The Sector Skills Council for
Chemicals, Nuclear, Oil and Gas,
Petroleum and Polymers

A Gap Analysis for the
Chemical Industry

An investigation into gaps in provision based on current and predicted future skills needs.

May 2006

Innovation — Competence — Productivity — Sustainability

Improving *business performance through* ***skills*** *development*

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Contents

1. Introduction - the current picture of the Chemical Industry in the U.K.

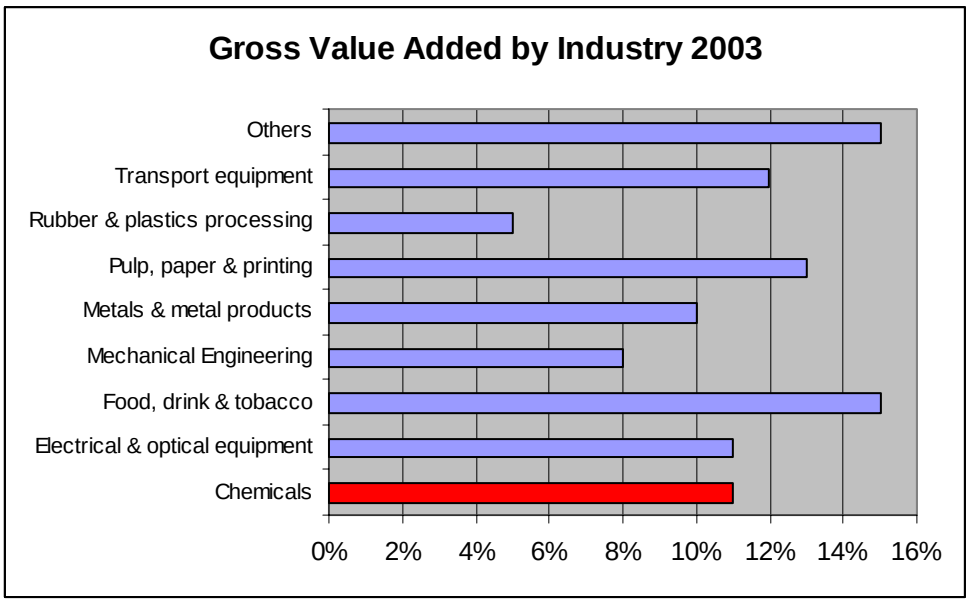
A great deal of research has been carried out, looking to the future of the Chemicals industry in the UK. At a national level, the DTI-sponsored Chemicals Innovation and Growth Team reported in 2002/03, followed by an expanded report from the Skills Network group of the Chemistry Leadership Council titled "Skills for the 21st Century Chemicals Industry" in 2004. At a regional level, the industry has major clusters in both the North East and the North West of England. Regional perspectives have been investigated via One North East (the Regional Development Agency for the North East) and the North East Chemistry Leadership Council, and via NWDA (the RDA or the North West) and the North West Chemicals Initiative.

Rather than reopen a new debate on the future industry shape and direction, these reports have been used as the basis for consultation and development of future scenarios to inform this document, the Sector Skills Agreement Stage 3 Gap Analysis.

1.1 The Industry in the UK

The UK chemical industry is a major contributor to the UK economy, as shown in Figure 1. It is the sixth largest in the world, and has reported productivity levels in line with European competitors. It exports 75% of production, with 75% of domestic demand being served through imports. Total employment in the sector has fallen from 274,000 in 1998 to 227,000 in 2004, a decline of 17%. The number of actual employers has fallen by only 8%. Over the same timeframe, turnover has increased by 12%.

Figure 1: Gross Value Added for Chemicals Industry, compared to other Manufacturing Industries



Source: ONS

The industry consists of several sub-sectors, some of which are not within the Cogent footprint, however for completeness they have all been included when a whole industry picture is shown.

Future scenarios point to a continuation of the current trend away from bulk chemicals manufacture, towards higher added value, or speciality chemicals – that is, those sold on quality and effect. This will drive a need to investment in research and development, in order to maintain a competitive edge. The UK is already considered to lag behind the rest of the world in this respect, although when compared to other industries, it compares favourably (7th versus a global position of 8th, but with percentage spend in 2004 of 3.5%, compared to 5.1% in the global picture). For pharmaceuticals, the UK has a dominant position, with R&SD expenditure far exceeding the global picture – this is reflected in its position at number 1 in the UK "charts".

