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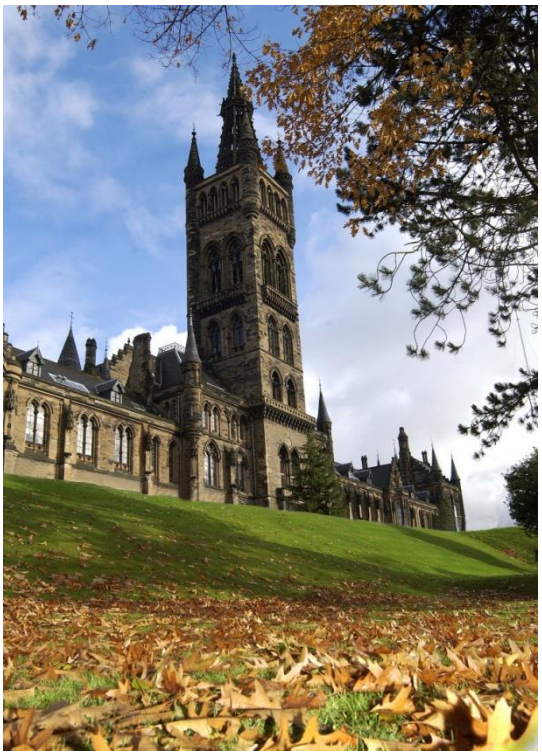

# SCOTLAND'S FUTURE SKIILLS NEEDS: FINAL REPORT


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## 1. Background and Brief

This study was commissioned by the Strategic Board's Analytical Unit to provide a concise evidence review to help guide the working group charged with delivering on the ***Meeting Future Skills Needs Mission.*** The Mission purpose is:
'*To consider whether there might be opportunities to accelerate inclusive growth in Scotland's productivity by considering the skills needs of Scotland's workforce with a particular focus on our understanding of current skills requirements and how these may change in future.'*

The work programme has been organised around 5 broad questions.

- How well are we currently meeting employer skill needs?
- How are employer skill needs likely to change in the future?
- What are we currently delivering in terms of skills investment?
- What productivity return are we getting on our skills investments?
- How should we measure improvements in the effectiveness of our skills investments as we move forward?

The key questions were worked out and agreed in consultation with the working group associated with the process.

The content of the report is based on:

- Responses to the questions coming from the Scottish Funding Council, Skills Development Scotland and Scottish Enterprise.
- A selective review of the literature on skills and productivity.

## 2. Starting Point

The Scottish Government's broad economic goal, as set out in Scotland's Economic Strategy, is ***inclusive growth***. In simple terms this is about achieving higher rates of growth ***and*** ensuring a more even distribution of the benefits of that growth. To achieve a higher rate of per capita growth, we need to deliver:

- Greater ***participation*** in employment – if more people are working growth is increased.
- Higher ***productivity*** – if each person employed becomes, on average, more productive growth is increased.

To the extent that both can be delivered simultaneously, a significant inclusive growth spurt can be achieved.

In theory, public sector skills investment can contribute to productivity enhancement in a number of ways. Some illustrations are provided below.

- Appropriate skills investments can increase the productivity of the individual employee in terms of both the volume and quality of product/service delivered, and so raise the competitiveness or effectiveness of their employers.
- Well directed skills investments can minimise the threat of skills shortages, again raising the competitive edge of employers by reducing constraints on output growth.
- Economies with well-qualified and skilled workforces are in good position to attract and retain businesses at the high-value end of the economy. This can involve foreign direct investment, but also investment in Scotland by businesses located in other regions of the UK.

- Where skills investments are inculcating key core skills and attributes, such as problems solving behaviours, these may encourage innovation in the workplace which in turn can enhance productivity.

## 3. Scotland's Skills and Productivity Performance

The Scottish Government's Purpose Target was to be in the top OECD quartile on ***productivity*** by 2017. In the latest Scottish Government update (February 2018):

- Scotland ranked top of the 3rd quartile.
- Scotland's productivity levels were only 75.7% of Netherlands – the lowest performer in the top quartile.
- The UK (inclusive of Scotland) is ranked 3 places above Scotland.
- Scotland's ranking has changed very little over a long period of time.

However, Scotland ranks highly in terms of ***qualifications***:

- A 2004 study (TERU, 2004) showed that Scotland was in the top quartile in terms of a number of qualifications indicators.
- Since then, Scotland has risen further up the top quartile, and is now 1st out of 36 OECD economies in relation to the tertiary qualifications indicator (Office of Chief Economist, 2016).

So Scotland has performed well in terms of qualifications, and our ranking has improved over time – but productivity levels remain stuck at the middle levels of international comparisons. Why is this? There are many potential explanations.

