people:skills:jobs:

Department for Employment and Learning
www.delni.gov.uk

# Forecasting Future Skill Needs in Northern Ireland

## Summary Report

**A report prepared by Oxford Economics in association with FGS Consulting**

April 2009

OXFORD ECONOMICS

The Department for Employment and Learning launched its skills strategy – Success through Skills – in 2005. Its vision is one of achieving a skilled Northern Ireland workforce by 2015. From it, targets flowed which were underpinned in the Executive's Programme for Government. In 2009, the Department will be carrying out a review of the skills strategy. In order to add to the evidence base and further inform debate, the Department commissioned Oxford Economics, in association with FGS Consulting, to carry out an analysis forecasting possible scenarios for future skill needs in NI, particularly to 2015, which marks the current end of the strategy period. The following summarises the main findings of this work.

# Introduction

The Skills Strategy for NI, 'Success through Skills' was launched in 2005 with the following strategic vision for NI by 2015:

*"the NI economy is highly competitive in global terms; based on high value jobs with progressive leadership from a strong cadre of local managers; it has increased export levels and it attracts substantial amounts of inward investment; its people are entrepreneurial and innovative; small businesses are encouraged to grow and strong, coherent services and support for businesses of all sizes are provided. Employment has increased, leading to an expansion of the workforce and migrant workers are playing a valuable role in the economy; the workforce, increasingly, is literate and numerate and has sufficient ICT skills. Individuals can solve problems, work in teams, are innovative and enterprising and expect to learn new skills throughout their working lives. A broader adoption of technology and e-learning will have reduced transport and location barriers[1]."*

In 2008, the NI Executive's Programme for Government[2] has put the economy at centre stage of policy in NI with 'growing a dynamic and innovative economy' a main tenet of the programme. This, and several of the Public Sector Agreement (PSA) targets, has both direct and indirect implications for skills. On the direct side, there are a number of skill targets such as ensuring "80 per cent of the working age population are qualified to at least GCSE level or equivalent". Indirectly PSA 1 (productivity) and PSA 3 (employment levels) will be influenced by skill levels, reflecting the policy desire to get more people working and earning more, ultimately improving productivity.

The strategy's implementation plan is grouped under four themes:

- Understanding the demand for skills
- Improve skill levels of the workforce
- Improve quality and relevance of education and training
- Tackling skills barriers to employment

It could therefore be said that this research addresses directly the first of the four themes though many of the policy issues and recommendations arising refer to all four.

[1]See www.delni.gov.uk/index/publications/pubs-sectoral/skills-strategy-ni.htm
[2]See www.pfgbudgetni.gov.uk

# Approach

The approach to this research included the following elements:

### Consultation and desk-based research phase

This included interviews with key stakeholders, both face-to-face and by telephone; a presentation session to Sector Skills Councils (SSCs) and Invest NI sector representatives; a review of Sector Skill Agreements (plans by the SSCs to raise the skill levels in their sectors); a survey of SSCs and Invest NI sector representatives; and a Stakeholder Conference which took place towards the end of 2008.
The consultative and research process and findings are fully documented in Annex H of the final report.

### Extensive analysis of Labour Force Survey (LFS) data

A 10-year time series of LFS data for UK regions was analysed, by industry and occupation, and by National Vocational Qualification (NVQ) and National Qualification Framework (NQF) categories. This enabled us to make regional skill, occupation and degree subject comparisons.

### Enhanced the original forecasting methodology

We used a forecasting methodology originally devised by Regional Forecasts[3] and which informed NI economy and labour market models including those used by the Government's Economic Development Form (EDF)[4]. In particular, more attention was paid to "replacement demand" – ie new labour required to fill the places of those who move between occupational groups. The model is now based on a full flows matrix of leavers and joiners; and includes forecasts of skills stocks and the skills of leavers and joiners. In addition, degree subject analysis was added.

### Developed an aspirational scenario

in order to assess what might be needed to meet the targets of the Programme for Government, we developed an inspirational scenario that achieves PSA 1 (productivity); which reflects the unique characteristics and competitiveness strengths of the NI economy; and captures the ethos and direction of policy (Success through Skills, MATRIX, Invest NI etc), including focus on Government's priority sectors.

[3]Regional Forecasts merged with Oxford Economics in January 2007.
[4]See www.detini.gov.uk → Economic Development Policy → Economic Development Forum.

# The importance of skills

*"Our aim is to ensure our people have the right skills to deliver economic prosperity now and in the future." NI Executive: Programme for Government.*

There is widespread consensus on the value of higher skills both to the individual and to the economy as a whole. Across the UK, regions such as London, with a higher share of private sector graduates in total employment, tend to have higher productivity. In NI, as in other regions and economies, wages are positively correlated with a person's highest level of qualification and better skilled working age persons are more likely to be employed and less likely to be unemployed or economically inactive. Productivity, wage levels and employment are all part of the NI Executive's published economic goals; therefore skills should be an intrinsic part of achieving these goals.

**BOX 1: IMPORTANCE OF SKILLS**

- Higher skills are associated with higher productivity, higher wage levels and higher employment rates.
- As each of these are part of the NI Government's published economic goals, skills should be an intrinsic part of achieving these goals.

In this report, future skill needs are expressed in terms of formal qualifications – some of the levels are combined and categorised as shown in **Table 1** (the classification is based on the NQF: this is only a high level summary).

TABLE 1: SKILLS CLASSIFICATION AND TERMINOLOGY

| NQF | DESCRIPTION | TERMINOLOGY |
|---|---|---|
| 8 | Doctorate | Postgraduate |
| 7 | Masters, postgraduate certificate and diploma | |
| 6 | Honours degree | First degree and sub-degree |
| 5 | Sub-degree including foundation degrees | |
| 4 | Certificates of higher education | |
| 3 | NVQ Level 3 | Intermediate a |
| | A-Levels | |
| 2 | NVQ Level 2 | Intermediate b |
| | GCSE grades A* - C | |
| 1 | NVQ Level 1 | Low |
| | GCSE Grades D - G | |
| Entry | Entry level certificate in adult literacy | |
| | Other qualifications | |
| | No qualifications | |

# Skills in context

### NI skill strengths

Given that skills are intrinsic to Government's economic goals, it has been a positive development that skills levels in the NI workforce have been improving steadily over the last decade with the per cent of the workforce with sub-degree, degree and postgraduate qualifications (NQF 4-8) increasing from just over 20 per cent to almost 30 per cent. This is explained by a combination of:

- *the sectoral shift* in the economy away from more traditional lower skilled (in formal qualification terms) activities such as agriculture and textile manufacturing towards more skills hungry activities in the service sector and higher value added elements of manufacturing
- *a generational effect* of older less qualified workers leaving the labour force, coupled with inflows of more qualified young people. It is worth remembering that NI has one of the best school systems in the UK in terms of leaver qualifications although large numbers still choose to leave for GB higher education institutions and remain working there following graduation
- *up-skilling* of the workforce with persons completing part time or evening courses
- these are important factors to consider when thinking of the change in future stock of workforce skills

The steady improvement in workforce skills has helped to place the Northern Ireland economy 'within the pack' of UK regions in terms of graduate concentrations. With approximately 30 per cent of persons employed qualified to sub-degree, degree and postgraduate level, this is on par with the Eastern region and above the Welsh and industrial Midland regions, but below ROI, London and leading international economies such as the US and Finland.

