified to Level 4 and above.

Table 7.1 presents the profile of employment by highest qualification in Wales in 2017 and 2027. In 2017, 61.1 per cent of those in work had a highest qualification below higher education level (i.e. qualification level below 4). This percentage is projected to fall to 51.1 per cent in 2027. The largest category in 2017 was those with A-levels or equivalents, but by 2027 the largest category is expected to be those with a first degree. The numbers with qualifications of A-levels and below (no qualifications to level 3) is projected to decline, with the largest rates of decline occurring for those with lower level or no qualifications. However, the projected rate of decline is slower than the UK average. In contrast, the rate of increase for those with other higher degrees and doctorates is projected to be faster than the UK average.

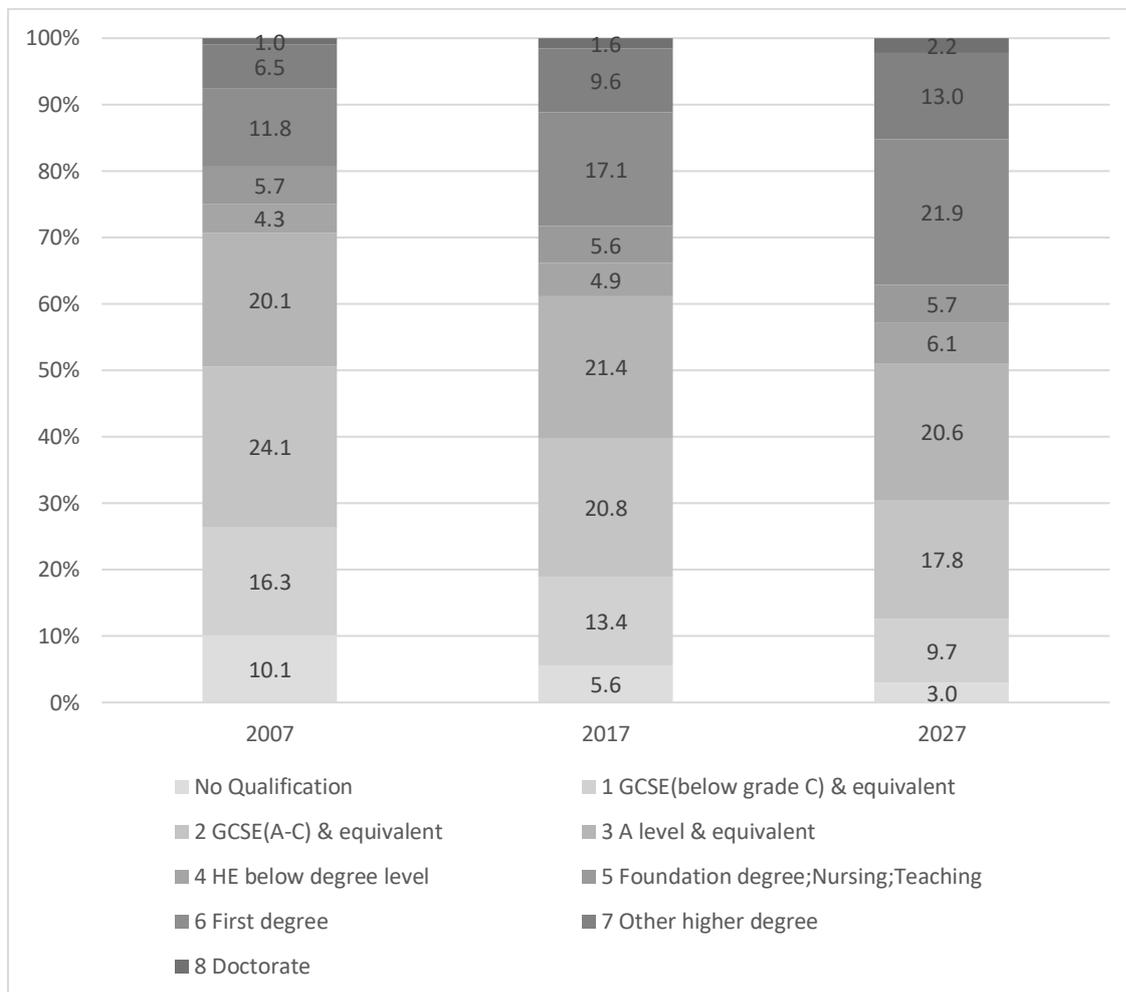
³ Working Futures presents data on highest educational qualifications using the Regulated Qualifications Framework (which applies in England and Northern Ireland). The RQF classification has nine levels: entry level and levels one to eight. The Credit and Qualifications Framework for Wales (CQFW) has the same nine levels as the RQF and has adopted the same level descriptors for regulated (non-degree) qualifications.

