High Level Skills in Yorkshire and Humber: Understanding the Drivers of Change

Phase 1 High Level Skills Context

A Report to Yorkshire Futures

CRESR
Centre for Regional Economic and Social Research

May 2010

European Union
European Social Fund
Investing in jobs and skills

yorkshirefutures

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1 Introduction

1.1 High level skills (HLS) appear to play a key role in the growth and productivity of economies. As Yorkshire and Humber (Y&H) makes the transition to a knowledge-based economy, the extent to which it is able to attract, develop and retain higher skilled workers will be a necessary, although not necessarily sufficient, condition in generating more high value jobs.

1.2 For clarity, HLS are defined to be any qualification at Level 4 and above, both academic and vocational, including professional qualifications and non-accredited Continuing Professional Development qualifications.

1.3 The overall aim of this project is to assess the context for HLS development in Y&H. In doing so, the study seeks to provide Yorkshire Futures and its partners with a greater insight into how the growth in HLS can be accelerated and to understand which interventions are likely to be the most effective. Sitting beneath this aim are the following objectives:

- Conceptualising the HLS context in Y&H;
- Identifying what works in both the HLS context and similar contexts; and
- Drawing on the above to generate recommendations for policy intervention.

1.4 The research is being undertaken in two phases. The first phase, to which this report relates, seeks to establish the regional context for HLS development, examining how Y&H performs and reviewing the evidence on what works. Comparator analysis has also been undertaken to explore what, if anything, Y&H can learn from skills development in other regions.

1.5 The second phase will seek to build on this analysis and apply a realist synthesis method of evidence review to arrive at a series of policy implications. Findings from the second phase of the work will be presented in a phase two report in August 2010.

1.6 This report is a high level summary which concentrates on examining the key evidence on HLS. It is recognised that there is a wealth of evidence which may be directly or indirectly relevant. Our focus has been on a series of specific key sources, set out in Annex 1. A detailed evaluation of the effectiveness of existing interventions, for example Train to Gain, to boosting HLS in Y&H is outside the scope of this review. Rather, the focus is on synthesising evaluation, academic and practitioner evidence to generate a set of policy implications.

2 High Level Skills: Y&H Performance

Introduction

2.1 Understanding the factors that influence HLS performance is central to this study. This section of the report draws on academic literature and statistical evidence to examine the relationship between supply (e.g. workforce qualifications) and demand (e.g. jobs in knowledge based industries) factors. It also considers whether a low skills equilibrium exists in Y&H and the associated policy implications.

2.2 It is recognised that the economic performance and structure of Y&H is not uniform. Where appropriate, the key datasets are broken down into the four functional sub-regions (FSRs) of Sheffield City Region, Leeds City Region, Hull and the Humber Ports City Region, and York and North Yorkshire.

The Role of the Supply Side in HLS Performance

The National Picture

2.3 Until recently, UK policy on skills has centred on supply-side assumptions that aggregate levels of skill to drive national economic performance (Keep, 2006; Payne 2008), although there are tentative signs that this is changing, as outlined below. This assumed link between skills and productivity has been premised on close examination of cross-national league tables of skill levels in which Britain performs less well than some of its international competitors (Keep, 2006).

2.4 The diagnosis that flows from this has encouraged policymakers to focus on education and training as a 'panacea' (Lloyd and Payne, 2003: 86) to a vast area of social and economic problems including poor productivity and weak competitiveness. In terms of HLS, this has translated into policies to expand higher education on the dual presumption that this will improve economic performance and increase access to better jobs for those from lower socio-economic backgrounds (Keep and Mayhew, 2004). A commitment remains to a target of 50% higher education participation as recently reaffirmed in the Skills for Growth white paper (BIS, 2009). Critically, the shift from an elite to a mass higher education system is seen by policymakers as not only satisfying existing demand but also stimulating demand for better jobs from employers (Wilton, 2008). In other words, supply will generate its own demand.

2.5 Policies to boost the supply of skills are justified on two grounds. Firstly, there is empirical evidence to suggest growing demand for HLS. In reviewing the polarised opinions on the validity of a supply side skills policy, Wilton (2008: 1-2) presents a series of studies that support the government's position by identifying a growing demand for qualifications, an increase in high-skilled jobs and a rise in the utilisation of skills. Wilton also highlights research (see Purcell and Wilton, 2004) suggesting that the expansion of higher education has not led to a deterioration in employment opportunities for graduates or an over-supply of graduates. Moreover, Felstead et al.'s (2002) skills survey reported an approximate balance between the supply of high level qualifications (Level 4 or above) in the workforce and employers' utilisation of these qualifications across the economy, despite imbalances at other levels of qualification.

2.6 A second justification for boosting the supply of skills is the notion that the optimum supply has not yet been achieved because of market failure. Keep (2006) identifies four categories of reason used to explain why the market for skills may be subject to failure:

- Imperfect information on the benefits of investing in learning or training on the part of both employers and individuals;

- Time preference, short-termism and risk aversion where individuals or firms fixate on the short-term and ignore long-term benefits. This partly reflects the complexity of discounting future benefits;

- Capital market imperfections where problems may be encountered in obtaining funding for investment. For example, individuals may struggle to secure personal loans needed to fund education; and

- Externalities where the wider benefits of skill formation are not fully captured by those investing in it, thereby leading to a disinclination to invest. Employers, for example, may be reluctant to train staff if they fear they may subsequently leave. Moreover, the wider spillover benefits of training or education such as a more skilled workforce boosting national productivity may have little impact on the investment decisions of individual firms.

Supply Side Characteristics in Y&H

2.7 The evidence from Y&H supports some but not all of these arguments. Below we examine supply side dynamics. The four categories of market failure are considered in Chapter 4.

2.8 Looking at the key characteristics, 25% of the region's working age population possessed a qualification at NVQ4 or above in 2008, up from 19% a decade earlier. Increased participation in higher education has been a key driver, but in spite of this growth, the region's ranking dropped from sixth to seventh of the nine English regions.

Table 2.1 Attainment of NVQ Level 4+ by Age Group, 2008, Rank

	16-19	20-24	25-29	30-39	40-49	50-ret
East	8	3	6	4	5	7
East Midlands	7	5	9	6	6	5
London	6	1	1	1	1	1
North East	3	8	8	8	9	9
North West	6	4	5	5	4	6
South East	4	2	2	2	2	2
South West	5	7	3	3	3	3
West Midlands	2	9	4	9	7	8
Yorkshire & Humber	1	6	7	7	8	4

Source: Annual Population Survey, 2008, ONS.

2.9 The region's ranking is broadly similar across age groups, with the exception of those aged 50 and over (see Table 2.2 overleaf). This suggests that lifestyle factors, particularly in York and North Yorkshire, may act as a significant magnet to highly qualified people to reside in the region, when career advancement opportunities are less of a consideration.

Table 2.2 Attainment of NVQ Level 4+ by Age Group, 2008, %						
	16-19	20-24	25-29	30-39	40-49	50-ret
East	0.7	22.7	32.3	32.6	28.1	25.7
East Midlands	1.0	19.5	31.3	31.6	28.1	26.2
London	1.1	32.0	51.9	47.7	37.6	33.5
North East	1.4	18.7	31.9	30.7	25.7	23.8
North West	1.1	19.8	32.5	31.9	28.8	25.9
South East	1.3	22.9	37.4	39.6	35.4	31.8
South West	1.3	18.8	34.7	35.0	31.7	30.2
West Midlands	1.9	18.0	33.4	29.8	27.0	24.9
Yorkshire & Humber	2.3	19.0	32.0	31.2	26.5	26.6
Functional Sub-region						
Leeds CR	*1.5*	*20.5*	*34.5*	*31.7*	*27.1*	*27.6*
Hull & Humber Ports CR	*1.4*	*13.8*	*21.3*	*28.1*	*23.7*	*21.6*
York and N Yorkshire	*1.2*	*21.2*	*39.2*	*43.0*	*34.8*	*35.2*
Sheffield CR	*2.3*	*14.8*	*30.2*	*29.5*	*26.7*	*26.8*
Source: Annual Population Survey, 2008, ONS.						

2.10 Within Y&H, the Hull and the Humber Ports City Region performs relatively poorly. Low levels of educational attainment, although improving, feed through into poor progression into higher education and a local economy which has too few businesses which demand HLS and qualification levels.

2.11 At an FSR level, York and North Yorkshire has a higher proportion of its working age population with HLS than any other English region, excluding London (see Tables 2.2 and 2.3). For the Leeds City Region, the profile suggests a strong initial level of graduate retention followed by a leakage of higher skilled individuals elsewhere. This is explored further below.

Table 2.3 Household Qualifications and Skills, % of respondents					
	Hull and Humber Ports City Region	Leeds City Region	York and North Yorkshire	Sheffield City Region	Y&H
Fewer than 5 GCSEs/ NVQ Level 1	18.8	18.2	17.1	18.9	18.2
5+ GCSEs (grade A* - C) or equiv.	26.5	28.9	32.9	27.2	28.1
NVQ Level 2, Intermediate GNVQ	11.4	10.7	9.7	12.2	11.1
2+ A levels, 4+ AS Levels or equiv.	13.3	17.0	20.4	14.7	15.9
Trade Qualifications	18.2	17.1	20.1	17.3	17.3
NVQ Level 3, OND, Advanced GNVQ	8.7	7.8	8.5	8.4	8.1
NVQ Level 4 or 5, HNC, HND	6.2	6.0	7.4	5.9	6.1
First Degree	14.5	18.0	22.5	14.7	16.7
Postgraduate Qualification e.g. MA	5.4	7.1	8.9	5.7	6.6
No qualifications	14.5	13.0	10.8	14.5	13.6
Source: Acxiom, 2009. Copyright © 2010 Acxiom Corporation.					

2.12 There is a natural increase in the demand for training as individuals become more qualified themselves. One in five of the Y&H workforce is considering training in the next 12 months which is close to the national average (see Table 2.4). The differences between qualification levels, with the exception of those having no qualifications, are not substantial, suggesting that efforts to stimulate employee engagement in learning are likely to be equally effective across a number of groups in the labour market.

Table 2.4 Demand for Skills Development (% considering training)

	NVQ Level 1 or equivalent	NVQ Level 2 or equivalent	NVQ Level 3 or equivalent	NVQ Level 4 or 5 or equivalent	Up to Degree/ Postgrad	No Quals
North West	19.0	21.8	22.3	23.0	23.0	6.9
North East	16.9	21.4	24.1	24.4	23.7	6.2
East Midlands	18.9	21.1	22.0	22.8	22.8	6.3
West Midlands	20.9	23.0	23.9	24.3	24.0	7.9
East	17.2	19.1	20.9	21.6	21.5	6.0
London	24.1	25.9	27.4	28.5	28.2	10.2
South East	17.5	19.0	20.2	21.0	20.7	6.0
South West	17.1	19.4	21.1	22.0	21.8	5.3
Y & H	20.4	21.8	22.7	23.2	22.8	7.7
England	19.2	21.3	22.5	23.3	23.2	7.0

Source: Acxiom, 2009. Copyright © 2010 Acxiom Corporation.

2.13 Possession of some of the components of HLS varies across Y&H but not by as much as might be expected given the relative differences in qualifications attainment. Team working, customer care and management skills are the most in demand in Y&H (see Table 2.5).

Table 2.5 Skills Self Assessment

	Hull and Humber Ports City Region	Leeds City Region	York and North Yorkshire Sub-Region	Sheffield City Region	Y&H
Marketing	9.4%	11.1%	13.3%	9.5%	10.4%
Team Working	26.9%	28.9%	30.1%	26.6%	27.9%
Selling	14.6%	16.0%	17.0%	14.7%	15.4%
Customer Care	22.6%	25.0%	26.2%	23.2%	24.1%
Microsoft Office	19.3%	22.5%	23.0%	19.7%	21.1%
Management	21.4%	23.5%	27.3%	21.1%	22.5%
Communications	19.7%	21.6%	23.3%	19.6%	20.8%
Clerical / Secretarial	18.1%	19.6%	20.1%	17.9%	18.8%
No Response	62.9%	60.5%	58.4%	63.5%	61.7%

Source: Acxiom, 2009. Copyright © 2010 Acxiom Corporation.

2.14 However, data from the Acxiom 2009 household survey suggests that more than nine in ten residents do not have a strong desire to develop work-related skills in a wide range of service related activities (see Table 2.6), suggesting that interventions focused on boosting individuals' aspirations and demand for training are unlikely to play to a receptive audience, and will need to be targeted.

Where a desire was expressed, the strongest motivations were to develop management and/or IT skills.

Table 2.6 Skills Development Aspirations

	Hull and Humber Ports City Region	Leeds City Region	York and North Yorkshire Sub-Region	Sheffield City Region	Y&H
Marketing	2.4%	2.9%	2.4%	2.5%	2.7%
Team Working	1.8%	2.0%	1.6%	1.9%	1.9%
Selling	1.8%	2.1%	1.7%	1.7%	2.0%
Customer Care	2.0%	1.9%	1.5%	1.8%	1.9%
Microsoft Office	3.2%	3.5%	3.1%	3.4%	3.4%
Management	3.3%	4.0%	3.0%	3.5%	3.7%
Communications	2.1%	2.3%	1.7%	2.1%	2.2%
Clerical / Secretarial	2.3%	2.4%	2.0%	2.2%	2.3%
None	92.9%	92.0%	93.4%	92.6%	92.4%

Source: Acxiom, 2009. Copyright © 2010 Acxiom Corporation.

2.15 It is also the case that a much lower proportion of the Y&H workforce would consider changing career than is the case nationally. This characteristic is largely replicated across the four FSRs. The ICT sector was highlighted as the most likely avenue for job movers, which links to the identification of IT skills as an area for development. Overall, however, motivations appear relatively modest.

Table 2.7 Career Aspirations*

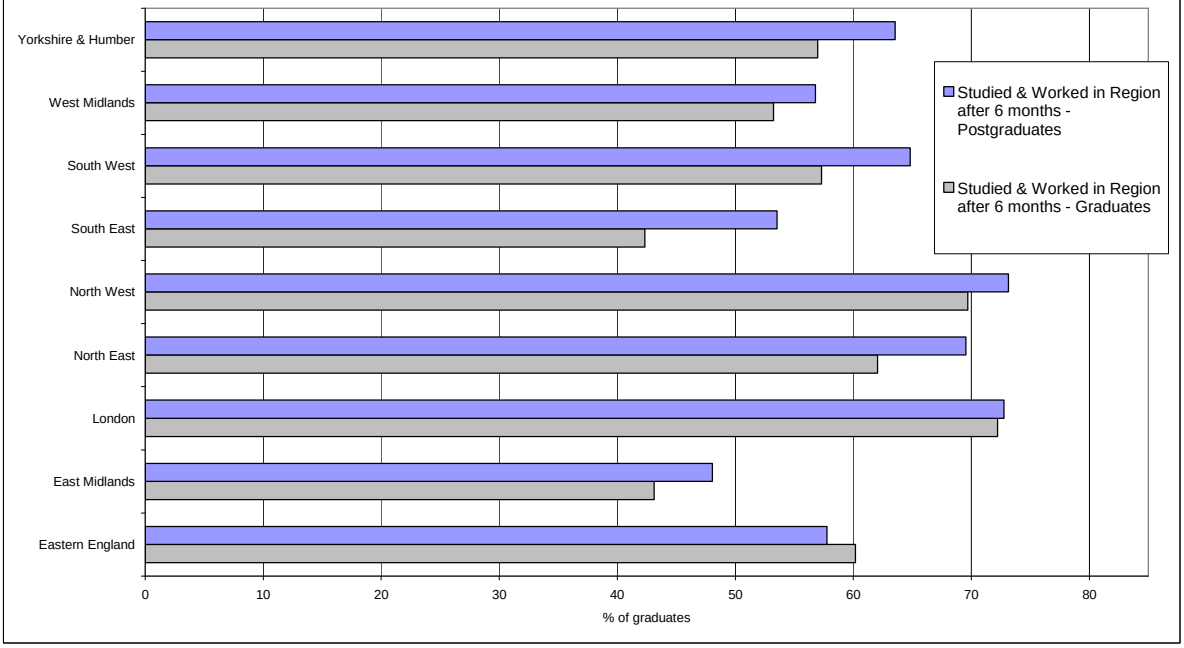
	Hull and Humber Ports City Region	Leeds City Region	York and North Yorkshire Sub-Region	Sheffield City Region	Y&H
Career change to: IT	4.3%	4.8%	3.5%	4.6%	4.6%
Career change to: Bookkeeping	2.1%	2.1%	1.9%	2.1%	2.1%
Career change to: Plumbing	2.7%	2.7%	2.2%	2.4%	2.6%
Career change to: Electrical	1.7%	2.1%	1.6%	2.1%	2.1%

Source: Acxiom, 2009. Copyright © 2010 Acxiom Corporation. *aspirations of those who identified a desire to change career.

2.16 Looking at the graduate labour market, the region fares modestly in retaining graduates from its HE institutions in the immediate period following graduation, ranking sixth of the nine English regions with a retention rate of 57% at six months (see Chart 2.1). At 64%, the post-graduate retention rate is higher. Retention of science graduates is higher than the graduate cohort as a whole, reflecting perhaps the availability of both employment and further research opportunities in the region.

Chart 2.1 Graduate Retention After 6 Months, 2002/2003 to 2006/7 Pooled

Source:HESA



2.17 Comparing initial destination and work location suggests that there is something of a mismatch between graduate supply and demand in the region - between 2002 and 2007, Y&H accounted for 10.2% of graduates in the UK but only 8.2% of graduate jobs (not taking account of graduate-underemployment), an outflow of 20,000 people (see Table 2.8).

Table 2.8 Initial Graduate Labour Flows, 2002/3 to 2006/7, pooled

	% of graduates remaining in region after 6 months	% of graduate workers in the region who studied in the region
East	60	35
East Midlands	43	62
London	72	42
North East	62	79
North West	70	60
South East	42	54
South West	57	59
West Midlands	53	62
Yorkshire & Humber	57	71

Source: HESA from analysis conducted by the University of Strathclyde.

2.18 The data also reinforces the pull of London as a graduate destination – 85,000 more graduates began work in London between 2002 and 2007 than graduated from London's HE institutions over the same period. However, only the North East has a higher share of graduate workers who studied in the region than Y&H.

2.19 Part of this dynamic relates to the link between home domicile and place of study (see Table 2.9). Y&H possesses above average proportions of residents at its universities, but these students account for a much smaller share of its undergraduate population. The suggestion is that Y&H is a

more popular place to study than it is to remain in to work and the region loses a large number of students who originated from other regions following graduation.

Table 2.9 Initial Undergraduate Study Destinations, 2002/3 to 2006/7

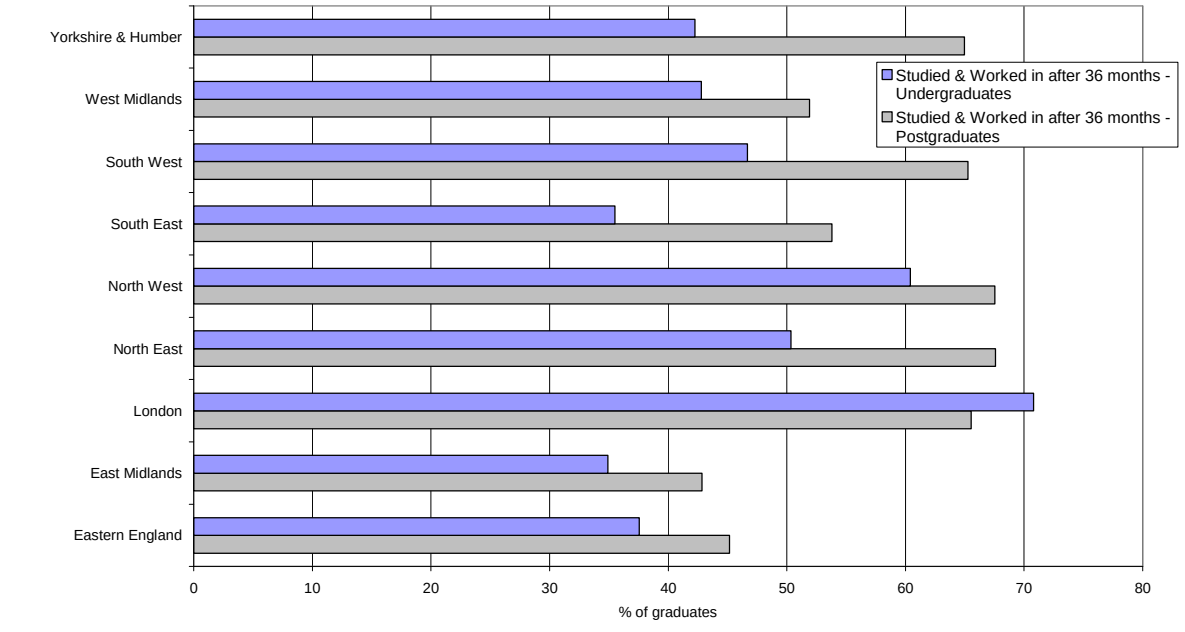
	% of students studying in their own region	% of the students in the region's HEIs drawn from that region	Balance
East	26	56	+30
East Midlands	45	35	-10
London	51	62	-9
North East	67	51	-16
North West	51	60	+9
South East	46	41	-5
South West	49	51	+2
West Midlands	51	48	-3
Yorkshire & Humber	58	41	-17

Source: HESA from analysis conducted by the University of Strathclyde.

2.20 Just over two in five of the region's undergraduates are still in Y&H (or have returned from elsewhere) three years after graduation (see Chart 2.2). This places Y&H in the mid rank of the nine English regions. In contrast, retention rates for post graduates are comparatively good.

Chart 2.2 Medium Term Graduate Destinations, 2002/3 Graduates

Source: HESA



2.21 Again, insufficient demand or availability of career options appears to act as the key driver – the data upon which chart 2.2 is based shows that there were 56% more graduates from Y&H universities than graduates in employment in Y&H. This pattern is mirrored across the regions of the north and the midlands but appears particularly stark in Y&H (see Table 2.10).

Table 2.10 Medium Term Graduate Labour Flows, 2002/3 cohort			
	% of graduates remaining in region after 36 months	% of workers in the region who studied in the region	Balance
East	38	31	-7
East Midlands	35	52	+17
London	71	33	-38
North East	50	56	+6
North West	60	52	+12
South East	36	45	+9
South West	47	49	+2
West Midlands	43	57	+14
Yorkshire & Humber	42	66	+24
Source: HESA from analysis conducted by the University of Strathclyde.			

2.22 Whilst it should be recognised that the results represent a snapshot in time, they nonetheless provide a useful insight into the relationship between HE and the Y&H economy. A notable contrast is apparent with the North West, where the total number of graduates in work after three years exceeds the number of students who studied at North West universities.

2.23 Looking now at occupational structures (Table 2.11), there is evidence that Y&H is evolving. Y&H has experienced significant growth in higher order occupations (SOC1-2) over the past decade, with the share of the workforce now 26.1% compared to 23% in 1998.

Table 2.11 Occupational Structure, 2008, % of workforce									
	NE	NW	Y&H	EM	WM	EE	L	SE	SW
Managers/S Officials	13.2	15.0	14.4	15.5	14.7	17.0	17.8	17.6	16.5
Professional	11.5	11.5	11.7	11.3	12.1	13.1	17.0	14.5	11.9
SOC 1-2	***24.7***	***26.5***	***26.1***	***26.8***	***26.8***	***30.1***	***34.8***	***32.1***	***28.4***
Assoc Profess Trades	13.1	13.9	12.7	12.3	12.7	14.4	18.9	15.6	14.4
Admin & Secretarial	11.5	12.2	11.4	10.8	11.9	11.2	11.8	11.3	10.9
Skilled Trades	11.0	10.9	11.3	12.0	11.9	11.3	7.4	10.0	12.3
SOC 3-5	***35.6***	***37.0***	***35.4***	***35.1***	***36.5***	***36.9***	***38.1***	***36.9***	***37.6***
Personal Services	8.7	8.4	8.3	8.4	8.1	8.0	7.3	7.7	8.8
Sales/Customer Serv	9.0	8.1	8.3	7.8	7.6	7.0	6.2	7.4	7.9
Process & Machine Operative	8.9	8.4	8.8	8.7	8.5	7.1	4.2	5.4	6.0
Elementary	13.0	11.7	12.9	13.2	12.4	10.9	9.4	10.5	11.3
Source: Annual Population Survey, 2008, NOMIS									

2.24 The rate of change, however, has not been sufficient to alter Y&H's ranking relative the other English regions (see Table 2.12). With the bulk of the 2030 workforce already in employment, this reinforces the need to boost workforce development.

Table 2.12 Occupational Structure, 2008, % of workforce, Rank									
	NE	NW	Y&H	EM	WM	EE	L	SE	SW
Managers/S Officials	9	6	8	5	7	3	1	2	4
Professional	7	8	6	9	4	3	1	2	5
Assoc Profess Trades	6	5	7	9	8	4	1	2	3
Admin & Secretarial	4	1	5	9	2	7	3	6	8
Skilled Trades	6	7	4	2	3	5	9	8	1
Personal Services	2	3	5	4	6	7	9	8	1
Sales/Customer Serv	1	3	2	5	6	8	9	7	4
Process & Machine Operative	1	5	2	3	4	6	9	8	7
Elementary	2	5	3	1	4	7	9	8	6
Source: Annual Population Survey, 2008, ONS. 1= highest %; 9 = lowest %.									

2.25 Looking forward, the growth in higher order occupations is forecast to continue in Y&H, although this will be at a slower rate than in the UK as a whole (see Table 2.13).

Table 2.13 Current and Forecast Occupational Structure, % of workforce						
SOC Major Group	2010		2026		Y&H Relative to UK	
	Y&H	UK	Y&H	UK	2010	2026
Managers and Senior Officials	15.3	16.3	16.6	17.3	-1.0	-0.7
Professional Occupations	12.0	13.0	11.6	13.1	-1.0	-1.5
Associate Prof. and Technical	13.5	14.8	14.0	15.4	-1.3	-1.4
Administrative and Technical	11.4	11.8	10.6	11.1	-0.5	-0.5
Skilled Trades	10.0	10.4	10.1	9.6	-0.4	0.5
Personal Service	7.6	8.2	7.4	8.5	-0.6	-0.9
Sales and Customer Service	8.3	7.4	9.3	7.7	0.9	1.6
Process, Plant Operatives	8.9	7.1	7.8	6.8	1.8	1.0
Elementary	12.9	10.9	12.6	10.5	2.0	2.1
Source: Yorkshire Forward Regional Econometric Model.						