Figure 2: Top 10 UK sectors by R&D expenditure, compared to Global 10 sectors

UK Sector	% U.K 750 R&D	Concentration % Sector R&D for Top 2 Companies	Global 1000	
			Sector Rank	% Global 1000 R&D
1. Pharmaceuticals and Biotechnology	39.6% (39.3%)*	71%	3	18.1%
2. Aerospace and Defence	12.3% (11.9%)	70%	7	3.8%
3. Automobiles and Parts	7.7% (6.9%)	76%	1	18.9%
4. Food Producers	5.5% (5.5%)	86%	-	1.0%
5. Software and Computer Services	5.2% (4.5%)	19%	5	6.4%
6. IT Hardware	4.8% (5.7%)	37%	2	18.6%
7. Chemicals	3.5% (3.4%)	42%	6	5.1%
8. Oil and Gas	3.4% (3.5%)	34%	4	11.3%
9. Electronic and Electrical	3.4% (3.5%)	97%	9	2.1%
10. Telecommunication Services ** Engineering ** Health	2.9% (3.1%) 2.7% (2.7%) 1.9% (2.0%)	97% 18% 76%	9 8 10	2.1% 2.9% 2.0%

* The figure in brackets is the proportion of UK 700 R&D in the 2004 Scoreboard.
** These sectors are in the global top 10 but **not** in the UK 750 top 10.

Source: DTI: The 2005 R&D Scoreboard

The actual geography of the industry shows little sign of change, with significant presence in locations in the North East and North West of England; according to the regional cluster organisations[1,2], the industry accounts for 35,000 and 44,000 direct jobs respectively, which at 2003 employment levels, is just over 33% of the UK total. Much of this activity has its roots in the activities of ICI and its forerunners, who were active in these regions as far back as the 1700s[3]. Updated information from the CIA[4] shows the North West employment figures at just over 47,000, reflecting a relatively stable, or even growing industry.

[1]North East Chemicals Strategy, Arthur D Little, 2004
[2]NWCI Skills and Resource Report, NWCI 2002,
[3]North East Chemicals Strategy, Arthur D Little, 2004
[4]"Facts and Figures UK Chemical Industry", CIA, 2006

In Scotland, the industry employs over 13,000 people. It accounts for 8% of gross value added for manufacturing as a whole in Scotland. Average gross value added per employee is around 50% higher than that found in manufacturing as a whole. It is amongst Scotland's top four export sectors and currently represents around 9% of total Scottish manufactured export market share[5]. The industry is mainly clustered in the central belt.

Overall, the industry average annual growth rate between 1994 and 2004 was recorded as 2.9%, ranking it one of the highest in the UK, and in line with the average growth rate in GDP. When compared to productivity trends in the rest of Europe, the industry is ranked third, behind France and Belgium. Unlike many others in Europe, the UK-based industry has maintained a relatively stable upward growth trend over the last 10 years.

1.2 Employment Trends

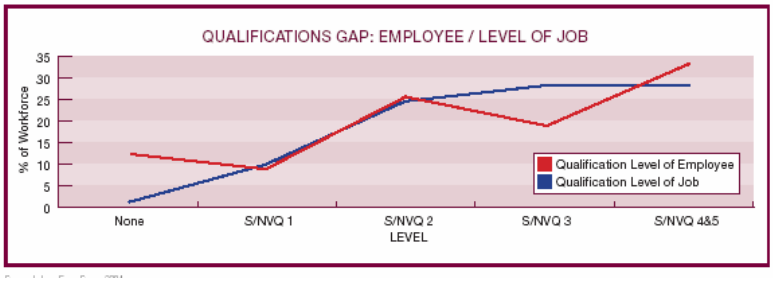
Whilst employment numbers in some areas are in decline, others have remained stable or have expanded. When compared to output based on turnover and gross value added, the changing shape of the industry and productivity levels become more apparent:

Industry area	Employment levels 1999 - 2004	Turnover 1999 - 2004	GVA 1999 - 2004
Manufacture of basic chemicals	-21%	+12%	+8.1%
Manufacture of pharmaceuticals, medicinal chemicals and botanical products	+4.2%	+29.5%	+23.8%
Manufacture of soap, detergents, cleaning products, perfumes etc.	-20%	+0.4%	-0.7%
Manufacture of pesticides etc.	-33%	-23.4%	-6.3%
Manufacture of paints etc*	-30%	-0.8%	+7.5%

Source: ABI
* Proskills footprint

Trends in industry wide employment numbers are expected to decline slowly, as an extension to the current pattern of approximately 3% per annum. The numbers in each occupational category, will, however change. This reflects the move towards a higher proportion of manufacturers being engaged in production of higher added value products. This area of production already accounts for 60% of the UK-based industry, compared to 40% in Germany and 44% in the USA.