Figure 7.1: Employment by highest educational qualification, 2007-2027



Source: *Working Futures, 2017-2027*

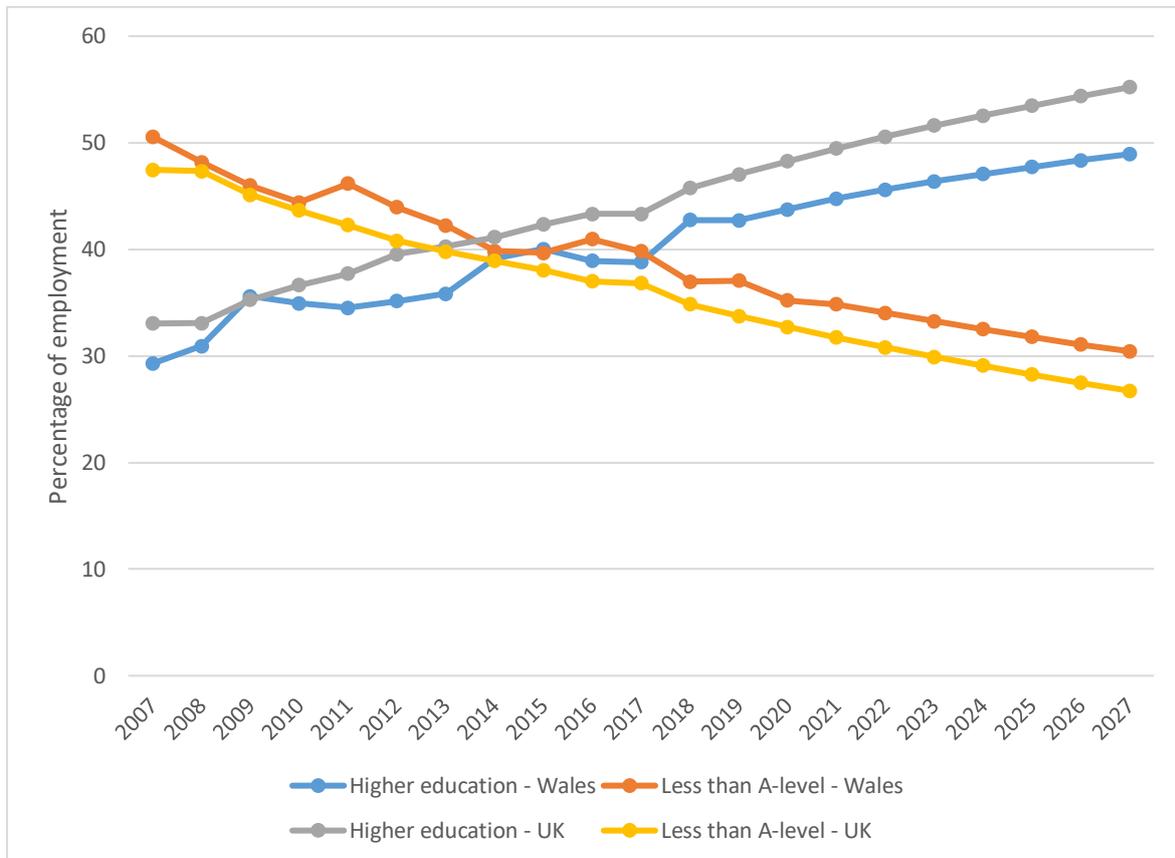
Figure 7.2: Employment shares in Wales by highest educational qualification, 2007, 2017 and 2027



Source: *Working Futures, 2017-2027*

Table 7.2 presents expansion demand, replacement demand and net labour requirement over the period 2017-2027 by highest educational qualification for Wales. Expansion demand is projected to be largest for those with degrees and above, while there is negative expansion demand for those with the lowest or no qualifications. Replacement demand is greatest for those qualified to first degree level, resulting in a net requirement of 195.8 thousand over the period. The other large total requirement is likely to be for people qualified to other higher degree level. These estimates suggest that there will be strong demand from employers for students leaving higher education over the period 2017-2027.

Figure 7.3: Highest educational qualifications in Wales and the UK, 2007 to 2027



Source: *Working Futures, 2017-2027*

Table 7.1: Employment change in Wales by highest educational qualification, 2017-2027

Highest qualification (RQF/CQF level)	Employment 2017		Employment 2027		Change 2017-27		
	(000s)	Share of all employment (%)	(000s)	Share of all employe nt (%)	Wales (000s)	Wales (%)	UK (%)
8 Doctorate	24.3	1.6	34.6	2.2	10.3	42.5	33.4
7 Other higher degree	146.7	9.6	203.3	13.0	56.6	38.6	32.2
6 First degree	261.0	17.1	344.1	21.9	83.0	31.8	34.6
5 Foundation degree;Nursing;Teaching	86.4	5.6	90.0	5.7	3.6	4.2	16.4
4 HE below degree level	75.3	4.9	95.8	6.1	20.5	27.2	30.0
3 A level & equivalent	326.8	21.4	323.7	20.6	-3.1	-1.0	-6.5
2 GCSE(A-C) & equivalent	318.9	20.8	279.8	17.8	-39.1	-12.3	-14.5
1 GCSE(below grade C) & equivalent	205.3	13.4	151.5	9.7	-53.8	-26.2	-34.5
No Qualification	85.0	5.6	46.4	3.0	-38.6	-45.4	-46.0
All qualifications	1529.8	100.0	1569.2	100.0	39.4	2.6	2.8

Source: *Working Futures, 2017-2027*

Table 7.2: Labour requirement by highest educational qualification in Wales, 2017-2027 (000s)