Across the economy, most of the private service sectors have a broadly comparable concentration of graduates in NI compared to the UK average, even in the key export potential sectors of financial and business services. Of course the potential for graduates to work in a sector, for example a call centre, and not require the level of qualification possessed is a possibility. There is part evidence of this from NI's observed private service productivity gaps (though new Regional Accounts GVA has changed the size of these gaps) and evidence from the 'NI Skills At Work' report (2006) of 'over-qualification'. According to the latter, while 'over-qualification' is less of an issue in Northern Ireland than in other parts of the UK, even in NI a third of workers are in possession of a qualification which is higher than the qualification required for the job they currently occupy. At the same time according to the NI Skills Monitoring Survey, in 2005 roughly 1 in 10 employers considered there to be a skill gap in their workforce (which refers to existing employees), with skill gaps most prevalent in financial services, health & social care and other services. In other words across and within sectors there is evidence of skill mis-matches with instances of both over and under-qualification.

**BOX 2: NI SKILL STRENGTHS - SUMMARY**

- Workforce skill levels have been improving steadily over the last decade.
- NI is 'within the pack' of UK regions for higher level workforce qualifications.
- Most of the private service sectors have a broadly comparable concentration of graduates in NI compared to the UK average (though there is some potential for over-qualification).

### NI skill weaknesses

Despite the skill strengths of the NI economy, a number of weaknesses can also be identified.

A key weakness is the under-representation of graduates in key sectors in the economy. Outside private services, graduate concentrations in agriculture, manufacturing, construction, retail and hotels & restaurants lag between 10 and 60 per cent behind the UK average.

NI also has a relative under-representation of managerial and professional occupations. This is likely a reflection of the limited 'upper–end' activities located in the region (reflected in the small number of NI PLCs and the 'small nature' structure of the economy). Many of NI's industrial and indeed professional services activities are not at the high end headquarter or design and strategy end of the spectrum and thus demand for managerial and professional occupations is lower. For the key export/potential high export sectors of manufacturing and business services, the managerial and professional gap is very evident, even compared to NI's 'near neighbours' in prosperity terms - Wales and the North East.

In terms of workforce degree subjects, there appears to be limited subject specialisation within NI, with a higher concentration of general subjects (business & administration and combined degrees) and much less specialism across elements of STEM, creative arts & design and arts subjects[5]. This pattern holds when measuring the number of degree holders by subject per 10,000 working age in addition to the share of overall degree holders in employment. It is of note that London, the most productive region of the UK, has the highest concentration of creative arts & design and arts graduates in employment, whereas NI has the least (this is likely to be in subjects such as graphic & multimedia design, film production and writing etc). Similarly the South East and Eastern, the next two most productive regions, have the highest concentration of elements of STEM graduates in work (physical sciences, mathematical sciences, engineering & technology etc) – again NI trails in last place for this narrow definition of STEM graduates (NI's workforce STEM degree ranking is better when medical degrees are included for which NI appears to have an above average concentration of degree qualified persons). Drilling down to key export sectors, both manufacturing and business services in NI appear to be lacking in these same key subject areas with the more generalist business and administration subject mix more prevalent.

[5]Arts subjects include Linguistics, Languages, Literature, History and Philosophy.

**BOX 3: NI SKILL WEAKNESSES - SUMMARY**

- Graduate concentrations in agriculture, manufacturing, construction, retail and hotels & restaurants lag well behind the UK average (more likely a demand rather than supply issue).
- Under-representation of managerial and professional occupations.
- Limited higher education subject specialisation/greater prevalence of general degrees.

### Where could NI be?

Against this backdrop, the report explored what the NI economy would look like if it had equivalent UK skill, occupation and degree subject concentrations within sectors (but assuming the existing sectoral composition). Note this should not be interpreted directly as what NI could achieve or what should be targeted in an aspirational scenario: rather the headline figures in **Box 4** are largely illustrative to identify the scale of NI's difference with UK averages[6].

**BOX 4: WHERE COULD NI BE IF IT HAD EQUIVALENT UK CONCENTRATIONS WITHIN SECTORS?**

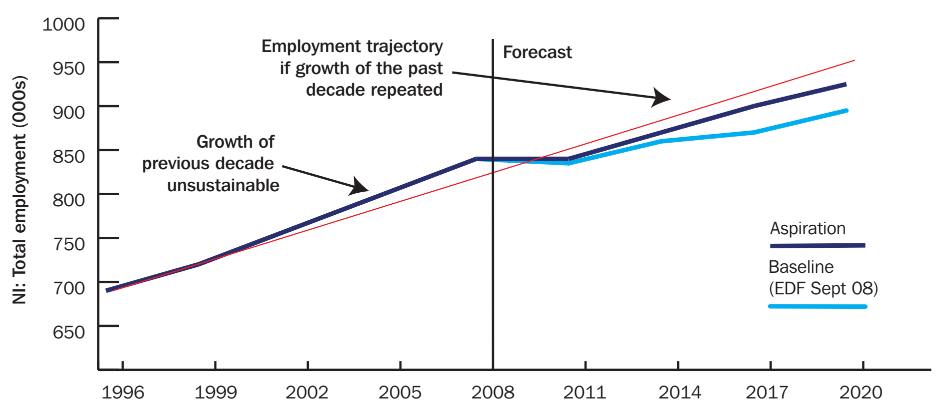
- 12,000 more persons in employment with sub-degree, degree and postgraduate qualifications.
- 30,000 more managers and 20,000 more professionals.
- 4,000 more STEM degree holders in work (based on a narrow STEM definition - physical sciences, mathematical & computer sciences and engineering & technology).
- 7,000 more creative and arts degree holders in the workforce.

### What does tomorrow's economy hold in store?

Up until the recent spike in commodity prices, the correction in house prices and full unravelling of the credit crunch, the global, national and NI economies enjoyed an unprecedented 'golden era' over the last decade in terms of rising output and employment, falling unemployment and increasing wealth and consumer spending. Upon more critical reflection, it is clear now that an element of this growth was debt-led, and unsustainable in the long-term, as saving ratios fell to historically low levels and house prices are now clearly recognised as having been over-valued.

[6] Note it would be worthwhile developing this analysis further to consider where NI could be assuming equivalent UK excluding Greater South East concentrations – this was beyond the scope of this research.

FIGURE 1: NI TOTAL EMPLOYMENT FORECAST (JOB-BASED)




*Source: DETI, LFS, Oxford Economics*

Between 1996 and 2008 the NI economy created 13,000 net new jobs per annum[7] (**Figure 1**), making it the fastest growing region in the UK in employment terms, albeit starting from a lower employment rate base. It is worth noting however that structural economic weaknesses have persisted and in some cases worsened. NI's employment rate is still a long way from converging to the UK rate (the unemployment rate is similar but inactivity much higher); relative GVA per head has barely shifted from being 20 per cent less than the UK average; and relative productivity compared to the UK has fallen by almost 10 per cent[8].

The replacement demand[9] analysis in the main report has showed that up until approximately 2004, job vacancies arising from high levels of expansion demand in the economy (the growing stock of total employment) and vacancies due to persons exiting employment (retirement, out migration etc), have been largely met by leavers from the education system and by joiners from unemployment (the stock of unemployed was almost 100,000 in the mid 1990s[10] so there was sufficient 'slack' in the labour market)[11].