- Qualifications are only a ***proxy*** for skills. To the extent that these are a proxy, achieving the top performance in qualifications is not the same as being top of the league in relation to skills
- ***Skills are only one driver of productivity***. Other important factors include capital investment by business, investment in transport and other infrastructures (such as digital), product market competition and innovation. Scotland may have been performing well on skills, but going backwards on capital investment and innovation, say.
- Scotland's ***mix of skills/qualifications investments may be sub-optimal*** in relation to productivity enhancement at the economy level.
- Skills only add significant value where are they are being ***effectively utilised*** in the workplace, but survey evidence suggests high levels of under-utilisation.
- We may be ***over-investing in skills (qualifications) relative to the demand for skills,*** leading to too many people working in jobs below their qualification levels.
- If a high proportion of our skilled young people are ***leaving Scotland***, part of the productivity gain will accrue to other UK regions and countries.

This report has a much more limited scope than addressing all of these possibilities, but will touch on some of them

## 4. Current Position on Employer Demand for Skills

In this section of the report**,** we consider employer demand for skills and how well this is being met. This is not a straightforward exercise as the normal employer survey methods are relatively light touch.

**Demand for Skills, Broken Down By Broad Skills Levels**

- Oxford Economics (SDS, 2017) estimate that, in 2017, 43% are employed in jobs requiring higher level skills, 31% in jobs requiring intermediate skills and 26% jobs requiring lower skills.
- As the corresponding percentages in 2012 were 41%, 32% and 27%, there has been a modest shift towards higher skills over the period, a continuation of long-term trends.
- The figures are at odds with the so–called hollowing out of the labour market, but it is still the case that the UK, Germany and the USA have the highest percentage of low skilled jobs in the developed world (McGregor, 2017).

**Skills Shortage Vacancies and Skills Gaps in Workforces**

The 2017 Employer Skills Survey has been carried out, but the details are not publicly available. The most recent data come from the 2015 Survey.

- In terms of vacancies which were hard to fill due to ***skills shortages***:
  - 6% of ***establishments*** surveyed in 2015 reported skill shortage vacancies, compared to 3% in 2011.
  - 24% of ***vacancies*** were deemed hard to fill due to skill shortages ('skills shortage densities') in the 2015 survey, compared to 15% in 2011.

  This suggests a clear worsening of skills shortages over the 4 years.
- In terms of staff not fully proficient in their jobs (***skills gaps***):
  - 14% of establishments surveyed in 2015 reported skills gaps, but this was a decline from 21% in 2011.
  - 5% of staff were judged not fully proficient in 2015, compared to 5.2% in 2011.

  It is important to note that one of the explanations for skills gaps is simply staff who have only recently been recruited, and who are in the process of getting up to speed. Additionally, positive developments, such as bringing through new products and introducing new equipment, can lead to temporary skills gaps.

There is ***little difference between Scotland and the UK*** as a whole in terms of reported skills gaps and skills shortages.

Evidence then is mixed. The incidence of employers reporting skill shortages in relation to vacancies which were hard to fill doubled between 2011 and 2015 - but it remains low. The proportion reporting skills deficits within their workforces is much higher, but has declined over time.

**Skills Shortages and Gaps by Sector, Occupation, Skill Levels and Regions**

Considering ***skills shortage densities****,* in 2015 the highest densities were in:

- Electricity, gas and water; construction; transport and communications; education and manufacturing – with all these ***sectors*** reporting that 30% or more of their hard to fill vacancies were due to skill shortages.
- Skilled trades, machine operatives, professionals, and customer service – where all these ***occupations*** had skill shortage densities of 28% or more.
- Borders, Dumfries and Galloway, and West Lothian, where all these ***regions*** and skill shortage densities of 33% or more.

Looking at change over time, compared to 2013:

- In terms of ***sectors***, construction and education showed big increases in skill shortages.

- In terms of ***occupations***, there were sharp increases in skill shortages for machine operatives, associate professionals, sales and customer service, skilled trades, and caring and leisure.

Moving on to ***skills gaps***, focusing on the percentage of staff not fully proficient, in 2015:

- In relation to ***sectors***, skills gaps were greatest in manufacturing, hotels and restaurants, and wholesale and retail – all with the least 5% of staff lacking the necessary skill levels.
- In relation to ***occupations***, skill gaps were most marked for machine operatives, skilled trades and elementary occupations - all with at least 6% of staff lacking full proficiency.
- Across ***regions***, Forth Valley, Fife and Aberdeen City and Shire had the highest skill gaps - with all reporting at least 7% of staff less than fully proficient.

Compared to 2013:

- There was a significant increase in skill gaps in manufacturing.
- Skill gaps increases were reported for administration and clerical staff, skilled trades and machine operatives.