2.26 The forecast data suggests that by 2026 the overall pattern will be broadly similar to 2010 with the following key differences:

- Growth in the proportion employed in two of the top three categories in Y&H but a decrease in the proportion employed in professional occupations; this category will become more significantly under-represented within the region compared to the UK; and
- A smaller proportion of people in the bottom two groups, coupled with a reduction in the over-representation compared with the rest of the UK.

The Role of Demand in High Level Skills Performance

The National Picture

2.27 The assumed relationship between skills and productivity, and the supply side focus on boosting skills has been challenged on two key grounds. Firstly, critics point towards evidence which, it is claimed, shows that the demand for HLS is not as high as often assumed. This centres on the assertion that there is currently an over-supply of graduates relative to demand. Keep and Mayhew (2004: 310), for example, have suggested that this fixation on expanding supply 'without due prior consideration of whether expansion is necessary or desirable' is flawed because the supply of graduates is 'massively outstripping' local demand for graduate labour in knowledge-intensive industries outside of lowland Scotland, London and the South–East[1].

2.28 The result is that graduates either migrate out of the region or take jobs that would previously have been occupied by school leavers (Hepworth and Spencer cf. Keep and Mayhew, 2004). Elsewhere, Keep (2006: 13) has presented further evidence of over-qualification within the British workforce, with 37% of employees holding qualifications higher than needed for their current job in 2001 compared with 29 per in 1986[2]. Brown et al. (2008) have also suggested that falling numbers of UK-domiciled students studying STEM (Science, Technology, Engineering and Maths) subjects may be a reflection of over-supply relative to domestic demand. This evidence is supported by the analysis of the supply side characteristics in Y&H presented above.

2.29 Further evidence that there is oversupply of skills relative to demand is provided by skills surveys of Britain (cf. Keep, 2008) and Scotland (cf. Payne, 2009) indicating that over a third of employees in both areas feel they are over-qualified relative to the demands of their job.

2.30 Moreover, those who challenge the government's supply-side focus have suggested there is little evidence that future economic growth will create sufficient demand in knowledge-intensive industries to soak up the expanding supply of graduate labour. Keep and Mayhew (2004) have observed, for example, that optimistic accounts of future growth in high-skilled jobs is based on a misreading of projections of the number of new jobs that will demand an HE qualification. They argue that this is often conflated with the total demand for graduates without recognising that these projections do not take into account the existing stock of jobs, many of which require lower levels of skills. Brown *et al.* (2008: 18) also cite evidence from the Skills at Work survey suggesting that the increase in supply of graduates continues to outpace the growth of jobs perceived by jobholders to require a degree (Brown et al, 2008: 18). At the same time, the acceleration of demand for knowledge workers in the 1980s has now plateaued, with little expectation of further acceleration in the near future. Between 1981 and 1991, the rate of increase in employment for knowledge workers (27%) was over four times that of the growth in the total number of jobs in the UK economy (6%). However, this rate of change has not been maintained since with growth figures for knowledge work falling continuously to reach 11% compared with 6% for all jobs in 2005-07 (ibid.: 20).

2.31 Lloyd and Payne (2003) also challenge claims that the UK is witnessing the growth of a 'knowledge economy' premised on the 'high performance workplace' that could accommodate a more highly-skilled workforce. They observe that whilst there may be long-term growth in professional and technical workers, there is concurrent growth in less-skilled occupations such as waitresses, care

[1] The source of this claim is Hepworth, M. and Spencer, G. (2002) *A Regional Perspective on the Knowledge Economy in Great Britain*. London: Department of Trade and Industry.
[2] According to figures from the 2nd Skills Survey : Felstead, A, Gallie, D. and Green, F. (2002) Work Skills in Britain 1986-2001. Nottingham: DFES.

assistants, sales persons, shelf-fillers and cleaners. Brown et al. (2008: 49) also contest the view that increasing the supply of higher educated employees will 'generate its own demand' by highlighting evidence that UK employers do not seem to be modifying the skill level of jobs in response to the greater availability of graduates. The extent to which these characteristics are evident in Y&H is considered in more detail below.

2.32 There is evidence, however, of skills shortages within particular sectors and occupations, even if aggregate supply outstrips demand. The 2009 National Skills Survey for England[3] found that the highest level of skill-shortage vacancies[4] (SSVs) were evident in Electricity Gas and Water sector (7% of employers) followed by Hotels and Catering; Education; and Health and Social Work (4% each).

2.33 Evidently, figures for sectors include vacancies demanding all levels of skill. A better insight into HLS shortages can be gained by looking at the data on occupations, with approximately one fifth of all vacancies identified nationally for professionals (19%), associate professionals (20%) and managers and senior officials (19%) attributed to skills shortages.

2.34 Commentators have noted that there may be unintended consequences if policymakers continue to boost the supply of HLS without a concurrent rise in demand. Keep and Mayhew (2004) suggest this could impact negatively on the prospects of non-graduates if employers recruit graduates for jobs that only require Level 3 skills. Moreover, Brown et al. (2008) also observe that the expansion of higher education may reduce the average returns to a degree (as measured by lifetime earnings) if it is not matched by a growth in jobs offering high wages. Recent data shows that there are already significant differences in the returns to a degree within the graduate population, with the benefits of graduate-level education actually declining over time for those at the bottom end of residual wage distribution (ibid., 2008: 45). This decline is attributed to a rise in levels of over-qualification that has seen a sharp increase in the costs of being over-qualified for those who do end up in jobs requiring a degree. In a Y&H context, this study has not been able to find substantial evidence of employers reporting graduate recruitment difficulties.

2.35 A second challenge to the supply-side focus on boosting skills focuses on the limitations of 'market failure' as an explanation for sub-optimum levels of skills. Keep (2006: 5) claims that the evidence base on the incidence of market failure is *'extremely patchy'* in terms of, for example, the scale of poaching. There is also very little research which goes below national-level analyses to attempt a more fine-grained analysis of market failure within different sectors of the economy. According to Keep (ibid.) this encourages crude 'one-size-fits-all' policy responses.

2.36 In particular, Keep (2006) argues that there are two key difficulties with the concept of market failure:

- Firstly, it overlooks the other factors which combine with skills to deliver economic performance including, for example, investment in plant and machinery;

- Secondly, it fails to recognise that employer decisions not to invest in skills may not be driven by market failure. Firms may introduce forms of work organisation that minimise skill needs or adhere to low commitment to forms of employee relations if they believe that training may have

[3] Figures taken from UKCES (2010) *National Employer Skills Survey for England 2009: Key findings report.*
[4] A subset of vacancies classified as hard-to-fill where the reason given for difficulty filling the position was a low number of applicants with the required skills, work experience or qualifications.

adverse effects such as raising unrealistic expectations about pay and progression as well as increasing dissatisfaction with repetitive work.

2.37 A separate review of vocational and educational training by Keep and Mayhew (1999: 4) characterises these impediments as '*systems failure'* rather than '*market and administrative failures'* within a scenario '*where employers were reacting rationally to a battery of incentives provided by the institutions and attitudes they inherited'*. In other words, employers were not inhibited from realising the optimal level of training by concerns about 'poaching' but, rather were responding positively to incentives to produce using a low-skill model. The specific evidence on systems failure in Y&H is limited, although in the section below we discuss the extent to which a low skills equilibrium exists in the region.

The Drivers of Demand in Yorkshire and Humber

2.38 As economic restructuring has taken place, the concentration of HLS has become increasingly intertwined with the structure of the business base, the number of jobs in knowledge based industries and other key characteristics. Whilst start up rates have improved, Y&H retains a significant enterprise deficit with better performing regions (see Table 2.14).

2.39 The region's industrial legacy remains apparent, with large firms continuing to account for a higher share of the business base than nationally. Many of these firms historically invested significantly in workforce development, so the continuing rationalisation of the manufacturing sector poses significant challenges for in-firm activities to develop HLS.

Table 2.14 Comparative Business Density

	No. of Businesses Per 1,000 inhabitants
East	38.0
East Midlands	33.4
London	44.5
North East	22.3
North West	30.8
South East	40.3
South West	38.9
West Midlands	32.7
Yorkshire & Humber	29.2
England	35.8

Source: Neighbourhood Statistics and Mid-Population Estimates, ONS. All VAT and/or PAYE Based Enterprises

2.40 Enterprise options are only considered by a small proportion of the workforce in Y&H, with a clear link to the existing rates of business start up and the stock of HLS in the workforce (Table 2.15). This suggests that productivity growth and HLS are more likely to be driven through the development of established non-micro firms. With the exception of the York and North Yorkshire Sub Region, the situation is across the FSRs is reasonably similar.

Table 2.15 Enterprise Potential in Y&H		
	% Self Employed / Running Own Business	% Thinking About Starting New Business
Hull and Humber Ports City Region	8.0%	1.6%
Leeds City Region	9.2%	2.4%
York and North Yorkshire City Region	12.7%	2.3%
Sheffield City Region	7.6%	2.0%
Yorkshire & Humber	8.8%	2.2%
Source: Acxiom, 2009. Copyright © 2010 Acxiom Corporation.		

2.41 Yorkshire and Humber is characterised by a growing knowledge economy, albeit concentrated in a small number of sub-sectors. Overall, growth in knowledge base industries (KBIs) has been slower than better performing regions, thereby dampening the demand for HLS (see Table 2.16). It should also be noted that some of the manufacturing niches which make up the KBI definition and where Y&H is strong, possess substantial numbers of roles which do not require HLS.

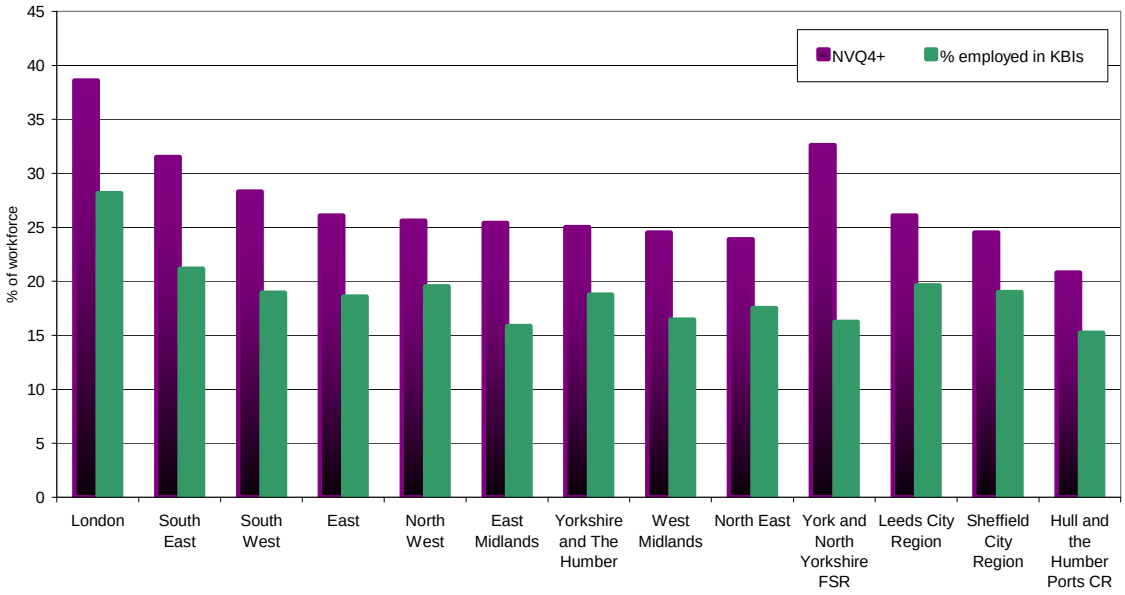
Table 2.16 Knowledge Economy Density			
	Employee Jobs in KBI	% of total	Ranking
East	444,381	18.6	6
East Midlands	299,935	15.9	9
London	1,173,366	28.1	1
North East	180,483	17.5	7
North West	586,915	19.5	3
South East	794,920	21.2	2
South West	424,210	18.9	4
West Midlands	387,525	16.5	8
Yorkshire & Humber	418,913	18.8	5
Sheffield CR	134,994	19.0	
Leeds CR	246,327	19.6	
Hull and the Humber Ports CR	55,108	15.2	
York and North Yorkshire FSR	56,173	16.3	
Source: Annual Business Inquiry, 2008, ONS.			

2.42 The other notable feature of KBI employment in Y&H, as in the other northern regions, is the large share accounted for by the public sector – 42% of KBI jobs in 2008, compared with 30% in the South East and 20% in London. This raises a number of points:

- First, the growth in the public sector has provided opportunities for graduates and other skilled individuals which might not otherwise have been available – it is estimated by Graduates Yorkshire that 50% of Y&H's graduates enter jobs in the public sector;
- Second, the public sector generally has a good track record in investing in employee development;
- On the downside, however, this picture masks the mixed performance on the growth in private sector KBIs and the extent to which crowding out effects may be apparent. Constraints on public sector expenditure in the medium-term also mean that this growth is unlikely to continue.

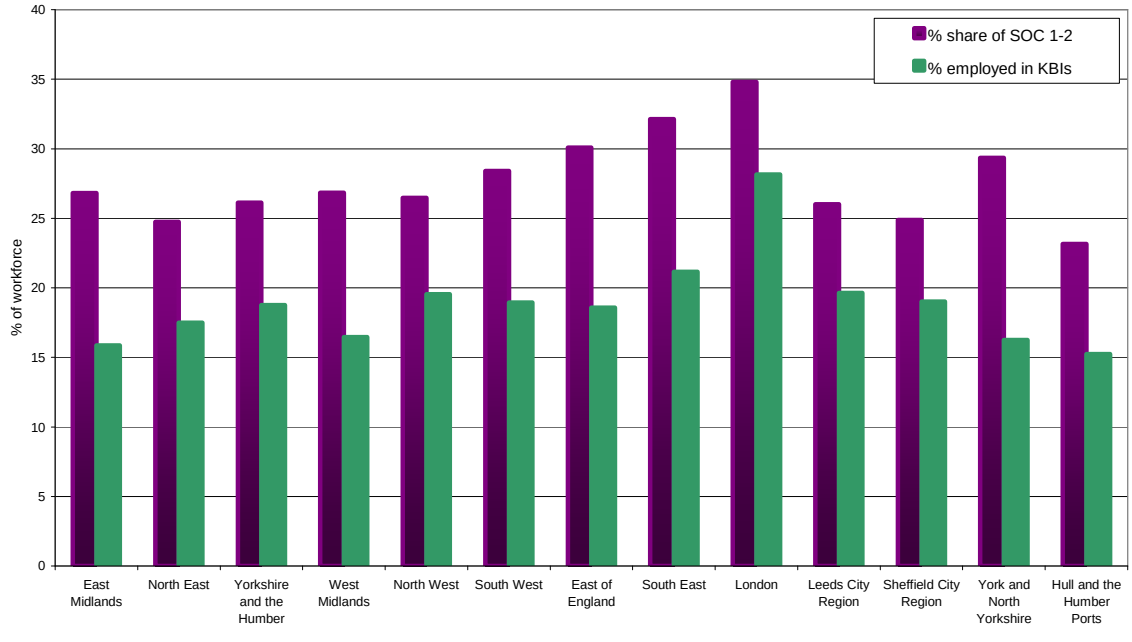
2.43 The correlation between HLS and the knowledge economy at a regional level is strong but not overwhelming (see Chart 2.3). This reinforces some of the national evidence in relation to skills utilisation and the extent to which HLS supply acts to influence demand.

Chart 2.3 Higher Level Skills and the Knowledge Economy
Source: ABI and APS, ONS



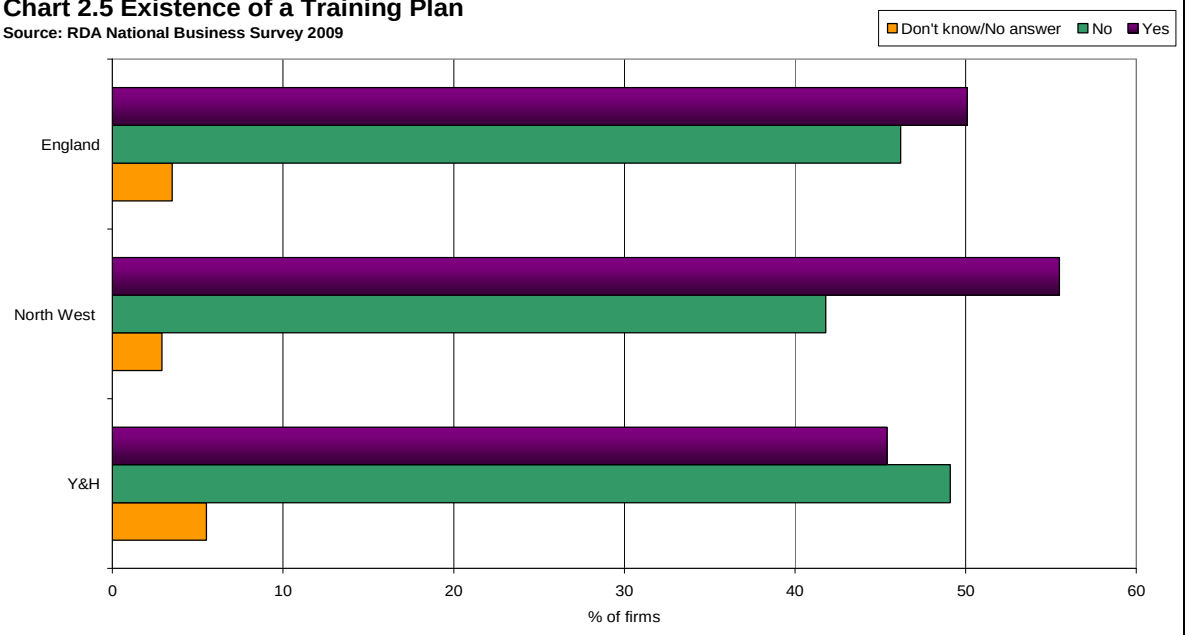
2.44 There is evidence that higher order occupations are also coalescing around the knowledge economy sectors in the better performing regions. This is most apparent in London. Within Y&H, the relationship appears quite strong in the Leeds City Region, with the apparent mismatch in York and North Yorkshire accounted for in part by commuting patterns (see Chart 2.4).

Chart 2.4 Higher Order Occupations and the Knowledge Economy
Source: ABI and APS, ONS



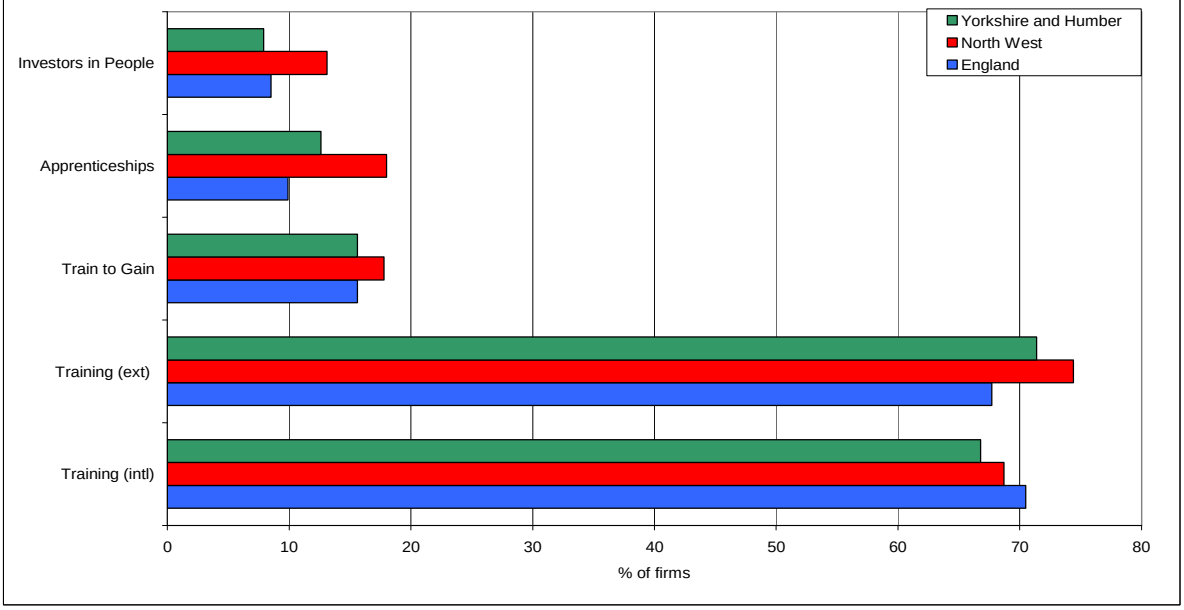
2.45 Encouraging firms to invest in workforce development in Y&H remains a major challenge. Of the nine English regions, Y&H possesses the smallest share of firms with a formal commitment to employee training (see Chart 2.5 – North West is used as a comparator given its similar industrial structure to Y&H). This is largely down to the approach of small businesses. Medium sized and larger firms in Y&H are as proactive in workforce development as in any other region.

Chart 2.5 Existence of a Training Plan
Source: RDA National Business Survey 2009



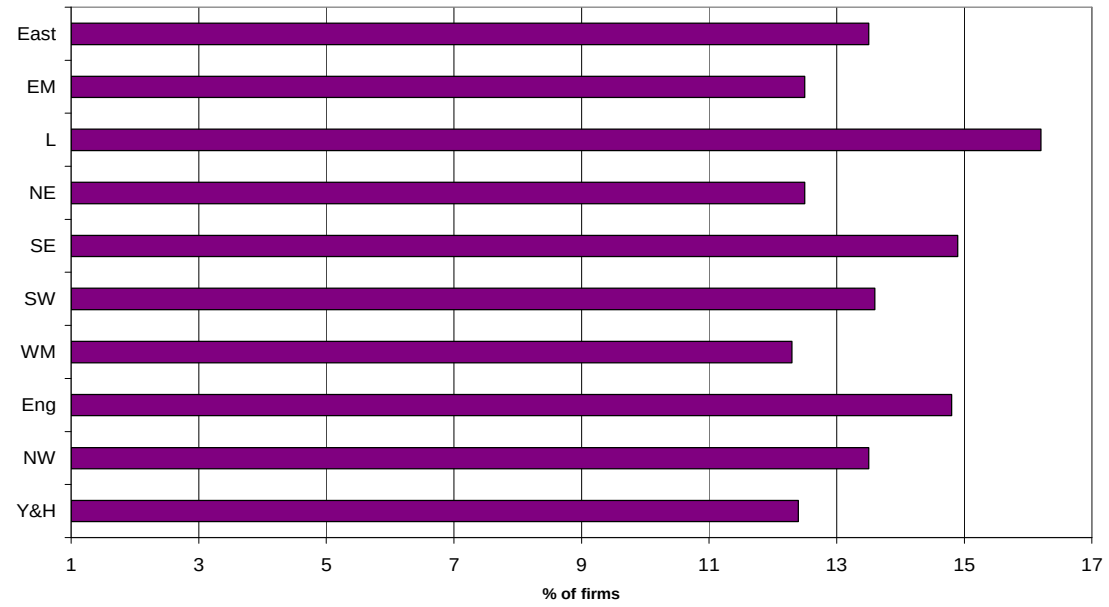
2.46 Linked to this, uptake of national accreditations and workforce development support services in Y&H is mixed, albeit on a par with trends nationally. On most of the indicators the region is ranked in the bottom half of the English regions (see Chart 2.6).

Chart 2.6 Participation in Training Activties in the Last 12 Months
Source: RDA National Business Survey, 2009



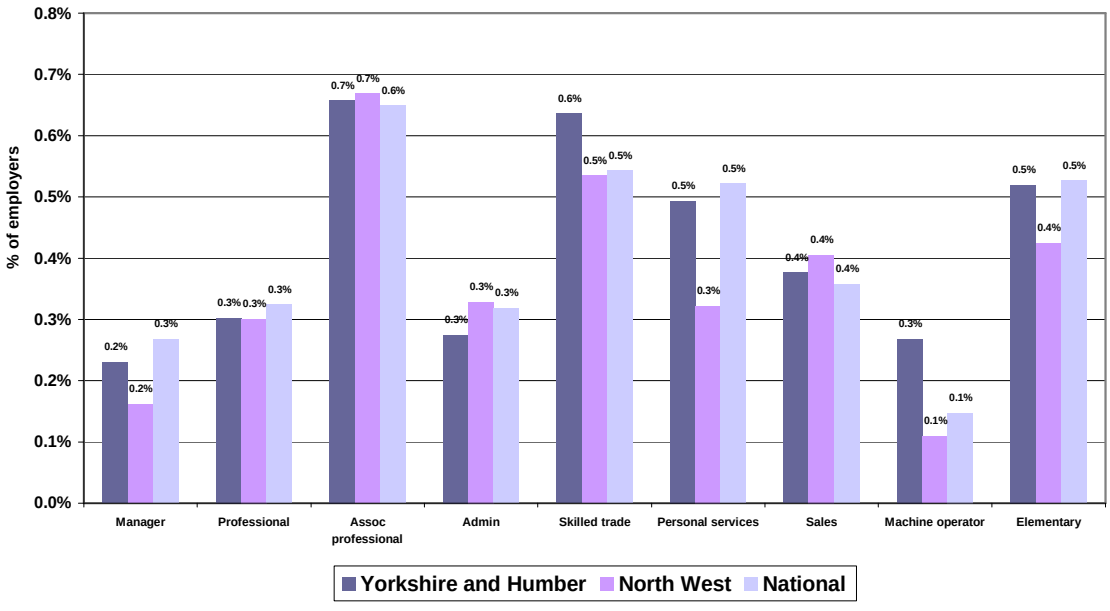
2.47 Firms of all sizes in Y&H report fewer skills shortages than elsewhere, highlighting (at a broad level) at least a better level of market equilibrium (see Chart 2.7). Whilst this may reflect labour availability due to the recession, analysis of previous years' data suggests a similar picture.

Chart 2.7 % of Firms With Hard to Fill Vacancies
Source: RDA National Business Survey 2009



2.48 In occupational terms, the evidence from the latest National Employer Skills Survey indicates that higher order occupations in Y&H are no less difficult to recruit to than either the North West or England as a whole. As nationally, recruiting associate professionals remains the most problematic, although the proportions of employers in all of the categories is very low.