However as the stock of unemployment could not fall indefinitely; and the incentives to join employment from inactivity remained low (with rising living costs, especially housing, the financial trade off between work and benefits was marginal); and furthermore the rate of expansion demand picked up (+20,000 net new jobs in 2005), the only way the NI economy could meet its labour demand was via a sharp increase in migration inflows. This coincided with Eastern European accession to the EU[12].

One of the strengths therefore of the replacement demand and skills forecasting model developed for this research is that it predicted the demand for migrant in-flows and broadly in the same magnitude as recorded by official statistics.

[7]Job-based measure.
[8]This is based on Regional Accounts GVA at the time of Oxford Economics' submission to EDF in September 2008 and not the latest figures published in December 2008, which indicate a recent improvement in NI's relative productivity compared to the UK excluding the Greater South East.
[9]Gross replacement demand is the demand to fill vacancies created by people leaving employment for a variety of reasons. Net replacement demand adjusts for joiners to employment from unemployment, inactivity excluding full-time students and other occupations.

The current (late 2008/early 2009) economic environment is very different to the previous 'golden era' decade and could hardly be more challenging. There are considerable unknowns with respect to how this current economic crisis will play out, which matters for the future demand outlook, not least:

- uncertainties attached to the range of policy measures implemented, most importantly the fiscal and monetary actions by the Treasury and Bank of England, including cuts in interest rates;
- when bank lending will return to normal levels;
- whether the economy will face a long period of deflation and what the impact of this might be; and
- the extent to which consumers will retract and re-build saving ratios.

The short-term economic problems and uncertainties will undoubtedly markedly change the level of demand for skills in the next 2-3 years from what the economy has been used to (and possibly the mix of skill demand as well). In addition the flow/supply of skills may change markedly, for example greater replacement of older expensive workers with younger cheaper resources, migrants competing with the indigenous non-employed, older workers staying in employment for longer etc.

All of these questions exist as a challenging 'backdrop' against which the research findings of this report need to be considered. Though the longer-term outlook remains positive, a return to the previous decade of growth is not projected for NI (or indeed most other developed economies). The central baseline forecast for the NI economy between 2008 and 2020 is of approximately 5,000 net new jobs *per annum*. This may not be the outcome NI aspires to, but the reality is the decade ahead will be more challenging than ever and as the analysis in the main report shows, the possibility of an over-supply of labour and rising unemployment in the first half of the next decade cannot be discounted, especially as economic growth forecasts continue to be revised downwards.

In saying this, the research actually shows that net employment growth of 5,000 *pa* is a more sustainable level for the NI economy given projected numbers of leavers and joiners and assuming similar annual entrants from the education system as in the past (which could actually fall as the school leaver age cohort decreases, which is a legacy of falling birth rates, though rising wealth and migration have recently been helping to reverse this trend). Any higher employment growth than 5,000 net *pa* and the NI economy could struggle to attract the migrant inflows required, especially as the weak value of Sterling erodes the Euro value of expatriated migrant earnings (making Sterling economies a less attractive migrant destination) and UK migration policy tightens with the introduction of a points-based system.

[10]Claimant count.
[11]Annex G in the main report shows that with a current school leaver age cohort of roughly 25,000, roughly 17,000-20,000 *pa* enter employment in NI. The remainder leave NI for higher and further education elsewhere or go straight to unemployment/inactivity (NEETs – Not In Education, Employment or Training).
[12]An interesting question around this is the extent to which employment growth at the time of accession was a demand or supply issue. It could well be that the availability of low cost migrant workers helped to prop up or grow faster sectors of the economy that otherwise in the past might have shed jobs for reasons of cost competitiveness or lack of available local labour.

Therefore under this 5,000 *pa* net jobs central baseline forecast, the NI economy should in the long-term fully absorb leavers from education and still have a requirement for moderate migration inflows (4,000 *pa* in-migration requirement in the baseline and 7,000 *pa* in the aspirational scenario – to put this in context international working age in-migration in 2007 was approximately 18,000, before even counting domestic migration inflows). Note again from above that other changes in supply patterns could influence resident migrant demand and demand for school leavers such as workers retiring later or a greater inflow from the inactive.

As is shown later under future skill needs, the weaker economic outlook relative to the past does not however necessarily 'read across' to mean a drop in demand for higher level skills. Indeed quite the opposite. The economy is still predicted to undergo a transformation towards more skills hungry sectors and occupations. Additionally in order to produce internationally competitive products and services, a higher skills base will be required than in the past when the debt-led boom and economic catch-up in NI generated rapid job growth, particularly in retail and construction. In future therefore the NI economy will have to rely more on exports as a source of demand rather than consumers and government.

**BOX 5: TOMORROW'S ECONOMY (EDF SEPTEMBER 2008)**

- The previous decade was a 'golden era' for the NI economy with 13,000 net new jobs created on average *pa*.
- The short-term economic environment today however could hardly be more challenging.
- The central baseline employment forecast for the NI economy between 2008 and 2020 is lower at 5,000 net new jobs *pa* with net jobs losses predicted in the short-run (note a number of uncertainties still surround the base outlook and latest forecasts predict slower growth).
- However net employment growth of 5,000 *pa*, according to Oxford Economics' model, is a more sustainable level of employment growth for the NI economy given projected numbers of leavers from and joiners to employment and assuming similar annual entrants from the education system as in the past.
- With this growth, the NI economy should, in the long-term, fully absorb leavers from education and still have a requirement for moderate and more sustainable in-migration inflows, despite overall slower employment growth (one of the key reasons is that the number of joiners from unemployment will be lower than the past decade).
- In addition the weaker short-term outlook does not necessarily 'read across' to mean a drop in demand for higher level skills. The economy is still predicted to undergo a transformation towards more skills hungry exporting sectors and occupations. A higher skills base will be required compared to the past (1) when the debt-led boom and economic catch-up in NI generated rapid job growth in lower skill sectors, particularly in retail and construction, and (2) to ensure NI remains internationally competitive as other economies strive to improve their skills offering.

This research also considered the skill needs of a more aspirational outcome for the NI economy. Described in more detail in the main report, the aspiration is the employment and occupation trajectory the NI economy would need to follow to meet the PSA 1 private sector productivity target by 2015, given the characteristics of the NI economy; the ethos and direction of policy (MATRIX, Invest NI etc), including focus on key priority sectors, namely financial and business services, ICT, life sciences and hi-tech manufacturing, which ensures growth is export led but with local multiplier impacts on secondary sectors; and also assuming productivity in the rest of the UK improves as envisaged by the Leitch Review. Note while this type of scenario was broadly endorsed at the Skills Stakeholder Conference in November 2008, it should be seen as just one potential option and a first step to arrive at a defined path for how the NI economy might achieve its published goals.