**Comparisons with Rest of UK**

The 2015 Employer Skills Survey provides some comparisons between Scotland and the other UK nations.

- Looking at the proportion of ***employers with skill shortage vacancies,*** in 2015 Scotland had the same figure (6%) as England and Wales. The changes since 2011 were also identical.
- Moving on to consider the percentage of all ***vacancies that were hard to fill due to skill shortages***, again figures (around 24%) are very similar for Scotland, England and Wales.
- Northern Ireland has significantly better statistics – both for 2015 and in relation to change over time.

In relation to ***skills gaps*** by UK nation:

- In 2015, the percentage of employers reporting skills gaps was identical at 14% for Scotland, England and Wales – but with Northern Ireland registering only 9%. However, Scotland should the greatest improvement since 2011.
- In terms of the percentage of employees not fully proficient, England and Scotland were both at 5% in 2015 compared to 4.5% for Wales and 3.3% for Northern Ireland. Wales and Northern Ireland showed substantial improvements over 2013 compared to Scotland – but Scotland outperformed England.

***In broad terms, Scotland is on a par with most of the rest of the UK in terms of skills shortage and skills gap indicators.***

**Reflection on Skill Shortage Information**

On the basis of reviewing the analysis in the employer skills survey, but also other material around labour shortages, there appears to be no clear position on the major occupational skill shortages facing Scotland now. The survey evidence is quite general and provides limited detail around occupations. There are a number of *ad hoc* surveys around digital skills issues, for example. Construction Skills publishes regular report on shortages in the construction industry. SDS conducts background research and employer consultations in the preparation of sector Skills Investment

Plans, and provides both a national review of Scotland's labour market as well as skills assessments for Scotland's regions. These give excellent general guidance on skills demand and supply. ***What is needed, however, is some mechanism to identify the major specific occupational skill shortages, in Scotland currently, which impact most severely on Scottish productivity and inclusive growth. Scottish Government and its agencies can then organise a more targeted, co-ordinated and coherent skills supply response.*** The evidence from sources such as the Employer Skills Survey is insufficiently robust and detailed to give confidence to skills agencies investing public money in attempt to prevent or mitigate skills shortages.

**Impact of Skills on Productivity and Growth**

***Employer Skills Surveys***

None of the survey evidence on skills shortages has been translated into estimated impacts on Scottish productivity and growth.

- The evidence from the Employer Skills Survey suggests that only around 1 in 20 employers were having to deal with a skill shortage vacancy at the time of the interview. In a complex labour market, with less than perfect information to guide employers looking for employees, and vice versa, this might be a reasonable result. However, if we imagine the survey being carried out at various points over a 12 month period, the proportion of employers having to deal, at some point during the course of a year, with hard to fill vacancies due to skill shortages could rise quite significantly.
- For those impacted, the ability to recruit key personnel can be extremely damaging for their organisation – and indeed for those buying their products and/or in receipt of their services. The latter impacts are very clear in the NHS with seemingly intractable shortages of GPs, consultants, radiographers, etc. leading to patient concerns at least, and major health complications at worst.
- However, a survey format with a short (average time of 23 minutes) questionnaire makes it extremely difficult to quantify impacts upon the output of the organisations surveyed in order to measure changes to productivity.

***It is reasonable to ask questions about the value of the Survey, or at least to consider reviewing its objectives in relation to the management and planning of the skills system.***

***Impacts on Foreign Direct Investment***

Foreign direct investment (FDI) is important for both growing the jobs base and improving its quality**.** Access to a highly skilled workforce is a potentially significant component of Scotland's offer to foreign direct investors. In the 2017 survey Scottish Development International (SDI) carried out with inward investors, the availability of skills was cited as a key factor by many in the decision to locate in Scotland. For 37% of the 12 of the 51 respondents to the survey, the skills base was the main reason for coming to Scotland.

***Possible Consequences of Skills Under-Utilisation***

The UK Commission for Employment and Skills (UKCES**)** carried out a great deal of work on the notion of skills under-utilisation. As the UK performed reasonably well against international comparators on qualifications – and by assumption on skills investment – is the poor performance in terms of productivity a result of a failure to utilise skills as effectively as many other economies?

OECD (2012) focus on the consequences of skills under-utilisation due to skills mismatches and point to the negative consequences for the workers concerned who may feel stress because they lack the necessary skills, or frustration as they are unable to deploy their skills in their jobs. Recent research by Scottish Enterprise (2016) conclude that:

- That the mismatch in Scotland between skills demand and supply is growing – and this is likely to cause an increase in skill shortages, skills gaps and skills under-utilisation.
- Anywhere between 12% and 15% of employers are likely to suffer negative impacts as a consequence.
- A combination of improved ***management and leadership skills***, along with the greater use of high-performance workplace practices, can help reduce skills gaps and skills underutilisation.