Chart 2.8 Hard to Fill Vacancies By Occupation
Source: NESS 2009



2.49 Sectoral skills shortage evidence also presents a mixed picture. As shown in charts 2.9 and 2.10, Y&H struggles comparatively in the creative industries, fashion and textiles, passenger transport and food manufacture. Given these sectors are characterised by a broad occupational structure, the bulk of the gap is likely to relate to intermediate and lower level skills.

Chart 2.9 Smaller Skills Gaps

Source: NESS 2009, top five best performing SSC sectors relative to national levels

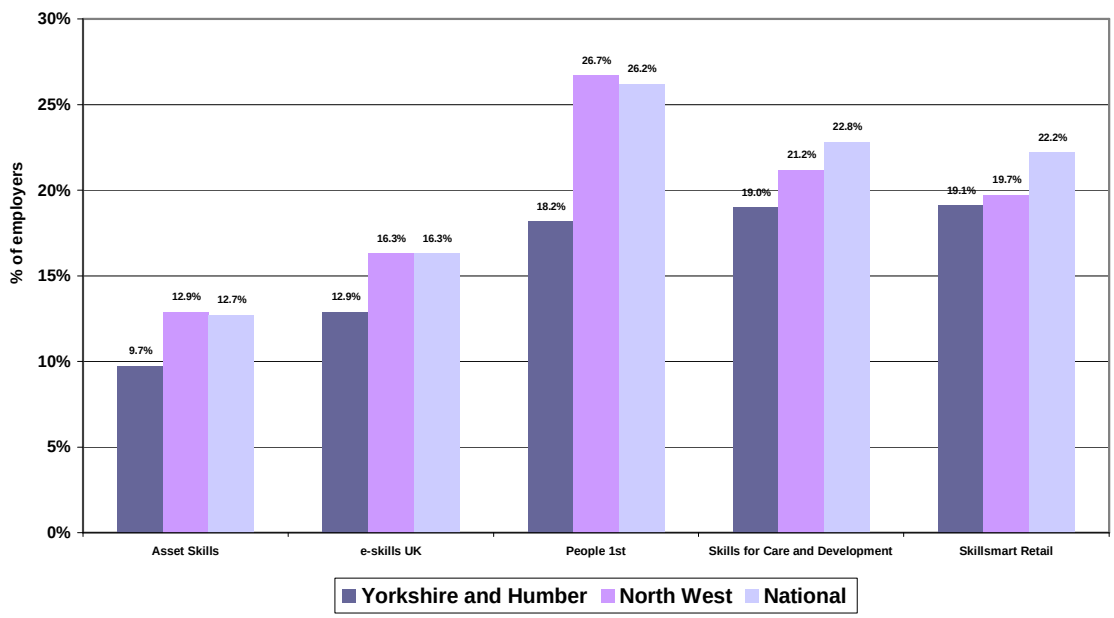
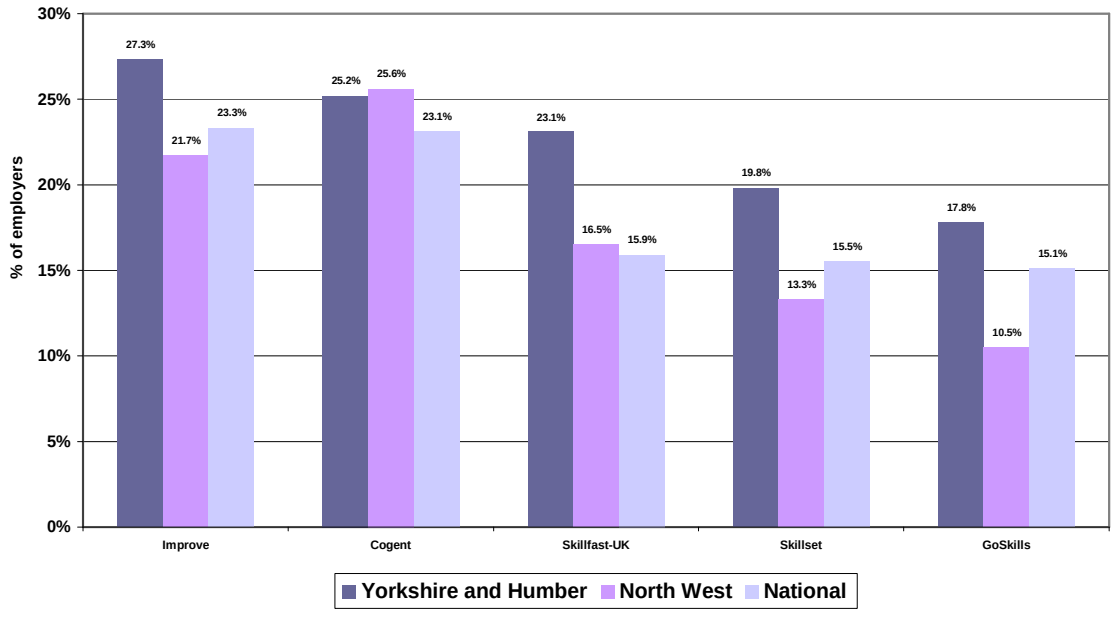


Chart 2.10 Bigger Skills Gaps

Source: NESS 2009, top five worst performing SSC sectors relative to national levels

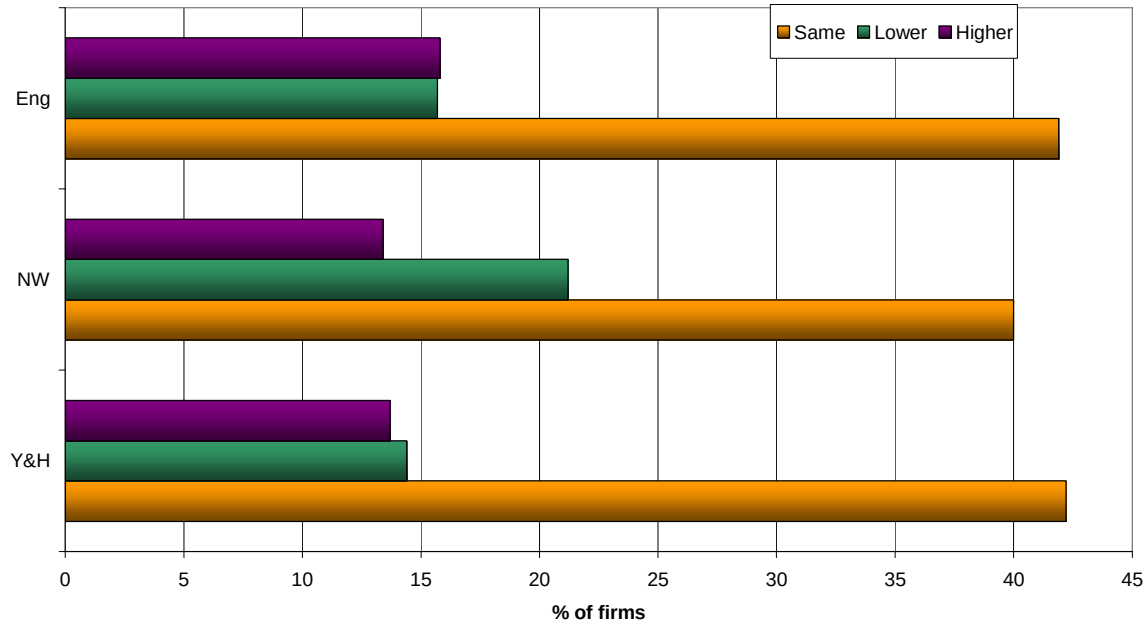


2.50 Firms in Y&H have been less likely than firms on average to cut back on training expenditure over the past year and the majority are expected to maintain investment over the next year (see Chart

2.11). This suggests that investment in workforce development in Y&H is not as cyclical as had been previously thought. A significant net balance (those whose anticipate increasing investment minus those who anticipate decreasing investment) of firms in the 10-50 employee size range is apparent.

Chart 2.11 Forecast Investment in Training in the Next 12 Months

Source: RDA National Business Survey, 2009

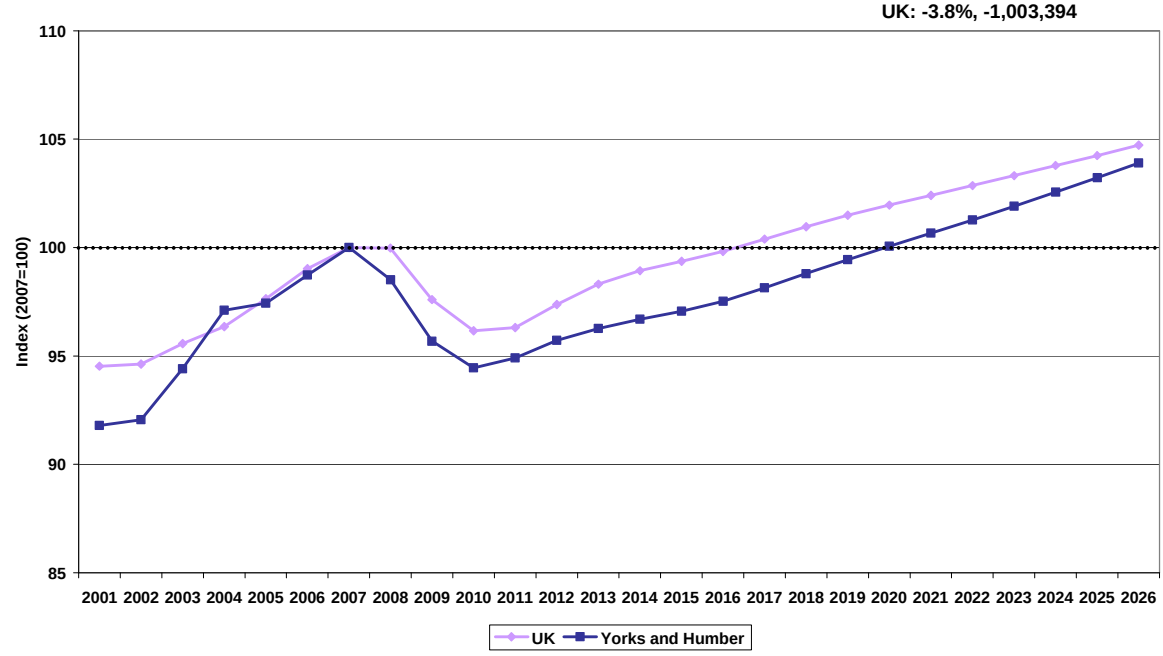


2.51 Employment and output forecasts suggest that the region is in line for a slow recovery and widening of the gap with the UK average. Having fared badly during the recession, the number of FTE jobs in the region is not expected to reach 2007 levels until 2019 at the earliest (see Chart 2.12).

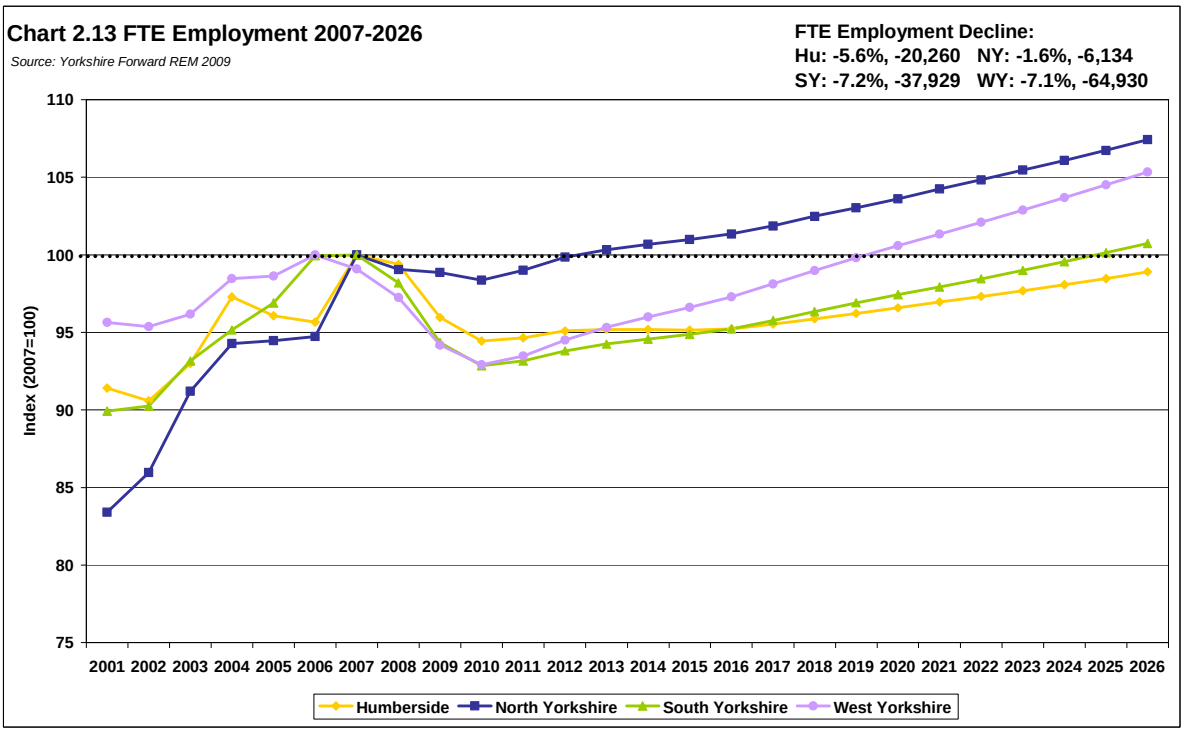
Chart 2.12 FTE Employment 2007-2026

Source: Yorkshire Forward REM 2009

FTE Employment Decline:
Y&H: -5.5%, -121,012
UK: -3.8%, -1,003,394



2.52 Significant sub-regional differences are apparent (see Chart 2.13). York and North Yorkshire is expected to weather the recession fairly well and build on its significant growth in the early part of the 2000s. A deeper recession is evident in West Yorkshire but faster growth is expected from 2012 onwards, in part due to its greater economic diversity. For South Yorkshire and Hull and the Humber Ports, only very slow growth is expected[5].



2.53 The structure of employment will look very different in 2026 with, for example, the manufacturing sector predicted to consolidate further and account for 6.8% of employment compared with 14.9% in 2001. The biggest growth areas are expected to be in business services and health. These sectors cover a number of sub-sectors and niches and will act as a strong driver of HLS. However, the extent to which this growth will be sufficient on its own to substantially alter the HLS profile of the region is debateable.

The Role of Skills Utilisation

2.54 Cutting across the debate on the demand and supply drivers of HLS is a growing interest in the way that skills utilisation (the way skills are deployed in the workplace) may provide a mechanism for boosting productivity and regional economic performance. This is often linked to product market strategies as a move by companies to compete on the basis of higher spec products or services that can generate internal demand for higher levels of skills. This is not, however, always the case.

2.55 The growing interest in skills utilisation reflects concerns that increasing aggregate levels of skill in itself will not necessarily translate into higher growth if the skills of employees are not put to full use e.g. graduates undertaking non-graduate jobs. A notable policy development in recent years is that the devolved administrations have shown a keener interest in skills utilisation than their counterparts in Westminster. Payne (2008) observes that there are two divergent *'strategic paths*' in the wake of the Leitch Review, with the English government focused on narrowly boosting skills supply whilst the Scottish Government has stressed the need to consider skills utilisation strategies and to integrate

[5] Sub-regions used here do not exactly correspond to Functional Sub-regions used earlier in this chapter.

skills policy within a wider business improvement, innovation and economic development agenda as part of 'Skills for Scotland' (Scottish Government, 2007)[6].

2.56 This difference is explained, in part, by the Scottish Government's recognition that labour productivity in Scotland is just below the UK average despite having a workforce with levels of formal qualification above the UK average. This adds weight to the argument that there is no simple relationship between aggregate skill levels and economic performance.

2.57 Although skills utilisation has the potential to boost the demand for skills, the evidence available to date on the impact of initiatives remains inconclusive. There is some indication, however, in the most recent white paper on 'Skills for Growth' (BIS, 2009) that Westminster is beginning to recognise some of the arguments about the importance of understanding the demand for skills and skills utilisation (Keep and Mayhew, 2010). This is likely to reflect the influence of the UKCES who have challenged an emphasis on boosting the supply of skills. Nonetheless, Keep and Mayhew (2010) also note, that BIS's apparent conversion to demand-side arguments has yet to translate into a coherent skills utilisation programme as per the Scottish Government. The Skills for Growth Paper also failed to address UKCES' argument that boosting the supply of highly-skilled people could lead to oversupply if growth in high-skilled jobs continues to lag behind other countries.

2.58 Much of the literature on how skill utilisation strategies might be deployed in the workplace focuses on the potential for 'high performance working' - 'bundles of management and work practices' (Payne, 2008) – thought to incentivise employees to deploy their skills more effectively, in turn, raising performance. These ideas have considerable appeal for policymakers but Payne (2008; see also Lloyd and Payne, 2003) has highlighted two key difficulties. Firstly, there are definitional problems in terms of the range of practices it encompasses. Secondly, there is mixed evidence on whether such approaches yield gains for workers with potentially negative consequences such as downsizing, work intensification and the loss of both control and autonomy.

2.59 These concerns aside, an emphasis on high performance working also raises questions about how, and to what extent, organisations can be encouraged to implement new working practices that raise skills. Recent research in Scotland has explored this by looking at the degree to which the Scottish Government can influence product market strategies that, in turn, encourage high performance working work practices that impact on the demand for skills and skills utilisation. Sung *et al.*'s (2009) study of 32 companies across five sectors in Scotland found that government can influence employers' product market strategies through a range of mechanisms including:

- Formal regulation such as efficiency frameworks that operate in the utility sector or Health and Safety legislation that applies to specific industries; and

- Branding to market specific industries such as the Scottish food and drinks sector as part of tourist initiatives.

2.60 The capacity of government to influence strategies varied considerably across industries, with the government most able to influence the utility and public sub-sector of the creative industries (museums, galleries etc). These variations highlight the importance of sector-specific analysis.

2.61 In terms of the relationship between product market strategies and skill levels, some employers wanting to move up the product market chain were looking to upskill their labour force. It was also the case, however, that high-valued added production could be achieved using a

[6] See especially Scottish Government (2007a) Skills for Scotland

predominantly low-skilled workforce. In other words, there was no 'invariant' relationship between product market and skill, even within the same industry (Sung et al., 2009: 6). Equally, the demand for and utilisation of skill appeared to be driven by factors unrelated to product market strategy including the introduction of new technology in the financial services and utilities sectors.

2.62 In terms of supply, skill shortages were identified in particular industry-specific occupations such as the lack of home-grown food technologists for the food and drinks industry; a shortage of IT skills in the financial sector and a lack of specialist skills to support in the renewable energy sector. Again, this illustrates the value of fine-grained analysis of conditions in particular sectors. Overall, the research suggested that governments can influence product market strategies in a way that impacts on the demand or utilisation of skill using a variety of levers. But these policy levers have to be deployed differently both across and within industries, which is indicative of the need to conceptualise skills utilisation within industry-specific models.

2.63 Empirical evidence on skills utilisation within firms in Y&H is limited, with data from the National Employers Skill Survey indicating that the number of firms experiencing skills gaps is broadly in line with the national average. In addition, there is a range of anecdotal evidence on cultural characteristics of firms and individuals which act to constrain high performance working and the accumulation of HLS. There may be merit in exploring the role of mechanisms to boost skills utilisation as part of the second phase of this study.

Low Skills Equilibrium

2.64 The evidence on demand and supply drivers of HLS has also been heavily influenced by the extent to which it is considered that parts of the UK economy are trapped in a Low Skills Equilibrium (LSE)[7]. Keep (2006: 3) observes that skills development may be constrained by the LSE within the UK economy which he defines as follows:

> *An LSE exists where a substantial part of the economy uses low levels of skill to produce relatively low specification goods or services, which are sold on the basis of low price and support large swathes of relatively low-paid employment. In many firms, path dependency (i.e. managerial reliance on a certain way of doing things and of coping with competition) and low domestic demand for higher quality goods mean that they are often unable to break free from this equilibrium. Demand for skill is therefore limited.*

2.65 One implication of the LSE theory is that it suggests that low skill levels may be the result of individuals or employers acting rationally in the face of the structural barriers or incentive structures that face them, even if this is sub-optimal for the economy as a whole. It has been noted, for example, that some of the most profitable companies in the UK in 2001[8] were freight distributors (Tibbett and Britten and Excel) and retailers (TESCO and Kingfisher) that are competitive without the need for a highly educated or broadly skilled workforce (Lloyd and Payne, 2003).

2.66 One of the key arguments deployed to question the continued emphasis on increasing the supply of HLS is the characteristics and trajectory of the UK economy. Whilst Keep (2006: 4) notes that the evidence for the LSE is 'inconclusive', he highlights other research (Mason, 2004) that suggests that product market and competitive strategies do play an important if complex role in determining the level of skills required by employers. Elsewhere, Keep and Mayhew (1999: 12)

[7] This concept was first popularised in Finegold, D. and Soskice, D. (1988) The failure of Training in Britain: Analysis and Prescription', *Oxford Review of Economic Policy*, Vol 4 (3), pp. 21-53.
[8] Based on the Financial Times 2001 list of the 10 most profitable companies in the UK.

suggest that '*skills are often a third–order issue* [against] *first-order questions such as choice of product market and competitive strategy, and consequent second-order decisions about work organisation and job design'*.

2.67 Whilst the concept of a LSE is often explored at the national level, Wilson and Hogarth (2003) have argued that it is important to understand how it operates within individual organisations given inter-firm variations. Their study of the food processing and business hotel industries in the West Midlands found evidence that some organisations studied were embedded on a low-skill trajectory. This was attributed to a range of factors including, in the case of food producers, competitive pressures to deliver low-cost food to supermarket chains driven by the procurement practices of monopolistic chains of supermarkets. They concluded that policymakers have very few levers to encourage firms to raise skill levels, however, because these organisations were acting rationally and were not failing as a consequence.

2.68 Moreover, the authors suggested that boosting skill levels unilaterally would lead to over-supply or under-utilisation of skill unless significant changes were made in parallel to product market strategies, service standards, work organisation and job design. As a study of the West Midlands, the report did suggest, however, that more could be done at a regional level to shift resources towards a more general business demand agenda and away from a narrow focus on skills supply through interventions such as DTI Industry Forums, cluster strategies, innovation initiatives and support for key sectors. At the same time, it suggested that resources should be targeted on industrial clusters that have more potential to benefit from injections of skill rather than sectors (such as the two studied) where skills may be a minor issue.

2.69 At a broader level, Keep (2006: 4) argues that the government needs to do more to encourage employers to '*raise their game* '(ibid.) in terms of their product market strategies to move the UK economy away from over-dependence on low-specification. Other commentators have suggested, however, that such a move from a LSE to a high skill economy presents a formidable challenge because it would require far-reaching political and economic reform. Writing from a political economy framework, Lloyd and Payne (2003) have claimed this shift would require a radical political project aimed at fundamentally reshaping the UK economy through:

- Institutional reform to move away from a City-driven model of capital accumulation geared towards the maximisation of short-term shareholder value and destructive of long-term investment in people, plant and technology; and

- Reform of the 'City-Bank-Treasury nexus' (2003: 93) that is detrimental to the UK's industrial base.

2.70 The scale of this task and the likely resistance it would invoke would necessitate imposing far-reaching reform on both government and capital to create a new social settlement. As the authors conclude, this demands reform on a scale that is not always understood or acknowledged by those who believe a high-skilled economy can be willed into being by consensus alone. Indeed, they argue that it highlights a fundamental paradox at the heart of current policy on skills. In their view, the current UK vocational education and training policy based on expanding the education system as the main vehicle for moving towards a high-skilled economy *'is pre-programmed to fail'* because:

> *It illustrates the paradox of New Labour's approach, where a high skills policy must be made to work within a neo-liberal consensus that rules out precisely the kind of regulatory and institutional changes needed to tackle the UK's skills problem* (Lloyd and Payne, 2003: 102).

2.71 A further note of caution about the possibilities for moving towards a higher-skilled economy is provided by Brown et al. (2008) who challenge the notion that developed countries can retain a competitive advantage through developing knowledge-intensive sectors. They highlight the growth of high valued-added, high-tech product markets in developing countries such as India and China as undermining assumptions that such work can be captured wholly or predominantly by OECD countries. Developing countries are increasingly able to compete on price *and* quality. The effect is that:

> *human capital…is losing its capacity as a source of competitive advantage, because the 'positional' advantage of those with higher education and skills is not only declining domestically (as higher education is expanded) but also globally…this global expansion of tertiary education has outstripped the demand for high-skilled workers, creating downward pressure on the incomes of skilled workers in the developed economies*' (Brown *et al.* 2008: 48).

2.72 The policy imperative that emerges from this re-configuration of competitive advantage is how people can be engaged in innovative and enterprising activities that cannot be performed elsewhere: *'It is the societal, regional or local 'capacity' for high-skill utilisation that counts, rather than merely increasing the supply of employable graduates'.* (Brown et al. (2008: 54). This conclusion reinforces the importance of skills utilisation as a means to boost productivity and regional economic performance.

2.73 Whilst it is outside the scope of this study to explore fundamental changes to the political and economic structures as advocated by Lloyd and Payne, the debate highlights the importance of institutional capacity in the wider system of influences on HLS. Promoting stronger HEI/business links has been as a policy in Y&H, so examining institutional responsive to business/economic needs may be one area for further examination in phase 2.

2.74 In relation to the wider question of a low skills equilibrium, the evidence presented above suggests that, at present, demand for skills is muted, with parts of the regional economy locked into a 'path dependency'. This refers to the situation where the high levels of low value activity that exist in Y&H have emerged as the cumulative outcome of historic decisions and now limits the capacity of policymakers or the private sector to fundamentally change this economic trajectory. Regional retention rates for undergraduates are moderate which may reflect the greater availability of better career opportunities elsewhere. Moreover, the projections for growth in high-skilled occupations are modest, which suggests that economic growth in Y&H is unlikely to deliver a significant increase in aggregate demand for HLS.

2.75 In combination, this data indicates that Y&H displays features of the low skills equilibrium, particularly in Hull and the Humber Ports and Sheffield City Regions. This points to a need to boost levels of demand through, for example, business/HEI collaborations or through skills utilisation strategies as outlined above.

Conclusions and Emerging Implications

2.76 Y&H has grown its HLS base over the past decade, yet lags behind a number of other regions. Improved educational attainment, growing participation rates in HE and in-migration are three of the key factors which have boosted the supply of highly skilled individuals. This said, skills gaps remain an important issue for many firms, albeit no worse than the position nationally. In addition, the modest aspirations of many in the workforce in relation to learning indicates that there are many

cultural and other perceptions which will change only slowly over time. Supply side dynamics remain a key part of the challenge.