Under the aspirational scenario, net annual job creation is forecast to be 7,300 *pa* compared to 5,000 in the baseline and GVA/wages & profits higher by £2.7bn in 2020 (2003 prices), equivalent to an 8 per cent larger economy compared to the baseline. The aspirational scenario is therefore less about job creation and more about significant productivity enhancements, as a result of higher levels of skills inherent in employment (from both new entrants and a higher rate of upskilling of the existing workforce). It incorporates faster employment growth but only as one element of the achievement of PSA 1[13]. GVA per head (relative to the UK average) would rise from its long term level around or just above 80 per cent to above 85 per cent, though the more striking development would be the improvement in the PSA 1 target which as said above, would be achieved by 2015 and overall parity (no gap) with the UK outside the Greater South East by 2020 (note the data suggest this was close to being the case in the mid-1990s). As such the aspirational trajectory can be said to be one of catch-up and convergence and would represent exceptional performance if achieved.

**BOX 6: WHAT WOULD AN ASPIRATIONAL SCENARIO LOOK LIKE AND DELIVER IF PSA 1 IS ACHIEVED?**

- Net annual job creation of 7,300 *pa* – a productivity scenario with employment growth only one element.
- More jobs in exporting priority sectors.
- GVA higher by £2.7bn in 2020 (2003 prices) – an 8 per cent larger economy.
- Relative GVA per head up from 80 per cent to 85 per cent.
- PSA 1 parity by 2020 (i.e. not only halving the gap, closing it).
- In summary catch up and convergence – exceptional performance, a genuine ‘stretch’ target!

[13]Given current economic conditions and the uncertain outlook, a more employment-orientated strategy would be less realistic.

# Future skill needs

While all of the above analyses are essential building blocks, the crux and main interest of this report is their implication for the direction of future skill needs and how this differs from the past. Typically the focus for skills supply provision is on the net requirement flow from education, training and migration – this is because joiners from non-employment and other occupations are assumed to be qualified already to take up a similar job as in the past. For the non-employed these tend to be low grade occupations. Ideally migration would be netted off but very little is known about migrant qualifications (and how overseas qualifications are rated by employers in the NI labour market) and with a relatively stable annual education output into employment, net migrant flows should act more as a residual. It should be noted that the skills forecasts presented in this report are demand-led (from an employers' perspective). Any reference to upskilling in this report refers to upskilling of the existing employed workforce. This does not include upskilling of the non-employed, which does occur, and from a supply-side perspective could boost NI's overall employment rate.

**Table 2** compares the skill requirements for education leavers and in-migration combined under the baseline and aspirational scenario. It also presents the upskilling requirement of the existing workforce[14]. Note forecasts are presented for the period 2010-2020 excluding the near term slowdown period to avoid this distorting the longer-term picture of skill needs (forecasts for the near-term are however presented in the main report). For comparison of recent trends, the average skill requirement pattern for the past five years is also presented.

TABLE 2: NET REQUIREMENT FROM EDUCATION AND MIGRATION AND UPSKILLING REQUIREMENT OF EXISTING WORKFORCE (2010-2020 ANNUAL AVERAGE)

| | BASELINE | | ASPIRATION | | HISTORICAL | |
|---|---|---|---|---|---|---|
| | Net requirement from education and migrants | Upskilling | Net requirement from education and migrants | Upskilling | Net requirement from education and migrants (2003-2007) | Upskilling (1997-2007) |
| Postgraduate (NQF 7-8) | 1.8 | 2.6 | 2.0 | 3.7 | 2.0 | 1.6 |
| First degree and sub-degree (NQF 4-6) | 7.8 | 6.0 | 8.7 | 8.5 | 7.2 | 3.8 |
| Intermediate a (NQF 3) | 4.8 | 0.3 | 5.5 | 0.3 | 6.4 | -0.6 |
| Intermediate b (NQF 2) | 2.8 | 0.0 | 3.9 | -0.9 | 4.7 | -0.9 |
| Low (NQF 1 and below) | 3.6 | -8.9 | 3.8 | -11.7 | 6.4 | -3.9 |
| **TOTAL** | **20.8** | **0.0** | **23.7** | **0.0** | **26.6** | **0.0** |
| Postgraduate (NQF 7-8) | 9% | - | 8% | - | 7% | - |
| First degree and sub-degree (NQF 4-6) | 38% | - | 36% | - | 27% | - |
| Intermediate a (NQF 3) | 23% | - | 23% | - | 24% | - |
| Intermediate b (NQF 2) | 13% | - | 16% | - | 18% | - |
| Low (NQF 1 and below) | 17% | - | 16% | - | 24% | - |

*Source: Oxford Economics*

[14]Upskilling forecasts are based on estimated observed past trends from the LFS, calcualted as the change in stock of skills minus joiner skills plus leaver skills (i.e. an accounting identity). For the aspirational scenario, an extra uplift in the rate of upskilling is needed to achieve the PSA 1 productivity target.
[15]Note the financial services share may be an over-estimate as call centre employment is likely to be under-estimated in official employee data – a classification issue. The hi-tech manufacturing share may reflect the legacy of the existing workforce and possibly could be higher. Further work is needed to improve the robustness of these estimates.

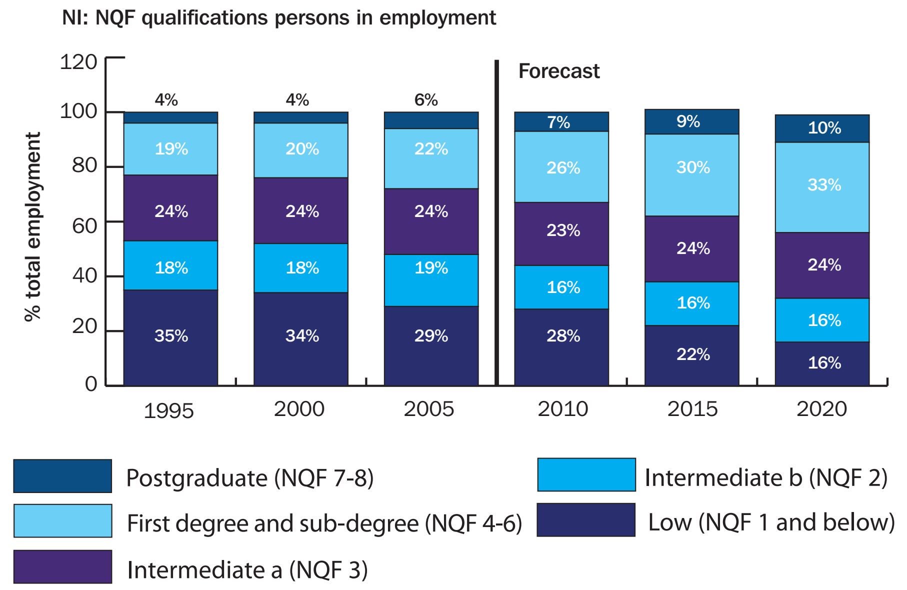
The annual average long-term demand for sub-degree, degree and postgraduate qualified persons (NQF 4-8) from education and in-migration is 9,600 in the baseline and just under 11,000 in the aspirational scenario (sum of rows 2 and 3 in **Table 4**). This represents almost half of the total requirement in both scenarios (20,800 and 23,700) compared to a third in recent years. The share of higher qualification requirements in the total net requirement of Government's priority sectors is potentially even higher at 70 per cent for financial/exporting professional services and ICT and just over 50 per cent for hi-tech manufacturing and life sciences[15]. (Note the financial services share may be an over-estimate as call centre employment is likely to be under-estimated in official employee data – a classification issue. The hi-tech manufacturing share may reflect the legacy of the existing workforce and possibly could be higher. Further work is needed to improve the robustness of these estimates). Only one in six jobs for people leaving the education system/migrants will be for people with low qualifications under both scenarios (NQF 1 and below). This compares to one in five in the past five years.