Evidence derived from the NWCI Skills and Resource Report points to a move away from middle-management posts, leading to a more empowered, and higher skilled operational and technical workforce. This is reflected in the trends reported in the North East. In effect, organisations are becoming leaner,



[5]Chemical Industries Association data, 2005

with flatter management structures. This trend however, does not maintain momentum when skills and qualifications are considered.

Currently, a significant number of chemicals industry employees are skilled at levels 1 and 2, rather than the optimum level 3. Continuation of movement towards level 3 operations technical posts and away from operators at level 2 highlights a growing need for training and education at levels 3 and above.

Due to the flattening of structures, elements of process flow management have now been assigned to job roles the traditionally have had supporting and controlling mechanisms, in the form of line management or specialist technical support. The skills gap at levels 2 and 3 is already in existence, and will continue to grow at an accelerated rate when account is taken of the emerging shift in need, unless action is taken.

The number of employees affected consists of one of the largest groupings in the Cogent footprint, with approximately 30% of chemicals industry process and maintenance employees in roles at levels 1 to 3 (administrative support and customer services functions account for a further 10%).

2. Skills Need of the industry - current and future

2.1 Entry to the industry

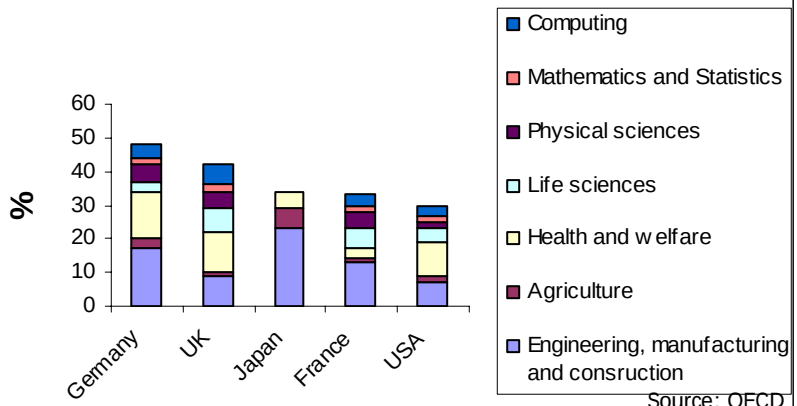
2.1.1 Undergraduate and Postgraduate Education

Graduate entry to the industry can be in a variety of disciplines, from Analytical Chemists to Mechanical Engineers – the subjects of most relevance tend to be included in SET group, that is, Science, Engineering and Technology. When looked at as an overall group, the facts relating to individual subjects can be masked. For that reason, the picture related to study and achievement in Chemistry, and that related to Engineering and Technology (which covers subjects such as Manufacturing Technology and Materials Technology) are discussed separately as well as part of the larger grouping.

When compared to the countries most often quoted when discussing productivity, GVA, GDP, etc, the UK lags behind in student numbers in Science, Engineering and Technology related subjects, as shown in Figure 3. Only 40% - falling to 28% if Health and welfare category is removed – of new first degrees are in SET subjects, compared to 47% (33%) in Germany.

However, the numbers for Life Sciences are proportionally higher in the UK. Evidence from employers shows that they have difficulty in recruiting scientists, with the smaller companies having greatest difficulty.

Figure 3: Science, Engineering and Technology Degrees (as proportion of all first degrees) 2003



Source: OECD

2.1.1.1 Chemistry

At graduate level, despite the recent increase in numbers of graduates in Chemistry and related subjects, a high proportion do not enter graduate level posts within industry.

It would appear from these facts, that despite a steady flow of graduates, many are not seeking employment in the industry, *or* hold qualifications not acceptable to employers and are therefore not deemed to have the required attributes. Indeed, the North West research study indicated that 60% of companies in the region reported that it was "difficult" to recruit at graduate level, despite having no shortage of applicants. Evidence derived from the Cogent Stage 2 "Assessment of Current Provision" shows that the numbers of options available for those studying chemistry and chemical industry related subjects is vast – more that 400 variations of "Chemistry with.." undergraduate offerings. In "Skills for the 21st Century", it is noted that the required levels of practical competence in analytical methods is a cause for concern. This was again highlighted in the recently published Society of

Chemical Industry members' survey (*Strategic Chemistry based science education into the 21st century, April 2006*), which emphasised the lack of match between breadth of study opportunities and the employability of those graduating. Amongst employers, a preference for experience over qualifications has emerged.

The move towards more industry focus on higher added value products (those sold on the basis of performance) will drive up the need for research and development, which will translate into a need for high calibre graduates, to prevent the loss of R&D facilities to other countries. The industry view is that such graduates emerge from only a limited selection of the provision on offer.