2.77 The findings from this evidence review have a number of implications for skills policy as it applies to Y&H. Firstly, given the low skills equilibrium which exists in parts of Y&H, it makes little sense to attempt to boost aggregate levels of skills if this is not matched by demand. Whilst the data suggests that in the Leeds City Region and in York and North Yorkshire there is a coming together of the characteristics necessary to achieve market driven growth in HLS, overall, the concentration of low value added activity more broadly means that demand side forces are not yet sufficiently strong to achieve accelerated growth in high level skills. Sectoral and employment change will, without intervention, see Y&H move further along the continuum but not, it would appear, at a sufficiently rapid rate to achieve a transformation in the Y&H's performance on higher level skills. This suggests that any interventions to meet HLS objectives should be spatially targeted e.g. in the Leeds City region. It is recognised that there may be equity or social inclusion implications from such a policy.

2.78 A second implication stems from the finding that skills shortages can still exist within particular sub-sectors even if overall levels of demand are muted. Higher than average skills gaps are evident in the transport, financial services and parts of the manufacturing sector within the Y&H e.g. food. This highlights the importance of a fine-grained analysis of the demand for skills across and within industries to identify the potential for targeted interventions to provide skills currently lacking in certain industries.

2.79 Thirdly, the most pessimistic assessments of the demand for HLS suggest that there are few obvious levers available even to national policymakers to move the economy away from a low skills equilibrium. This would potentially require radical reform of political and economic systems, the justification for which is outside the scope of this study. This has significant implications for institutions operating at sub-national levels who have even fewer levers for redirecting the path dependencies of regional or local economies. This is not to suggest sub-national actors are powerless but to highlight the importance of recognising the constraints they face in seeking transformation in economic performance.

2.80 The challenge for Y&H partners, therefore, is to identify a limited number of areas where they do have some capacity to shape the demand for skills. This is in the context of, in the short term at least, an environment of public sector expenditure constraints. Phase 2 of this study will utilise the realist synthesis approach to identify a set of policy implications which can address both demand and supply side dynamics. Before that, we consider lessons from other regions and the effectiveness of specific interventions to boost HLS.

3 High Level Skills: Regional Comparators

Introduction

3.1 Chapter 2 presented the national and Y&H context for HLS performance. This section of the report aims to explore some of the main dimensions of HLS presence and associated knowledge economy indicators in regions with a similar profile and/or industrial tradition to Y&H. It does this in three main stages through:

- A broad review of statistical evidence to identify regions with a similar contemporary profile to Y&H;
- A statistical profile of seven EU regions with a similar industrial tradition to Y&H[9]; and
- A series of regional profiles exploring the factors and components underpinning their economic development trajectories over the last 15 to 20 years, focusing especially on innovation and HLS.

3.2 Inevitably, the scope of the comparison is constrained by data availability. This should be borne in mind when interpreting the analysis.

Initial Review

3.3 An examination has been made of the comparative figures available at the regional level on relevant topics from the OECD Regional Statistics portal[10]. The following indicators were seen as the most appropriate for initial focus:

- **Tertiary education attainment:** the percentage of the regional labour force which has completed tertiary education;
- **Regional employment in high technology manufacturing (HTM):** the percentage of those employed in the manufacturing sector who are engaged in high technology activities;
- **Regional Employment in knowledge intensive services (KIS):** the percentage of those employed in the service sector who are engaged in knowledge intensive activities;
- **Gross domestic product (GDP):** measured on a per capita basis, in US dollars at purchasing power parity (PPP), and also in terms of average annual growth rates between 1996 and 2005.

3.4 Although not made explicit, it appears from other OECD sources that HTM and KIS can be defined as including the following sectors or activities:

- **HTM:** aerospace, automotive, biotechnology, electronics and microelectronics, high technology engineering;

[9] West Finland (FI), Lorraine (FR), Limburg (NL), North Rhine-Westphalia (DE), Basque Country (SP), Upper Silesia (PL) and Scotland (UK).
[10] http://stats.oecd.org/OECDregionalstatistics/

- **KIS:** accountancy, computer software (including bespoke applications), human resource management, legal services, management consulting, marketing, other ICT services, research and development.

3.5 Initial familiarisation with these online data sets involved navigation around the OECD Regional Statistics Explorer interface. This allows simultaneous mapping and charting of selected data topics for all regions covered by the system for different years, allowing the inclusion of EU and EEA members, but also regions in Australia, Canada, New Zealand, South Korea and the USA.

3.6 The first trial mapping involved the four indicators listed above. In particular it was seen as important that the two employment indicators be ranged against the levels of tertiary education across the regions. The result was four scatter graphs showing the relationship between levels of tertiary education and employment in HTM and KIS on the one hand, and GDP per capita and GDP growth rates on the other. These are shown in the screen shot charts on the following pages, with Y&H and other regions with similar scores on each dimension highlighted. In summary:

- Figure 3.1 examines the relationship between the proportion of the working age population with tertiary educational qualifications and the percentage of the workforce engaged in HTM activities. The results suggest that there is no particular association between the two indicators at the regional scale, and that Y&H falls just below the mid point of the distribution;

  Figure 3.2 ranges tertiary educational attainment against employment in knowledge intensive services, and again suggests that the association is at best weak, and possibly at worst non-existent. Here Y&H lies just above the middle zone of the distribution, and the regions with similar figures for employment in KIS are completely different to those in the HTM chart;

- Figure 3.3 compares tertiary educational attainment with GDP per capita. Here there does appear to be a positive relationship, albeit extremely weak, with regions to the right of the graph generally having higher GDP than those with fewer residents with HLS. The clustering of regions with similar levels of HLS as Y&H - again around the middle of the distribution - lends some more weight to this. However, there are sufficient exceptions at each end of the spectrum to cast doubt on any contention that higher levels of tertiary education automatically lead to more prosperous regions. The extreme outlier at the top of the graph (Washington DC) may also lead to a degree of compression amongst all the other regions.

- Figure 3.4 sets out average annual growth in GDP over the previous 10 years in relation to tertiary educational attainment. Again, it shows very little association between the two, and Y&H occupying a position just below the mid point of the distribution.

3.7 Overall, these charts appear to show that there is little association between levels of tertiary education attainment in a region on the one hand, and indicators of innovation and economic performance on the other. However, two caveats should be added to this assessment:

- The way in which the OECD indicators for HTM and KIS employment are constructed may be too broad and insensitive to the subtleties of any linkages between HLS and economic development;

- The use of cross-sectional data may not be most appropriate in detecting such linkages, given that they may emerge as long-run effects of earlier trends.

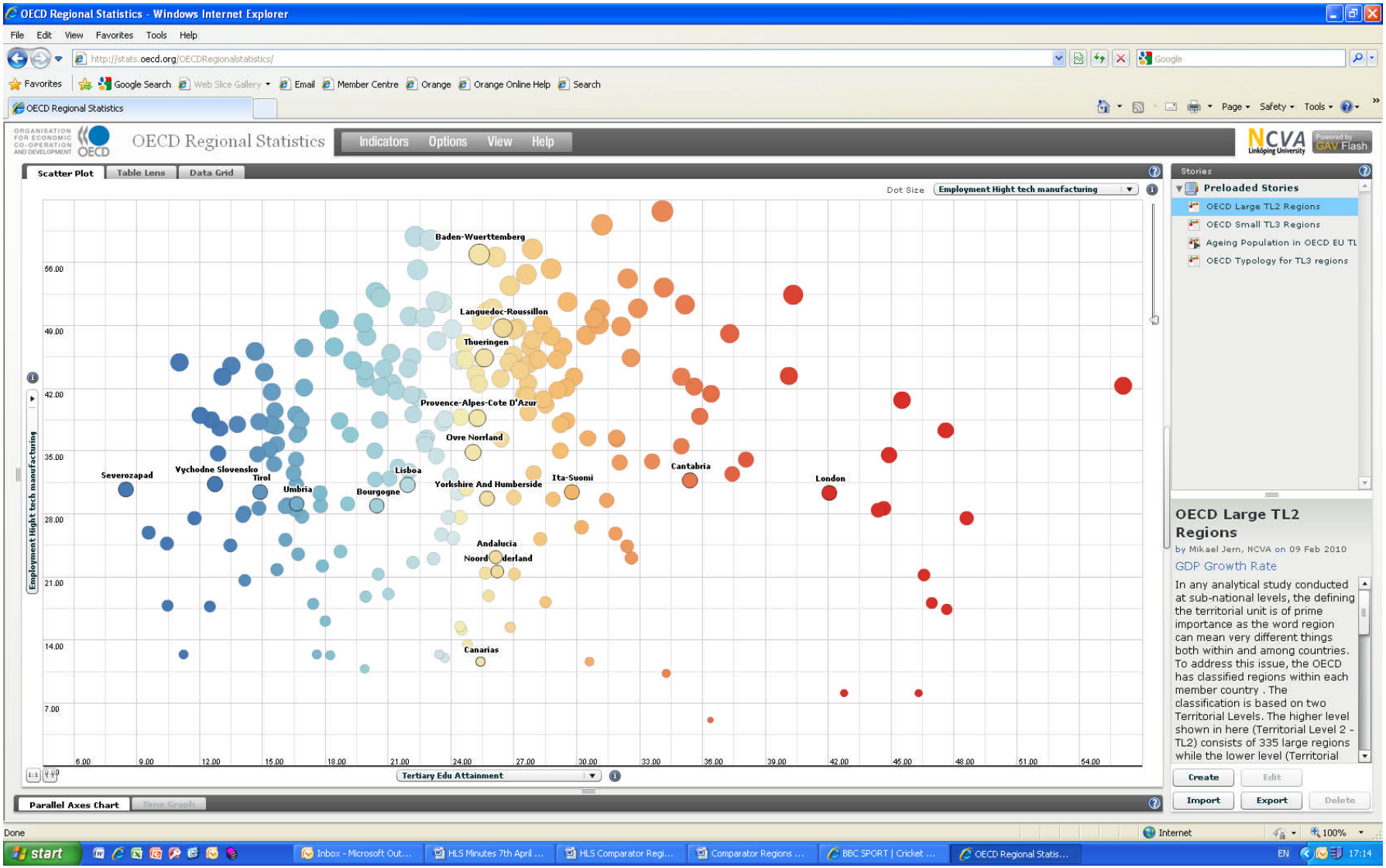


Figure 3.1: Employment in High Tech Manufacturing and High-Level Skills, OECD Regions, 2006

Figure 3.2: Employment in Knowledge Intensive Services and High-Level Skills, OECD Regions, 2006

Figure 3.3: GDP per Capita and High-Level Skills, OECD Regions, 2006

Figure 3.4: GDP Growth Rate and High-Level Skills, OECD Regions, 2005

3.8 One key message that does arise from the charts is that Y&H tends to occupy a middling position in comparison with most other OECD regions[11]. The OECD regional data sets were deployed in an attempt to identify those regions that most closely approximate Y&H in terms of the chosen indicators. However, as the charts show, the patterns that emerged were diverse, with no regions consistently appearing that could be taken as being matches in terms of sectoral mix, wealth generation and economic performance.

3.9 In the light of this analysis it was decided to adopt a more inductive approach involving the examination of a selection of European regions which shared a similar starting point to Y&H with regard to their industrial past and subsequent quest to undertake economic restructuring. Part of this exercise involved including some regions known to have made considerable progress in converting to modern knowledge-based economies. Based on our existing knowledge we were able to identify what appeared to be seven suitable comparator regions, as follows:

- Länsi Suomi (West Finland);
- Limburg (southern Netherlands);
- Lorraine (eastern France);
- Nordrhein-Westfalen (North Rhine-Westphalia, western Germany);
- País Vasco (Basque Country, northern Spain);
- Ślaskie (Upper Silesia, Poland); and
- Scotland (northern UK).

Statistical Review of Comparator Regions

3.10 This section presents a series of tables that allows a comparison of the trajectories followed by the seven comparator regions and Y&H over the last 10 years or so. The figures have been drawn from a combination of OECD and Eurostat Regional Statistics websites. It focuses on particular topics such as population, GDP, tertiary educational qualifications, and other knowledge economy indicators.

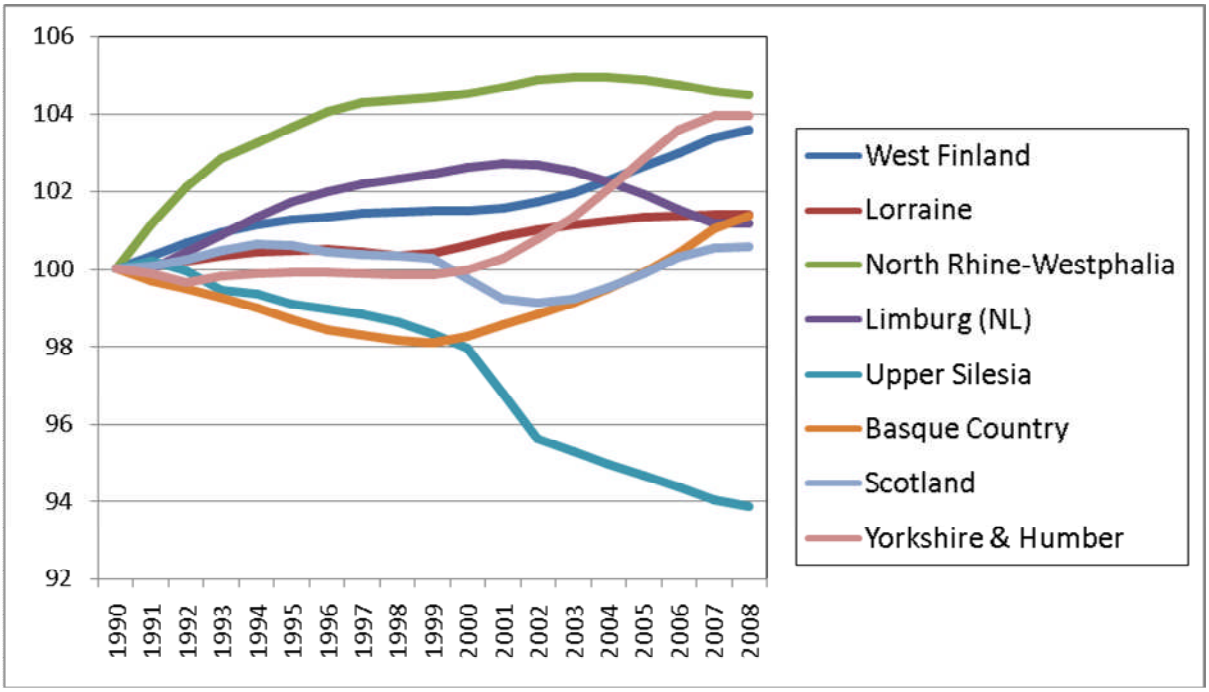
3.11 Figure 3.5 summarises trends in the size of the regional populations of the regions between 1990 and 2008, using the first year as the base point. It reveals that only Upper Silesia has experienced continued decline over the period, suggesting that it is still in the earlier stages of restructuring. Others that have undergone previous population loss, such as the Basque Country, Scotland and indeed Y&H, largely via out-migration, have all now exceeded their 1990 totals. The rest have witnessed continued growth, although the one with the highest, North Rhine-Westphalia, has been relatively static over the last nine years.

3.12 In terms of GDP per capita, the pattern is similarly varied (see Figure 3.6). Most of the regions have shown fairly steady growth, albeit from different starting points. The wealthiest region in 1995, North Rhine-Westphalia, was in fact relatively stagnant during the rest of the 1990s, and has advanced only slowly since. Those that had similar levels to Y&H in 1995 have had varied fortunes, with Lorraine falling behind but Limburg now approaching the level of its German neighbour. In

[11] all four charts have one axis which remains the same so you would expect each region to occupy a roughly similar part of each graph because of this.

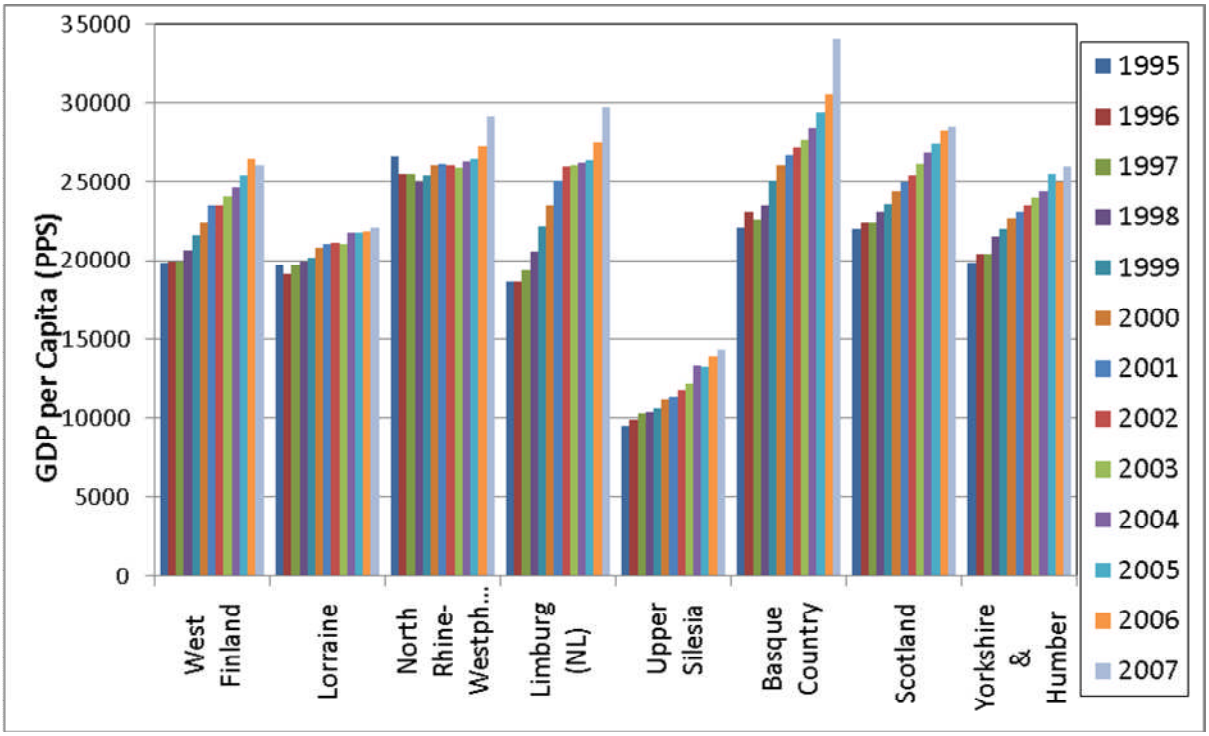
comparison Y&H has performed well, such that in 2007 it exceeded the figures for West Finland (on a par in 1995) and was just above Scotland (2,000 points higher in 1995), and had narrowed the gap with North Rhine-Westphalia from 6,700 to 1,200 points. The regions that gained most over the period were the Basque Country and Limburg. Upper Silesia also showed an impressive growth rate, but from a very low starting point.

Figure 3.5: Indexed Population Change in Comparator Regions, 1990-2008



1990=100 *Source:* OECD Regional Statistics

Figure 3.6: GDP per Capita, 1995-2007



PPS = Purchasing Power Standard *Sources:* OECD Regional Statistics; Eurostat Regional Statistics

3.13 Unfortunately, the figures for tertiary educational qualifications at the regional scale are much more patchy and available over a much shorter timespan (see Table 3.1). From the data that is available, the Basque Country is not only the leader here, but also has one of the highest proportions of any region in OECD countries. This is assisted by its strong tradition of higher education, the tendency for a high proportion of local students to study and then remain within the region, and the attractiveness of the region in terms of job opportunities to graduates from elsewhere in Spain. Scotland and West Finland have the next highest proportions, with around a third of their working age populations having tertiary qualifications. Again the strength of higher educational institutions plays an important role here, with the added attraction in West Finland of an extremely dynamic research and development culture (see regional profiles below).

Table 3.1 Working Age Population With Tertiary Education, % of working age population

	1999	2002	2005	2006
West Finland (FI)	n/a	30.2	31.9	31.9
Lorraine (FR)	20.1	20.7	21.8	22.0
Limburg (NL)	n/a	n/a	24.2	n/a
North Rhine-Westphalia (DE)	20.9	20.4	21.9	20.6
Basque Country (SP)	36.4	40.7	47.1	47.6
Upper Silesia (PL)	12.0	13.1	18.7	20.4
Scotland (UK)	30.9	33.7	34.2	35.0
Yorkshire and Humber (UK)	23.8	25.1	25.2	25.7

Source: OECD Regional Statistics.

3.14 Alongside Limburg, Y&H is in a more middling position, with around a quarter of its working age population possessing tertiary qualifications. However, since 2002 this figure has only been edging forward slowly as far as Y&H is concerned. Behind these are Lorraine, North Rhine-Westphalia and Upper Silesia, at around 20%. Each has followed different paths to this point, with Upper Silesia undergoing a rapid increase, Lorraine increasing its share slowly, and North Rhine-Westphalia effectively stagnating. However, given the very different approach taken in Germany to vocational and technological education and training, this situation may not be as alarming as it seems with respect to regional innovation and development.

3.15 Certainly North Rhine-Westphalia's low score on this indicator is not mirrored by a range of knowledge economy indicators. In terms of total expenditure on research and development (R&D), it has had a consistently high level compared with most of the other regions (see Table 3.2 overleaf). The leader by far in this regard has been West Finland, based particularly on innovative financing methods and dynamic integrated networking (see regional profiles below). Limburg, the Basque Country and Scotland also have witnessed reasonably high levels of R&D, with the latter two helped by extensive though varying degrees of devolution and autonomy. Y&H has consistently had lower figures than the seven comparators, alongside Lorraine; both tend to be hampered by the continuing central control over public R&D expenditure budgets, and the relatively low level of private sector investment in such activity within their territories. The extremely low figure for Upper Silesia is mainly a reflection of the underdeveloped nature of R&D activity in Poland in general.

Table 3.2 Research and Development Expenditure (% of regional GDP, all sources, 1996-2008)					
	1996	1999	2002	2005	2008
West Finland (FI)	n/a	3.39	3.12	3.60	3.68
Lorraine (FR)	0.77	1.01	1.10	1.09	n/a
Limburg (NL)	n/a	2.19	1.54	1.96	n/a
North Rhine-Westphalia (DE)	1.63	1.74	1.70	1.78	2.19
Basque Country (SP)	1.15	1.12	1.29	1.48	1.87
Upper Silesia (PL)	n/a	0.39	0.31	0.34	0.38
Scotland (UK)	1.39	1.34	1.64	1.59	1.81
Yorkshire & Humber (UK)	0.85	0.91	0.97	0.91	1.01
Source: Eurostat Regional Statistics.					

3.16 To a certain extent these varying investment levels are also reflected in the number of patent applications submitted (see Table 3.3). West Finland, Limburg and North Rhine-Westphalia stand far above the rest, a pattern that has persisted over the past decade. Y&H has performed credibly on this score, being close to Scotland's achievements in most of the selected years in spite of its lower R&D investments. Both Lorraine and the Basque Country were some way below the two UK regions, a position that did not quite match their R&D investment levels. This suggests that such expenditure there is aimed at producing different outcomes.

Table 3.3 Patent Applications, per 1 million population, 1996-2005				
	1999	2002	2005	2006
West Finland (FI)	125.0	230.7	264.1	275.7
Lorraine (FR)	26.6	38.8	42.9	40.3
Limburg (NL)	153.6	154.6	168.4	185.7
North Rhine-Westphalia (DE)	89.0	139.0	148.9	162.2
Basque Country (SP)	10.4	20.3	23.2	37.2
Upper Silesia (PL)	0.6	1.0	1.6	0.8
Scotland (UK)	39.6	58.5	77.4	65.4
Yorkshire & Humber (UK)	42.6	54.8	64.8	63.4
Source: OECD Regional Statistics.				

3.17 Finally, Table 3.4 overleaf sets out the changing situation in relation to employment in high technology sectors. Here it should be noted that Eurostat appears to have adopted a much narrower definition of HTM and KIS than OECD, although no precise specification is provided on its website. The result is much lower proportions for each region, but with a similar overall pattern. Once again the three key leaders in this group are North Rhine-Westphalia, West Finland and Limburg, with the Basque Country and Scotland also scoring over 4%. Y&H was just below this mark in 2008, having suffered a decrease over previous years. It was followed by Upper Silesia and Lorraine. Over the period shown most regions have seen some fluctuation in these employment levels, possibly due to faster increases in other parts of the economy. Only the Basque Country and Upper Silesia have displayed continuous growth on this indicator, while Scotland is the only one to show a continuous decline.

Table 3.4 Employment in High Technology Sectors, % of total employment, 1996-2008					
	1996	1999	2002	2005	2008
West Finland (FI)	n/a	4.45	4.87	5.04	4.90
Lorraine (FR)	4.85	4.52	4.18	2.96	2.50
Limburg (NL)	4.56	5.80	4.69	4.51	4.89
North Rhine-Westphalia (DE)	5.23	4.62	5.49	5.28	5.29
Basque Country (SP)	2.23	2.58	2.57	3.41	4.50
Upper Silesia (PL)	n/a	n/a	2.49	2.97	3.24
Scotland (UK)	6.42	5.73	4.89	4.41	4.27
Yorkshire & Humber (UK)	3.91	3.97	3.95	4.01	3.84
Source: Eurostat Regional Statistics.					

3.18 The recent release of the Regional Innovation Scoreboard 2009 by the European Commission also allows an assessment of the position of these comparator regions relative to all other EU regions in terms of innovation activity. In general terms, this review of key indicators and other data revealed four key conclusions:

- All EU countries have regions at different levels in terms of innovation performance;
- However, the most innovative regions are in the most innovative countries.
- Although there is no straightforward association between a region's innovation performance and its relative strengths and weaknesses, those with the lowest levels appear to have particular deficiencies in enabling factors such as human capital; and
- With a few exceptions (none of which are in the UK), regional innovation performance has remained stable since 2004.

3.19 Normalised indicators have been calculated for each region on a range of innovation-related dimensions. These give a score for each region on a scale from 0.01 (lowest performer) to 1.00 (best performer). The scores for the seven comparator regions and Y&H are shown in Table 3.5. This shows that (as previously noted) Y&H generally occupies a middling position in comparison with other EU regions. The main exceptions are lifelong learning, where it is amongst the leaders (alongside other UK regions), and employment in high tech manufacturing, where it is in the bottom third. It also performs underneath its general level with respect to business R&D expenditure.