Highest qualification (RQF/CQF level)	Employment (000s)		Labour requirement 2017-2027 (000s)			Replacement demand as % of total requirement	
	2017	2027	Expansion demand	Replacem ent demand	Total requireme nt	Wales	UK
8 Doctorate	24.3	34.6	10.3	8.1	18.5	44.0	51.7
7 Other higher degree	146.7	203.3	56.6	50.8	107.4	47.3	53.7
6 First degree	261.0	344.1	83.0	112.8	195.8	57.6	54.5
5 Foundation degree;Nursing;Teaching	86.4	90.0	3.6	30.5	34.1	89.3	69.4
4 HE below degree level	75.3	95.8	20.5	29.7	50.2	59.2	56.5
3 A level & equivalent	326.8	323.7	-3.1	89.9	86.8	103.6	132.2
2 GCSE(A-C) & equivalent	318.9	279.8	-39.1	86.6	47.5	182.2	231.7
1 GCSE(below grade C) & equivalent	205.3	151.5	-53.8	40.8	-13.0	-314.2	-121.6
No Qualification	85.0	46.4	-38.6	10.2	-28.4	-35.9	-40.2
All qualifications	1529.8	1569.2	39.4	459.6	499.0	92.1	91.6

Source: *Working Futures, 2017-2027*

8. Employment change by Economic Region

The Welsh Government commissioned local Working Futures projections from Cambridge Econometrics and the Warwick IER for the three Economic Regions of Wales (Figure 8.1). Because of the limitations of socio-economic data at this geographical scale, less detail is produced by the model than for Wales. For example, there is no breakdown of employment by gender. The model is estimated separately for each Economic Region and the outputs are not constrained to sum to the Wales total. Working Futures yields projections for the same set of industries, occupations and qualifications as for Wales and estimates replacement demand by industry occupation and highest qualification for each Economic Region. However, because of the lack of local information, the projection model assumes that UK- or Wales-level relationships apply at the local scale. The cautions which apply for Wales are thus even more pertinent when interpreting data for Economic Regions.

Nearly half of employment is projected to be located in the South East Wales in 2027. The share of employment in the region fell slightly between 2007 and 2017, however it is projected to remain unchanged between 2017 and 2027 (Table 8.1). The rate of employment increase between 2007 and 2017 was highest in North Wales, but it is projected to grow only slightly faster than the other two regions between 2017 and 2027 (Table 8.2). Replacement demand greatly exceeds expansion demand in all three economic regions, accounting for nearly all of the total labour requirement. It is largest in South-East Wales (Table 8.3).

Table 8.4 shows regional employment projections by sector. The estimated share of employment in manufacturing is highest in North Wales in both 2017 and 2027, while the share of business and other services is largest in South-East Wales in both years. The estimated employment share of the primary sector is highest in South-West and Mid Wales in both 2017 and 2027).

Table 8.5 reveals that the primary sector gained employment rapidly between 2007 and 2017 in all parts of Wales, but is projected to grow more slowly between 2017 and 2027. Employment in manufacturing industry is projected to contract more slowly between 2017 and 2027 than in the preceding decade in South East and North Wales, but the rate of job loss is projected to increase for South-West and Mid Wales. Business and other services is projected to grow fastest in North Wales (by 7.5%). However this is a slower rate of growth than the region saw between 2007 and 2017. In South West and Mid Wales, by contrast, the rate of employment growth in business and other services is projected to be faster between 2017 and 2027 than it was between 2007 and 2017.

There is little difference between Economic Regions in occupational structure (Table 8.6). The most marked difference in 2017 was that skilled trades occupations were more common in

North Wales and South West and Mid Wales, and less common in South East Wales. This difference is projected to remain in 2027. North Wales is projected to have a higher percentage of process, plant and machine operatives and elementary occupations than the other two regions, while the share of employment in professional, associate professional and administrative and secretarial occupations is projected to be higher in the South East. Professional occupations grew fastest in North Wales between 2007 and 2017, but there is projected to be little geographical variation from 2017 to 2027 (Table 8.7). South-East Wales has the highest percentages of workers with higher level educational qualifications (Table 8.8), but all three Economic Regions are projected to experience a shift towards more highly qualified workers between 2017 and 2027 with very large differences in percentage employment changes between the most highly qualified and least qualified in all three Economic Regions (Table 8.9).

Table 8.1: Employment estimates and projections by Economic Region

Economic Region	Employment 2007	Share of Wales, 2007 (%)	Employment 2017	Share of Wales, 2017 (%)	Employment 2027	Share of Wales, 2027 (%)
North	320.5	22.7	356.3	23.3	365.8	23.3
South-West and Mid Wales	406.2	28.8	439.9	28.8	451.1	28.7
South East	685.7	48.7	736.2	48.1	755.3	48.1
Wales	1,409.0	100.0	1,529.8	100.0	1,569.2	100.0

Source: *Working Futures, 2017-2027*

Note: The sum of employment in the Economic Regions varies slightly from the total for Wales. This is because separate models were estimated for Wales and each region and their totals were not constrained to match.

Table 8.2: Employment change by Economic Region

Economic Region	Change 2007-2017			Change 2017-2027		
	(000s)	%	Annual average	(000s)	%	Annual average
North	35.9	11.2	1.1	9.5	2.7	0.3
South-West and Mid Wales	33.7	8.3	0.8	11.2	2.6	0.3
South East	50.6	7.4	0.7	19.1	2.6	0.3
Wales	120.8	8.6	0.8	39.4	2.6	0.3

Source: *Working Futures, 2017-2027*

Table 8.3: Expansion and replacement demand and total requirement 2017-2027, by Economic Region

Component of total labour requirement, 2017-2027	Economic Region (000s)			Wales (000s)
	North	South-West and Mid Wales	South East	
Expansion demand	9.5	11.2	19.1	39.4
Replacement demand	117.1	145.3	242.2	503.5
Total requirement	126.5	156.5	261.2	542.9
Replacement demand as a percentage of total requirement	92.5	92.8	92.7	92.7