The 2015 employer skills survey prepared by UKCES (UKCES, 2018) devoted a chapter to skills under-utilisation in the workplace. They defined this as a combination of situations where employees had ***qualifications*** more advanced than required by the role, but also ***skills*** at a higher level than needed.

- 39% of UK employers reported qualifications under-utilisation, versus 30% skills underutilisation.
- When the two measures are combined, 32% of Scottish employers reported under-utilisation, relative to 28% in Northern Ireland and 30% in England – and 34% of Welsh employers.

However, there many factors behind skills under-utilisation, including personal choices of employees and poor management practices. This phenomenon cannot be attributed simply to mismatches in skills demand and supply.

The Annual Population Survey captures one specific issue which may impact on skills/qualifications under-utilisation, namely information on graduates working in ***non-graduate roles.***

- For Scotland in 2016, 51.8% of recent graduates (those leaving full-time education within the previous 5 years) were in non-graduate roles compared to 46.4% for the UK as a whole. The corresponding figures for 2011 were 53.8% and 47.4%. The improvement over the 5 years is probably to do with the recovery from the recession.
- Turning to non-recent graduates, for 2016 figure for Scotland was 40.8% working in non-graduate roles compared to 35.1% for the UK as a whole. The corresponding figures for 2011 were 39.8% and 32.6%.

Although these figures will include graduates from outside of Scotland working in the Scottish economy, they suggest a high level of underutilisation of graduates – not simply confined to graduates struggling to find their first job after graduating.

There is some challenge to the figures generated by the Annual Population Survey around the definition of higher education courses – and consequently the meaning of the term ‘graduate’. On the other hand, the 2015/16 survey carried out by the Higher Education Statistics Agency (HESA) reported that 28% of full-time, first degree leavers from Scottish HE providers entering employment in the UK go into a ‘non-professional’ job.

***Given the importance of this issue for guiding potential entrants to higher education, and indeed for the economy more generally, some work needs to be done to establish clarity on what the true position is on the incidence of graduates in non-graduate jobs in Scotland.***

***Skills and Productivity in Low Wage Sectors***
There is a tendency in Scottish and UK policy to equate the pursuit of higher productivity with higher earning jobs and higher level qualifications. Recent work sponsored by the Joseph Rowntree Foundation (JRF) is focused on productivity and pay in low-wage sectors. It finds that Dutch, French and German workers in low-wage sectors produce as much in 4 days as British workers do in 5. Increasing the productivity of British workers to Dutch, French and German levels could impact significantly on their earnings.

As part of the JRF research programme, a statistical analysis (Forth and Rincon-Aznar, 2018) compared the different economies and controlled for the impact of differences in capital investment and labour quality. They find that investment in capital and in people does not explain the variations in productivity. They attributed the difference to the efficiency of production processes, and isolate 4 key influences:

- Better management practices, including the greater use of performance–related pay.
- A higher proportion of workers receiving on-the-job training.
- A lower share of temporary workers.
- A higher percentage of workers using ICT.

There are 2 important skills messages in this list.

***In formulating a plan to change the way we do skills in Scotland in order to enhance productivity, there may be value in looking at what can be done for different broad sectors of the economy – and start by treating the low pay/low productivity sectors as a group. Some of these sectors – such as Care – will grow and, if labour supply is tight as it almost certainly will be, we need to capture the potential productivity uplift. Additionally, if we can grow Care earnings through enhanced productivity, we will create and retain an effective workforce, and secure a significant inclusion dividend at the same time.***

## 5. Scotland's Future Skills Demand and Supply

**Statistical Projections**
Statistical projections for employment are in common use throughout the UK. The limitations of these approaches are well known, and there are great dangers in using these at the disaggregated geographical scale, as in some instances this comes close to projecting the future of a small number of major employers rather than the local economy. Projections are particularly fragile at times of great uncertainty in terms of the global economy, or major regional economies within this. Currently there are major issues with China's debt burden, a potential major trade war – and of course BREXIT. Additionally, the nature of employment is set to change radically – and perhaps rapidly, although this is less certain – due to the impact of digitalisation.