As the skills forecasting methodology developed for this research is based on past trend data, which may or may not reflect 'actual' skill demand, care should be taken in interpreting the results. It may be the case that in recent years inflows into the labour market from education have not had as high a level of formal qualification as employers might have wished, from which the economy would otherwise have benefited from better educational standards[16]. As evident from **Table 2**, the up-skilling of the existing workforce is also an extremely important element of the changing workforce skill structure, as it is too in the UK Commission for Employment and Skills analysis of developing a world-class skills base in NI[17]. The estimates suggest a further 8,600 persons qualified to NQF level 4-8 per annum required in the baseline and 12,200 in the aspirational scenario through upskilling[18]. The negative numbers lower in the skills spectrum, NQF 2 and below, reflect 'stepping up' the skills ladder, i.e. existing working persons moving from highest qualification NQF 2 and below to NQF 3 and higher. Note upskilling figures are effectively net flows. Many workers are required to move up the skills ladder from a low qualification level to intermediate level and many workers with intermediate qualifications are also required to move up to higher qualification levels. Therefore although the net flow upskilling figures for intermediate qualifications are low, this masks an underlying dynamic of persons moving out of this skills category and people moving into this category, previously with low qualifications[19].

Overall then the skill demand picture, taking into consideration sectoral and occupational trends and leaver and joiner flows, is one of an increasingly 'graduate hungry' economy. What the inflow of new skills, outflow of skills and up-skilling of the existing workforce means for the overall stock of workforce skills is presented in **Figure 2** and **Figure 3**. The higher skilled NQF 4-8 proportion of the workforce is forecast to rise to 43 per cent in 2020 under the baseline scenario (49 per cent in the aspiration) from an estimated 28 per cent in 2005. Conversely the proportion of the workforce with low qualifications falls from 2005 level of 29 per cent to 16 per cent in 2020 (12 per cent in the aspiration). This compares closely to the trends in the Leitch Review (see **Table 3**). Again this serves to emphasise the rising gradient of future skill needs in the NI economy. A key factor here is that in future a decreasing share of vacancies will be filled by the non-employed and a rising share by better qualified leavers from the education system.

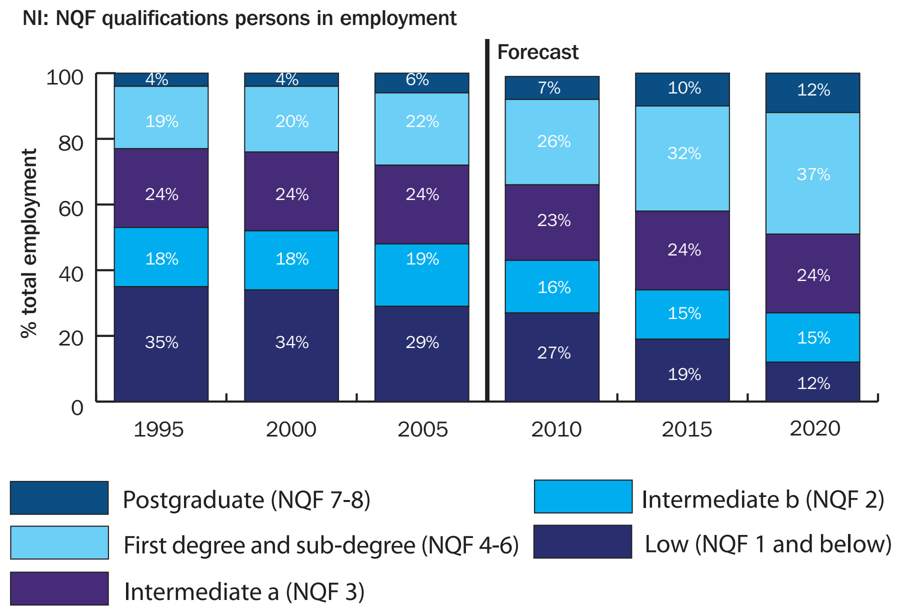
[16]The opposite may also be true where employers recruit persons with higher qualifications than actually necessary, e.g. call centres, though employers can still benefit from the higher skills available.
[17]Source: Presentation by Mike Campbell, UKCES, NI Annual Economic Conference 2008.
[18]While this figure appears high it is plausible given the number of part-time HE enrolments.
[19]In practice more of the higher level skills could come from entrants from education if for example the share of school leavers going on to higher education was to rise, which would reduce the upskilling requirement.

## FIGURE 2: TREND IN WORKFORCE SKILLS (BASELINE)




*Source: LFS, Oxford Economics*

## FIGURE 3: TREND IN WORKFORCE SKILLS (ASPIRATION)




*Source: LFS, Oxford Economics*

## TABLE 3: TREND IN FORECAST STOCK OF WORKFORCE SKILLS – NI COMPARISON WITH UK LEITCH (2020)

| | BASELINE | | ASPIRATION | |
|---|---|---|---|---|
| | NI - Oxford Economics | UK - Leitch | NI - Oxford Economics | UK - Leitch 'catch up' |
| Postgraduate (NQF 7-8) | 10% | 11% | 12% | 13% |
| First degree and sub-degree (NQF 4-6) | 33% | 31% | 37% | 33% |
| Intermediate a (NQF 3) | 24% | 26% | 24% | 27% |
| Intermediate b (NQF 2) | 16% | 19% | 15% | 17% |
| Low (NQF 1 and below) | 16% | 13% | 12% | 11% |
| **TOTAL** | **100%** | **100%** | **100%** | **100%** |

*Source: Oxford Economics, Leitch Review*

### BOX 7: FUTURE SKILL NEEDS

- Just under one half of the total net requirement from education and in-migration between now and 2020 is estimated to be for sub-degree, degree and postgraduate qualified persons (average of 9,600 *pa* in the baseline, just under 11,000 in the aspiration), compared to an average of one-third over the past five years. For Government's priority sectors, the proportion of higher level skill requirements of total requirements is greater at around 70 per cent for financial/professional exporting services and ICT, and just over 50 per cent for hi-tech manufacturing and life sciences (though additional sector research is required to firm up these projections).
- Only one in six jobs for people leaving the education system/migrants will be for people with low qualifications under both scenarios (NQF 1 and below), compared to one in five in the past five years.
- Up-skilling of the existing workforce is an extremely important element of the changing workforce skill structure – 8,600 upskilled graduates per annum are required from lower qualification levels in the baseline on top of new entrants from full-time education (12,200 in the aspirational scenario).
- The higher skilled NQF 4-8 proportion of the workforce is forecast to rise to 43 per cent in 2020 under the baseline scenario (49 per cent in the aspiration) from an estimated 28 per cent in 2005. Conversely the proportion of the workforce with low qualifications falls from 2005 level of 29 per cent to 16 per cent in 2020 (12 per cent in the aspiration). This compares closely to the trends in the Leitch Review for both the baseline and better performance scenarios.
- Overall then the skill demand picture, taking into consideration sectoral and occupational trends and leaver and joiner flows, is one of an increasingly 'graduate hungry' economy, particularly so if NI aims to close the productivity gap and achieve PSA 1.