Latest information from the 2005 R&D Scoreboard (DTI) shows that R&D spending has decreased by 0.5% among the 750 UK companies included on the scoreboard. This is not a uniform decline, with foreign-owned companies reducing spend by 3%, and UK listed companies increasing spend by 1%. The bulk of the decline in spend can be attributed to just six companies (4 UK listed, 2 foreign-owned).

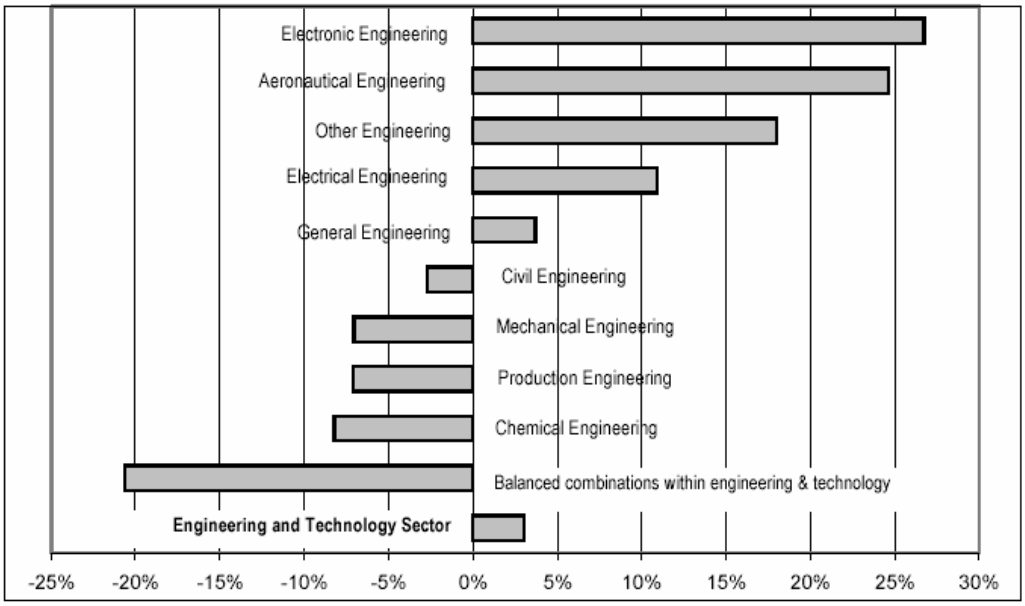
In conclusion, the case is more of an overabundance (breadth) of provision for Chemistry rather than a need for expansion. The provision most suited to employer need already exists, albeit with a level of concern related to practical competence. The expansion of "Chemistry and…" provision has lead to confusion among employers on the skills levels expected of graduates, and the benefits or detrimental results of this dilution of chemistry as a subject in its own right.

2.1.1.2 Engineering and technology

For engineering disciplines (see Figure 4 for further illustration of areas of study included in this category), the decline in entrants for Engineering and Technology should be considered in the context of rising participation in higher education – more people are accessing higher education in general, but there is a growing gap in those choosing E&T subjects. Since 1996, E&T numbers have fallen by 5%, whereas student numbers have risen by 34%. As a direct comparison, Engineering students made up 12% of the cohort in 1996 – by 2001 this had fallen to 6%.

This trend is of great concern to employers, who are already highlighting existing difficulty in recruiting engineers, and forward projections showing an increasing demand for skills in this area. It is further complicated by the field of engineering being studied, with some faring better than others (see figure 4).

Figure 4: Percentage change in Student Numbers, by Subject Area; 1998/1999 to 2001/02



Source: HESA/SEMTA

The latest available data from UCAS indicates that this downward trend for Production Engineering has continued through to 2005, however there has been some upward movement for both Mechanical and Chemical Engineering.

2.1.2 Vocational Provision

The availability of provision in the vocational area is much more focused, with only a limited number of HNC/HND opportunities. In the past, these have been valued by employers as a route into the industry or as a means of developing current employees. In the main, that is still the case. Employers have noted that some provision needs updating to reflect changes in technology and working practices. There is little or no obvious support for the introduction of foundation degrees to replace such provision; however initial research has shown that this is due more to lack of knowledge than actual evidence based opinion.

The numbers accessing HNC and HND courses are low, given the industry drive towards process and productivity improvement. A single foundation degree has been developed in one location, with uptake meeting original anticipated numbers. The issue of transferability of such provision to other locations, and the overall suitability of such provision is being addressed out with the Sector Skills Agreement process.