3.20 Another recent contribution to these issues is an article in Regional Studies on older industrial regions in Europe by Birch et al. (2010). It focuses on a number of smaller regions and sub-regions (NUTS2 level) with economies formerly based on mining, steel production and engineering, such as the Ruhr-Rhine area in Germany, Lorraine in France, the Basque Country in Spain, and coal-mining areas in the UK (including South Yorkshire). Using data drawn from Eurostat Regional Statistics, they trace sectoral employment change between 1996 and 2005 broken down into key segments including high and medium-high technology manufacturing and knowledge-intensive services.

Table 3.5: Regional Innovation Scores, 2006								
Region	**Tertiary Education**	**Lifelong Learning**	**Broadband Access**	**Public R&D Expenditure**	**Business R&D Expend**	**EPO Patents**	**Jobs in HTM**	**Jobs in KIS**
West Finland (FI)	0.77	0.82	0.76	0.65	0.83	0.73	0.51	0.48
Lorraine (FR)	0.42	0.46	0.40	0.53	0.57	0.52	0.60	0.40
Limburg (NL)	0.46	0.65	0.87	0.47	0.68	0.64	0.36	0.48
North Rhine-Westphalia (DE)	0.35	0.42	0.59	0.54	0.58	0.68	0.53	0.54
Basque Country (SP)	0.92	0.60	0.45	0.41	0.62	0.41	0.55	0.51
Upper Silesia (PL)	0.35	0.34	0.36	0.33	0.30	0.12	0.45	0.36
Scotland (UK)	0.69	0.89	0.54	0.62	0.50	0.44	0.26	0.60
Yorkshire & Humber (UK)	0.48	0.87	0.56	0.52	0.43	0.41	0.31	0.52
Leading EU Region	Bruxelles-Capitale (BE)	London (UK)	Utrecht (NL)	Braunschweig (DE)	Stuttgart (DE)	Noord-Brabant (NL)	Stuttgart (DE)	London (UK)/Île de France (FR)

Source: Regional Innovation Scoreboard 2009 (Hollanders et al, 2009)

3.21 Birch et al. (2010) show that the sample UK regions have all seen a substantial contraction in terms of HTM, but rapid expansion in terms of KIS, but with the latter only producing a positive balance in a few sub-regions such as South Yorkshire. In conclusion, they make four key observations:

- National institutional structures and favoured regional adaptation paths arguably play a central role in influencing the nature and direction of regional trajectories. Thus, the interventionist diversification and upgrading policies pursued in France, Germany and Spain have helped to limit or even reverse the decline in manufacturing industry, whereas the market-oriented approach in the UK has resulted in further deindustrialisation, the expansion of financial and business services and a reinforcement of regional disparities.

- There is no simple link between regional employment trends and degrees of devolution or institutional presence. As already noted, regional performance tends to reflect the overall national position, albeit mediated by local differences in emphasis.

- While geographical factors such as location and accessibility help to shape processes and outcomes of regional adjustment, historically entrenched patterns of uneven spatial development may be very hard to overcome. This is especially the case in the UK, but also in certain other regions such a Lorraine and the Ruhr-Rhine belt.

- Regional trajectories appear to be the product of the interlocking processes of path dependency and path contingency with respect to both national economic development and regional adaptation.

Comparator Regions: History and Recent Development

3.22 While the brief statistical review of comparator region trends reveals various patterns, it also poses several questions. In particular, the rates and numbers are unable to tell the story of how these different regions have gone about adjusting to the loss of their traditional economic base. This section attempts to fill some of these gaps by presenting a series of short regional profiles. These focus on matters such as historical background, regional innovation models and support mechanisms, financial instruments and governance arrangements. Key data sources are provided within Annex 2.

West Finland (Lansi Suomi)

This region includes the area around Tampere, which formed the original industrial heartland of Finland, specialising in particular in textiles, paper, railway engineering and motor vehicles and accessories. Most of these were in decline or had disappeared by the mid-1960s, and a combination of public sector response and private firm adaptation has seen a dramatic transformation of its fortunes.

The company that acts as an emblem for this change is the Nokia Corporation, named after the small town of the same name. This started life in the 1860s as a paper mill, adding rubber products such as tyres and later electricity cables to its range. It branched into electronics and computers in the 1960s, moving into radio telephony via a joint venture with a television production company in 1979. Since then it has consistently been at the forefront of the mobile telecommunications revolution, such that in 2007 it was rated as the fifth most valued brand in the world. A large part of its success has been due to it being nimble in responding to rapidly evolving technologies, much of which is driven by its own dedicated R&D activity, distributed across 16 countries including Finland with one in Tampere and two others in the Helsinki region. All its research centres have close links and, in some cases, co-location with key university departments and research institutes, following the collaborative 'open innovation' developmental model. Another important feature is its annual worldwide internship programme, recruiting suitably qualified graduates and postgraduates and offering summer trainee posts to current students.

In terms of public policy in the Tampere sub-region, the economic development model adopted over the last 25 years has followed very similar lines. The main exception has been the financing vehicles employed, given that Nokia is able to generate virtually all of its R&D investment through its own trading operations. The main platform has been the establishment of a series of technological research centres, focusing particularly on automated engineering (including laser applications), ICT, health and biotechnology (including vaccine research). All of these involve the on-site presence of university research groups, product designers and high technology enterprises as an integral feature. Support in terms of access to funding and navigating public sector regulatory procedures is also readily available. The idea is to facilitate constant dynamic networking between all relevant actors. In addition, some university courses have been adapted to ensure that graduates have the appropriate competences for taking up job opportunities. Again, the centres offer trainee work placements, and there is also a further centre (Demola) that enables current students and entrepreneurs to work together on developing digital products and services. Another synergy is the passing on by Nokia of ideas that it has explored but decided not to run with to SMEs in the Technopolis Innovation Mill (located in a converted textile factory).

Two further components make a distinctive contribution to this mix. The first is the involvement of a real estate company specialising in technology incubator units. This has an operating model that ties it directly into the success of new innovating companies that take up space in these units. Part of the offer here is the flexibility of rental terms that reflect the current position of the firm in question and the phase that its development has reached. The second key input is the involvement of a bespoke financial intermediary (Hermia) which seeks to assemble 'local' money from a mixture of public and private sources for investment in key innovating firms. Typically it will contribute 20 per cent of the overall investment, either direct or as share capital, in an effort to bridge the gap between start-up and the first venture capital phase. An important aspect of its operation is its appeal to existing company leaders and other individuals in the Tampere area to show their support for their home patch in a mutually beneficial financial contribution.

Lorraine

This is a classic traditional industrial region which has struggled to adapt to modern economic circumstances. Situated in eastern France and bordering Belgium, Luxembourg and Germany, originally it was a key area of coal mining, iron and steel production, engineering and textiles. As elsewhere these have all declined or disappeared, leading to high levels of selective out-migration during the 1980s and 1990s, disproportionately involving younger well-qualified people. The early response to this need for restructuring was shaped around the attraction of foreign direct investment. While this brought some success, it did make Lorraine vulnerable to subsequent changes in global production strategies, which resulted in the relocation of many plants to the emerging economies of the Far East. Even so, the region remains dominated by large employers, a large percentage of which are foreign owned, with a correspondingly underdeveloped SME base. The latter of course reflects the relatively low levels of entrepreneurship found in such regions. More recently, the region has benefited from its geographical situation and good communications in two ways: as an excellent location for European logistics firms; and in enabling residents to commute to jobs in neighbouring EU countries (especially in Luxembourg and Saarland).

Although well endowed in terms of academic research laboratories, Lorraine has historically been one of the weakest of all French regions with respect to R&D expenditure, and particularly of the type that leads to conversion to commercial applications (see Tables 3.4 and 3.5 above). Although there has been a regional administrative level in place since the 1980s, in effect the tendency until recently has been for the Conseil Régional merely to be in a position to implement decisions on industrial policy made centrally in Paris. However, the first Regional Technology Plan, formulated in the mid 1990s, did lead to the development of infrastructure and mechanisms for the promotion of R&D and innovation.

This includes two Centres of Competitive Excellence, focusing on both new and traditional sectors such as aerospace, motor vehicles, buildings and equipment, composite materials and textiles. Their mission is to foster collaborative projects between universities, research institutes, companies and public sector bodies around R&D and training. Linked to these has been the development of five business networks, some linked to the sectors already mentioned and others at potential growth areas such as wind energy and furniture. However, most of this activity is heavily dependent upon public financial support, often without a requirement to ensure that some form of commercial gain emerges as an end result.

A second strand to this economic development activity was the establishment of technological intermediaries in key sectors as a means of linking research centres with SMEs. This led to some fruitful collaborations, although over time there was a tendency for the same innovating clients to receive assistance, and for few new ones to emerge. A key issue here was the emphasis on what research centres could offer, rather than what SMEs might need (admittedly often difficult to specify precisely). A recent evaluation concluded that the intermediaries offered a high quality service, but to a very narrow target base. Consequently their remit has become more restricted to specific technologies in given sectors, but without much other change in terms of the functioning and financing of innovation support infrastructure.

The four universities in the region also set up separate knowledge transfer units, plus one incubator unit for the commercialisation of research results. This fragmentation meant that there was limited success in developing collaborations with industry in terms of product development and process improvement. Of course, this lack of linkages also meant that course adaptation, graduate recruitment, student placements and applied project working have all been few and far between. In sum, in spite of a recognition some 15 years ago that Lorraine needed to move from a linear to an interactive model of innovation, the political, administrative and wider institutional culture nationally and regionally still appears to conspire against achieving this goal.

Limburg

The Dutch province of Limburg lies in the south-east of the Netherlands, and is the eastern portion of a much larger ancient duchy, the main part of which falls within Belgium. The region forms a narrow slice of territory along the German border, and includes the 'panhandle' around Maastricht that juts into Belgium. As such it is classified as a NUTS3 sub-region, rather than a full NUTS2 region. Transected by the River Maas (Meuse), its southern hillier part was home to coal mining and heavy industry up to the 1960s. The cessation of mining in the mid 1960s, the decline of associated industries and consequent high unemployment levels threatened to compound the area's peripherality in national terms to make it one of the most impoverished in Europe.

The first economic restructuring plan and the establishment of an independent financial institution/development company to support new enterprises, the Industriebank LIOF were key turning points in the 1970s in stimulating the process of renewal that has now placed Limburg at the European innovation crossroads. The Industriebank LIOF coordinates inward investment, venture capital investment, product innovation, enterprise development and provision of business parks. An additional source of venture capital (Limburg Ventures) for new firms in the high grade metals sector has also been launched, though the focus here is more on existing companies which are looking to expand.

Other targeted clusters include composite materials, chemical processes, conventional and sustainable energy generation, life sciences and biomedical applications. These have been promoted in a number of ways, from a network of dedicated R&D parks to major inter-regional and cross-border collaborations. The former include the Chemelot Research and Business Campus at Sittard-Geleen (a joint venture between the provincial government, two local universities and industry), the Biopartner Incubator in Maastricht, the Avantis Europ Science and Business Park in Heerlen, and the Schenten Campus in Venlo. Although there are variations, each of these is seeking to follow a networked 'open innovation' approach by co-locating researchers, entrepreneurs, business facilitators and placement students. One interesting aspect of this model is the use of these sites wherever possible for running practically oriented interdisciplinary science masters courses, suitably accredited by one of the participating universities.

Broader-based developments include the linking together of a range of actors working in the sustainable energy field into a loose network dubbed 'Solar Valley'. Another is the Syntens scheme, which helps SMEs identify potential innovation products that would help them develop their business, and then covers the cost of hiring appropriately qualified personnel to take the idea forward. While this mainly involves technological skills, on occasion it has also required recruitment on the commercial and managerial side. Similarly, the BioMedbooster project involving LIOF and two universities provides assistance to researchers who are looking to market their ideas. This also includes a strong proactive element whereby university research groups are regularly 'scouted' for ideas that might have commercial potential but have not been examined from this angle.

However, such collaboration is not restricted to the province alone. Indeed, Limburg acts as a partner in four long-standing cross-border partnerships involving other regions in the Netherlands, Belgium and Germany (Flanders-Netherlands; Meuse-Rhine; Rhine-Meuse North; Rhine-Waal). Around these the six regions that cover the Aachen-Leuven-Eindhoven triangle, within which Limburg sits, are together aiming to become the leading Top Technological Region (TTR) in Europe, via an 'acceleration agenda' of key public investments. Within this area there are over 100 research institutes, university departments and hospitals, and technological development centres that are directly linked into business development networks. Each of the targeted sectors mentioned above has also entered into collaborative arrangements to establish linked courses at secondary professional and tertiary levels. There is also a scheme called the 'Limburg Innovation Class' designed to attract high quality graduates from other parts of Europe into the region.

North Rhine-Westphalia

North Rhine-Westphalia (NRW) is situated in west-central Germany, and is the most populous and economically most powerful of the 16 Länder (federal states). It is mainly centred on two elongated urban agglomerations, one along the Rhine linking Düsseldorf, Cologne and Bonn, the other known as the Ruhrgebiet and including Dortmund, Duisburg and Essen. It also includes Aachen on the Dutch border and Bielefeld and Münster in the north. Up to the 1960s NRW was known as 'the land of coal and steel', with the Ruhr area emerging after World War Two as one of the foremost engineering and manufacturing regions in Europe, and a key component of the German 'economic miracle'.

Although coal mining, steel production and heavy engineering all declined considerably from the 1970s onwards, none has disappeared completely, and the region remains the home to some of the leading German manufacturing firms, such as Bayer, Krupp and Thyssen. Indeed, 20 of the country's leading 50 companies have their headquarters in NRW. Moreover, because of its pivotal location with respect to the rest of the EU, it also attracts over a quarter of all the foreign direct investment flowing into Germany as a whole.

In addition to the traditional activities that still exist (albeit with much smaller labour forces), the region's industrial base is varied, ranging from traditional and sustainable energy generation through chemicals, pharmaceuticals and mechanical engineering to telecommunications, nanotechnology and environmental management. In other words, it has a reasonably balanced mix of classic and future-oriented sectors, the latter often based on adaptation of specialised expertise developed in traditional industries over the past century.

As well as benefitting from the R&D functions of major firms, NRW has also been able to develop an advantageous policy environment for innovation. Grounded in the considerable autonomy afforded to the federal states, the Landes NRW has its own Ministry of Economic Affairs and Labour. Over the past 30 years this has sought to strengthen the innovative capacity of the regional economy through various routes. These include bringing together key players in each designated sector as a networked partnership, improving communication and dialogue between them, and on the back of this brokering links between firms, universities and other research centres. It has also responded to sectoral needs by fostering more inclusive policy-making mechanisms and making regulatory processes more effective and efficient.

An important vehicle in this has been the Centre for Innovation and Technology (ZENIT), founded in 1984 as a public-private partnership, a three-way split between the Land, a consortium of banks and an association of 250 SMEs. Its role has been to develop and implement technology transfer mechanisms, to facilitate communication between SMEs and political decision-makers, and to provide technical assistance to policy makers with respect to programme design and evaluation and support to SMEs for export development. It also acts as an intermediary to ensure that firms can gain access to other forms of assistance.

Another agency with a more specific remit is the Science-to-Business Centre Eco, which focuses on energy efficiency and carbon emission reduction. This brings together numerous companies, universities, research institutes and trade and business associations in the region. Its main roles are to organise working groups and competence networks; to develop training programmes; and to foster technological development networks. The latter are essentially regional platforms for linking industry, academia and the public sector in exploring and developing new applications. One example is the Hydrogen and Fuel Cell Network NRW, set up as a non-profit-making organisation in 2000. It now has over 300 members, and has also forged collaborative links with similar research groups across the EU.

Similarly, biotechnology research feeds into start-up and spin-off companies through a dense network

of academic scientists and a robust funding environment backed by banks, venture capital providers and business development organisations. This has resulted in over 300 life sciences firms now in operation in NRW, assisted in their early days by technological centres and incubators situated close to and associated with key research institutes. These centres provide assistance with knowledge transfer and application, product and process development, marketing, laboratory facilities and office premises. They also negotiate access to seed corn, venture capital and share issue finance, and advise on the legal and commercial aspects of company formation.

However, as the summary statistics in Table 3.1 attest, this impressive support infrastructure and the high levels of R&D expenditure and high tech employment has not fed through into an above average proportion of people with tertiary educational level qualifications, nor has it prevented below average GDP growth. Clearly there must be a critical mass of appropriately talented individuals in NRW to support the emergence, expansion and continued strength of innovating firms, but the continued large presence of manufacturing at the expense of financial services (clustered further south around Frankfurt) may act as a brake on GDP growth. It may also be that the nature of the German educational system, with its emphasis on much technological and vocational training in establishments outside the university system, means that there are more people with the equivalent of tertiary level skills than appear in the official statistics.

Basque Country (País Vasco)

The autonomous region of the Basque Country is situated at the eastern end of Spain's northern coast, sharing a border with France, and contains the remainder of what is considered to be Basque national territory. Although fractured by deep valleys and steep wooded hillsides, the area has always acted as one of the industrial heartlands of the country as a whole. Traditional activities included mining and quarrying, fishing, iron and steel making, shipbuilding, chemical processing, trading activities and port functions. Much of the original industrial plant was installed during the Franco dictatorship, and was either state-owned or heavily subsidised. This compounded the difficulties faced in these sectors as globalisation developed, and Spain's economy was exposed fully to such forces in the democratic era after 1975, including accession to the EU and the establishment of the single market. The result was that much of older heavy industry has now dwindled or disappeared, to be replaced in cities like Bilbao by retail, tourist and cultural activities (the oft quoted 'Guggenheim effect').

Although the region retains a presence of many of the classic industrial sectors (including petrochemicals, mechanical engineering, paper and rubber products), there has been a drive over the last 30 years to produce a more diversified economy. As well as broadening the scope of existing sectors, a key aspect of this has been to promote innovating high value-added activities such as electronics, telecommunications, biotechnology, sustainable energy and aerospace. The high degree of autonomy given to the Basque government (including tax-raising powers) as part of the post-Franco settlement has allowed it to mount intensive policy interventions in terms of supporting such developments.

Overseen by the Basque Autonomous Community's Department of Industry, these policies have evolved over time through a number of different phases. In the early days (1980s) emphasis was placed on building an R&D infrastructure, resulting in a network of five state-funded but privately run technology centres. Each was closely associated with and in most cases located adjacent to one of the Basque Country's higher education institutions. In the second phase (early 1990s), these centres then helped to launch and foster support and development networks, bringing together key actors in R&D, academia, industry and finance in different clusters. They also helped to establish a range of research centres specialising in areas such as biotechnology, material physics, neuroscience, nanotechnology, health and medical applications and energy generation. The involvement of existing

research institutes such as the one run by the Mondragon Cooperative was instrumental in ensuring that these adopted effective management structures, financing models and operating practices. In general the model followed has been a bottom-up demand-driven one, the aim being for clusters or network groupings articulating industry's needs and R&D and technology transfer activities seeking solutions to these. Mondragon has also been at the forefront in terms of university-industry links, setting up its own institution in 1997.

Not surprisingly, these mechanisms took some time before any appreciable effects were apparent. Clearly progress was also hampered by the generally critical state of Spain's economy during the 1980s. Since the mid-1990s, however, there has been rapid growth in expenditure levels on R&D and innovation activities and in employment in high tech industries (see Tables 3.2 and 3.4 above). Patent applications have also increased, though these remain below comparable levels for other regions, especially in view of the relatively higher expenditure in the Basque Country.

The other impressive feature of the region is the high proportion of the working age population with tertiary educational qualifications (see Table 3.1). However, the extent to which this supports R&D and innovation activity at a higher level than other regions (e.g., North Rhine-Westphalia) is debatable. For one thing, there is evidence that higher qualified people in Spain tend to opt for permanent jobs where their skills may not be fully utilised ('over-qualification' or 'over-education'), rather than taking up one of the third of all jobs in Spain offered on a fixed-term contract. In the Basque Country this may be compounded by much higher levels of loyalty to their home region (seen by many as a separate nation) than elsewhere. This could also lead to people taking up posts for which they are over-qualified.

Compared with many other regions of Spain, Basque science and technology policies have been ground-breaking and advanced, spearheaded by the Basque Innovation Agency Innobasque. The fact that they owe much to Scandinavian and Germanic models of 'open innovation' should not detract from the manifest achievements and the economic progress of the region. However, continuing fragmentation within the system has meant that the full potential of what exists has yet to be fulfilled. In particular, the connections between the education-oriented university system and the industry-oriented R&D system remain relatively undeveloped, both in terms of applied research and in the content of undergraduate and postgraduate courses. There is also a tendency for technology policies to be framed and implemented separately to more general industrial policy (e.g., attracting foreign direct investment). Levels of participation in terms of the design and implementation of Basque technology policy have also remained fairly low, even though the percentage of firms undertaking R&D has grown. There remains a great deal of scope for further network development, especially in terms of their influence over the direction of policy.

Some of these issues are being addressed by the current Science Technology and Innovation Plan (2010), which also aims to increase R&D expenditure to 3% of GDP by 2015. At the same time, this strategy appears to place greatest emphasis on a number of large scale flagship initiatives, such as its bid for the European Spallatron Neutron Source (to be located in Bilbao if successful), and promotion of the bioBASQUE 2010 biocluster from a fairly small base.

Upper Silesia (Ślaskie)

This region lies in the south of Poland, with the Tatra Mountains forming its southern border with Slovakia and the north-east of the Czech Republic. Both before World War Two and during the Soviet era it has been one of country's core industrial zones, based around classic activities such as coal mining, iron and steel, engineering and chemicals. Whilst these still remain important, extensive restructuring in the post-Soviet period has seen their employment levels and economic contribution plummet. The regional authorities have embarked on a 'reindustrialisation' strategy revolving around the attraction and promotion of export oriented new technology companies.

Upper Silesia was the first region in Poland to adopt an innovation strategy. This identifies five clusters around which attention will be focused: ICT; e-medicine; biotechnology; renewable energy; and natural resources. Working groups have been set up in each, with some having more than one depending on how far it has been subdivided. These are in the throes of developing collaborative networks and linking systems that can bring together players from university departments, research centres, industry, financial institutions and public agencies. These are seeking to capitalise on a growing R&D presence of major transnational corporations such as IBM, Google, Siemens, and HP, and on the 30-plus universities and academies located in the region.

Up to this stage the principal focus has been on the construction of support infrastructure and network connections. This includes the establishment of around 40 research centres, most supported by both national and regional resources. These have recruited some of the top scientists in the country, and though already plugged into specific local firms, are seeking to engage much more widely with entrepreneurs in their particular sector. In addition a series of advanced technology centres and a technological transfer network are being developed, and provision of a spread of science and technology parks and incubator units is in train. Coordination of this activity is being provided by an R&D institutions council and the regional conference of university rectors. There is also a regional consortium of SME support organisations to share new ideas, to advocate good practice and to ensure that duplication is avoided.

To date the innovative component of the Upper Silesian economy remains in a fairly embryonic state, as the figures in Tables 3.2 and, 3.3 demonstrate. Nevertheless, the rapid rise in both the proportion of working age people with tertiary qualifications (Table 3.1) and the share of employment in high tech industries (Table 3.4) illustrate that progress is being made.

In fact, the increase in the proportion of HLS is an intriguing one, given that it has taken place during a period of population decline. Normally the out-migration component of such a change involves a disproportionate number of highly qualified young people, but the statistics appear to suggest that they are more likely to be staying put. That said, the absolute increase is likely to be somewhat lower given that even a constant number will always increase its share of a declining denominator. The presence of this expanding cohort of highly qualified workers should act as an advantage for the region's further economic development.

There are a number of key challenges that Upper Silesia still faces. First, major land, water and air pollution problems persist, reducing quality of life and attractiveness to investors. Second, economic restructuring has been slow and very costly, with state control of or subsidies to older industries still in place. Third, much inward investment has been at the less skilled end of the spectrum, and using new ventures to find fresh products has taken rather a low profile. Fourth, there is still a lot to do in terms of building up trust between individuals and organisations, one element of which is to increase institutional capital. Finally, there remain a large number in the labour force who have no or inappropriate skills.

Scotland

Although Scotland tends to be treated as a single whole in most regional analyses, it is in fact divided into several distinct zones. For the purposes of this profile attention is mainly directed at the central belt, a traditional industrial-urbanised zone formed by a rough rectangle with Glasgow, Dundee, Edinburgh and Kilmarnock at its four corners. The oil-based boom area around Aberdeen is of much later vintage and very different in character. The Scottish industrial heartlands contained the full panoply of classic industries: coal mining, iron and steel, heavy engineering, shipbuilding, petrochemicals, energy generation, textiles and trading activities.

Economic restructuring commenced in earnest in the late 1960s, following the conventional trajectory of initially focusing on the attraction of foreign direct investment, especially in terms of final production branch plants of major multinational firms. Many of these specialised in ICT systems and products, hence the adoption of the shorthand place name 'Silicon Glen'. The transfer of such units to cheaper locations in more recent times has prompted a shift in the spotlight onto more generative mechanisms of economic development that seek to mobilise skills and resources to create sustainable, locally rooted businesses. The emphasis here, as elsewhere, has been on harnessing scientific and technological advances into commercially viable and marketable products and processes.

Devolution of a selection of powers from the UK government in London to the Scottish Parliament and Executive in Edinburgh in 1999 was seen as an opportunity to move towards the more inclusive associational form of governance that characterises most successful regional innovation systems. A major step forward in this regard was the establishment of Intermediate Technology Institutes for key sectors such as ICT, bioscience and energy. These are intended to act as intermediaries between researchers on the one hand and SMEs and entrepreneurs on the other, with a view to turning research findings into commercial innovations.

The bioscience segment provides a good example of how things have developed. Dedicated science parks have been established in Edinburgh and Glasgow, and the location there of major research bodies such as the Centre for Biomedical Research and the Roslin Institute (of 'Dolly the Sheep' fame) has helped in attracting new SMEs. Promotion of this sector is hoping to draw on the strength of life sciences teaching and research at Scottish universities, which produce 18 per cent of all UK graduates in these fields. However, retention of such skilled personnel remains a key issue, with the underdeveloped nature of the industry meaning that though job opportunities exist, they are seldom sufficient to absorb each year's new supply. Apart from some student placement schemes, other industry-university links are relatively limited, and a dynamic network of interested players is yet to develop fully.