Source: *Working Futures, 2017-2027*

Table 8.4: Percentage employed in each industry sector in 2017 and 2027, by Economic Region

Industry sector	Economic Region						Wales	
	North		South-West and Mid Wales		South East		2017	2027
	2017	2027	2017	2027	2017	2027		
Primary sector and utilities	6.0	5.8	7.1	7.0	4.0	3.9	5.3	5.3
Manufacturing	11.8	10.8	7.9	6.9	9.5	8.4	9.6	8.6
Construction	7.1	7.0	7.4	7.3	6.6	6.5	7.0	6.9
Trade, accommodation and transport	26.0	25.9	25.9	25.7	23.7	23.4	24.9	24.7
Business and other services	19.6	20.5	19.8	20.6	24.4	25.2	22.0	22.8
Non-market services	29.5	29.9	32.0	32.4	31.8	32.4	31.2	31.7
All industries	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: *Working Futures, 2017-2027*

Table 8.5: Percentage employment change by industry sector for 2007-2017 and 2017-2027, by Economic Region

Industry sector	Economic Region						Wales	
	North		South-West and Mid Wales		South East		2007-17	2017-27
	2007-17	2017-27	2007-17	2017-27	2007-17	2017-27		
Primary sector and utilities	38.0	0.4	59.7	1.5	67.3	2.2	55.9	1.4
Manufacturing	-15.8	-6.2	-7.0	-10.0	-17.5	-9.2	-14.7	-8.5
Construction	-7.5	1.1	-8.4	0.9	-4.5	0.9	-6.4	0.9
Trade, accomod. and transport	8.3	2.5	6.0	2.1	5.3	1.6	6.3	1.9
Business and other services	20.3	7.5	1.9	6.7	9.5	6.2	9.4	6.6
Non-market services	25.1	4.0	16.2	4.1	15.5	4.5	18.0	4.2
All industries	11.2	2.7	8.3	2.6	7.4	2.6	8.6	2.6

Source: *Working Futures, 2017-2027*

Table 8.6: Percentage employed by occupation in 2017 and 2027, by Economic Region

SOC Major group	Economic Region						Wales	
	North		South-West and Mid Wales		South East		2017	2027
	2017	2027	2017	2027	2017	2027		
Managers, directors and senior officials	7.9	8.7	7.9	8.6	8.0	8.8	7.9	8.7
Professional occupations	17.8	19.7	18.5	20.5	19.4	21.4	18.8	20.7
Associate professional and technical	10.8	11.6	11.0	11.8	11.7	12.5	11.2	12.0
Administrative and secretarial	9.9	8.4	10.1	8.5	11.1	9.3	10.5	8.8
Skilled trades occupations	14.5	13.1	14.6	13.3	12.1	10.9	13.4	12.1
Caring, leisure and other service	10.6	11.6	11.1	12.2	11.1	12.1	11.0	12.0
Sales and customer service	8.0	7.6	8.2	7.7	8.3	7.9	8.2	7.8
Process, plant and machine operatives	8.2	7.3	7.0	6.2	7.3	6.4	7.4	6.6
Elementary occupations	12.3	12.1	11.6	11.3	11.1	10.7	11.5	11.2
All occupations	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: *Working Futures, 2017-2027*

Table 8.7: Percentage employment change by occupation for 2007-2017 and 2017-2027, by Economic Region

SOC Major group	Economic Region						Wales	
	North		South-West and Mid Wales		South East		2007-17	2017-27
	2007-17	2017-27	2007-17	2017-27	2007-17	2017-27		
Managers, directors and senior officials	27.2	13.1	24.9	12.4	25.9	12.6	26.0	12.6
Professional occupations	34.9	13.4	27.5	13.2	28.7	13.2	29.8	13.2
Associate professional and technical	23.4	10.3	16.7	9.8	16.4	9.7	18.2	9.8
Administrative and secretarial	0.2	-13.2	-6.7	-14.0	-5.0	-13.6	-4.3	-13.6
Skilled trades occupations	6.1	-6.8	11.1	-6.6	3.1	-7.4	6.3	-7.0
Caring, leisure and other service	38.2	12.0	31.1	12.3	32.2	12.5	33.3	12.3
Sales and customer service	-2.6	-2.7	-6.8	-3.3	-3.7	-2.5	-4.4	-2.8
Process, plant and machine operatives	-13.5	-9.4	-8.2	-9.2	-15.5	-9.8	-13.1	-9.5
Elementary occupations	-4.4	0.9	-12.2	-0.2	-12.4	-1.3	-10.4	-0.5
All occupations	11.2	2.7	8.3	2.6	7.4	2.6	8.6	2.6

Source: *Working Futures, 2017-2027*

Table 8.8: Percentage employed by highest qualification in 2017 and 2027, by Economic Region