Nonetheless, robustly conducted statistical projections can help guide us in terms of skills and labour market planning. The headline figures on employment projections for Scotland are captured below. By 2028, Oxford Economics project a ***net growth*** of 84,000 jobs, at an annual growth rate of 0.3%. Within this:

- Strong ***sectoral*** growth is projected for Administrative and Support Services; Professional, Scientific and Technical Activities; and Construction.
- Manufacturing is projected to decline by 25,000 jobs, with another 16,000 are expected to go in Public Administration and Defence.
- Some ***occupations*** are expected to show significant growth – business and public service professionals; associate professionals; skilled construction and

building trades; elementary clerical and service occupations; corporate managers; and caring and personal service occupations.
- Occupational decline is anticipated in relation to skilled metal and electrical trades; administrative occupations and process; plant and machine operatives.
- In terms of more aggregated skill levels, growth is anticipated for higher-level skills – but their share rises only from 43.1% to 43.8% of total employment. This is balanced by projected modest declines in both intermediate and lower level skills, where the expectation is that the percentages in 2028 will be 30.5% and 25.7%
- The highest rate of jobs growth is anticipated in the cities of Edinburgh and Glasgow. The net job growth for the two cities combined is close to 68,000 jobs, over 80% of the jobs growth for Scotland as a whole.

The expected net growth in jobs is, however, extremely modest compared to the number of job openings projected for the next 10 years as a result of people moving jobs, leaving Scotland, retiring from the labour market, or leaving employment for other reasons. This ***replacement demand*** is projected to amount to 900,000 job openings. Within this:

- The largest demand is projected for elementary clerical and service occupations, with 150,000 job openings. Sales occupations account for a further 102,000.
- In terms of occupations requiring higher qualification levels, projections are for 96,000 job openings for teaching and research professionals, and 67,000 for science and technology professionals.
- The occupational analysis by Oxford Economics bring out very different projections for intermediate skills (23%) and low-level skills (33%) compared to the sectoral analysis discussed above – but there is no explanation for these ***substantial*** variances.

***Given the scale of the replacement demand, it would be valuable to break this down into its major components – retired from the workforce, moved occupation and/or sector, migrated from Scotland, etc.***

An analysis of the required qualifications associated with the net growth in employment and replacement demand combined, carried out by Oxford Economics in 2017 (SDS, 2017), shows the importance of qualifications from HNC upwards. The qualifications requirement for job openings, over the course of the decade to 2027, was estimated as follows:

- SCQF 11-12: Doctoral or postgraduate 6%
- SCQF 7-10: HNC to Honours degree 46%
- SCQF 6: Higher level 13%
- SCQF 5: National 5 22%
- SCQF 1-4: National 1 to 4 4%
- No qualifications 8%

In essence, if these projections prove to be correct, over 50% of the job openings will require qualifications at the higher education level.

**Potential Skills Implications of Major Events and Trends**

The problem confronting the consultants producing statistical projections, as well as policy analysts and those responsible for making significant skills investments, is uncertainty about the future. We are currently living through times which are particularly uncertain relative to past periods.

***BREXIT***

Although the implications will be massively dependent on the precise nature of BREXIT, there is a very high degree of consensus (McGregor, 2017) on the likely impact on ***employment levels*****,** at least in the short to medium term. These are likely to be lower than what would otherwise have been the case for 3 principal reasons:

- UK output and employment will fall due to reductions in exports associated with the disruption in trading arrangements with European Union, and potentially many other countries with which the EU has trade agreements.
- Some existing UK employment is likely to be moved to the continent in order to retain the benefits of access to the European marketplace, and to key suppliers.
- Foreign direct investment is likely to be lower than would otherwise have been the case, given that setting up in the UK no longer secures access to the EU marketplace.

Although there have been a number of studies trying to identify which sectors will be most severely impacted, their findings are heavily dependent on the precise nature of BREXIT, the alternative trade arrangements put in place by the UK and the speed with which these can be implemented. Given how close we are to decisions on specific nature of BREXIT it seems fruitless to speculate at this level of detail.

A second issue which has received considerable attention has been ***labour supply*** implications. Again the precise impacts will be dependent on the nature of the BREXIT deal. There have already been some changes in migration volumes, partly due to the fall in the value of sterling reducing the real value of remittances, rising relative earnings in the Eastern European countries and no doubt uncertainty about the future for migrant workers from continental Europe. However, although the volume of continental European immigration has declined and return migration increased, in the last full year for which data are available, there has nonetheless been an excess of immigration relative to return migration of around 90,000 at the UK level.

A study looking at the potential impacts of BREXIT in the UK labour market (McGregor, 2017) identified the 10 specific sectors and occupations most dependent on migration from continental Europe. In virtually all instances the sectors and occupations were characterised by low pay, and by implication low skill requirements Whereas the picture may be different to some degree in Scotland, this finding suggests that, in the short run at least, the major impact is more likely to be on the supply people than on the supply of skills. The will of course also be threats to the supply of highly skilled labour in relation to the NHS, the universities, etc. Additionally, if employment growth declines as predicted, with potentially even a reduction in employment levels, a reduction in EU migrant labour could militate against a rise in unemployment.