Despite the ambitions with respect to looser governance arrangements and resourcing decisions, it appears that slow progress has been made in moving in this direction as far as the innovation system is concerned. The result has been a decrease in the level of employment in high tech sectors, in spite of healthy R&D expenditure and an increasing proportion of people with higher level qualifications (see Tables 3.1, 3.2 and 3.4 above). There are a number of reasons for this - public research funding has remained a power reserved by the national UK government, giving the Scottish Executive much less flexibility than it would like. However, it and its development agency Scottish Enterprise have still tended to operate in a gate-keeping role, acting in a top-down and consultative manner rather than in a more open and participative way. This has militated against the flourishing of networks and integration of all interests in innovation policy making and implementation. The continuing perception of key players as essentially separate bodies that need to be brought together, rather than as networked entities, has also acted as a barrier to progress. This is manifested in the adherence to the linear model of innovation, targeting commercialisation of research in universities instead of involving

SMEs in R&D as a means of exploring scientific research and technological knowhow to devise solutions to identified problems.

Other criticisms point to congestion and duplication in the provision of economic development services generally, including a multiplicity of innovation support schemes; the fact that science policy tends to have a national focus centred on universities, while innovation and technology policy lies more at the regional scale targeted at private companies; a policy paradigm that relies too heavily on dedicated publicly funded programmes rather than integrative solutions; and an overriding concern with bringing business into research, rather than research into business.

Key Emerging Messages

3.23 The analysis in this chapter has shown that HLS in regional development trajectories is a complex one. A number of key messages emerge from the analysis:

- There appears to be little direct association between levels of tertiary education attainment in a region and indicators of innovation and economic performance;
- On most economic development and innovation indicators Y&H tends to occupy a middling position in comparison with other EU and OECD regions. Its main areas of underperformance are in high tech manufacturing and business R&D expenditure;
- Adjustment and adaptation to the loss of a region's traditional economic base is a very long-term process, and ensuring increased proportions of the workforce with HLS appears to be a necessary but not on its own a sufficient element in the equation;
- National institutional structures and varying regional adaptation paths appear to play a central role in influencing the nature and direction of regional trajectories;
- However, there are examples where greater regional autonomy has enabled stronger promotion of innovation, through the development of dynamic research/business networks and the establishment of dedicated financial instruments.

3.24 The above does not suggest that HLS are not important to economic adaptation. Rather, it emphasises that some caution is required in attempts to 'read-off' policy lessons. As argued elsewhere (see, for example, the conceptual framework in Section 5), HLS need to be considered within a national innovation system and this includes approaches to labour market regulation, sectoral composition and the balance between classic and future oriented sectors. Comparison between Y&H and a set of other similar regions highlights that relatively slow processes are work in the adaptation of these economies, as revealed in aggregate secondary data.

4 HIGH LEVEL SKILLS: REVIEW OF MECHANISMS

Introduction

4.1 The purpose of this chapter is to provide an overview of the available evidence base for HLS interventions. It provides the basis for consideration of potentially appropriate mechanisms and will inform the realist synthesis part of this study.

4.2 Chapter 2 discussed the presence of a low skills equilibrium in Y&H and suggested that, in this situation, an approach that is overly focused on supply side measures is inappropriate and could carry negative impacts. The analysis did, however, indicate specific skills gaps, particularly for associate professional jobs, and there is a case for addressing gaps at this level within Y&H's priority sectors[12].

4.3 This review has been deliberately wide and does not pre-empt the later stages of this work by taking contextual factors into account. Assessment of mechanisms has focused on evidence of successful application and, broadly, whether interventions would be practically deliverable at the sub-national level. The concluding part of the chapter does, however, provide some initial consideration of their appropriateness given the findings presented earlier in the report.

4.4 It should be noted that the overview of mechanisms presented here is in summary form, designed to indicate the scope of potential focus for the next stage of the commission which will explore specific mechanisms and contextual factors surrounding their previous use in more detail. It should also be understood that this is a review of the evidence that it has been possible to source to date. There will inevitably be evidence that has not been uncovered. Some interventions have been subject to little or no evaluation and some evaluation studies are ongoing with only early findings available at the moment. For example, the Higher Level Skills Pathfinders should provide some very relevant and good quality evidence but the evaluation to date is not able to provide conclusions about which elements should be rolled out. It is anticipated that later stages of the work, including peer consultation, will yield further evidence.

4.5 Overall, as the UKCES Review of Employer Collective Measures study has found, for many interventions evidence is very limited (UKCES, 2010). This issue is magnified when considering measures in relation to HLS as these form one element of the wider skills agenda with much activity focused on basic and Level 2 skills development. The evidence review presented here is based on a range of studies, carried out for a variety of purposes and at different geographical scales and policy levels. Although much of the evidence is not HLS specific, interventions developed specifically to develop lower level skills have generally been disregarded. The UKCES work includes a review of measures to boost skills, based on a national call for evidence in 2008. As such, it has been a particularly useful source for the present study.

4.6 A wide range of potential mechanisms has been examined. Many are from the UK but the review also includes, where appropriate, international examples. Many are supply side measures, reflecting the dominance of this approach in the UK and elsewhere. Several have the potential to stimulate demand, such as HEI collaboration, and may be particularly appropriate given low demand within Y&H.

[12] Advanced Engineering and Materials (AEM), Digital and New Media, Environmental Technologies, Food and Drink, and Healthcare Technologies.

4.7 The evidence is presented under twelve headings and includes an initial assessment of the relevance of each type of intervention in the Y&H context, taking into account available evidence of success and deliverability at the regional level. Rankings are 1 to 5 where 5 = very relevant. A summary table is provided below followed by a more comprehensive overview of each mechanism in individual tables.

Summary Assessment

Intervention Type	Relevance	Key points:
Employer Networks / Inter-employer collaboration	**5**	• Available evidence suggests that inter-employer collaboration impacts positively on training. • The Skillnets example from the Republic of Ireland supports this and also suggests potential for increasing demand for HLS among businesses. • The UKCES study (UKCES, 2009b) identifies employer networks as its top policy priority following an extensive evidence review and consultation exercise. • This mechanism is potentially deliverable at the regional level.
Information Advice and Guidance (IAG) for Employers	**5**	• IAG can help to make the case for training as well as supporting firms to access appropriate training. • The Higher Level Skills Pathfinders are trialling different brokerage approaches. To date the North West model which augments Train to Gain with specialist support is proving successful. • This type of mechanism is deliverable at the regional level.
HEI Collaboration / Supporting the Infrastructure for Learning	**5**	• There are numerous examples of business / HEI collaboration involving partnerships and joint delivery and also development of new physical infrastructure such as Knowledge Exchange Centres and new learning facilities. • Evaluation evidence tends to be positive in terms of stimulating innovation (with the potential to boost demand for HLS), workforce development and graduate retention. • On-site training facilities for employers, developed with the support of Advantage West Midlands have had a positive impact on training levels. • With the collaboration of HEIs and other partners, this type of activity can be led and/or supported by regional actors.
Developing Skills for Clusters	**5**	• The rationale for cluster focused interventions is where certain sectors have skills gaps that inhibit productivity. • The evidence presented is from mechanisms being implemented within Y&H. These would, as a minimum, be a key reference point for future intervention. • Most activity within the programme is directed at increasing HLS. • The mix of projects address demand as well as supply side issues. • Overall the programme appears successful to date based on interim evaluation findings with projects on track and broadly delivering activity as anticipated.

Attracting and Retaining People with HLS	**4-5**	• There is evidence of successful interventions to address HLS gaps by encouraging people to move to / stay within an area. • Success may be easier to achieve in some sectors than others. • The evidence for achieving net inflows of HLS through successful marketing relates to Scotland and it may be more difficult to achieve at the regional level. • Graduates Yorkshire has been a successful graduate retention scheme and there may be potential for further development although there are limitations associated with using careers service advisors.
Skills Utilisation	**4**	• This approach is based on encouraging better utilisation of existing skills within the workforce rather than new skills development. • It is a rational approach with the potential for good cost effectiveness but there is little evidence to suggest significant economic outcomes to date. • It has generally been delivered at the national level. There may be potential for regional delivery but this could be difficult without national policy support.
Raising Demand for HLS Training by Individuals	**4**	• Careers guidance directed at all ages has been very successful in Scotland. A similar approach is being developed in England as the Adult Advancement and Careers Service. There could be potential to augment this and/or ensure it links effectively to other mechanisms. • Career Development Loans have proved effective at encouraging people to develop HLS (GHK, 2008). It would be difficult to implement individual rights to training at the regional level. • There is little evidence of schemes designed to boost motivation to increase HLS among employees. • A key factor will be the attitude of employers and the culture within the workplace.
General Subsidies	**4**	• There is a wider range of evidence on the effectiveness of this type of mechanism. • Subsidies do tend to have a significant positive impact • The extent to which subsidies are effective at providing more / better quality training varies considerably. • Contextual factors, appropriate scheme design and effective delivery are likely to be critical to success. • Subsidy schemes are deliverable at the regional level (e.g. the Train to Gain Enhancement Fund).
Quality Assurance Standards	**3**	• Evidence to support the effectiveness of quality assurance schemes at boosting training provision is limited. • Deadweight in terms of additional training is likely to be significant although there may be some wider promotional benefits. • There is potentially some scope for regional delivery.
Levies	**2**	• Levies are effectively a mechanism for enforcing training by firms. • They have some existing application in the UK and are more widely used abroad. • Overall their success is uneven and dependent on the specific design and administration of schemes. • As a mandatory measure it is an intervention that would be difficult to deliver on a sub-national basis.
Occupational Licensing	**1**	• There is limited evidence of increased training as a result of occupational licensing although there is clear potential for doing so. • UKCES (2009b) study shows support for use in some sectors but this mechanism would not be deliverable at sub-national level.

Tax Breaks	**1**	• The evidence for tax breaks to support training is very limited. Evidence on tax breaks to support R&D is not really comparable due to worker mobility. • This measure is more likely to lower financial barriers to training rather than act as a genuine incentive. • This mechanism is not practically deliverable at a sub national level.

Overview of Intervention Evidence

Employer Networks / Inter-Employer Collaboration

Key Points

- Available evidence does suggest that inter-employer collaboration impacts positively on training.
- The Skillnets example from the Republic of Ireland supports this and also suggests potential for increasing demand for HLS among businesses.
- The UKCES study (UKCES, 2009b) identifies employer networks as its top policy priority, following an extensive evidence review and consultation exercise.
- This mechanism is potentially deliverable at the regional level.

Inter-employer collaboration can occur in a variety of forms including business membership organisations such as Chambers of Commerce, trade associations, sector specific groups, group training associations, and through supply chain relationships.

Employer networks emerged from the UKCES work as the principal policy priority for increasing skills (UKCES, 2009b). The study acknowledges that, as with all the measures reviewed, there is little evaluative assessment of training impacts but it draws on studies that utilise national survey data. For example, Hoque and Bacon (2006) used national survey data to look at SMEs and found that embedding firms in wider networks had a positive impact on the amount of training undertaken. Training activity was higher if firms belonged to 'a multiple of business advisory networks; membership of one organisation tended to limit training benefits to management/professional occupations'. Stone and Braidford (2008) found benefits of SMEs pooling resources for training. This work also supports Hoque and Bacon's (2008) findings about the relationship between networks and training.

Further endorsement of the benefits of the network approach comes from the Republic of Ireland and its Skillnets programme. Skillnets is a publically funded enterprise support organisation concerned with increasing training and upskilling the workforce to improve Ireland's national competitiveness. Skillnets supports and funds networks of enterprises to engage in training under the Training Networks Programme. These 'Skillnets', are business led to deliver training programmes across a broad range of industry and service sectors. Using public sector subsidy, networks are able to offer member companies significant discounts on market training rates. The member companies also contribute to the grant aided programme. Evaluation material of Skillnets is not publicly available but annual survey results reported in the Skillnets annual report provide a strong endorsement of the approach.

Over 6,000 companies responded to the 2008 member company satisfaction survey:

- 93% stated they would recommend becoming a member of a training network to other companies;
- 85% of companies stated that their training network delivered lower cost training than available alternatives;
- 46% of companies stated that their participation in their Skillnets training network had created

new business partnerships, with 61% reporting key business contacts generated;

- Companies stated that participation in their Skillnets training network had a positive impact on levels of customer satisfaction (78%) and employee morale (83%);
- 77% of companies stated that staff training had increased from their membership of a network with a further 82% stating that they could now avail of training that would not have been otherwise available;
- 78% of companies stated that the Skillnets Training Networks Programme was more flexible being enterprise-led and 82% felt the training provided was better suited to their business needs;
- Of companies that participated in networking events organised by their network,
    - 68% stated they were of benefit in generating ideas for development;
    - 75% found that these events were of benefit in sharing learning opportunities;
    - 77% kept up to date with market developments;
    - 76% learned best business practice approaches for their sector (Skillsnet, 2009).

As well as increasing training in a way that is industry relevant, the survey findings suggest that the Skillnets are also an effective mechanism for increasing innovation and best practice, factors with the capacity to boost demand for HLS.

Relevance = 5

Although there is little direct evaluation evidence, research findings and the Republic of Ireland Skillnets experience support the potential of this approach. The intervention is deliverable at the regional level although funding and securing buy-in, especially if national level sector support is not forthcoming, could be constraining factors.

Information Advice and Guidance (IAG) for Employers

Key Points

- IAG can help to make the case for training as well as supporting firms to access appropriate training.
- The Higher Level Skills Pathfinders are trialling different brokerage approaches. To date the North West model which augments Train to Gain with specialist support is proving successful.
- This type of mechanism is deliverable at the regional level.

The rationale for IAG is market weakness caused by businesses' poor understanding of training availability and failure to understand its potential value.

A study of training provision by business in Y&H found that 70% of business surveyed had not provided training in the previous year[13]. Of those that did train, clear benefits to the business were recognised. For those that did not, this tended to be because they thought there would be no benefits to the business arising from training (CFE, 2008). The findings imply that there is unacknowledged potential for Yorkshire & Humber businesses to perform better as a result of staff training.

The CFE study (2008) categorises non training employers as 'hard' and 'soft' 'nos'. 'Soft nos' would consider undertaking staff training in the next 12 months and represent an easier target group for providers. The 'hard nos' represent a greater challenge and it will be more desirable to target these

[13] Based on a survey of 448 businesses

from a policy perspective than that of a provider. Realistically, not all firms will invest in training and targeting 'soft nos' is likely to provide the greatest return on investment.

IAG provision encompasses a range of measures to both help persuade employers of the business benefits of training, and also to support them to find the right provision. IAG tends to be focused on the latter but the volume of non training employers in Y&H provides a clear case for effective persuasive measures. This may involve publicity/marketing but could also include provision of services/tools to help business quantify potential business benefits. For example, in the West Midlands AWM are working with SEMTA[14] and the University of Warwick to develop tools capable of capturing the impact of training on firms' productivity (SQW, 2009).

IAG is frequently provided through brokerage services. These are intermediary services that help employers to access the most appropriate training for their business. In the UK Train to Gain, operated through Business Link, is the nationally provided brokerage service and has implemented a leadership and management focused pilot scheme[15]. Each of the Higher Level Skills Pathfinders (HLSP) have taken a different approach to developing Brokerage Models. The evaluation (GHK, 2008) has found that the North West, which has built on Train to Gain has been the most successful. It augments the Train to Gain service with advisors from the Higher Education Regional Association to access specialist sector knowledge. The evaluation acknowledges that establishing which parts of Train to Gain to engage with may be problematic but that the sector specific approach, adopted in the North west, appears to have addressed this. The other HLSPs (in the South West and North East) have developed separate brokerage systems linked with HEIs. Y&H survey evidence from a study focused on leadership and management skills gaps suggests that awareness of Train to Gain in the Region is low (Ci Research, 2008). Based on the North West HLSP experience, there may be potential to significantly develop its effectiveness to boost HLS in Y&H.

In the West Midlands the Regional Development Agency has implemented measures focused on improving Management and Leadership as part of the Skills Strategy. Following an initial pilot, this has been expanded and includes needs analysis, tailored training solutions, and support from specialist brokers. Evaluation evidence identifies positive impacts with 18% of firms reporting GVA impacts and 80% planning to invest in training in the future (SQW, 2009). Other IAG includes supporting a strategically important employer by mapping the competencies associated with job roles and linking these with NVQs.

Relevance = 5

Effective IAG has the capacity to ensure that demand and supply are matched as far as possible with current provision. Local evidence suggests that there is a need to improve information and raise awareness of training benefits and opportunities. This type of intervention is deliverable at the regional level and there is considerable potential to draw on lessons learned in other regions, including the HLSPs, to develop an effective approach, building on existing provision.

[14] The Sector Skills Council for science, engineering and manufacturing

[15] Train to Gain also involves an element of subsidy not specifically considered in this section. Subsidies are considered separately

HEI Collaboration / Supporting the Infrastructure for Learning

Key Points

- There are numerous examples of business / HEI collaboration involving partnerships and joint delivery and also development of new physical infrastructure such as Knowledge Exchange Centres and new learning facilities.
- Evaluation evidence tends to be positive in terms of stimulating innovation (with the potential to boost demand for HLS), workforce development and graduate retention.
- On-site training facilities for employers, developed with the support of Advantage West Midlands have had a positive impact on training levels.
- With the collaboration of HEIs and other partners, this type of activity can be led and/or supported by RDAs.

There are numerous instances of business collaboration with HEIs undertaken in order to contribute to wider economic and skills related objectives. These projects are often supported by Regional Development Agencies and may involve development of physical infrastructure or be solely based on development of a partnership and/or services.

DIUS (2008) emphasised the potential for HE to contribute to workforce development in the UK and provided case studies of exemplar projects. These included:

- A new university in Cumbria with a dispersed campus, the principal purpose of which is to provide access to HE in rural and urban areas and to meet the learning needs of the sub-region's businesses[16];
- Collaboration between the University of Essex and the South East Essex College which includes development of a new publicly funded centre in Southend.

Assessments of outcomes for these projects are not publicly available but the DIUS literature identifies a number of success factors:

- Collaboration between universities, and between universities and further education colleges;
- Strong, coherent support from local partners, ranging from businesses to regional development agencies, local authorities, and those holding European funds;
- Long term and sustainable planning; and
- Management capacity.

Other examples include the Lancaster Leadership Centre, which has been developed as an extension to the university's Management School. This was an RDA funded project designed to target SMEs and to boost management capacity through knowledge transfer. There have been very positive outcomes as a result of the Lancaster Centre including business growth and performance as well as high level qualification outcomes. The Centre also strengthened support networks for SMEs and helped to facilitate partnership development (Inner City Solutions, 2008).

[16] The university was opened in 2007 but is now at risk of closure. This is at least partly due to administration problems and does not necessarily reflect on the potential to deliver this model elsewhere.

The Digilearn project in Liverpool did not involve development of a new centre. It supported the existing Digital Academy within John Moores and sought to provide industry relevant learning opportunities and to contribute to Digital Academy's position as a regional centre of excellence for this sector. Evaluation evidence suggests that there have been positive Strategic Added Value outcomes and that the project has increased the digital skills base of participants and has increased their employment opportunities and earnings potential. It has also raised the levels of technology transfer between HE and North West businesses (Inner City Solutions, 2008b).

Centres for Knowledge Exchange (CKE) are HEFCE led[17] and aimed to retain graduates, develop knowledge industries and initiate collaboration between HEIs and SMEs. Inner City Solutions have evaluated the Graduates for Merseyside CKE and found that it has made a strong impact in supporting both companies and graduates across the region and will also benefit future delivery for HEI partners. Of particular relevance to the skills agenda, graduates reported strong linkages between the employability skills gained through CKE and their success in accessing subsequent job opportunities to support high levels of graduate retention within the North West. There are already a number of CKEs linked to HEIs within Yorkshire & Humber[18].

Development of University Centre Barnsley occurred following a takeover of Barnsley College by the University of Huddersfield. Yorkshire Forward contributed £2million to the project amounting to a third of total costs. The principle project aims were to widen participation in HE within Barnsley and to contribute to the town's regeneration. The interim evaluation undertaken by Hoshin (2008) was hampered by lack of monitoring data and was unable to reach clear conclusions on many aspects of the project. The findings suggest that the majority of students came from professional households and were undertaking post experience qualifications. While not wholly positive from the viewpoint of widening participation in HE and the labour market, this is a constructive outcome in terms of increasing HLS within the existing workforce.

Development of learning infrastructure, unconnected to HEIs, with the potential to boost HLS, has been undertaken in the West Midlands supported by Advantage West Midlands (AWM). Investment in employer based training facilities has been undertaken and the opportunity used to influence co-ordinated delivery of support services. The AWM Skills Strategy evaluation concludes that "the model has proven effective in promoting employer investment in skills and enabling the take up of training among employees" (SQW, 2009).

Relevance = 5

Physical infrastructure for learning will not, on its own, boost HLS in a region but it can be an important factor. Partnership with HEIs is one means of delivery but infrastructure may also be employer based and RDA led.

There is a clear rationale for business and HEI collaboration in terms of addressing the mismatch between supply and demand for HLS training (Wedgwood, 2008), for stimulating demand for HLS and also for helping to retain people with HLS in the region. The evaluation evidence is positive in all respects.

[17] HEFCE funding finished in 2009.

[18] Business and Community Knowledge Exchange (University of Hull), Software Factory (Sheffield Hallam University) and West Yorkshire Knowledge Exchange (University of Huddersfield).

Developing Skills for Clusters

Key Points

- The rationale for cluster focused interventions is where certain sectors have skills gaps that inhibit productivity.
- The evidence presented is from mechanisms being implemented within Y&H. These would, as a minimum, be a key reference point for future intervention.
- Most activity within the programme is directed at increasing HLS.
- The mix of projects address demand as well as supply side issues.
- Overall the programme appears successful to date based on interim evaluation findings with projects on track and broadly delivering activity as anticipated.

A rationale for a cluster focused approach to skill development exists when some sectors of the economy are more severely affected by skill shortages than others, and where these shortages impact significantly on productivity and competitiveness.

The Skills for Clusters programme is being delivered in Y&H until 2011 to address the HLS needs of the region's priority sectors. The evaluation of the Skills for Clusters (S4C) programme in Y&H (Milburn Trinnaman La Court, 2009) suggests that, to date this approach has generated positive impacts. The evaluation is in three phases. Phase 1 findings include six projects supported under the programme:

The National Metals Technology Centre (NAMTEC) involves an Education Intervention programme, an Undergraduate Development Programme and an employee Development Programme. Initial findings are very positive with successful employer engagement, good progress with respect to gaining appropriate accreditation for training and good relationships between employers and schools all identified. The project is being delivered effectively with no identified need for it to be modified.

Manufacturing Masters (MM) is a workforce learning, knowledge and skills programme for company employees to improve business performance and support change. It covers a range of qualifications including full Masters level qualifications and City and Guilds modules. Initial findings are that, despite some early slippage, the project has recovered to a successful position. The rational and demand for its services remain strong but there may be some deadweight associated with participation by companies which already invest well in employees. There is, as yet, no empirical evidence of improved business performance as a result of participation.

The National Skills Academy for Manufacturing (NSA-M) is a national programme delivered regionally by each of the nine RDAs. YF funding supports a Regional Manager, Project Co-ordinator and operating costs. NAS-M delivers a set of training products relating to productivity and competitiveness, leadership and management, and technical workforce development. Interim findings are that the project has achieved all its deliverables and demonstrates good practice with respect to stakeholder, partner and provider engagement, and through use and application of good practice from elsewhere. It has also developed a tool to measure and demonstrate the economic benefit to employers of providing training and systems approach to learning called the learning engine. The overall conclusion is that the rational for the project is sound and it as progressed well but that it needs to deliver more tangible results.

CPD for Health Innovation (CDP4HI) provides a platform for joint innovation for those working within the health sector. Activity includes a series of one day master classes, development of a CPD module and a series of 4 day CPD design workshops, creation of a new Master qualification in Heath Technology and extension of an electronic gateway to provide a hub for training and development activity across the region. A final review of this project indicates that it has generally been very successful. Involvement with four universities was ambitious but has been effective and there has been good synergy between different project strands. A more collaborative approach to the electronic gateway was needed but this is under review. The project is now planned to continue as a social enterprise.

Northern Leadership Academy (NLA) is part of the Northern Way strategy. It is supported by the Northern Way and the three northern Regional Development Agencies. It seeks to promote 'leaderful' businesses and communities. Activity has included development and delivery of Action Learning Sets (ALS) by individual centres, and other activity including development of an SME (rapid) growth programme; the management of an SME Forum Network; and the production of appropriate learning materials. Interim findings show underperformance against targets but with some justification including the impact of the recession. SAV benefits have been achieved in relation to collaborative working. A number of recommendations are made to improve operation and ensure that activity is measured effectively.

Open Source for Business (OS4B) is based on the rationale that an increasing number of business are using open source (OS) software and that there will be a resulting need to increase OS skills. Activity includes establishing an employers' forum to influence training provision and enhance knowledge transfer with respect to OS development, development of partnerships with OS vendors, design and delivery (with subsidy) of OS training packages. Wider project aims are to establish an OS Academy for the North of England to: develop OS training programmes customised to the business community; deliver HLS training in OS technologies; and to enhance OS knowledge transfer networks. Initial evaluation findings suggest that the project has the potential to provide businesses within the region with a competitive advantage. While the assessment of outcomes and SAV is premature, the project is collaborating with the appropriate partners (including SCY and Hull Digital) with scope to extend this to other networks in the region. Overall it appears to be progressing well.

Relevance = 5

The programme appears to be effective and addresses demand as well as supply side measures although there is little evidence, as yet, on the impact on businesses and whether this does in fact stimulate demand. The programme is implemented within Y&H with a strong role for Y&H and as such is demonstrably deliverable. It provides useful evidence about what is working well at present with further phases of the evaluation able to provide evidence on longer term outcomes including impact on demand.

Attracting and Retaining People with HLS

Key Points

- There is evidence of successful interventions to address HLS gaps by encouraging people to move to / stay within an area.
- Success may be easier to achieve in some sectors than others.
- The evidence for achieving net inflows of HLS through successful marketing relates to Scotland and it may be more difficult to achieve at the regional level.
- Graduates Yorkshire has been a successful graduate retention scheme and there may be potential for further development although there are limitations associated with using careers service advisors.

One way of increasing the number of people with HLS is to achieve net in-migration of people with HLS, either by attracting new people into the region and/or by encouraging existing high skilled residents not to move away.