Highest qualification (RQF)	Economic Region						Wales	
	North		South-West and Mid Wales		South East		2017	2027
	2017	2027	2017	2027	2017	2027		
RQF8 Doctorate	7.9	8.7	7.9	8.6	8.0	8.8	7.9	8.7
RQF7 Other higher degree	17.8	19.7	18.5	20.5	19.4	21.4	18.8	20.7
RQF6 First degree	10.8	11.6	11.0	11.8	11.7	12.5	11.2	12.0
RQF5 Foundation degree;Nursing;Teaching	9.9	8.4	10.1	8.5	11.1	9.3	10.5	8.8
RQF4 HE below degree level	14.5	13.1	14.6	13.3	12.1	10.9	13.4	12.1
RQF3 A level & equivalent	10.6	11.6	11.1	12.2	11.1	12.1	11.0	12.0
RQF2 GCSE(A-C) & equivalent	8.0	7.6	8.2	7.7	8.3	7.9	8.2	7.8
RQF1 GCSE(below grade C) & equivalent	8.2	7.3	7.0	6.2	7.3	6.4	7.4	6.6
No Qualification	12.3	12.1	11.6	11.3	11.1	10.7	11.5	11.2

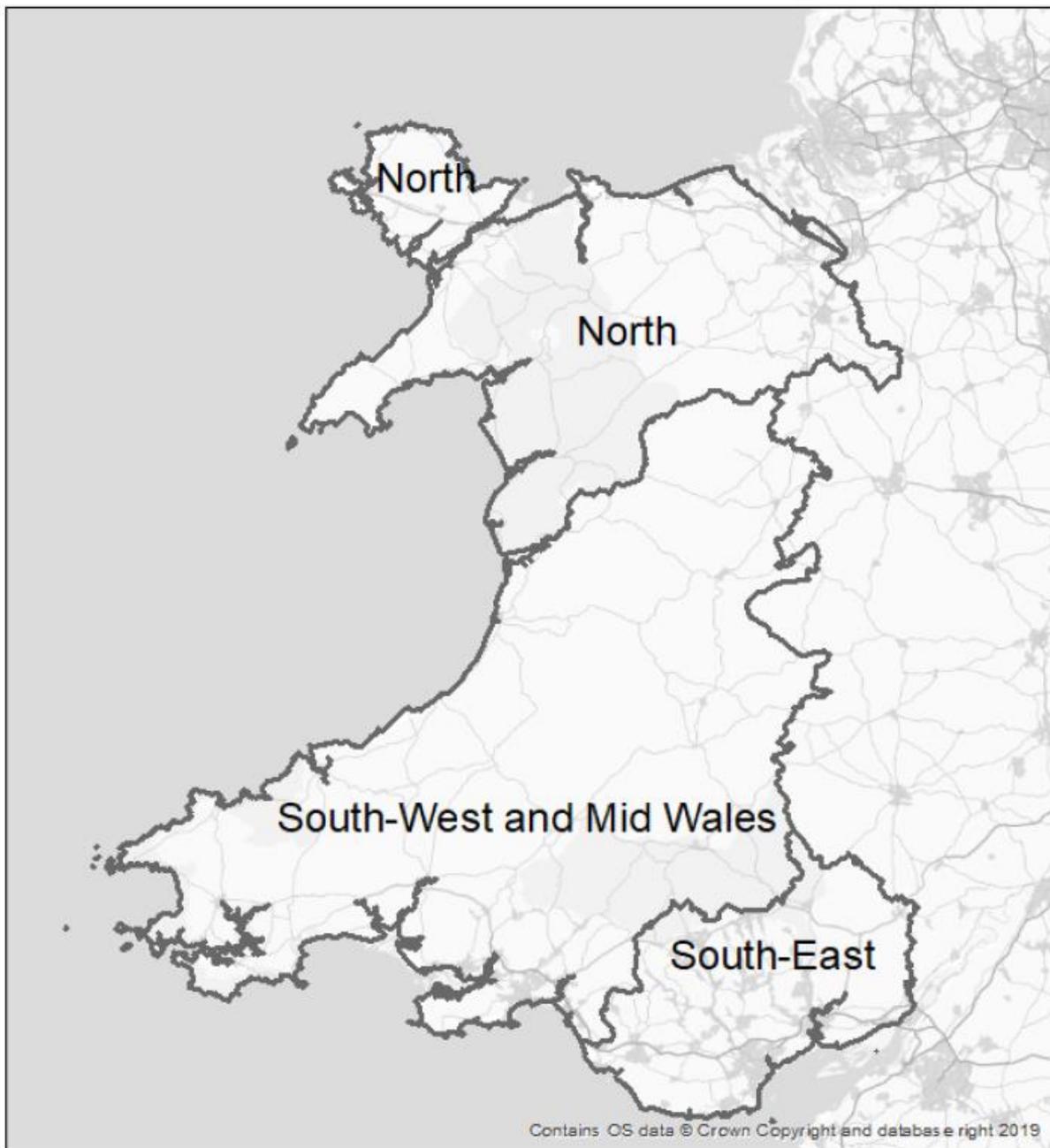
Source: *Working Futures*, 2017-2027

Table 8.9: Percentage employment change by highest qualification for 2007-2017 and 2017-2027, by Economic Region