***Digitalisation***

Digitalisation is already changing face of the economy and labour market across the developed world. Digitalisation will destroy jobs – but also create many jobs and change the nature of many more jobs. In the digital technologies industry, productivity is extremely high – three times the Scottish average. In addition, digitalisation will raise the productivity of many of our existing industries.

The danger is that Scotland fails to capture the productivity benefits of digitalisation due to the lack of digital skills (Scottish Enterprise, 2018). There are already concerns that the output of university and college graduates, apprentices, and others in digitally relevant courses and training is not keeping pace with the growth in demand (ScotlandIS, 2018). SDS has identified key skill challenges across sectors, stemming from the fact that growth in demand for digital skills is effectively a given, which include:

- Recruiting and people with the right skills who are STEM proficient.
- Keeping up with the pace of change in technical competences, including software, content development and coding.

Projections around the impacts of digitalisation and the implications for skills are fraught with difficulty, however. The leading academics in this field (Frey and Osborne, 2013) make very detailed assessments of the occupations most at risk of radical change, but are very careful not to put a timescale on the process. The more popular literature, on the other hand, is not so timid in its projections. Governments investing in digital skills have a difficult balancing act to pull off.

Putting to one side more detailed statistical projections, there are some consistent themes emerging from the literature:

- Digital technologies will influence most forms of work and most workplaces, and more jobs, or tasks within jobs, will be done by machines.
- Digital technologies will increasingly find new ways of connecting and collaborating on the global business stage, opening up many new market opportunities.
- The information landscape will become increasingly complex over time, putting a premium on skills and systems that are able quickly to interpret and exploit what is out there.
- As the role of machines grows, workers will become more focused on tasks such as working with and supporting others, and using creativity and drive to deal with complex issues.

However, Scotland needs to resolve a key issue if it is to ensure the supply of digitally skilled labour to the quality and in the volume likely to be required. Currently, ***digitally skilled employment as heavily gendered***, with only around 20% of females involved. Some statistics from the school and college systems show the challenge (Digital Scotland/ Ekosgen, 2017)

In terms of ***schools***:

- In 2016, only 18% of entries for computing qualifications for the National 5 examinations were girls – and this had fallen from 24% in 2014.
- At the Higher level, only 17% of entries were girls – down from 20% in 2014.
- At the Advanced Higher level, only 14% of entries were girls, a figure which has remained static over time.

Moving on to ***colleges***:

- Only 25% of girls were enrolled for qualifications relating to computing and ICT.
- This falls to 15% based on ‘credits’, meaning girls are doing less intensive courses on average.

***Demographic Challenge***

As is well known, Scotland and many other developed economies are experiencing demographic changes which will reduce the share of the working age population

relative to the population as a whole. It is not clear that this will pose significant skills issues *per se*, as the proportion with qualifications is higher in the younger age bands relative to the 50+ age group. However, as noted earlier, it would be helpful to disaggregate the 900,000 job openings that are projected over the next decade as a result replacement demand. This analysis could underpin a more in-depth review of demographic change and its potential skills impacts on skill supply.

**Future Employment and Skills Scenarios**

One of the U.K.'s growth industries is 'future gazing', with an extraordinary volume of reports produced by range of consultants over the last few years. These studies do draw in data covering relevant trends, but most often the key outputs result from consultations with gatherings of international experts. A comprehensive review of this work is well beyond the scope of this study. Two illustrative examples are sketched below

***Meta Skills***

SDS and Centre for Work Based Learning are leading work to identify and describe the meta skills that will create resilient workers who can perform highly in today's employment - but also in tomorrow's labour market whatever it might look like (SDS, 2018). Meta skills have been identified under 3 main headings:

- Self-management.
- Social intelligence.
- Innovation

Each of these broad headings is then broken down into specific skills components – for example, in relation to self-management the key components are focusing, adapting and initiative.

The report also recognises that in tomorrow's labour market there will remain a need for:

- Core technical skills.
- Literacy and numeracy
- Digital intelligence, but much enhanced beyond current levels

The key challenge, however, to ***develop*** new meta skills – and the core competencies which are currently required in workforces.

***NESTA***

NESTA is well respected organisation whose central focus is on innovation. Their analysis (NESTA, 2017) generate some conclusions on changes in the nature of demand in terms of sectors and occupations. They have also devised techniques for surfacing 'hypothetical occupations'.

Their more grounded contribution is in relation to skill sets which will become much more important in the future. They argue that the demand for skills will change, with a stronger emphasis on:

- Interpersonal skills, such as social perceptiveness and coordination, and negotiation skills.
- Higher–order cognitive skills, such as originality, fluency of ideas and active learning.
- Systems skills, such as judgement and decision-making, systems analysis and evaluation.