In an effort to stem 'brain drain', and a resulting skills gap within Scottish industry, the Scottish Executive launched Talent Scotland in 2001. The programme was designed to address skills gaps in specific sectors, initially design electronics with life science, financial services and the energy sector added later. The programme involves a marketing campaign and recruitment tool with a web interface. This provided information and contacts for potential in-migrants (including a student zone), employers and recruiters with jobs and potential employers listed on the site. It includes a wide range of material including practical advice about moving to Scotland. The Talent Scotland evaluation carried out by Frontline Consultants (2009), found very positive outcomes associated with the programme including raising the profile of Scotland as a place to live among high skilled people and aiding recruitment to bridge skills gaps in industry. However, while Talent Scotland works well in some sectors it is not working well for financial services. Suggested reasons for this include lack of communication between Talent Scotland and 'the sector' with too much emphasis on individual companies but also the intricacies of the sector itself.

Retaining graduates helps to maximise the regional benefits of HEIs and a number of graduate retention schemes have been implemented around the UK. Graduates Yorkshire (GY) was a regional partnership-based project, established in its early form in 1996. It drew together HEIs, their Careers Services and Yorkshire Universities to encourage graduate retention in the region. Its activity was mainly linked to employment and recruitment services. Funding support from Yorkshire Forward enabled development of GY's activities and the establishment of GY Ltd as an exit strategy. Milburn Trinnaman La Court's (2008) evaluation for Yorkshire Forward provides generally positive conclusions about the scheme, noting that employer benefit is demonstrable by the successful move to a charged-for web based vacancy recruitment service. There was also good labour market progression among those graduates accessing the service. User benefits include better knowledge of the labour market in the region, better job search and decision making skills, and better uptake of employment opportunities. Regional benefits included improved matching of skills to jobs, better productivity and higher incomes. In terms of the 'jobs filled' measure against the core evaluation question, deadweight of 50% was identified against a total figure of 2,035 jobs.

The evaluation policy recommendations include:

- Shifting the focus of graduate retention in the region to towards the effective use of graduates in the economy;
- Graduate guidance services should be designed to address assumptions about geography, sectors, occupations and degree subjects;
- Graduate guidance should be placed in wider policy contexts of labour market progression;
- There could be value in developing a network to share practice about optimising the economic potential from the human capital of HE in the regions.

The study highlights a significant limitation of working with a careers service in that advisors are required to be impartial and will not necessarily direct graduates to opportunities within the region.

The GY study notes that graduate schemes in other regions have tended to be more orientated towards providing graduate placements and include Graduates for Business in the South West, Graduate Advantage in the West Midlands and Hot Prospects in the East Midlands. Indications from *emda* are that Hot Prospects has been successful (EMDA, 2008) but availability of evaluation evidence for other schemes appears limited.

Within the North West, the Graduates for Merseyside Centre for Knowledge Exchange is principally a knowledge exchange project but with a strong graduate focus stemming from its foundations in an earlier graduate retention scheme. Evaluation evidence (Inner City Solutions, 2009b) suggests that it has supported graduates into work locally and aided graduate retention within the region.

GO Wales is a graduate retention programme aimed at increasing the number of graduates employed in Welsh businesses. It targets Welsh graduates and undergraduates and SMEs, providing work placements and tasters and supporting Continuing Professional Development. EKOS Consulting (2007) found the programme to be successful in terms of showing SMEs how they could benefit from graduate labour; helping graduates to develop the skills that employers need; and increasing employer engagement with HEIs to encourage innovation (which has the potential to increase demand for HLS). The study found that the programme helped to retain graduates within Wales: almost half (44%) of the survey respondents stated that the placement had positively impacted on both their perception of working in an SME and of career opportunities in Wales.

The Merseyside Centre for Knowledge Exchange has a particular focus on graduate retention as it developed from a graduate project called Business Bridge. It has been successful in this respect (Inner City Solutions, 2009b; also see commentary under 'HEI Collaboration / Supporting the Infrastructure for Learning').

Relevance = 4-5

There is some, if not extensive, available evidence that schemes to attract and retain high skilled people can work to address skills gaps within regions and countries. Potential limitations are that Talent Scotland type approaches which require promotion of a strong brand may be more difficult to implement on a regional basis although Yorkshire does have some basis for this. The Graduates Yorkshire scheme has been successful and provides a strong basis on which to build. The evaluation and its policy recommendations should be considered in light of the current regional context and other potential interventions to increase HLS.

Skills Utilisation

Key Points

- This approach is based on encouraging better utilisation of existing skills within the workforce rather than new skill development.
- It is a rational approach with the potential for good cost effectiveness but there is little evidence to suggest significant economic outcomes to date.
- It has generally been delivered at the national level. There may be potential for regional delivery but this could be difficult without national policy support.

A skills utilisation approach does not seek to increase the supply of skills but to ensure that existing skills are utilised more effectively by employers which has the potential to boost innovation and increase productivity.

The Skills for Scotland strategy has translated into a number of initiatives to promote the skills utilisation agenda:

- A Skills Utilisation Leadership Group comprising the Scottish Trades Union Congress (STUC), public bodies and employers was established in 2008. The group aims to raise awareness of how skills can be best used in the workplace; contribute to the development of a programme of research; and make recommendations for further action including actions specific to Group members.
- A report on encouraging employers across all sectors to maximise the skills of their workforce ('Reaping the Benefits) was published in 2009. This includes a series of actions and recommendations for key public sector bodies (the Scottish Government, NHS) to audit workforce skills and develop new skills utilisation strategies.
- The Scottish Government has funded 12 college or university-led projects to a total of £1.8 million that focus on improving skills utilisation strategies within key industries. For instance, Dundee College is leading a £226k project to create a strategy for sustainability by establishing a skills ecosystem for the Scottish Life Science industry. This is intended to bring life science companies, colleges and universities together to generate innovation, growth and competitiveness within the industry.
- A Skills Utilisation Cross-Sectoral Network has been established to connect organisations in the public, private and third sectors with a common interest in encouraging the better use of workplace skills.

This approach has yet to be evaluated but activities undertaken so far clearly indicate a commitment by the Scottish Government to drive forward skills utilisation strategies within key sectors.

Other examples of skills utilisation strategies led by government include the Finnish Workplace Development Programme; the Australian 'skill ecosystem projects'; the National Health Service's Changing Workforce Programme; and the Welsh Assembly Government's Workforce Development Programme (WDP). Two of these are outlined in more detail below.

The Finnish Workplace Development Project (FWDP). Skills utilisation in Finland became important because of high levels of job dissatisfaction that accompanied economic growth in the 1980s combined with low productivity. The FWDP has run from 1996 to the present and funded workplace-initiated projects to improve productivity involving a total of 1,000 businesses between 1996 and 2001 alone. One example is a project in a nursing home for the elderly which aimed to empower staff members as part of a move from task-orientated nursing care based on a division of a labour to primary nursing care based on the needs of individual residents Evaluations of FDWP projects highlight significant social outcomes for those employees involved including a greater sense of responsibility and self-direction, enhanced co-operation between staff and management and better opportunities to develop skills. There is little robust evidence, however, on the economic outcomes of the Finnish approach in terms of impact on productivity.

The Australian skills ecosystem model. The Australian skills ecosystem model seeks to create an environment for skills formation in all industries to enable Australia to compete internationally. It differs from workplace-focused initiatives such as Finland's FWDP by developing strategies that bring together employees, firms, VET providers and policymakers. The ecosystem is built around federal and state-level skills formation strategies that incorporate individual skills ecosystem projects delivered within particular industries. The Queensland strategy for example, incorporates 20 skills formation strategies spanning a number of industries and areas. This includes an ICT strategy that brings together ICT enterprises, professionals, the VET sector and government agencies to improve collaboration, information sharing, address workforce development issues at a strategic level and to improve the sustainability of the sector as whole. Each project includes a number of different components identified as training solutions (e.g. customised training, new skills development) or non-training solutions (e.g. recruitment policies and job design).

Early and mid-term evaluations of individual projects are inconclusive in terms of the impact of these initiatives but it has been suggested that the skills ecosystem model provides a useful analytical tool for understanding skill formation challenges in different contexts. The model also encourages stakeholders to commit to a broad agenda focused on industries or regions rather than individual workplaces, with a strong focus on using evidence to understand the skills needs of employers.

Source: Scottish Government (2008)

Relevance = 4

There is limited evaluation evidence and little to suggest significant economic outcomes from skills utilisation interventions. Examples of skills utilisation identified are mainly delivered at the national level. The individual mechanisms do not require fiscal or regulatory reform, with many focusing on information sharing and dissemination, network development and training. There is therefore potential to deliver regionally but there may be less scope to exert the necessary influence without a national policy framework.

Raising Demand for Training from Individuals

Key Points

- Careers guidance directed at all ages has been very successful in Scotland. A similar approach is being developed in the UK as the Adult Advancement and Careers Service. There could be potential to augment this and/or ensure it links effectively to other mechanisms.
- Career Development Loans have proved effective at encouraging people to develop HLS (GHK, 2008). It would be difficult to implement individual rights to training at the regional level.
- There is little evidence of schemes designed to boost motivation to increase HLS among employees.
- A key factor will be the attitude of employers and the culture within the workplace.

A key barrier to the development of HLS is perceived to be motivation among employees to undertake training and gain new qualifications. The UKCES Collective Measures study includes a specific review of what measures may be effective to increase demand for training by employees. The study was principally focused on those with low skills but provides some general insight and lessons applicable to boosting demand for HLS. The key message was that it is the attitude of employers and the learning culture within the workplace that is most likely to affect demand among employees. Of the initiatives reviewed:

To address financial barriers

Career Development Loans (which have been available in England, Scotland and Wales since 1988) were found to be generally successful, particularly among younger, relatively high skilled but low paid employees, and with a reasonable level of additionality (around 50%)[19].

To address knowledge barriers

The Scottish Government's All Age Guidance Careers service was found to have been very successful. The evaluation (SWQ, 2005) suggests that 44% started a training course within nine months. Around a third were more confident and knowledgeable about education and training. The service was particularly successful with respect to the over 45 age group indicating potential applicability for the existing workforce. Levels of additionality, based on survey results, are indicated to be in the region of 75%.

In Finland a programme, developed specifically to provide IAG for older workers (aged over 45) was developed as a response to the ageing population and high levels of unemployment among older people. It had three component parts: research and development, education and training, and provision of information. Evaluation evidence apparently shows that the programme help to boot the supply of training for older people. A particular issue for this group is development of IT skills.

[19] Based on the LSC evaluation of Career Development Loans.

To address awareness, motivation and confidence

Most programmes to address these issues are directed at those with low skill levels and are specifically basic skills focused. There are no apparent examples of interventions designed specifically to motivate employees to gain HLS. The Aim Higher programme initiated by the DfES in 2001 seeks to raise aspirations among 16 to 19 year olds within disadvantaged areas and to increase their participation in HE. There is little statistical evidence to demonstrate a conclusive impact on aspirations and destinations but softer qualitative evidence does suggest positive impacts (EKOS Consulting, 2006).

To provide time to learn

The UKCES study (UKCES, 2008, 2009) gives consideration to the potential for introducing individual rights to training. Different models of this type of mechanism are employed in a number of countries around the world, both within and outside Europe. In the UK this is currently limited to a right to 16 and 17 year olds, who are not in full time education and do not have a Level 2 qualification. Broadly, schemes to provide employees with training rights fall into three broad categories that include: sectoral collective agreements, rights to time away from work linked to membership of professional bodies; and individual rights to request time off implemented at the national level (used in France). Overall UKCES (2009) indicates that there is too little evidence to draw conclusions about what has worked well. It is difficult, in any case to see how a rights based mechanism could be implemented on a regional basis.

Relevance = 4

It will be vital to increase demand for training among employees in order to increase skill levels across the region to meet Leitch requirements given that the majority of the 2020 workforce are already in employment. However, the potential to achieve significant impacts is likely to be significantly constrained / enabled by the attitudes of employers and it may be more productive to focus efforts on employer engagement. Increasing HLS to the desired levels will be dependent to a lesser extent on widening participation among young people but there is little conclusive evidence about what works well in this respect.

General Subsidies

Key Points

- There is a wider range of evidence on the effectiveness of this type of mechanism.
- Overall subsides do have a positive impact.
- The extent to which subsidies are effective at providing more / better quality training varies considerably.
- Contextual factors, appropriate scheme design and effective delivery are likely to be critical to success.
- Subsidy schemes are deliverable at the regional level.

This type of mechanism includes subsidised training programmes, often linked to brokerage services, such as Train to Gain in the UK. The evidence available for subsidy schemes, reviewed in the UKCES study (2009), comes mainly from the UK and RoI. Evaluation of these has been more prolific than for other types of intervention and, although success is variable across schemes, all demonstrate some degree of additionality.

Graduate training through the Go Wales programme, which involved an element of subsidy, was effective with high levels of additionality (EKOS Consulting 2007). The Skills in the Workplace ESF programme in North Wales, also aimed at SMEs, demonstrated reasonable additionality, particularly in terms of training quality. It should be noted that this programme supported training and qualifications up to Level 3 only (CRG, 2008).

The Workforce Development Programme provides diagnostic advice along with subsidies. The subsidy element has been successful in encouraging firms to undertake leadership and management training as a result. Over 40% indicated that the partial subsidy was a decisive factor in their own training investment (Cambridge Policy Consultants,2008). The evaluation recommends focussing on SMEs rather than larger firms.

The national evaluation of Train to Gain suggests that it generates high levels of satisfaction among employers and employees (LSC, 2010) but the UKCES study suggests that it has had very uneven take up across sectors (UKCES, 2009). There is also very low take up among smaller firms. Train to Gain has also involved a pilot of a Leadership and Management Training Programme but it is unclear how successful it has been. UKCES (2009) note that another similarly targeted programme was found to have had little additional impact.

A study to consider the impact of subsidies on training in the Republic of Ireland found that it did generate additional investment, particularly in domestically owned firms. It is suggested that lower investment in foreign firms may have been due to their higher levels of existing investment.

Overall, the UKCES study (2008) concludes that although the evidence for subsidies is mixed, it is clear that they do provide some additional benefit and without them firms would do less training or none at all.

Relevance = 4

Subsidies are a commonly used way of incentivising subsidy and are widely used in the UK, including through Train to Gain. Wider availability of evidence on effectiveness of various schemes provides a useful basis for further examination of this mechanism and success factors in differing contexts. Augmenting the Train to Gain service to provide additional subsidies for HLS (as in the North West HLSP case) may be a possibility.

Quality Assurance Standards

Key Points

- Evidence to support the effectiveness of quality assurance schemes at boosting training provision is limited.
- Deadweight in terms of additional training is likely to be significant although there may be some wider promotional benefits.
- There is potentially some scope for regional delivery.

Quality assurance standards are used around the world to indicate firms that meet a specified standard as employers. In the UK Investors in People (IiP) is the most widely recognised. The Skills Pledge is a scheme operated by the LSC in England. It was introduced in June 2007 and involves a commitment by firms to upskill staff and to help them to work towards relevant qualifications. It is geared towards those with low skill levels or who lack key skills. The ISO 9000 / 9001 is an international widely used quality standard that includes a clause on training.

The UKCES Collective Measures undertook a review of evidence for the effectiveness of both IiP and quality assurance standards more generally. For both, the evidence was mixed and generally weak. Although some firms did increase their training as a result of IiP, there is also evidence of significant deadweight as firms seeking accreditation tended to be those that already invest in training. There is reasonably consistent evidence that SMEs are less likely to pursue IiP, and also between IiP achievement and increased training within SMEs. For other quality standards, UKCES (2008) found very limited evidence that training was increased in terms of quality or quantity.

The ekosgen (2009) evaluation of the LSC's Skills Pledge standard found that around half of firms who had made their Skills Pledge provided staff with more opportunity to / access to training than they did before. Just under 40% had a more comprehensive training plan and a quarter had developed a training plan where they didn't previously have one. Around a third reported that the workforce was more productive as a result of their commitment. However, the main motivations for making the commitment include that it 'fits with the organisation's ethos' and 'to gain recognition for work that we are already doing'. This does seem to support the IiP findings about deadweight with respect to additional training.

Relevance = 3

The evidence that is available to indicate the impact of quality assurance standards on training suggests a considerable amount of deadweight and more limited impact on SMEs. There may be some benefit to promoting schemes such as Skills Pledge within Y&H, potentially with a HLS focus, but the principle benefit is likely to be raised awareness rather than a significant increase in HLS training.

Levies

Key Points

- Levies are effectively a mechanism for enforcing training by firms.
- They have some existing application in the UK and are more widely used abroad.
- Overall their success is uneven and dependent on the specific design and administration of schemes.
- As a mandatory measure it is an intervention that would be difficult to deliver on a sub national basis.

Levies are a policy lever involving employers within a group/sector to each spend a defined amount on training. Firms in specific circumstances (such as those with low turnover) can be exempt. Levies are common in Europe and established in around 30 counties world wide. Within the UK, they are used in the construction industry and run through CITB. They have also been newly introduced in the UK film industry.

There are different types of levy system. These include:

- Payroll tax exemption;
- Grants based on payroll tax contributions; and
- Sectoral funds agreed through collective bargaining.

These schemes broadly break down into 'train or pay' schemes and levy/grant schemes which operate much as a system of taxes and benefits.

The UKCES Collective Measures study (UKCES, 2009) has undertaken a review of the evidence around the effectiveness of levies at improving the quantity and quality of training by firms. The study found limited evaluation evidence for this type of policy lever but was able to conclude that impacts are variable depending on design and administration and that there is mixed evidence as to whether expenditure on training is actually increased.

Although levies provide incentives to make training provision they don't necessarily ensure optimal investment in training. The approach also does not address employer funding shortages although some systems will allow less able to pay firms to benefit from collective bargaining or grants. Levies do provide the potential to generate economies of scale and provision of appropriate and cost effective training can be secured through sectoral agreements.

Overall the UKCES (2008) study identifies levies as a problematic policy lever dependent on fine tuning the detail to make them effective. Problems in operation include uneven impacts across firms of different sizes and superficial compliance. Levy schemes work best when they are tailored, for example, to different sectors, simple, clear to employers and devolved to the lowest level of implementation possible.

Relevance = 2

The evidence for the success of levies is mixed. Although it may be possible to develop a scheme appropriate to the Y&H context it would be difficult to implement as a mandatory measure on a regional basis. A voluntary scheme is a possibility and could be linked to an incentive measure (such as a quality assurance scheme) but there is no existing indication of how effective this might be.

Occupational Licensing
Key Points • There is limited evidence of increased training as a result of occupational licensing although there is clear potential for doing so. • UKCES (2009b) study shows support for use in some sectors but this mechanism would not be deliverable at sub national level.
Occupational licensing involves enforcement/encouragement of standards for certain services. It is most often used for services / professions where there is a significant element of potential risk to the public if the service is of a poor standard. In the UK, for example, many healthcare services are licensed through bodies such as the Health Professions Council and provision of financial services through the Financial Services Authority. Gas installation is licensed through CORGI. There is generally little evidence of the impact of licensing on training levels although the UKCES (2008) review does note some evidence of increased levels in financial services. Associated risks are that is may lead to superficial training and higher costs for services. The UKCES study (2009a, 2009b) did, however, include this measure within a set of policy priorities for consultation. Licensing found considerable support for application within a limited number of sectors.
Relevance = 1 Despite lack of evaluation evidence, a requirement to achieve standards linked to training and qualifications clearly does have potential to raise HLS. It would be difficult to enforce a mandatory scheme on a sub national basis. A voluntary scheme would effectively be a quality assurance standard.

Tax Breaks
Key Points • The evidence for tax breaks to support training is very limited. Evidence on tax breaks to support R&D is not really comparable due to worker mobility. • This measure is more likely to lower financial barriers to training rather than act as a genuine incentive. • This mechanism is not practically deliverable at a sub national level.
Tax breaks are used in a number of countries to encourage training by employers. They are not used in the UK although it has provided tax credits for R&D since 2007. The UKCES study (2009a) found that in 2006, six OECD countries had tax incentives for corporate training. They are usually capped and limited to formal, externally provided courses. Some are designed to be SME specific. The evidence reviewed through the UKCES (2009a) study is principally around the impacts of tax breaks for R&D in the absence of evidence about the impact for training purposes. Evidence around R&D impacts suggests that there is some additional benefit and that this provides better value for money when schemes are designed to reflect a firm's starting point and to reward additional investment. However, a key difference between R&D and training provision is workforce mobility - firms may invest only to have their staff move on when better qualified. This doesn't apply with R&D and makes use of R&D evidence as a proxy unreliable. The UKCES study suggests that tax breaks are likely to lower barriers to training rather than act as an effective incentive to train for employers that do not already want to undertake training.
Relevance = 1 There is no real evidence to support the effectiveness of this intervention. As a fiscal measure its application at the sub national level would not be practical.

Emerging Messages

4.8 This chapter has sought to review the evidence base for interventions that have the capacity for generating economic outcomes by addressing workforce skills. In view of the nature of this study the focus has been on HLS although in practice much of the evidence is more generic.

4.9 In view of the messages emerging from the previous chapters, which suggest the presence of a low skills equilibrium within Y&H, it is likely that future approaches to HLS will involve demand as well as supply side measures. Where activity is designed to improve the supply of HLS, it should be targeted at specific gaps. For example, the gap in the lower end of the HLS range indicated by skills shortages for Associate Professional jobs.

4.10 Of the twelve types of mechanism that have been assessed in this chapter, several would be difficult to implement at a sub-national level although there could be some potential for implementation of pilot schemes. For example, there was considerable support expressed for occupation licensing through the recent UKCES study (UKCES, 2009b) and this could be trialled on an experimental basis in Y&H. Other national level schemes involving fiscal interventions such as tax

breaks and levies would be extremely difficult to implement sub-nationally and should probably be discounted from further exploration at this stage.

4.11 A number of the mechanisms reviewed emerged as having a particularly high degree of relevance based on evaluation evidence and delivery considerations. Further interpretation, taking evidence from the rest of the report into account, provides a more contextualised assessment. This should help to inform development of the scope for Phase 2 of the work.

4.12 **Employer networks/collaboration** were identified as the policy priority measure through the UKCES employer collective measures work. The Skillnets model in Ireland may provide some useful lessons for application in Y&H. Factors that may make this approach particularly appropriate include its potential to boost innovation and stimulate demand for HLS alongside a move away from the current low value/low skill position. There is potential for effective sector focused activity which aligns well with the need to target some sectors/clusters and there is likely to be considerable scope for alignment with the Skills for Clusters programme already being delivered within the region. One potential concern is that success of the Skillnets model may be linked to high profile implementation at the national level.

4.13 **Enhanced IAG for employers** also has the capacity to boost both supply and demand for HLS. Principally it is a supply side measure but effective IAG should be able to increase employers awareness of the benefits of training and, more widely, the scope for raising the value of their businesses. The HLS pathfinder programme provides a current example where enhanced IAG is delivered through enhancement to Train to Gain in partnership with the HEI sector to draw on specialist knowledge. As the focus in Y&H may be on increasing demand, there may be value in utilising tools to demonstrate the economic benefits of HLS training such as that developed through the NSA-M project within the Skills for Clusters programme. Again, enhanced IAG could be developed on a targeted basis.

4.14 **HEI collaboration/supporting the infrastructure for learning** involves both supply and demand side measures. HEIs are training providers but also have a key role in innovation and R&D which are strong drivers of demand. Measures to improve knowledge transfer in Y&H, potentially linked to industry specific training, may warrant further exploration in Stage 2. The role of FE as well as HE institutions should also be given full consideration, particularly in view of skill shortages for Associate Professional jobs. These qualification types tend to be at the lower end of the HLS spectrum and the FE sector may have a key role in provision, potentially through partnership with HEIs.

4.15 **Skills for Clusters** is an existing Y&H programme which takes a sectorally based approach to increasing the supply of skills within the region. The evidence available to date suggests successful implementation. Current and future evaluation findings are likely to provide important lessons for development of future approaches to HLS development within Y&H.

4.16 **Attracting and retaining people with HLS** can be an effective way of boosting the supply of HLS within a region. However, the evidence for Y&H suggests that net outflows of graduates are driven by lack of available opportunities. In this context retaining graduates without reciprocal demand for their skills would, on a general basis, be inappropriate. There may be potential for measures to target graduates within specific sectors but they may be overqualified for technical Associate jobs. Effective targeting is also likely to be constrained by lack of evidence on supply and demand for graduate positions. Further research to gain a clearer picture of this may be useful. There may also be value in better understanding the profile of Y&H's graduates in terms of sectoral

mix as supply may present an opportunity in terms of growth sector development or promoting inward investment. Again this would require further research.

4.17 **Increasing demand for training among the potential and existing workforce** will be important to achieve HLS objectives and examples of measures to address barriers to training such as time and finance have been included here. However, employee specific measures such as provision of individual rights to training would be difficult to implement at the sub-national level and Career Development Loans are an existing, and effective, financial tool. Importantly, the evidence suggests that employee aspirations are principally determined by their employers' attitude to training and their workplace culture. This suggests that there may be more value in a regional approach that focuses, at least initially, on employers. This could usefully be supported by efforts to ensure effective implementation of the new Adult Guidance and Careers Service within the region.

4.18 The majority of measures examined here are designed to boost the supply of skills to the labour force but some do have the potential to also increase demand through encouraging innovation and growth. A number of the HEI collaboration projects involve knowledge transfer elements and Skillnets in the Republic of Ireland has been successful in encouraging innovation through sector specific engagement and collaboration as well as increasing training levels. Without moving entirely into the business support domain, the potential to incorporate demand side measures does exist. The following chapter discusses the development of a conceptual framework for the second part of this study and gives further consideration to the treatment of supply and demand side factors within an approach to HLS in Y&H.

5 The Conceptual Framework

Introduction

5.1 This section of the report maps out an initial conceptual framework for understanding the drivers of HLS. The conceptual framework is designed to act as the link between the first and second phase of the research, where we will explore a limited number of programme theories as to how HLS performance may be boosted using the realist synthesis approach. Next steps are set out at the end of this section.

Skills and Economic Performance

5.2 In terms of the drivers and characteristics of high-skilled regions, it is important to think through the components that, together with skills, contribute to regional or sub-regional growth. The government identifies skills[20] as one of five drivers of regional productivity along with:

- Enterprise;
- Innovation;
- Competition; and
- Investment.