At Levels 1 to 3, there is currently adequate (though limited) provision in terms of N/SVQs, Apprenticeships and vocationally related training and qualifications. As previously stated, there is an existing skills gap at these levels amongst current employees when qualifications are used as a proxy for skills. This does not mean that employees do not have the skills to carry out their jobs – it means that they are not recorded as having qualifications at the level specified for the role, and therefore *may* not have the required skills and underpinning knowledge.

For employers, this means that there is potential to expand currently available opportunities, such as apprenticeships, to meet expected demand. From the supply side, the capacity exists to meet current demand, and could be expanded in line with future demand. The industry target is to have at least 65% of the workforce at Level 3 or above. This encompasses provision related to a number of occupational groups, including operators and technicians. Evidence derived from the North West study found only 48% were at Level 3 and above. An employer survey carried out by Catalyst Consultants for NWCI in 2002 estimated the employment base at 44,000, giving a potential number for an "upskilling programme" of approximately 7,500 in this region alone.

If this picture is extrapolated to encompass the UK wide industry, it shows that (using 2004 population estimates) in the region of 40,000 employees need to raise their skills level – that is an increase of 26% from those already skilled to Level 3 or above.

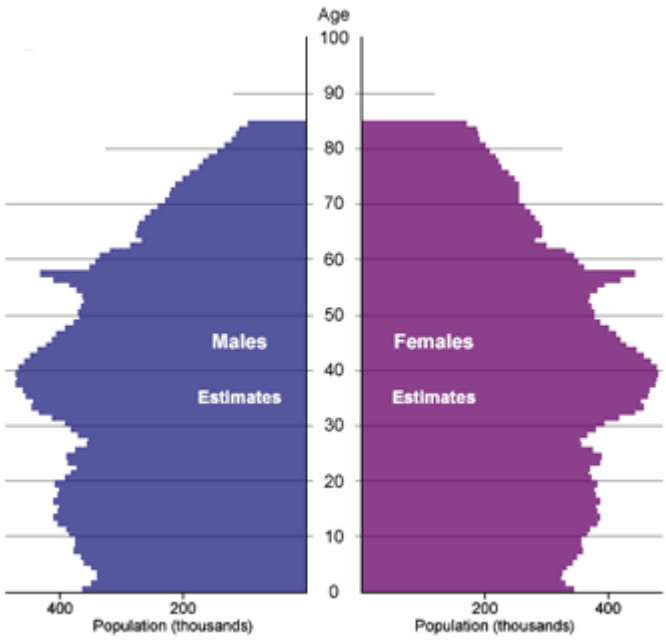
2.2 Pathways into the industry

Entry routes into the industry are many and varied, but there is no existing route mapped out to allow potential employees to compare their skills and attributes with those required for employment. There are also no benchmarks of suitable progression paths for existing employees. Mature entrants in particular may have difficulty in assessing their suitability and prospects. At the moment, the possible entry routes (with gaps in recognised benchmarks) are as shown in Figure 5.

For mature entrants in particular, there are no recognised short courses or programmes in place to add to the valued skill sets already held, allowing employers to build on these rather than starting afresh.

Figure 5: Population Estimate

population: by gender and age, mid-2004 Source: NOS



The demographics of the UK as a whole point to a need for industry to attract more recruits from the general population, as well as from school and further/higher education – the changes in the

working-age population will shift over the next five years, reflecting the lower numbers aged between 10 and 20, as shown in Figure 5 - school leavers will be fewer in number, coinciding with a need for industry recruitment to address replacement demand. The estimated recruitment demand for the whole Cogent footprint is predicted to be as shown in Table 3 – this takes no account of the industry indications of the requirement to up skill the workforce, therefore some of the quoted lower level occupations may need to be filled by new entrants at a higher skills level.

Table 3: Expansion/contraction and replacement demand for Cogent 2004 - 201

Employment levels (000s)	Net change	Replacement demands	Total requirement
Managers and senior Officials	2	24	26
Professional Occupations	0	13	13
Associate Professionals and Technical Occupations	-1	18	17
Administrative, Clerical and Secretarial Occupations	-5	18	13
Skilled Trades Occupations	-9	22	13
Process and Machine Operatives	-17	41	24
Elementary Occupations	-20	20	0
Total	**-50**	**156**	**106**

Source: Working Futures 2

The Chemicals industry is a key employer of Process and machine operatives (along with the Polymers industry) within the Cogent footprint, therefore it can be assumed that a substantial percentage of the required 24,000 will be aligned with vacancies in chemicals manufacturing. The only occupational area showing no requirement is at the lowest level, however it should be noted that, although the number of actual posts is expected to fall by 20,000, there is still a replacement demand of 20,000. If projected changes are not delivered through natural wastage, there may still be a need to recruit.