# Future degree subject needs

It has also been possible in this research to take skills forecasting one step forward by making indicative estimates of the degree subject qualifications required using the net requirement forecast for higher level qualifications and HESA data on degree subject sectoral and occupational employment destinations. Note this is the first time degree subject demand analysis has been attempted in NI. It should be noted that a great deal of caution needs to be taken with this form of analysis as it is based on past trend data from HESA. This may represent what the labour market could get, not what it desired. In other words employers may be taking more general business and administration degrees when they would ideally like more advanced STEM subjects (for example taking a business studies graduate when they might have preferred a maths graduate). This analysis should therefore be considered subject demand if past trends are indicative of actual labour market desires and not just labour market practicalities/subjects supplied by universities.

**Table 4** shows that relative to recent trends (the final column), the degree subject requirement will become: more skewed towards physical sciences, mathematical & computer sciences, engineering & technology, law and creative arts & design; and less skewed towards subjects allied to medicine and education. This should help to address some of the current 'specialisation' weaknesses of the NI graduate workforce provided the education system aligns its supply to this requirement. Note however that the forecasts build in some subject 'creep' in some of these growing subject areas based on past trends and an assumption that degree subject gaps with the UK average will be closed over time. Therefore not all of the change in subject demand is explained entirely by sectoral employment trends. The sum of degree subject demand in the final row of **Table 4** is equal to the degree element of the net requirement for NQF 4-8 qualifications. A proportion of NQF 4-8 qualifications (roughly 25 per cent), which include foundation qualifications, are not classified as full degree qualifications and are not recorded in LFS degree subject or HESA data.

## TABLE 4: NET REQUIREMENT FROM EDUCATION AND MIGRATION – DEGREE SUBJECTS (2010-2020 ANNUAL AVERAGE)

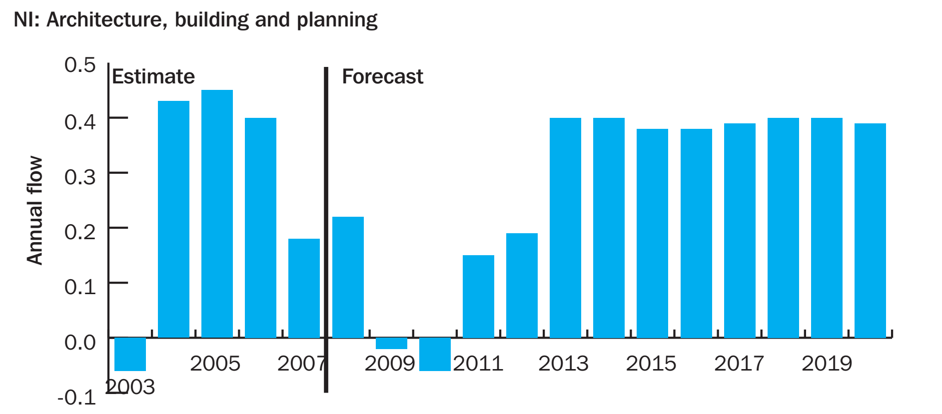
| | BASELINE | ASPIRATION | BASELINE % TOTAL | ASPIRATION % TOTAL | HESA NI domiciled graduates from UK HEIs entering employment in NI % total (2003-2007 annual average) |
|---|---|---|---|---|---|
| STEM | 3.5 | 3.9 | 48.0% | 49.0% | 43.0% |
| Mediciine & dentistry | 0.2 | 0.2 | 3.2% | 2.9% | 3.3% |
| Subjects allied to medicine | 1.1 | 1.2 | 15.6% | 14.7% | 17.3% |
| Biological sciences | 0.4 | 0.4 | 5.3% | 5.1% | 5.2% |
| Veterinary science | 0.0 | 0.0 | 0.1% | 0.0% | 0.1% |
| Agriculture & related subjects | 0.0 | 0.0 | 0.1% | 0.0% | 0.7% |
| Physical sciences | 0.2 | 0.2 | 2.4% | 2.8% | 2.2% |
| Mathematical sciences | 0.0 | 0.1 | 0.6% | 0.9% | 0.5% |
| Computer science | 0.6 | 0.8 | 9.0% | 9.5% | 6.5% |
| Engineering & technology | 0.5 | 0.6 | 7.3% | 8.1% | 4.0% |
| Architecture, building & planning | 0.3 | 0.4 | 4.6% | 4.9% | 3.1% |
| Law | 0.3 | 0.5 | 4.8% | 5.7% | 2.8% |
| Business and Administration | 1.1 | 1.2 | 15.5% | 14.7% | 15.6% |
| Languages | 0.2 | 0.2 | 3.0% | 2.7% | 3.0% |
| Creative Arts and Design | 0.3 | 0.4 | 4.3% | 5.0% | 3.4% |
| Education | 0.9 | 0.9 | 11.9% | 10.7% | 18.0% |
| Combined degree | 0.1 | 0.1 | 1.6% | 1.7% | 0.6% |
| Other* | 0.8 | 0.8 | 10.9% | 10.5% | 13.6% |
| **TOTAL** | **7.2** | **8.0** | **100.0%** | **100.0%** | **100.0%** |

*Source: Oxford Economics*

*Note: NQF 4-8 requirement from education and migration adjusted for LFS subject degree % NQF 4-8*
** Social studies, mass communication and documentation; philosophical studies*

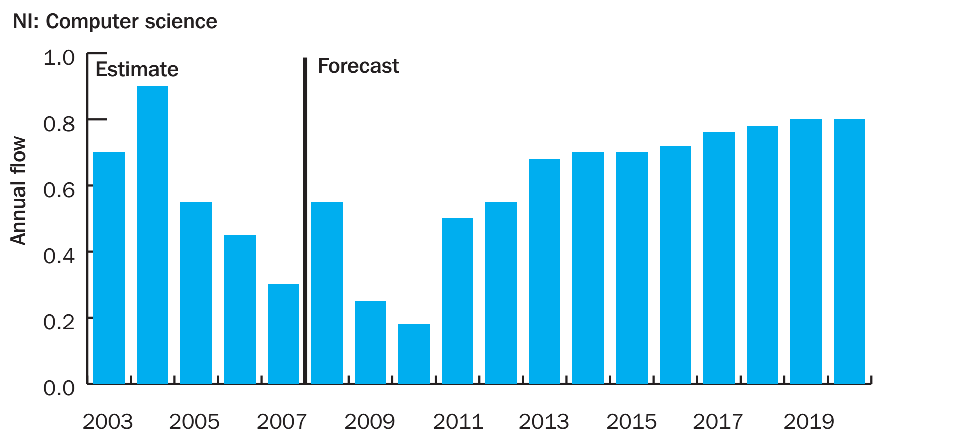
Without wishing to focus on the short-term, it is nonetheless worth drawing to attention the near term implications of the economic slowdown for graduate job prospects. **Figure 4** and **Figure 5** present degree subject demand forecasts under the baseline for two subject areas – architecture, building & planning and computer science (other subject charts are available in the main report). The charts clearly illustrate the impact of the slowdown, particularly for architecture, building & planning graduates, a large share of who typically enter construction related occupations. It is however worth saying that the graduate net requirement is based on the assumption of no major change in joiner rates from non-employment (the LFS data on which joiner rates are based are not available for a recessionary period). It could well be that all graduates are absorbed first (whether or not their high skills are required or can be appropriately rewarded), severely limiting opportunities for the non-employed in the short-run, including those persons recently made redundant.