5.3 More sophisticated attempts to capture the inter-relationships of the drivers of growth include Porter's (1990) cluster theory. This holds that regions grow because of several factors including concentrations of highly specialised knowledge, inputs and institutions; the motivational benefits of local competition; and often the presence of sophisticated local demand for a product or service. By contrast, evolutionary geography emphasises the path-dependency of growth in claiming that regional and local economic trajectories are shaped by historical and current circumstances. Places carry their history with them, and factors such as sectoral mix, culture and institutional performance can persist for a very long time (Boschma cf. Green, 2009).

5.4 Much of the literature implicitly or explicitly cautions against the notion that enhanced regional productivity can be engineered simply by putting the drivers of growth in place. Three reasons are given for resisting this simple causal model:

- It neglects the importance of demand in assuming that growth will automatically follow if all five drivers are present (Kitson *et al*., 2004);
- It overlooks externalities in terms of the institutional and social relationships that underpin growth which may be difficult to measure; these are captured in concepts such as 'tacit knowledge', 'traded interdependencies', 'social capital', 'the negotiated economy', and 'institutional thickness' (see especially Morgan, 1999); and

[20] H. Treasury (2004) cf. Kitson, M., Martin, R., Tyler P (2004) 'Regional Competitiveness: An Elusive Yet Key Concept', *Regional Studies, 38: 9, pp. 991 - 999.*

- It encourages policymakers to indiscriminately offer incentives for firms to locate in less-developed regions ('smokestack chasing') when regional policy should focus on developing existing, specialised activities (Porter, 1996).

5.5 These caveats are reflected in our analysis of the evidence in Y&H. The conceptual framework, therefore, clearly needs to account for the inter-relationship of skills with other drivers of growth but in a way that does not 'read-off' the presence or absence of any particular driver as providing a direct, casual explanation of regional performance.

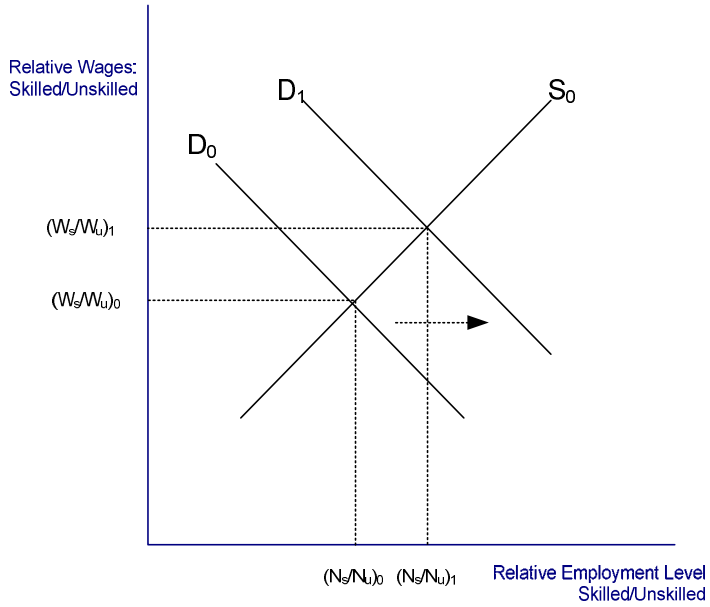
Developing the Conceptual Framework

Innovation and Employment

5.6 The evidence in Chapter 2 suggests that the balance of market failure in HLS performance lies with the demand side factors. A starting point for understanding the drivers of HLS is to consider the effects of innovation of firms. The effects of innovation on the type and quality of employment are at least of equal importance to the foci on the quantity of employment; specifically in a context where human capital is seen as a significant component of (firm-level) competitiveness. That is, firms don't simply choose the balance between capital and labour, but also what kind of labour to use in combination with given levels of capital endowments. Their decisions will depend on relative scarcity but also the relative productivity of labour in relation to capital endowments and how this is utilised in the production process. If technical change (and more broadly innovation) requires more skilled workers relative to unskilled workers it is held to be 'skill biased'.

5.7 The following diagram, drawn from Machin's (2001) study of employment change in seven OECD countries, shows demand and supply curves constructed with the ratios between skilled and unskilled wages (y-axis) and the ratio between employment levels of skilled and unskilled workers (x-axis). The ratios represent, respectively, the relative wages and the relative utilisation of skilled to unskilled labour.

Figure 5.1: Skilled Biased Technical Change - An Analytical Framework



Source: Machin 2001

5.8 The argument follows that if innovation is (positively) skill biased, the relative demand for skilled and unskilled labour will shift from D_0 to D_1 and lead to new employment and wage levels that strengthen the share of skilled workers to the detriment of unskilled workers. This model is used to explain change in skilled employment over the last three decades; where supply has not kept pace (until perhaps recently) with demand for skills. However, there is found to be considerable variation across advanced economies (see Piva et al. 2005) - the model explains change better in the US, less well in the UK and on continental Europe where the evidence is less clear cut (perhaps reflecting more regulated labour markets).

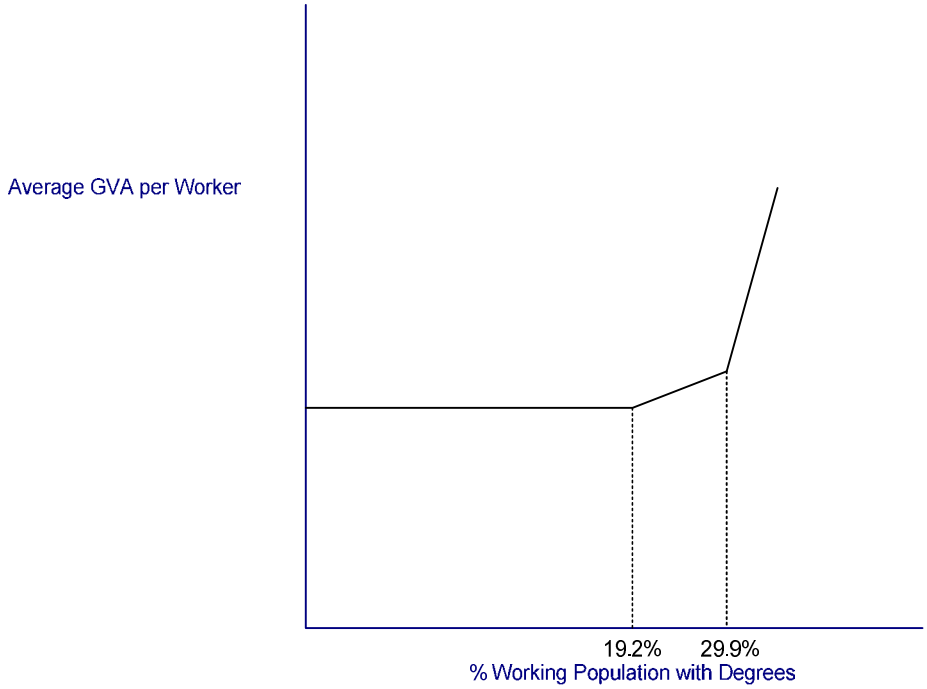
5.9 In terms of innovation, the traditional distinction has been between product and process innovation: the former tending towards employment creation and the latter to employment destruction. However, more recent research considers 'organisational innovation' as a determinant of the demand for skills: here the importance is less on technology itself (which is seen as becoming pervasive) but rather on how organisations change to adopt and use new technologies. However, it is notable that there is some evidence of a correlation between the two. This approach is further developed in analyses which have emphasised the significance of 'emotional labour' in determining competitiveness: put simply, the importance of people skills.

5.10 A corollary to the skills-biased explanations of technical change is that technical change can be explained by trade and in particular sectoral composition. The argument here is that locations with particular sectoral composition at $t_{=0}$ perform differently over time to locations with different sectoral compositions.

5.11 Further economic analyses emphasise the effects of globalisation on firms and locations, and see supporting institutions, labour market regulation and financial structure as being of significance. These issues have been picked up by the OECD in its work on the concentration of HLS and economic performance. Work by the OECD and Work Foundation has suggested that there are certain 'tipping points' for the proportion of employees who have HLS, at which point GVA per person for an area begins to increase more rapidly. This relationship is illustrated in Figure 5.2 overleaf.

5.12 The diagram shows that, for the sample of local authority districts analysed by the Work Foundation, GVA per worker increases markedly when (on average) 19.2 percent of the workforce has a degree level qualification and even more markedly when 29.9 percent of the workforce has such a qualification. The Work Foundation make similar assertions around tipping points for the stock of knowledge based firms.

Figure 5.2: Knowledge Intensity by Qualification: tipping point



Source: Work Foundation 2006

5.13 Although the Work Foundation model to explain relative economic performance has considerable intuitive appeal, the literature review in Chapter 2 would cast some doubt over whether it offers the basis for policy intervention: it would appear to overstate the scope of supply-side and intermediary related interventions. What is striking is that the majority of regions remain at relatively fixed points in relation to other regions along the GVA returns - skills concentration curve in the medium to long term, and where there is movement, this largely does not involve relative (between region) change. This reinforces the case for a wider systems approach to accelerating HLS performance.

Towards a Conceptual Framework: Market Failure, Innovation and the Systems Approach

5.14 As we set out in Chapter 2, Keep (2009) and Dodgson et al (2010) have provided a powerful critique of the market failure approach to understanding the relationship between skills and economic performance. The rationale of neo-classical and welfare approaches to understanding market failure is either that they should clear through the removal of obstructions to the operation of the free market, or that they provide a guide and rationale for public policy intervention. Both neglect explanations of economic performance which may suggest that (a priori) market failures (e.g. spillovers, agglomeration effects, monopolistic power and asymmetric information) can all lead to economic

advantages – some may be quite fleeting (as these positions are difficult to protect for replication) whilst others may be sustained and self sustaining (e.g. financial service centres such as London).

5.15 Literature on national systems of innovation has sought to understand the links between these 'market failures' and economic performance as functioning and sustaining systems. These approaches are redolent of work in evolutionary economics. National Innovation Systems (NIS) approaches have gained a strong hold amongst policy makers, regionally (RDAs), nationally (BIS and HMT), and internationally (notably the OECD).

5.16 However, more recent work (see in particular Dodgson et al 2010), argues that the traditional approach to NIS has been too static and has led policymakers to continue to focus on market failure. What these authors suggest is that whilst the precepts of NIS should remain (e.g. the importance of innovation in driving economic development), the focus should be on understanding the interlocking systems which lead to innovation; and equally the case of systems failure. Reflecting on the emerging findings on comparator regions, it is apparent that simple market failure arguments to explain varying performance are inadequate.

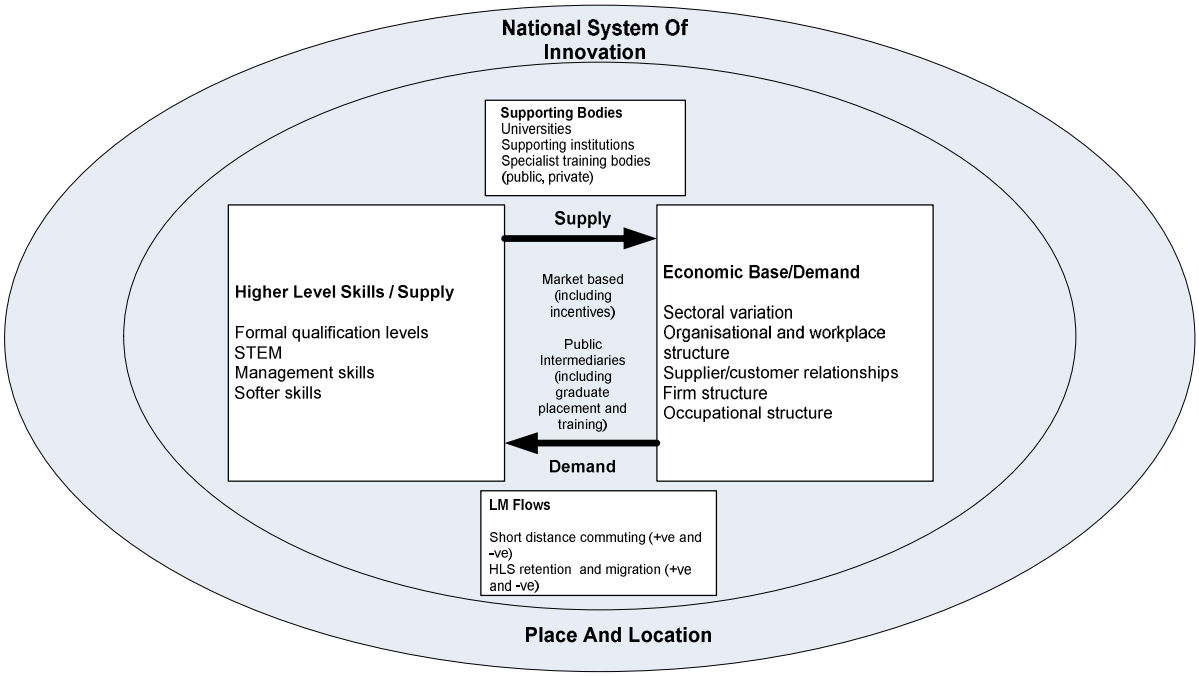
5.17 Anticipating the next stage of the research (which seeks to test competing programme theories around HLS) we propose that the conceptual model understands HLS in the region as relating to a set of interacting systems which comprise the following (nested) factors:

- Place, demography and migration;
- Institutional support;
- Sector, organisation and workplace; and
- Skills, qualifications and occupational structure.

5.18 The next stage would seek to understand these relationships in a series of contextual settings: these could be at a sectoral level (e.g. how HLS drives different sectors), place (behavioural and rational economics factors as drivers), qualification-sector skills relationships (e.g. industry specific versus generic qualifications and competences).

5.19 These relationships are set out in Figure 5.3 overleaf. This seeks to capture all key variables which may be at play in determining the drivers of HLS and their contribution to economic performance. What the preceding analysis and the evidence outlined in the previous chapters seeks to highlight is the importance of understanding HLS within a national system of innovation (which may explain different approaches to labour market regulation and credit availability) and the conditioning role these play on the supply and demand of HLS and in particular the contribution of HLS to economic performance.

Figure 5.3: Outline Conceptual Framework for Understanding High Level Skills



5.20 The conceptual framework above also gives some weight to place-based factors, including culture. Within Y&H, we found considerable variation in the location of employees with HLS: with York and North Yorkshire having significant shares of HLS endowed workers in the region. By location, we also stress the importance of the relationships between different places and in particular the direction of short distance commuting flows (again reflecting much of the city-region analyses undertaken in Y&H).

5.21 Whilst we wish to reinforce the importance these contextual variables we also highlight the importance supply, demand and intermediary factors as drivers of HLS and economic performance. These factors will form an important focus for the next stage of the study.

Testing the Conceptual Framework: the Realist Synthesis approach

5.22 The role of the next phase of the study will be to test theories of change for each factor in relation to a wider system of innovation. The potential factors which appear to be a useful starting point are:

- **Place**: The role of place in driving HLS (for instance the attraction of graduates or the attraction of high performing entrepreneurs to select locations).
- **Institutional Support:** The capacity and focus of institutional support and their relationships with the economy.
- **Demand (1).** The significance of sectoral and/or organisational structure in shaping demand for HLS.
- **Demand (2):** understanding the returns to skills in the short and long term both in terms of employers and employees' behaviour.

- **Supply (1):** the role of formal skills in STEM subjects.

- **Supply (2)**: the role of higher level employability/softer factors in influencing economic performance.

- **Policy:** understanding the impact of different policy stances in relation to support of HLS within a system of innovation; for example, the competences of different agencies (for instance central and decentralised competences), the interaction between different components of policy (and implementing authorities/agencies), and the stance of policy (for instance between a narrow focus on market failure or understanding of HLS in a wider context of a system of innovation.

5.23 The second part of the study will focus on understanding specific theories of change in relation to context-mechanism-outcome relationships. In undertaking the realist synthesis it is likely that evidence will be examined which is drawn from different:

- **Disciplines:** the initial evidence review has drawn on literature produced from different disciplinary stand points (notably economics, geography and social policy) although further literature has been identified in business and management studies, and technology policy studies;

- **Methods Used:** range from "gold standard" RCTs and quasi experimental approaches and modelling based approaches to qualitative firm and locality case studies. The key assessment to be made will be around the quality of the research, as much as the methods used;

- **Place and Location:** following Pawson's work it will be necessary to understand the importance of context (typically a geographic location) in shaping evidence. This may be at local but also national levels;

- **National Innovation System Contexts:** evidence from interventions outside HLS may be drawn upon, for instance evidence on behavioural change in companies which is non-skills related;

- **Outcomes:** the focus of the study is around the drivers of HLS with outcomes understood primarily in terms of productivity and economic growth gains. However, outcomes may also include equity effects and intermediate outcomes (for instance around product or organisational innovation in companies).

5.24 It will be necessary to understand the inter-relationships between these factors within a system of innovation: for example the role of place, industrial structure and skills alongside each other. The rationale for the realist syntheses which are undertaken will be around understanding the scope for intervention and the extent to which this can shape drivers of HLS. A set of clear policy recommendations will be drawn from this analysis.

5.25 As argued at the end of Chapter 3, the factors which drive HLS need to be understood in the context of institutional, geographic and historical factors, which mean that improvement of HLS in Y&H is a necessary but not sufficient condition for wider outcomes around economic growth or equity.

5.26 The next step in the research is to derive a series of hypotheses which can be explored through realist synthesis. In the course of the first phase of the research we have discussed the notion of low skills equilibrium and the factors which lead to its persistence: notably the rational pursuit by firms of financial returns based on low cost-product strategies.

5.27 Whilst an important context for understanding the limitations of some policy levers, we argue that these should not be the focus for Phase 2: rather it is more appropriate to consider firm level strategies and policy interventions which seek to increase the utilisation and return to HLS. Therefore the focus outlined above on occupational and organisational structure, on STEM and on innovation. This may not yield 'generalisable solutions' for HLS (which may rest with shifts at a national level to regulatory levers), but should provide evidence to guide and target specific interventions in the future in Y&H.

6 Conclusions and Implications

6.1 Over the past decade, Y&H has made significant strides towards the HLS objectives set out in '*Delivering A Skilled and Employed Region*'[21]. Yet, the evidence suggests that, whilst the supply of HLS has improved, it has done so at a slower rate than elsewhere.

6.2 The current size and structure of the business base places a constraint on demand and although forecasts suggest that demand will increase, this will not be transformational. Both factors are consistent with the existence of a low skills equilibrium within parts of Y&H with demand for HLS suppressed by large volumes of low value economic activity. Only in the Leeds City Region and in York and North Yorkshire is there evidence that the demand for and supply of HLS is moving towards a level of sufficient density to achieve accelerated economic growth.

6.3 The literature identifies barriers to addressing demand side constraints. Not least is that low value businesses can be operating profitably as individual units. Collectively they may provide a constraint on economic growth but there is little incentive to the business to train staff or introduce new products or processes.

6.4 Critics of supply side focused approaches, which have historically been dominant in the UK, maintain that simply boosting the supply of skills will not impact on productivity in the absence of demand. Instead, the result is likely to be a skills oversupply, a proposition we find persuasive. Rather, mechanisms to boost demand by increasing the volume and value of economic activity should be prioritised. The skills utilisation approach bridges supply and demand side measures by promoting better take up of existing skills within the workforce which has the capacity to raise productivity and stimulate demand.

6.5 The challenge for Y&H is therefore to identify where policy and interventions will be most effective in an environment of reduced public spending. A largely supply side strategy is not appropriate in our view, with a need to focus more clearly on innovation and skills utilisation as mechanisms to boost HLS performance, alongside carefully targeted supply side interventions.

6.6 The review of comparator region performance reinforces the complexity of the relationship between skills and productivity. The analysis suggests that increasing the proportion of the workforce with HLS may be a necessary factor in economic restructuring but is not a sufficient driver on its own. This supports arguments that caution against overly supply side approaches.

6.7 There is some indication from the regional comparator analysis that greater regional autonomy has enabled stronger promotion of innovation. Although these regional examples may provide a useful reference point during later stages of the research, it would be unwise to draw premature conclusions about 'what works' in apparently similar regions. Elements of the good practice uncovered e.g. in skills utilisation, can be considered further as part of the realist synthesis review of evidence in the second phase of the project, factoring in the Y&H context.

6.8 Our review of mechanisms and interventions to boost HLS identified a hierarchy of effectiveness and deliverability, although it is important to recognise that the review was not exhaustive. In addition, the quality of the evidence was not assessed in detail. With these caveats in mind, the analysis identified a number of mechanisms which have potential application in Y&H:

[21] Delivering A Skilled and Employed Region, Y&H Skills and Work Partnership.

- **Employer networks/collaboration** with potential to build on the Skillnets model. This may be particularly appropriate in the Y&H context given its potential to boost innovation as well as promoting training. There is also evidence of effective delivery on a sectoral basis fitting well with the need to target supply side interventions;

- **Enhanced IAG for employers** potentially delivered through enhancement to Train to Gain drawing on lessons from the HLS pathfinder programme. Again this could fit well with a sectoral approach.

- **HEI collaboration/supporting the infrastructure for learning** is particularly relevant in this context given its potential to boost demand and ensure that supply is demand led and tailored to employers needs. FE as well as HE institutions may have an important role given the shortage of associate professional skills within Y&H.

6.9 The second phase of this study will involve more detailed analysis of the potential application of some or all of these measures through thorough consideration of the Y&H context.

6.10 The conceptual model positions HLS in Y&H as relating to a set of interacting systems which comprise the following (nested) factors:

- Place, demography and migration;

- Institutional support;

- Sector, organisation and workplace;

- Skills, qualifications and occupational structure.

6.11 In our view, simple market failure arguments to explain varying performance are inadequate and there is a need to adopt a systems based approach. The focus of the second phase of the research, therefore, will be to explore the effectiveness of a select number of mechanisms including occupational and organisational structure, and innovation, to generate a practical set of policy recommendation for Yorkshire Futures and partners.

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ANNEX 2 SOURCES FOR COMPARATOR REGION ANALYSIS

Finland

Tampere Region Innovation Strategy: Summary.
http://www.pirkanmaa.fi/fileadmin/pirkanmaa/pdf/innovation_strategy.pdf

Nokia Research Center: http://research.nokia.com/openinnovation

European Association for Research on Services: http://www.reser.net/FINLAND-Tampere_a267.html

RUNUP Thematic Network: http://urbact.eu/fileadmin/Projects/RunUp/LE_Tampere_Report.pdf

Demola http://www.demola.fi/files/tampere.pdf

HighTech Finland http://www.hightech.fi/direct.aspx?area=htf&prm1=555&prm2=article
Martinez-Vela, C and Viljamaa, K (2004) Becoming High Tech: The Reinvention of the Mechanical Engineering Industry in Tampere, Finland, Special Working Paper MIT-IPC-LIS-04-001, Cambridge (MA): Massachusetts Institute of Technology

Lorraine

Innovation Policy of the Regional Council of Lorraine - Powerpoint presentation by P.Bourgogne (2006)
www.e-innovation.org/supersme/files/P1_Kom_LORRAINE.ppt
Henderson, D and Thomas, M (1999) Creating a Regional ***Innovation*** Policy in ***Lorraine, Chapter 4 in Morgan, K and Nauwelaers, C (eds) Regional Innovation Strategies:*** The Challenge for Less-Favoured Regions***, Regions and Cities series, London: Routledge, pp.57-80***

Regional Technology Plan
http://www.e-innovation.org/lorraine.html

Interreg programmes
http://www.e-innovation.org/stratinc/partner1.html

Adkins, K (2001) Regional Policies: Alsace and Lorraine, mimeograph
www.cherry.gatech.edu/trp/proceedings/2001/01Adkins.doc

Georgia Tech-Lorraine Collaboration
http://www.georgiatech-metz.fr/mission

North Rhine Westphalia

Ministry of Economic Affairs
http://www.economy.nrw.de

Biotechnology cluster
http://www.innovation.nrw.de/downloads/BioTech_en.pdf

Research and development infrastructure
http://www.uni-duesseldorf.de/home/Internationales/Information/NRW-Nahost-Foerderprogramme/Israel/Israel-Scholars-Network/NRW
Hilbert, J, Nordhause-Janz, J, Rehfeld, D and Heinze, R (2004) Industrial Clusters and the Governance of Change: Lessons from North Rhine-Westphalia, Chapter 9 in Cooke, P, Heidenreich, M and Braczyk, H-J (eds), Regional innovation systems: the role of governance in a globalized world, London: Routledge, pp.234-258.
ZENIT
http://www.zenit.de/e/service/download/ZENIT%20Flyer_englisch-web.pdf

Science to Business Centres
http://www.creavis.com/sites/creavis/en/s2b-centers/Pages/default.aspx

Hydrogen and Fuel Cell Network
www.fuelcell-nrw.de

Limburg
Open Innovation Campus
http://news.maastrichtregion.com/blog/limburg-based-open-innovation-campus-of-national-and-euregional-importance.html

Chemelot
http://www.chemelot.nl/default.aspx?taal=en

Acceleration Agenda
http://www.versnellingsagenda.nl/nl/page00001.asp

Limburg Ventures
http://www.limburgventures.com/

Limburg Innovation Class
http://www.msminterbridge.nl/3/3/uk/limburg_innovation_class/

Regional Innovation Partnership
http://ec.europa.eu/regional_policy/innovation/innovating/pdf/limburg-nl_en.pdf

Basque Country

Department of Industry
http://www.comp-era.net/C8/EUROBULEGOA%20-%20Spain/default.aspx

Science Technology and Innovation Plan
http://cordis.europa.eu/basque-country/rd_en.html

Technological Research Centres and Development Networks
http://www.ikerbasque.net/research_centers/bercs/research_centres.html
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http://www.innobasque.com/home.aspx?tabid=474

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http://www-sre.wu-wien.ac.at/ersa/ersaconfs/ersa04/PDF/16.pdf

Upper Silesia

Upper Silesian Regional Development
http://www.silesiantechnopolis.com/wp-content/uploads/2009/03/st-policentric-innovative-milieux-_-summary.pdf
http://www.foresightgom.pl/o_projekcie.php?lang=en

Regional Innovation Strategy
http://ris.silesia-region.pl/zalaczniki/2005/12/22/1135285319.pdf
http://www.ris-silesia.org.pl/pliki/gazeta_wersja_ang_15_01.pdf

Technology Parks
http://www.katowice.eu/uploads/concept.pdf

Technology Transfer Centres
http://ec.europa.eu/regional_policy/cooperation/interregional/ecochange/goodpractice/1knowledge/2links/pl_stim.pdf

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http://www.proinno-europe.eu/sites/default/files/page/10/03/RIS_2009-Regional_Innovation_Scoreboard.pdf