2.3 The existing workforce

The current workforce has been the subject of several recent studies, the most relevant being the work carried out by and on behalf of the Chemicals Innovation and Growth Team (2002).

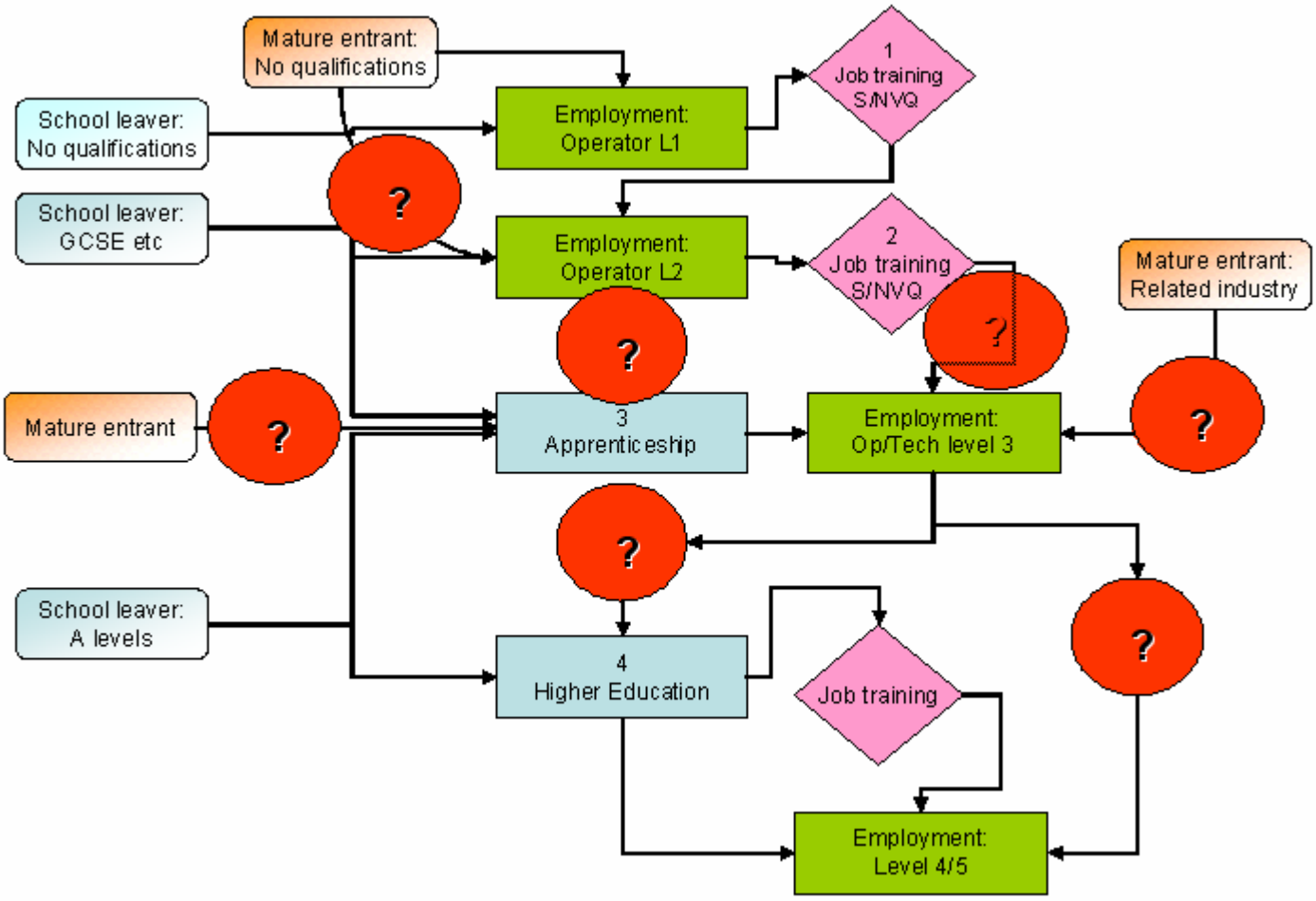
The current make-up of industry no longer matches the requirements for a sustainable and innovative future. Enhancement of skills of the current workforce is the top priority. This can only be achieved through delivery of a structured, unitised programme, accessible for companies of all sizes, and with the fiscal advantage promoted widely, to encourage full engagement.

The currently available range of training and education goes some way towards addressing needs, but is not readily understood by employers or employees. The delivery mechanisms are, in the main, dictated by external influences (such as fixed programmes for HNCs and HNDs, requiring block release, or S/NVQs available as whole programmes only) and are not necessarily work-friendly towards what is in part a continuous processing industry.