Highest qualification (RQF)	Economic Region						Wales	
	North		South-West and Mid Wales		South East		2007-17	2017-27
	2007-17	2017-27	2007-17	2017-27	2007-17	2017-27		
RQF8 Doctorate	88.6	43.3	79.9	42.4	77.4	42.4	80.6	42.5
RQF7 Other higher degree	67.4	39.4	57.2	38.0	57.8	38.6	59.8	38.6
RQF6 First degree	63.1	32.9	55.0	32.1	54.4	31.2	56.6	31.8
RQF5 Foundation degree;Nursing;Teaching	13.0	5.7	7.5	4.8	6.0	3.3	8.1	4.2
RQF4 HE below degree level	27.3	28.4	25.5	28.1	20.8	26.0	23.8	27.2
RQF3 A level & equivalent	17.5	-0.6	15.1	-0.7	14.0	-1.3	15.2	-1.0
RQF2 GCSE(A-C) & equivalent	-3.4	-11.6	-6.4	-12.3	-7.6	-12.6	-6.2	-12.3
RQF1 GCSE(below grade C) & equivalent	-7.8	-25.2	-10.6	-26.3	-12.2	-26.7	-10.7	-26.2
No Qualification	-38.9	-46.2	-39.4	-45.7	-41.8	-44.9	-40.4	-45.4
All qualifications	11.2	2.7	8.3	2.6	7.4	2.6	8.6	2.6

Source: *Working Futures*, 2017-2027

Figure 8.1: Map of Economic Regions in Wales



9. Conclusion

The *Working Futures* projections indicate that employment in Wales is likely to grow more slowly over the period 2017 to 2027 than in the preceding decade. The earlier period included the employment contraction consequent upon the financial crisis of 2007-8, and a recovery in jobs from 2012 to 2017. Employment in Wales is projected to grow slightly more slowly than in the UK as a whole (at 0.3 per cent per annum), but national and regional variations within the UK are quite small. The employment trends projected for Wales are quite similar to the UK averages. However, the economy's requirement for labour over this period is likely to be more than 11 times greater than the growth in employment, due to the need to replace workers leaving the workforce. These projections were produced before the Covid-19 pandemic emerged. This will have an impact on trends especially in the short term.

The number of women employed is expected to increase much faster than the number of men, increasing the female share of employment in Wales. Male full-time employment is also projected to contract, while male part-time employment grows at around the UK average annual rate. For women part-time work accounts for the majority of the employment increase. Overall, part-time employment is projected to grow around twice as fast as full-time employment. In contrast to the period up to 2017, self-employment is projected to decline by 3.9 per cent, slightly more quickly than the UK average, with the decline faster for males than females. Most of the increase in employment is expected to be in part-time jobs, and male full-time employment is projected to contract.

The relative shift of employment towards the service sector is projected to continue over the period 2017 to 2027. The largest sector is non-market services, followed by trade, accommodation and transport. The slow contraction of employment in manufacturing industry is likely to continue, while employment in business and other services is expected to increase. This is reflected in the continued movement in the occupational structure towards higher status occupations. Since the health and education sectors are expected to continue to be major employers, the demand for professional, associate occupations and caring, leisure and other service occupations is projected to increase. Nevertheless, the ageing of the population means there will be continued replacement demand in declining occupations.

The consequence of these occupational trends combined with increased participation in higher education is a continued shift in the qualification profile towards higher level

qualifications over the period 2017 to 2027. However, the average level of educational qualification among workers in Wales is likely to continue to be lower than the UK average and the rate of improvement will remain slower.

The local *Working Futures* projections reveal only small differences in expected rates of employment change between the three Economic Regions. South-East Wales is likely to experience the shift towards the service sector and more highly skilled and qualified employment most strongly, while manufacturing industry and associated occupations are expected to remain more significant in North Wales.

Appendix A.1: Regional Annex

Local *Working Futures* projections for the three Economic Regions of Wales were commissioned from Cambridge Econometrics and the Warwick IER by the Welsh Government. These have been summarised in Chapter 8 of this report. Detailed estimates of employment change by industry, occupation and highest educational qualification have been produced and are contained in an Excel workbook for each Economic Region. In addition, the workbooks include separate projections for the Mid Wales and South West Wales regions. The contents of each workbook are summarised in Table A.1.1 below. As can be seen, a very large amount of information is available. Thus, only summary tables for employment by industry and occupation are presented in Tables A.1.2 and A.1.3.

Table A.1.1: The worksheets contained in each workbook

Sheet name	Contents
Ind T1	Employment by Industry Sector (6 industries)
Ind T2	Employment by Industry Group (22 industries)
Ind T4	Employment by Industry Group in Sector (6 + 22 industries)
Ind F1	Bar Chart Growth in Employment by Industry Group (6 + 22 industries)
Ind F2	Line Chart Employment by Industry (6 + 22 industries)
Occ T1	Employment Change by Occupation Group and Replacement Demand (9 occupations)
Occ T2	Employment Change by Occupation and Replacement Demand (25 occupations)
Occ T3	Employment Change by Occupation in Occupation Group (9 + 25 occupations)
Occ F1	Bar Chart Growth in Employment by Occupation (9 + 25 occupations)
Occ F2	Line Chart Employment by Occupation (9 + 25 occupations)
Occ F3	Changes in Occupational Employment Structure (9 occupations)
Qual T1	Employment by Qualification (9 qualifications)
Qual F1	Line chart Employment by Qualification (9 qualifications)
ShiftShare T1	Shift-Share by Occupation (25 occupations)
RD T1	Replacement Demand by Occupation and Qualification (25 occupations by 9 qualifications)
RD F1	Replacement Demand by Occupation Group (9 + 25 occupations)
Basic T1	Employment by Industry Sector, Occupation Group and Qualification (9 occupations by 6 industries by 9 qualifications)
Basic T2	Employment Change by Occupation and Replacement Demand (25 occupations by 9 qualifications)
Basic T3	Occupation by Qualification (25 occupations by 9 qualifications)

Table A.1.2: Components of employment change by industry Sector, 2007-2027 (000s)