FIGURE 4: DEGREE SUBJECT DEMAND - ARCHITECTURE, BUILDING & PLANNING (BASELINE)




*Source: Oxford Economics*

FIGURE 5: DEGREE SUBJECT DEMAND - COMPUTER SCIENCE (BASELINE)




*Source: Oxford Economics*

## BOX 8: FUTURE DEGREE SUBJECT NEEDS

- Relative to recent trends, the degree subject requirement will become more skewed towards physical sciences, mathematical & computer sciences, engineering & technology, law and creative arts & design; and less skewed towards subjects allied to medicine and education (this is part trend-based and part designed to align more closely with UK average subject patterns). This should help to address some of the current 'specialisation' weaknesses of the NI graduate workforce, provided the education system aligns its supply to this requirement.
- Though in the short-run job prospects for graduates will weaken (as it will across the entire skills spectrum), particularly for degree subject areas traditionally supplying sectors such as construction which are most exposed to the current downturn (though much depends on who employers recruit first from the choice of potential joiners). Graduate prospects are forecast to recover in 2011 and 2012.

# Adequacy of supply

It was beyond the scope of this study to look at the skills supply side in detail in terms of factors such as the changing size of the school leaver age cohort, higher education joiner rates, the ‘brain drain’, further and higher education subject enrolment trends and The Department for Employment and Learning’s “C’mon Over” campaign to attract talent from the UK and further afield.

However net replacement demand analysis inherently brings in elements of the supply side and it is also useful to bring in other elements to ‘sanity check’ the model forecasts.

Indeed it has already been described above how the skills forecasting model developed for this research predicted the recent demand for migrant in-flows and broadly in the same magnitude as recorded by official NISRA statistics. For the future to 2020 the model predicts 4,000 in-migrants *pa* will be required in the baseline (7,000 *pa* in the aspiration), on top of the historic relatively stable entry flow from education to fill vacancies.

The research also compares degree subject demand estimates to HESA graduate NI employment destination figures by subject (**Table 5**). This provides a useful check of estimated demand and supply magnitudes by subject, many of which are similar, suggesting some validity in the approach. It does however indicatively suggest that even under the baseline forecast there would be a shortfall in subject areas such as mathematical & computer sciences, engineering & technology, law and creative art & design graduates, if the last 4 years outturns as recorded by HESA were to be replicated going forwards[20]. The shortfalls grow larger still under the aspiration scenario. This is before even considering the up-skilling element which at this stage cannot be split across sectors, occupations and subjects.

[20]Note: Supply from HESA is based on employment destination numbers and not number of qualifiers.

## TABLE 5: NET REQUIREMENT FROM EDUCATION AND MIGRATION AND COMPARISON WITH SUPPLY - DEGREE SUBJECTS (2010-2020 ANNUAL AVERAGE)

| | DEMAND | | SUPPLY |
|---|---|---|---|
| | BASELINE | ASPIRATION | HESA NI domiciled graduates from UK HEIs entering employment in NI (2003-2007 annual average grossed up) |
| STEM | 3.5 | 3.9 | 3.6 |
| Mediciine & dentistry | 0.2 | 0.2 | 0.3 |
| Subjects allied to medicine | 1.1 | 1.2 | 1.4 |
| Biological sciences | 0.4 | 0.4 | 0.4 |
| Veterinary science | 0.0 | 0.0 | 0.0 |
| Agriculture & related subjects | 0.0 | 0.0 | 0.1 |
| Physical sciences | 0.2 | 0.2 | 0.2 |
| Mathematical sciences | 0.0 | 0.1 | 0.0 |
| Computer sciences | 0.6 | 0.8 | 0.5 |
| Engineering & technology | 0.5 | 0.6 | 0.3 |
| Architecture, building & planning | 0.3 | 0.4 | 0.3 |
| Law | 0.3 | 0.5 | 0.2 |
| Business and Administration | 1.1 | 1.2 | 1.3 |
| Languages | 0.2 | 0.2 | 0.2 |
| Creative Arts and Design | 0.3 | 0.4 | 0.3 |
| Education | 0.9 | 0.9 | 1.5 |
| Combined degree | 0.1 | 0.1 | 0.1 |
| Other* | 0.8 | 0.8 | 1.1 |
| **TOTAL** | **7.2** | **8.0** | **8.4** |

*Source: Oxford Economics*

*Note: NQF 4-8 requirement from education and migration adjusted for LFS subject degree % NQF 4-8*
** Social studies; mass communication and documentation; philiosophical studies*

### BOX 9: ADEQUACY OF DEGREE SUPPLY

- Even under the baseline outlook a shortfall in subject areas such as mathematical & computer sciences, engineering & technology, law and creative art & design graduates is forecast, if the last 4 years outturns as recorded by HESA were to be replicated going forwards.
- The shortfalls grow larger still under the aspiration scenario before even considering the up-skilling element which at this stage cannot be split across sectors, occupations and subjects.

# Conclusions and policy remarks

As explained previously, the research identifies a number of interesting conclusions with respect to the Northern Ireland economy and its future skills needs. In some cases this provides confirmation and quantification of known trends. In other cases it identifies new challenges and issues. The main conclusions and associated policy remarks arising from the research are summarised below (and are elaborated in more detail in the main report).

- **NI's skills performance**. NI's concentration of higher qualified persons in the workforce (NQF 4-8) is on a par with many of the UK regions and a notable improvement in the proportion, from just over 20 per cent to almost 30 per cent, has occurred over the last decade. Despite this improvement, the region still suffers from a proportionately larger group of the working age population with no formal qualifications, which contributes to NI's overall relatively low employment rate.

- **Importance of skills**. There is clear evidence in published literature to show the importance of formal skills in driving economic growth and providing improved returns to individuals in terms of likely labour market outcomes and earnings potential, and this is supported by primary research reported in this study. For example over 90% of working age graduates are in employment in NI and a graduate in the workplace has an average salary premium of more than double over an individual with no formal skills. As a globally integrated economy becomes more of a reality the need to be internationally competitive will only increase and thus the need to improve qualification levels will remain, even through the current downturn.

- **The impact of recession**. The skills landscape will be noticeably different during the recession currently being experienced both in NI and across most of the developed world. There will undoubtedly be over supply in the short run and the immediate economic fortunes in 2009 and 2010 look extremely challenging for leavers from education, persons recently made redundant, and the non-employed seeking work.

- **Towards recovery**. There is little certainty over the timing and scale of economic recovery in NI. Based on latest forecasts at the time of writing (February 2009), Oxford Economics believe it will be 2010 before growth returns in any form and 2017 before employment levels return to their peak of early 2008 (the 5,000 *pa* average net job creation only occurs after 2010 and only just offsets the estimated net loss of approximately 25,000 jobs during the recession). In the recovery phase, the shape of growth will be different than the past – led less by the housing and retail sectors and more by export led activities. This will have implications for skills needs. We believe the long-run picture will be labour market expansion of approximately 5,000 - 6,000 net per annum, compared to over 10,000 on average per annum of the last decade. However given the current uncertainties, there will be a need to reappraise the quantum and nature of skills needs set out in this report.