As shown in Figure 6, the route to higher level skills and knowledge for existing employees is unclear, and is addressed by employers in an ad-hoc manner. The larger employers may have in place in-house

(unaccredited) programmes, or may have brokered relationships with a bespoke provider, leading to fragmented and sporadic development.

Industry entry routes



1. S/NVQ in Process Operations L2
2. S/NVQ in Process Operations L3
3. MA in Chemicals Manufacture/Engineering etc.
4. HNC/D, BSc/BEng etc.

3. Analysing the gaps

3.1 Defining the issues

3.1.1 Entering the industry

Traditional entry routes to part of the industry have been long established – apprenticeship frameworks are in place and supported by a number of large employers. However, few opportunities are offered by smaller employers. Also, each of these works in isolation, albeit following the national frameworks.

Entry via post-compulsory education routes, such as HNCs and HNDs, does not appear to be attracting candidates other than those in employment (for example as an underpinning knowledge component of an apprenticeship). Nor is there any foundation degree currently in place offered as a full-time study opportunity. This highlights a potential lost opportunity to capture those leaving school and not wishing to either enter degree programmes, or to progress directly into employment. An alternative entry route via vocational provision is possible, but is not being embraced. The development of new courses and qualifications in this area, designed to meet the changing face of the industry, would close the gap in an alternative vocational route into the industry.

At graduate level, there is a surfeit of provision in terms of breadth, but a lack in terms of depth – more opportunities are available at chemistry-light undergraduate level than in standard single subjects, leading to employers being potentially faced with a plethora of qualifications of which they have little knowledge. The chemistry content is variable, but not apparent from titling. In addition, employers report the lack of business acumen and practical skills as being of concern.

The decline in numbers of engineering undergraduates, in the face of increasing student numbers, has already been recognised as a major issue. The attractiveness of careers and potential remuneration packages in this area is not being taken on board by prospective students, who may be going for perceived “easier options”.

This leads to an opportunity to focus on the provision that employers value and support, and to investigate further the promotion and support of these qualifications from both employers and stakeholders.

3.1.2 Continued development

There are very few industry-specific opportunities for development, and there is no clear route or benchmark in place to guide employers and employees. The larger companies tend to have in place management training schemes, CPD models, and extensive health, safety and environmental training programmes, but in many cases these are developed and delivered in-house, and receive no recognition from other employers and academia (i.e. they are not accredited, and have no recognition in qualifications frameworks). No distinctive interventions have been put in place to address the emerging skills needs in business improvement for current employees, to drive forward process and productivity improvement.

As previously alluded to, the HNC and HND provision which employers have stated as being valued, is not being accessed in sustainable numbers. For these to be supported by employers, they must be up-to-date, valid and valued, and to be supported by providers, they must have adequate entrants to remain on offer.

There is an opportunity to develop a clear training and qualifications route, with preferred qualifications tied clearly to progression within the industry. This requires direct input from both employers and providers, to ensure that a fully supported route in put in place, meeting, and adaptable to, the changing needs of industry.

The quantifiable skills gap in the current workforce shows a need to raise the skills of approximately 40,000 employees, from level 2 to levels 3 and above. It should also be noted that there is also a need to improve the skills levels of around 10 % of employees shown to have attainment at less than Level 1, where the number of jobs available at that level is practically zero.

An industry wide framework mapping progression through accepted training and development (linked to qualifications) would allow a clear pathway for the current workforce, delivered through programmes designed to meet the needs at both local and national level.

3.1.3 Working in the industry

Health and safety training is of paramount importance within all areas of the industry. However, this has not led to co-operation and sharing of best practice. Each company has developed or sourced training to suit its needs, without working with others to establish best practice and minimum levels of competence.

There is also a clear gap in qualifications at intermediate level, with a large number of operator/ technician roles at (in N/SVQ terms) skills Level 3, where there is evidence of the workforce holding only Level 2 qualifications. The employers push for upskilling needs to ensure that the qualifications currently in place will meet future needs, and can be delivered where and when required. Influence on content of vocational provision is already a reality, however direct input from employers at (re)design and development needs to be improved.

3.1.4 Conclusions

As with other areas of the Cogent footprint, the industry does not currently present a career of choice for young people – the diversity of opportunities is not readily recognised. It suffers from the same gender imbalance across most areas, with the exception of retail.

In order to address this, the industry needs to raise its profile, or the profile of skills related to science and engineering maintenance which would benefit the UK as a whole.

There needs to be recognition of the skills profile of the industry as a whole, clearly articulating the component parts (such as associated qualifications or competence measures) needed to achieve the desired long-term sustainable development and profitable growth.