Economic Region and SIC 2007 sector	2007	2017	2027	2017-2027		
				Expansion Demand	Replacement Demand	Total Requirement
North Wales						
1 Primary sector and utilities	15	21	21	0	7	7
2 Manufacturing	50	42	39	-3	12	9
3 Construction	27	25	26	0	7	7
4 Trade, accommodation and transport	85	92	95	2	30	32
5 Business and other services	58	70	75	5	23	29
6 Non-marketed services	84	105	109	4	38	42
All industries	320	356	366	9	117	127
South-West and Mid Wales						
1 Primary sector and utilities	20	31	32	0	10	11
2 Manufacturing	37	35	31	-3	9	6
3 Construction	36	33	33	0	9	10
4 Trade, accommodation and transport	107	114	116	2	37	39
5 Business and other services	85	87	93	6	29	35
6 Non-marketed services	121	141	146	6	50	56
All industries	406	440	451	11	145	156
South-East Wales						
1 Primary sector and utilities	17	29	30	1	9	10
2 Manufacturing	85	70	64	-6	19	13
3 Construction	51	49	49	0	14	14
4 Trade, accommodation and transport	165	174	177	3	56	59
5 Business and other services	164	179	191	11	60	71
6 Non-marketed services	203	234	245	11	84	95
All industries	686	736	755	19	242	261

Source: *Working Futures, 2017-2027*

Table A.1.3: Components of employment change by Occupation (SOC Major Group), 2007-2027 (000s)

Economic Region and SOC 2010 Major Group	2007	2017	2027	2017-2027		
				Expansion demand	Replacement Demand	Total Requirement
North Wales						
1.Managers, directors and senior officials	22	28	32	4	11	15
2. Professional occupations	47	63	72	9	22	31
3. Associate professional and technical	31	38	42	4	13	17
4. Administrative and secretarial	35	35	31	-5	11	6
5. Skilled trades occupations	49	52	48	-3	14	11
6. Caring, leisure and other service	27	38	42	5	15	19
7. Sales and customer service	29	29	28	-1	9	8
8. Process, plant and machine operatives	34	29	27	-3	8	5
9. Elementary occupations	46	44	44	0	14	14
All occupations	320	356	366	9	117	127
South-West and Mid Wales						
1.Managers, directors and senior officials	28	35	39	4	13	18
2. Professional occupations	64	82	92	11	29	39
3. Associate professional and technical	41	48	53	5	16	21
4. Administrative and secretarial	48	45	38	-6	14	8
5. Skilled trades occupations	58	64	60	-4	18	14
6. Caring, leisure and other service	37	49	55	6	19	25
7. Sales and customer service	38	36	35	-1	11	10
8. Process, plant and machine operatives	33	31	28	-3	9	6
9. Elementary occupations	58	51	51	0	16	16
All occupations	406	440	451	11	145	156
South-East Wales						
1.Managers, directors and senior officials	47	59	66	7	23	30
2. Professional occupations	111	143	161	19	50	69
3. Associate professional and technical	74	86	94	8	28	37
4. Administrative and secretarial	86	81	70	-11	25	14
5. Skilled trades occupations	86	89	83	-7	24	18
6. Caring, leisure and other service	62	81	92	10	32	42
7. Sales and customer service	64	61	60	-2	19	18
8. Process, plant and machine operatives	64	54	49	-5	15	10
9. Elementary occupations	93	82	80	-1	25	24
All occupations	686	736	755	19	242	261

Source: *Working Futures, 2017-2027*

Table A.1.4: Components of employment change by highest qualification 2007-2027 (000s)

Economic Region and highest qualification	2007	2017	2027	2017-2027		
				Expansion demand	Replacement Demand	Total Requirement
North Wales						
8 Doctorate	3	5	8	2	2	4
7 Other higher degree	19	32	45	13	12	25
6 First degree	36	59	78	19	28	47
5 Foundation degree;Nursing;Teaching	18	20	21	1	8	9
4 HE below degree level	14	18	23	5	8	13
3 A level & equivalent	65	77	76	0	23	23
2 GCSE(A-C) & equivalent	78	75	67	-9	23	14
1 GCSE(below grade C) & equivalent	53	49	37	-12	11	-1
No Qualification	34	21	11	-10	3	-7
All qualifications	320	356	366	9	117	127
South-West and Mid Wales						
8 Doctorate	4	7	10	3	3	5
7 Other higher degree	27	42	58	16	16	32
6 First degree	48	74	98	24	35	59
5 Foundation degree;Nursing;Teaching	23	25	26	1	10	11
4 HE below degree level	17	22	28	6	9	16
3 A level & equivalent	82	94	94	-1	29	28
2 GCSE(A-C) & equivalent	98	92	81	-11	28	16
1 GCSE(below grade C) & equivalent	66	59	43	-15	13	-2
No Qualification	41	25	14	-11	3	-8
All qualifications	406	440	451	11	145	156
South-East Wales						
8 Doctorate	7	12	17	5	4	9
7 Other higher degree	46	73	101	28	27	55
6 First degree	83	129	169	40	60	100
5 Foundation degree;Nursing;Teaching	39	42	43	1	16	17
4 HE below degree level	30	36	45	9	15	25
3 A level & equivalent	137	156	154	-2	47	45
2 GCSE(A-C) & equivalent	164	152	133	-19	45	26
1 GCSE(below grade C) & equivalent	111	98	71	-26	22	-4
No Qualification	68	39	22	-18	5	-12
All qualifications	686	736	755	19	242	261