As with the work on meta skills by SDS and the Centre for Work Based Learning, the significant challenge is how to create these skills.

***It is likely that these skills will need to be developed in the earlier years of a person's life, and will need significant investment in re-designing approaches to learning at the pre-school and school stages. It will be difficult and expensive for the post-school education and skills system to carry out the necessary remedial work.*** We know from Heckman's major contribution to this general field that the rate of return to public investment in education and skills falls as we move through the age groups – the Heckman Curve.

**Building Responsive Skills System to Deal with Unanticipated Developments**

Moving on statistical projections and scenario building around future skills demand, a key complementary approach is to ***build greater resilience and responsiveness into Scotland's skills system***. There are a number of potential elements to this.

- Creating a much ***greater understanding of current skills supply and demand***, with a much speedier and more robust approach to reducing or closing down skills supply which is clearly not meeting a need - and conversely when graduates from the skills system are flying off the shelf into occupational areas for which they have been prepared.
- Enhancing significantly ***systems for following up on learner labour market outcomes*** on completion of their education/training. Robust systems are required to underpin robust actions.
- Engineering ***much speedier adjustments to skills provision*** in order to respond to the situations described above will require an approach to funding which sets aside sufficient resource that can be deployed more in a responsive and less in a planned mode. Better to hold some money aside than to keep spending money on skill development which is not needed.

This is a sketch of what we might do – but there are many potential ways to create a skills system which responds more quickly and effectively to changing patterns of demand. There is also the potential tie in here to broader developments around learner journeys, in terms of shortening and simplifying these where it makes sense.

***Finally, building a more resilient and responsive skills system is not just about meeting employer and economy needs. Training too many young people in skill areas where the demand is simply not there is bad for them, and bad for the reputation of our skills system and the organisations within it.***

## 6. Scotland's Current Investment in Skills

**Public Funding**

This section attempts to make a concise statement on how much public sector funding is currently going into the major skills efforts around apprenticeships, college and university education. Based on apprenticeship funding for 2016/17, and on college and university funding for 2018/19, the figures are as follows:

- £80 million on apprenticeships.
- £594 million on college students.
- £737 million on university students.

These figures include the substantial learner support investment in the college sector, but exclude capital spend on colleges and universities, and strip out the research and innovation funding going to universities. Additionally, Scottish Enterprise invests around £4 million annually in skills initiatives.

The total enrolments in apprenticeships, and in colleges and universities in terms of publicly funded FTEs, are set out below for 2017/18:

- 28,700 apprentices.
- 119,200 college students.
- 127,400 university students.

An important and distinctive feature of the Scottish system is the high proportion of college students pursuing higher education courses – and these account for nearly 36,000 of the enrolled college student FTEs in 2017/18.

Although the college numbers are relatively flat in the period since 2013/14, the number of apprentices enrolled has increased by 13% and the number of publicly funded university students by 2%.

An attempt has been made to assess the destinations of those leaving the publicly funded skills provision, but this has proved difficult because of different approaches to measurement. College Leaver Destination statistics are published by SFC, but as the principal destination is another course – mainly in the same college – these statistics are not comparable with the equivalent statistics for universities. Nearly 79% of college students pursuing FE courses 'leave' to go to further study. Additionally, as apprenticeships are jobs, there would be an expectation that a high percentage of apprentices on completion would be in employment. On the other hand, because apprenticeships are jobs, apprentices are risk of redundancy in the normal fashion.

The Strategic Board, with its joint remit in relation to enterprise and skills, should ***consider developing a simple framework to measure, on a common basis, short and medium-term destinations for those completing apprenticeships, college and university provision. This could also then form part of a measurement framework for estimating the productivity impacts of these different types of skills provision.***

Finally, in terms of full-time UK domiciled students from higher education providers in Scotland, 88% of leavers entered employment within Scotland in 2015/16.

**Employer Investment in Workforce Development**

It has long been understood that employers are responsible for making a substantial investment in skills through the development of their workforces. This exacts a cost on employers, generally made up of the following elements:

- ***Direct costs*** such as the development of training facilities, the employment of training staff and/or the buying in of training services.
- ***Indirect costs***, principally the loss of output when employees are being trained. One central aspect of this is the time cost of on-the-job training which is often delivered informally through more experienced employees passing on knowledge and expertise to less experienced ones.

The measurement of these indirect costs is extremely difficult – but these costs are very real and employers are very conscious of them.

There have been many studies that suggest that UK employers are under-investing in workforce development relative to employers in competitive economies. A recent study (CIPD, 2017) shows that:

- UK employer investment in employee training is well below half the average for EU economies, and is only a quarter of what French employers spend.