At the moment, there is a disjointed set of qualifications, with, in general, low uptake by employers and prospective employees. Effort is required to accurately map the emerging needs of industry to the network of both public and private provision, followed by the implementation of a structured programme of training and development, delivered to industry agreed standards, with industry commitment to access via agreed routes, and wherever possible tied to units suitable for inclusion in accredited qualifications. This will provide, for the first time, a clear depiction of the workforce of the future, in terms of skills, knowledge and contribution to the business.

The use of external resources to maintain facilities, such as contractors brought on site to carry out shut-down maintenance, or an engineering resource bought in from another company to provide day-to-day maintenance, brings with it another set of challenges for the industry. The provision of training for this workforce lies with the company employing them, but their skills levels, and grasp of new technology has a direct bearing on the productivity and profitability of the industry. Employers in the Cogent footprint have expressed a growing concern regarding the currency of skills of this contracted workforce. Research carried out by ECITB has also highlighted the aging profile – this was confirmed in a limited study carried out by Cogent in 2005, where some occupations had an average age of more than 50. This workforce, itinerant in nature, does not readily fit into the Skills for Business Network – the occupational classifications are common across a number of SSCs, and the employers are not all in scope to ECITB. It may also have difficulty in accessing conventional training, for example apprenticeships ad S/NVQs are normally delivered in fixed locations.

The industry requires a well structured system of training and development, with participation from existing employees, in order to meet the already apparent skills gap at operator and technician level. Failure to address this gap will lessen industry's ability to meet expectations in productivity improvement.

Potential new entrants to the industry do not have a sufficiently clear picture of preferred skills profile, or opportunities for career development - unless this is addressed, other, perceived to be more attractive, opportunities will continue to be taken up.

4. Potential interventions

A full description of the issues, with potential interventions, has been prepared for consideration. This has been tested with industry groups and a small number of stakeholders prior to presentation to a wider audience. At the outset, a number of issues were presented to the Industry advising group, leading to the development of a more concise listing.

It has been presented for consultation purposes only, showing the issue, the potential intervention, and the anticipated stakeholder involvement. Geographical relevance has been shown in the end

Issue	Intervention	Stakeholder involvement	Geographical relevance
There is poor understanding of career pathways and opportunities, both for entry to and progression within the industry.	Development of a career progression route map and qualifications requirements.	Advisory Council, LSC, SQA, QCA, ACCAC, DEL, Careers Services (Careers Wales Association, Careers Scotland, Connexions etc.)	Whole U.K.
There is a lack of skills and knowledge required to make progress on process and productivity improvements.	Roll out the BIT (Business Improvement Techniques) training and qualifications and promote best practice.	LSC, ScotExec, WAG, DELNI, PICME, Training providers.	Whole U.K. Potential focus on North East, North West England, Central Scotland and South Wales
The number of apprentice technicians entering industry and contractor programmes will need to rise to meet industry forecast demand.	Confirmation of suitability of frameworks across the industry. Establishment of delivery model and funding models to meet employer needs.	LSC, ScotExec, ELWa (WAG), and national approval groups ECITB	Whole U.K.
Young people don't understand careers in the industry - it is not attracting a broad spectrum of applications for careers in the industry.	Development of up-to-date careers guidance and information for students and teachers. Promotion of role models. Development of interventions map, detailing all interventions with schools.	Careers Wales Association, Careers Scotland, Connexions etc. SCI, EBLOs	Whole U.K
There is no benchmark or framework for expected skill/ performance in roles at all levels.	Development and setting of benchmark for job roles (gold standard). Mapping and action planning to meet gaps in provision.	Advisory council PICME, Trade Unions, HSE, Accrediting Bodies, Awarding Bodies	Whole U.K.

Issue	Intervention	Stakeholder involvement	Geographical relevance
There is no common approach to the development of competence, i.e. competence management.	Creation of common competency model endorsed by industry and HSE, piloted regionally and then rolled out.	HSE, NEPIC, ONE (RDA)	North East England (pilot) Whole U.K.
The sporadic demand for contract support for shutdowns and turnarounds creates risk to productivity of industry.	Development of co-ordinated scheduling for major projects.	Other SSCs ECITB	Whole U.K.
There are health, safety and productivity risks associated with the lack of clarity of contractor skills and knowledge.	Development and introduction of a single national passport system and database for the chemical industry.	ECITB HSE, Trade Unions	Whole U.K.
Undergraduates and graduates entering the industry do not have business/practical skills acumen.	Work with FE and HE to influence course content.	UUK, Subject centres, HEFCE, HEFCW, SFC, DELNI	Whole U.K.