Source: *Working Futures, 2017-2027*

Appendix A.2: Technical Annex

Further details of the *Working Futures* projections

The reports from the UK *Working Futures* 2027-2027 projections can be found on the gov.uk website at: <https://www.gov.uk/government/publications/labour-market-and-skills-projections-2017-to-2027>. There are four reports, as follows:

- Long-run labour market and skills projections: main report :
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/863506/Working_Futures_Main_Report.pdf
- Long-run labour market and skills projections: headline report:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/863886/Working_Futures_Headline_Report.pdf
- Technical report on sources and methods:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/863508/Working_Futures_Technical_Report.pdf
- Annexes (including the Annex describing the projections for the nations and regions of the UK);
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/863979/200204_Working_Futures_Annexes_-_For_Publication.pdf

The workbooks containing the results for the UK, the four nations of the UK and Government Office Regions can be downloaded from the IER website. Workbooks for Local Enterprise Partnerships in England will also be made available.

Terminology

The report makes reference to expansion demand, replacement demand and the total requirement. These can be summarised as:

- Expansion demand – the net change in the number of jobs between two points in time;

- Replacement demand – the need for employers to replace workers due to mortality, retirement or other reasons and
- Total requirement – the sum of expansion and replacement demand.

Due to data limitations, replacement demand projections are based on the assumption that the general patterns of age structure and rates of flow are common across all sectors and regions. This will not be true in practice, although they are occupation-specific at the UK level. For this reason replacement demand results at the sector level should be considered as merely indicative. Replacement demand calculations are made by occupation and aggregated across occupations within industries (or educational levels) to produce estimates for industries (or for highest educational qualification). Rounding error due to small categories or missing data can lead to inconsistencies between replacement demand estimates, which is most apparent in the estimates by highest educational qualification.

Industrial and occupational classifications

Table A2.1 below shows how the 6 sectors and 22 industries used to present employment trends by industry are defined in terms of the 2007 Standard Industrial Classification. It also demonstrates the composition of sectors in terms of industries. The levels of the 2010 Standard Occupational Classification used in the report are presented in Table A2.2.

Caveats for interpreting *Working Futures* projections

As with all projections and forecasts, the results presented in *Working Futures* should be regarded as indicative of likely trends and orders of magnitude given a continuation of past patterns of behaviour and performance, rather than precise forecasts of the future.

As noted in the main text, the projections were conducted before the Covid-19 crisis emerged. herein the short-term, the model predictions will diverge from reality as the impact of an economic crisis the nature of which could not be predicted plays out. However, if the lockdown is relatively short and the impact in terms of permanent loss of economic activity is limited, the longer term trends and patterns of the economy will largely re-establish themselves and the model predictions will more closely reflect actual economic conditions.

Creation of the projections involves a great deal of estimation to produce employment time-series which are consistent over time, which may not precisely match the employment data published by the Office for National Statistics. The detailed reasons for this are explained in the *Technical Report*.

Table A.2.1: Working Futures Industry classifications

6 sectors		22 Industries		
Code	Name	Code	Name	SIC 2007
1	Primary sector and utilities	1	Agriculture	(01-03)
		2	Mining and quarrying	(05-09)
		6	Electricity and gas	(35)
		7	Water and sewerage	(36-39)
2	Manufacturing	3	Food and drink	(10-12)
		4	Engineering	(26-28)
		5	Rest of manufacturing	(13-25) (29-33)
3	Construction	8	Construction	(41-43)
4	Trade, accommodation and transport	9	Wholesale and retail trade	(45-47)
		10	Transport and storage	(49-53)
		11	Accommodation and food	(55-56)
		12	Media	(58-60) (63)
5	Business and other services	13	IT	(61-62)
		14	Finance and insurance	(64-66)
		15	Real estate	(68)
		16	Professional services	(69-75)
		17	Support services	(77-82)
		21	Arts and entertainment	(90-93)
		22	Other services	(94-96)
		6	Non-market services	18
19	Education			(85)
20	Health and social work			(86-88)

Table A.2.2: Working Futures occupational classifications

SOC 2010 Major Group		SOC 2010 Sub-Major Group	
Code	Name	Code	Name
1	Managers, directors and senior officials	11	Corporate managers and directors
		12	Other managers and proprietors
2	Professional occupations	21	Science, research, engineering and technology professionals
		22	Health professionals
		23	Teaching and educational professionals
		24	Business, media and public service professionals
		31	Science, engineering and technology associate professionals
3	Associate professional and technical	32	Health and social care associate professionals
		33	Protective service occupations
		34	Culture, media and sports occupations
		35	Business and public service associate professionals
		41	Administrative occupations
4	Administrative and secretarial	42	Secretarial and related occupations
		51	Skilled agricultural and related trades
5	Skilled trades occupations	52	Skilled metal, electrical and electronic trades
		53	Skilled construction and building trades
		54	Textiles, printing and other skilled trades
		61	Caring personal service occupations
6	Caring, leisure and other service	62	Leisure, travel and related personal service occupations
		71	Sales occupations
7	Sales and customer service	72	Customer service occupations
		81	Process, plant and machine operatives
8	Process, plant and machine operatives	82	Transport and mobile machine drivers and operatives
		91	Elementary trades and related occupations
9	Elementary occupations	92	Elementary administration and service occupations