- **Demand for skills**. Even though the NI economy is forecast to slow considerably in the downturn and even in the longer-run is unlikely to return to the levels of job growth of the recent past, there will still be a significant demand for additional labour (to both support expansion of certain sectors and to replace retirees and other leavers from the labour market). On average our analysis suggests approximately 15,000 jobs are available in the NI economy in a given year even without any net increase in the total number of jobs (this is the net replacement demand figure). A labour market expanding at 5,000 net jobs per annum is consistent with the current education system outturns – assuming net migration is roughly in balance (down from recent trends) and employment rates roughly unchanged (again a change from the recent trend of rising employment rates).

- **Aspirational growth will require a 'step-up'**. Though there is no detailed sectoral 'roadmap' for the 'NI economy of tomorrow' aspired to in the Economic Vision and associated policy documents and plans (including the Programme for Government), there is acceptance that improved economic performance is central: PSA targets and Executive statements support this. To achieve improved growth would require uplift in skill levels across the workforce. This is both a demand issue (creating more high productivity jobs) and a supply issue (having the skills to fill these jobs and upskill existing workers). Setting out an indicative alternate economic growth trajectory which meets the published productivity policy goals suggests a need for higher qualification (NQF 4-8) concentrations in the workforce to rise from approximately 30 per cent to 50 per cent: an uplift across the skills ladder would be required.

- **Need for balanced supply**. Though driving faster growth would require a more skilled workforce the labour market will still require workers across the skills spectrum and not just at the graduate end. The model suggests annual requirements of roughly 3,500 for workers with low qualifications over the decade ahead (compared to almost 10,000 for persons with higher level qualifications).

- **Up-skilling the workforce matters**. In order to meet aspirational targets (and indeed even to support the projected baseline needs), a considerable uplift within the existing workforce skills profile would be required. Some of this occurs 'organically' as better skilled young people enter sectors and lesser skilled older workers depart, but nevertheless the research shows a significant requirement for upskilling the existing workforce to support economic growth. For example under the baseline scenario, 9,000 workers with low qualifications are required to upskill to a higher qualification, and consequently workers with intermediate qualifications are required to move up the skills ladder.

- **Graduate under-representation in certain sectors.** The research suggests that relative to UK averages and regional comparisons, NI has an under-representation of graduates in a number of sectors. These are primarily agriculture, manufacturing, construction, retailing, and hotels & catering. Elsewhere in professional services and public services graduate concentrations are at a comparable level to elsewhere. Note that the presence of graduates within a sector does not guarantee the full utilisation of skills. In addition much of the explanation of graduate concentrations may lie in the nature of the particular firms located in NI (in other words it could be a demand rather than a supply question).

- **Managerial and professional weakness**. The research suggests a significant managerial weakness in the occupational structure of the NI economy. Even accounting for sectoral mix, NI is some 50,000 managers and professionals short of what level would be expected if NI had the same sectoral managerial and professional concentrations as the UK average. This shortage is likely a function of the type of activities carried out in NI and the limited amount of higher end functions carried out in the region's firms.

- **Graduate subject diversity**. The research suggests that the pool of graduates within the workforce has a rather 'narrow' unspecialised subject focus, which otherwise are essential for developing an innovative, export-led economy. There is an over abundance of business and mass communications graduates and a notable under-representation of creative arts & design[21]/arts and STEM graduates (7,000 and 4,000 respectively). This may reflect demand as opposed to current supply (many may migrate out for work) but is nevertheless a notable facet of the NI economy.

- **Flexibility and adaptability**. The current economic circumstances and the limitation of the data (and a forecast based approach) suggest that skills policy requires an increased level of flexibility and adaptability. Though this can be difficult in planning courses and educational infrastructure, it is a necessary requirement in a fast moving global world. For example the importance of financial service skills in the decade ahead may be less than in the decade past or envisaged pre-credit crunch, whilst the importance of subjects related to environmental technologies may be greater. Thus revisiting and reappraising skills research such as this (and that carried out by the SSCs) will be important.

- **Changing dynamics of supply**. The forecasts presented in the research rely on assumptions drawn from the recent trends in the data. Consideration of changes in patterns over the future may be required. For example retention of older staff, or even returning retired staff due to weakening personal wealth circumstances (as pension values have been eroded), may change the magnitudes of outflows and inflows from these particular categories. This would have an implication on the skill demand and needs from the educational system (and equally have an implication on the adult training environment).

- **Increasing demand for STEM subjects**. As best as can be predicted, the base forecasts suggest that the growing sectors of the economy will require an increasing number of STEM qualified graduates and skilled labour.

- **Shortfalls could occur**. The analysis suggests that if a faster growth trajectory can be achieved - the aspirational scenario - there could be skill subject shortfalls emerging within the next decade (for example in some STEM, law and creative/arts subjects). This provides an important 'early warning' of future gaps which if unfilled would result in either lost economic growth or an increased dependence on imported labour.

[21]There is a recognised need for creative design disciplines to increasingly work with other sectors, such as engineering, to produce innovative solutions that lead to wealth creation.

- **Retain and return**. The challenge to maintain and improve the skills base suggests a need to attract back into the labour market well-qualified persons. This could be from outside the labour market, such as parents looking after children or the early retired; or from outside NI, including school leavers who previously left the region to study and continued to work elsewhere. Such a flow of skilled labour could help to address managerial and diversity of graduate subject weaknesses already identified. It is also important not to overlook the greater returns to individuals from skills gained at a personal level, even if they do not reside in the region - up-skilling is rarely wasted on the individual.

The conclusions above raise a number of policy questions and provide support for many of the existing skills programmes already in place. It is important to reflect on the level of job growth in the region over the last decade, and though the 'outturns' in productivity may not have been what might have been hoped for, NI's impressive employment record nevertheless provides some commendation of the skills outputs to date.

The worries at the lower skills end remain with the high proportion of the adult population, workforce, and most worryingly leavers from education having no formal qualifications and limited basic skills.

Looking forward the recession will require short term 'emergency supply-side measures', primarily to help leavers from the education system and those made redundant, especially as businesses are already adjusting quickly (some are operating a reduced number of days per week etc). However a strategic long-term plan must remain in order to capitalise on opportunities when the world emerges from the current economic malaise and to ensure that NI's skills offering remains internationally competitive.

The model developed in this project provides one useful evidence tool capable of re-visiting future skill needs when the economic picture becomes clearer and recovery begins to take shape (or does not). It can augment the qualitative and 'sector by sector' expertise within SSCs, DEL and elsewhere, and can help understand the quantum of skills required given the likely demand within the economy.

Perhaps the emergence of 'green jobs', the reshaping of the financial and professional services sector and a more developed tourist industry will alter the shape of the skills mix and a different aspirational path may emerge. The skills forecasting model will be a useful tool to address the alternate skills needs and we recommend its continued use in exploring alternate scenarios and looking ahead, alongside further consideration of the roadmap to deliver the 'better NI' to which policy aspires.

Copies of the full report "Forecasting Future Skill Needs in Northern Ireland" are available at: http://www.delni.gov.uk/forecastingfutureskills

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