- Whereas UK employers spend has declined over time, it has risen across the EU.

At various times, government agencies across the UK have tried to stimulate employer investment in their workforces through a variety of devices. In Scotland:

- The apprenticeship system involves co-funding with employers, where the government provides funding to offset part of the training costs of the apprentice.
- Using UK Apprenticeship Levy monies, the Scottish government has made available £10 million per annum to Scotland's colleges to generate additional workforce development provision for employers. This is being evaluated, and it will be crucial to establish the extent to which the Workforce Development Fund has been successful in stimulating increased employer investment in their workforces, and increased productivity in their productivity workforces.

There have been many attempts to explain the poor performance of UK employers in relation to workforce skills investment (Keep, 2006; Stone, 2010; Stone, 2012; BIS, 2013). However, in a period where there is great pressure on public expenditure, a renewed effort is needed to identify and implement effective mechanisms for securing a higher level of employer investment in skills development. This is an area that crosses over to the enterprise agenda, insofar as competitively skilled workforces are likely to create and sustain internationally competitive businesses. ***The Strategic Board may wish to consider instituting a review and appraisal of options in this area. These options should include deploying the leverage of public sector procurement to encourage SMEs, in particular, to do more in terms of the up-skilling and accreditation of their workforces.***

## 7. Return on Scotland's Skills Investment

The focus of the Mission is on how to secure a greater productivity enhancement from Scotland's skills investments. The major skills investments made by the public sector – outside investments in workforce development within the public sector – involve:

- The apprenticeship program.
- Further education delivered through the colleges.
- Higher education delivered partly through the colleges, but principally the universities.

As we noted earlier, these involve considerable sums of public money. Given this, it is important to be able to demonstrate the return in terms of the social and economic impacts of these investments. This is required to demonstrate that skills should continue to receive a high level of investment relative to competing priorities such as infrastructure, housing, health, education, etc.

However, in relation to the Future Skills Needs Mission, it is important to know the rates of return to the different elements of skills investment described above in relation to their ***impacts on productivity***. It would be a remarkable coincidence if the rates of return are more or less the same, as the levels of investment have been driven by different policies at different points in time. If they are not the same, then there is a case to be made for redistributing some resource from the skills investments yielding lower returns towards those with higher returns.

Given the potential to extract more productivity value from the skills budgets by appropriate reallocation of resources across the main budget headings, the Strategic Board should consider the potential value of a framework for estimating rates of return which :

- Captures impacts on productivity enhancement, as well as other key national outcomes such as increased labour market participation and greater inclusivity.
- Measures returns for individuals, employers and the economy as a whole.
- Applies on a consistent basis across apprenticeships, further and higher education.

The last of these 3 principles is particularly important for obvious reasons.

SDS has already embarked upon the development of such a framework to capture the rates of return to investment in apprenticeships. This followed a recommendation to the Scottish Government contained in an Audit Scotland review. The ***Apprenticeship Long Term Outcome (ALTO)*** framework has been developed in collaboration with experts from the OECD.

There is a ***cautionary note*** that needs to be added, however. Rate of return analysis is complex. To attempt to capture the impacts on productivity, and the economy more generally, statistical modelling will be required. The assumptions underlying the modelling will be critical – and criticised! Finally, there is a danger the results – particularly in terms of contribution to Scottish GVA – will fail to pass the '*We simply don't believe this'* test. This means that, should the Strategic Board go down the rate of return route, it needs to take time to consider and test robustly some alternative models.

## 8. Measuring Progress on Increasing Productivity Impact of Skills investment

The intention was to provide a list of potential key indicators that would demonstrate whether or not Scotland's skills system is achieving a greater impact on productivity as we move forward. This has not been attempted for the simple reason that it has emerged in the course of the work that the Scottish Government and its agencies have yet to develop ***logic chains*** that trace the pathways from different types of skills investment through to productivity, via number of specified outputs and intermediate outcomes. ***An early action for the Strategic Board could be to request the development of these logic chains, with a view to then identifying a set of key indicators that can be used to assess the extent to which changes to the skills system are impacting significantly on productivity in Scotland.***

When key indicators are identified, it may make sense to try to ***benchmark*** the Scottish values against other comparator economies. This was tried nearly 20 years ago following the launch of *A Smart Successful Scotland,* with an annual series of reports on progress towards the desired outcomes. Currently, SDS are working with ETH Zurich to assess the potential for measuring how well Scotland's labour market and skills systems works for young people, benchmarked against data for 178 other countries. The benchmarking is based on 12 key indicators, organised under the headings of Activity State, Working Conditions, Education and Transitions Smoothness.

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